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Forecasting FTSE Index Using Global Stock Markets

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Abstract

Using data from July 1997 to July 2007, we examine if the FTSE index is affected by the past behavior of the DOW, DAX, NIKKEI, Hang Seng and Shanghai indices. We compare three different methods of estimating regression parameters. The results show that the FTSE lagged variable and the NIKKEI and DOW past performance are good indicators of the future performance of the FTSE. The models produce different predictive values but the effect of the variables is the same when examining the direction of the coefficients. Both the Newey-West OLS and GARCH models are better predictive models than the OLS with a standard error. The predictive power of the model increases as a result of allowing time varying variances.

Keywords: Spill-over, Newey-West, Co-movements, Stock Index

GEL Classification Codes: C52, G15, M49

1. Introduction

As world economies become more integrated, co-movements among international equity markets have become more evident (Chong, Wong and Yan; 2008). There are a number of reasons to expect integration. Examples often cited include the availability of information, round-the-clock trading and financial innovations. Tsouma (2007) show that the number of stock exchanges has increased and that established exchanges have expanded their activities. A substantial number of articles have addressed the issue of co-movements and spill-over effects but the results are not always consistent, especially over long-time periods and across different stock markets. Relying on the chronological order of trading and a careful definition of daytime and overnight returns, most studies confirm the existence of some form of co-movement, spill-over effect and, therefore, interdependence among leading global stock markets. The magnitude of the effects and the time period over which these effects exist are inconsistent (Baur and Jung, 2006). While research continues on the many aspects of co-movements and spill-over effects, there are three conclusions that researchers agree upon. First, existing research shows that some, but not all, stock markets are interdependent. Second, long-term relationships are for the most part non-existent (e.g. Fernandez-Serrano and Sosvilla-Rivero, 2001). Third, small changes in indices in the US, UK, Germany and Japan do not affect other indices (Hirayama and Tsutsui, 1998). There are also a number of trends in existing research. We observe that stock-market integration is progressive (Morana and Beltratti, 2008) and that a consistent theme is that the DOW is a good predictor of global indices but other global indices are not good predictors of the DOW (Note 1, 2). The exception to the general rule is the NIKKEI index, which we will discuss shortly.

In analyzing studies prior to 2000, a common methodological theme is the analysis of announcement effects in relationship to co-movements and spillover effects. A number of studies have analyzed how opening and closing prices are related (Note 3). Past studies have also examined the linkage between international indices, mostly focusing on the DOW in relationship to other global indices. A common finding in these studies is that US stock markets have a significant impact on Japanese equities. In one of the earlier studies; Becker, Finnerty and Gupta

(1990) found that S&P 500 one-day returns explained 7% to 25% of the fluctuations of the NIKKEI next day returns demonstrating that the US market greatly influences Japan. They were also able to show that up to 18% of the fluctuations in the overnight NIKKEI returns were attributable to the past performance of the US market. Evidence also suggests that the NIKKEI affects returns in some markets but not others. Using an impulse response functions, Chowdhury (1994) found that the response of the Hong Kong and Singapore stock markets to a shock in either the Japanese or US stock markets were absorbed within two days. Chong, Wong and Yan (2008) found that studies using recent data reveal additional evidence of transmission from the US to the Japanese markets. Using Japan as the core country of their analysis, they concluded that the Japanese stock market has a lead-lag relationship to other stock markets. In examining the synchronization of stock price movements, they found various lead-lag effects from the open-to-close return of stocks in Toronto, Paris, Frankfurt, London, Milan and New York Stock Exchange compared to the Japanese equity market. Chong et al (2008) also found that the NIKKEI index is well predicted by the movement of the FTSE Index. Regardless of the trigger level, the results revealed that the next day market performance in Japan can be predicted using signals from other markets. Focusing on markets other than Japan, Arshanapalli and Doukas (1993) found that the French, German and UK markets were not significantly related to the US markets prior to the stock market crash of 1987. Post-1987 results showed that these markets co-integrated significantly with the US stock market. Focusing on short-term information transmission, Baur and Jung (2006) analyzed correlation and spillover effects between the DOW and the DAX. They found that foreign daytime returns can influence overnight domestic returns. The effect was more pronounced in Germany. Johansson and Ljungvall (2009) showed spillover effects among the Chinese, Hong Kong and Taiwanese stock markets although there were no clear long-term interdependencies. Interestingly, the Taiwanese and Hong Kong markets influence the mainland Chinese markets but the Chinese market does not influence the other two markets. We conclude that existing research shows that markets are integrated but that level of integration requires further study.

There are at least four important reasons why the examination of market integration is important. First, international portfolio diversification depend on less than perfect co-movements and spill-over effects. Second, progressive integration implies increased market volatility. Third, a shock in one market is likely to have a pronounced effect in other markets suggesting that different hedging behaviors are needed. Fourth, market shocks are likely to have a larger global effect than previously. In this study, we examine the effect of the lagged indices of DOW, DAX, NIKKEI, Shanghai, HangSeng on the lagged FTSE index. To deal with some methodological issues encountered in many studies, we also examine three different methods of estimating regression parameters: (1) the OLS model with the standard error; (2) the OLS model with the Newey-West standard error, and (3) the GARCH model. Below, we discuss the models followed by a discussion about their application.

Many studies use OLS although it is well known that it yields inconsistent estimates if used in combination with lagged variables and correlated errors (Stocker, 2006). In addition, a standard OLS model has several assumptions that need to be met in order for the model to be valid. The residuals, μ_t, should be normally distributed with zero mean and constant variance (no heteroscedasticity). Financial data is known to be leptokurtic resulting in fat tails (Boyer et al, 2003). In addition; the error terms, μ_t, should be uncorrelated. If the error term μ_t is auto-correlated, then OLS is consistent, but in general the OLS standard errors for cross-sectional data are not (Stock and Watson, 2007). Finally, the independent variables should not be highly correlated, thus avoiding multicollinearity. Using Newey-West standard errors, we correct for issues of unspecified heteroscedasticity and autocorrelation (HAC). A Newey-West estimator reduces the frequency of over-rejection (Su, 2008) and produces robust results (Park, 2005).

The ARCH process introduced by Engle (1982) allows the conditional variance to change over time as a function of past errors leaving the unconditional variance constant (Bollerslev, 1986). In response to Engle, Bollerslev (1986) introduced the GARCH method, which is an extension of the ARCH method by letting its own σ_t^2 depend on its lagged value. The GARCH model provides a better fit than the ARCH model since it uses a declining lag structure similar to Engle and Kraft (1983).

Our study examines if global indices have an effect on the percent change (return) of the FTSE based on analyzing past performance of five global indices. We also examine different methods of regression to predict the FTSE index. A commonly used method is the OLS regression model. As we discussed previously, several assumptions of the OLS model are regularly violated and the models also ignores much of the relevant information (Morana and Beltratti, 2008). If the assumptions of the OLS model are ignored, a Type 1 error is significantly more likely to occur. In reality, this means that the standard error and hypothesis testing may be inaccurate and therefore cause a Type 1 error. To deal with this issue, we also include a second OLS model with a Newey-West standard error. This method adjusts for the inaccuracies of the OLS standard error and hypothesis testing that is commonly encountered when using financial time series data. The GARCH model is the last of the three regression models evaluated in this study. It allows the variance to change through the regression model. Using the GARCH model, we relax several

assumptions of regression models dealing with normality, linearity, and homoskedasticity. Therefore, our study also enhances the literature by incorporating different regression methods in testing and subsequent analysis.

Examining the results of the OLS and the Newey-West error term models, we note that they show similar results, i.e. that the past performances of the lagged FTSE, the NIKKEI and the DOW appear to be good indicators of future performance of the FTSE. The GARCH model also produces similar results. Using ANOVA, we show that the standard errors of the models are different from each other. The results suggest that there is a difference in the predicted values using each technique leading us to state the following. First, we predict that global indices will have an effect on the future performance of the FTSE. Second, we predict that the different regression models will show different results. We now turn our attention to discussing the details of our methodology and we provide an in-depth discussion of the results.

2. Methodology

This study uses 2608 daily observations from DATASTREAM for each international index during the period of July 1997 to July 2007. The variables are tested for normality (Skewness, Kurtosis), linearity (Graphs), and correlation (Correlation Matrix) between the dependent and independent variables before regression parameters are estimated. The dependent variable is the UK FTSE index and the independent variables are the US DOW index, the Japanese NIKKEI index, the Hong Kong HANG SENG index, the SHANGHAI index (China) and the German DAX index. We use the percent change (return) for each of the indices to standardize the data across all indices. We transform the daily index by the natural logarithm for each day, then subtracting the past day return from the current day return to obtain the percent change (return) of daily index values. Using the natural logarithm of the indices helps ensure that the data meets the assumption of linearity, an important issue when using different multiple regression models.

As we discussed previously, it is well known that financial time series data do not follow many of the assumptions in linear multiple regression (Gungor and Luger, 2009). We use three different regression methods in our study: (1) the OLS model, (2) the OLS model with a Newey-West error term, and (3) the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model. The regression model has a lagged variable of the dependent variable making it an autoregressive model. We now discuss the models. The regression model states:

$$FTSE_t = \beta_0 + \beta_1 FTSE_{t-1} + \beta_2 DAX_{t-1} + \beta_3 NIKKEI_{t-1} + \beta_4 DOW_{t-1} + \beta_5 HangSeng_{t-1} + \beta_6 Shanghai_{t-1} + \mu_t$$

- $FTSE_t$ is the present day percent change for the FTSE index,
- β_0 is the intercept,
- $\beta_1 FTSE_{t-1}$ is the lagged variable of the FTSE percent change of the FTSE index,
- $\beta_2 DAX_{t-1}$ is the lagged variable of the DAX index,
- $\beta_3 NIKKEI_{t-1}$ is the lagged variable of the NIKKEI index,
- $\beta_4 DOW_{t-1}$ is the lagged variable of the DOW index,
- $\beta_5 HangSeng_{t-1}$ is the lagged variable of the Hang Seng index,
- $\beta_6 Shanghai_{t-1}$ is the lagged variable of the Shanghai index, and
- μ_t is the error term of the regression model.

The difference between the OLS model and the Newey-West model is the treatment of the standard error. The standard error for both of the models is calculated as follows:

$$SE(\hat{B}_1) = \sqrt{\hat{\sigma}^2_{B_1}}$$

where the variance is calculated as:

$$\hat{\sigma}^2_{B_1} = \frac{1}{n} * \frac{\frac{1}{n-2}\sum_{i=1}^{n}(X_i - \bar{X})^2 \hat{\mu}_i}{\left[\frac{1}{n}\sum_{i=1}^{n}(X_i - \bar{X})^2\right]^2}$$

The difference between the two models is the inflation of the variance with the heteroskedasticity and autocorrelation consistent estimator of the variance of $\hat{B}_1$ is:

$$\tilde{\sigma}^2_{B_1} = \hat{\sigma}^2_{B_1} \hat{f}_T$$

where $\hat{\sigma}^2_{B_1}$ is the estimator of the variance of $\hat{B}_1$ in the absence of serial correlation. The $\hat{f}_T$ is an estimator of the factor f_T (Stock and Watson, 2007). Let $\hat{f}_T$ is defined as Newey-West variance estimator:

$$\hat{f}_T = 1 - 2\sum_{j=1}^{m-1}(\frac{m-j}{m})\tilde{p}_j$$

where $\tilde{p}_j = \sum_{t=j+1}^{T}\hat{V}_t\hat{V}_{t-j}/\sum_{t=1}^{T}\hat{V}_t^2$ where $\hat{V}_t = (X_t - \bar{X})\hat{\mu}_t$ (as in the definition of $\hat{\sigma}^2_\beta$). The parameter m is called the truncation parameter of the HAC estimator (Stock and Watson 2007).

The GARCH model mean equation is stated as:

$$FTSE_t = \beta_0 + \beta_1 FTSE_{t-1} + \beta_2 DAX_{t-1} + \beta_3 NIKKEI_{t-1} + \beta_4 DOW_{t-1} + \beta_5 HangSeng_{t-1} + \beta_6 Shanghai_{t-1} + \mu_t$$

- $FTSE_t$ is the present day percent change of the FTSE index,
- β_0 is the intercept,
- $\beta_1 FTSE_{t-1}$ is the lagged variable of the FTSE percent change of the FTSE index,
- $\beta_2 DAX_{t-1}$ is the lagged variable of the DAX index,
- $\beta_3 NIKKEI_{t-1}$ is the lagged variable of the NIKKEI index,
- $\beta_4 DOW_{t-1}$ is the lagged variable of the DOW index,
- $\beta_5 Hang Seng_{t-1}$ is the lagged variable of the HangSeng index,
- $\beta_6 Shanghai_{t-1}$ is the lagged variable of the Shanghai index, and
- μ_t is the error term for the regression model.

The first method is Ordinary Least Squares (OLS), which if unbiased, is consistent, has a variance that is inversely proportional to n, and has a normal sampling distribution when the sample size is large (Stock and Watson, 2007). Serial correlation may present itself when using a lagged variable of the dependent variable. This issue causes autocorrelation or heteroskedasticity with the error term. If this is the case, the coefficient estimators are consistent but OLS standard errors are not, resulting in misleading testing and confidence intervals (Stock and Watson, 2007). This leads us to the OLS with Newey-West error term models. The Newey-West error term adjusts for heteroskedasticity and autocorrelation in the regression model. The Newey-West error term OLS model replaces the standard error with an HAC error term, which makes the method more appropriate for financial time series data.

The GARCH model is the third model that we examine and it allows for a time-changing variance. It accomplishes this by letting the error, μ_t, being normally distributed with mean zero and variance σ_t^2 depend on past squared values of μ_t and letting the σ_t^2 depend on its lagged value (Stock and Watson, 2007).

$$\sigma_t^2 = \alpha_0 + \alpha_p \mu_{t-p}^2 + \phi_1 \sigma_{t-1}^2 + ... + \phi_q \sigma_{t-q}^2$$

Based on the previous discussion, we examine the error term of each model and tests if the means are similar. To test the model errors to evaluate if the means of the error are similar, we use ANOVA (Note 4). We test the difference between the OLS and the Newey-West model by comparing the standard error of the predicted values. The GARCH model will have different predictive values since it produces different coefficients. We are, therefore, able to compare the predicted values of the GARCH model and the predicted values of the OLS and OLS Newey-West standard error models. The results are then analyzed against each other using a one-way ANOVA test.

3. Results

In this section we discuss the results beginning with descriptive statistics, which are shown in Table 1 (Note 5). Each variable is examined in terms of the aspect of normally distributed skewness and kurtosis values. If a variable has a long right tail, the skewness value will be positive, and if the variable has a long left tail, the skewness value will be negative. The normal kurtosis value is 3 suggesting that if a variable have a number greater then 3, the distribution will have a substantial peak, and if the value is less than 3, the distribution will be flatter.

Insert Table 1 Here

Evaluating the FTSE return variable shows a left tail distribution with a value of -.101, as well as a substantial peak (5.678). The FTSE return lag variable has a skewness value of -.102 and a kurtosis value of 5.675 indicating that it has a left tail and a substantial peak. The DAX Return lag variable has a skewness of -.106 showing a left tail

distribution. The kurtosis value of 5.825 shows a distributional peak. The variable NIKKEI Return lag has values of -0.030 showing less of a left tail and a kurtosis value of 5.228. The DOW return lag has a skewness value of -.117 showing a left tail distribution and a kurtosis value of 7.398 indicating a substantial peak in the distribution. The HANG SENG return lag variable shows a peak in the distribution with a kurtosis value of 16.500 and a right tail skewness value of .501. The SHANGHAI return lag has a right tail distribution with a skewness value of .191 and a peak in the distribution with a kurtosis value of 8.833. Evaluating the variable as a whole, it shows a substantial peak in the distribution with no kurtosis value less than 5.1. We conclude that variables are skewed and that the kurtosis values are more extreme.

Insert Table 2 Here

To evaluate the linearity of the independent variables and to perform a comparison with the dependent variable, the variables were graphed against each other (see table 2). The FTSE, DAX, NIKKEI, DOW, and SHANGHAI return lag variables all show some linearity toward the dependent variable. The HANG SENG return lag shows no linearity towards the dependent variable. The evaluation of the substantial linearity of the variables shows that only the DOW return lag has a substantial linear relationship with the FTSE Return. This result is expected in time-series data. We now examine the results of the correlation matrix.

Insert Table 3 Here

An examination of table 3 shows the highest correlated variable of the FTSE return is the DOW return lag variable with a correlation of 0.270. There is concern that the DOW return lag variable is also highly correlated to the FTSE return lag and the DAX return lag variables, which may indicate that multicollinearity is present. HANG SENG is also highly correlated to the FTSE return lag, DAX return lag, and the NIKKEI return lag variables. Similarly, this may cause multicollinearity in the regression model. Finally, the DAX return lag is highly correlated to the FTSE return lag variable. Highly correlated independent variables suggest over-estimation of the regression model.

Insert Table 4 Here

Table 4 shows the regression results. The results from the OLS model show an F-statistic of 47.02 indicating that the overall model as being statistically significant at a .000 level. The Adjusted R^2 value is low at .0958. Examining the regression coefficients of the OLS model, the FTSE return lag has a coefficient of -0.0028 showing that with every unit increase in the past FTSE return, the future FTSE return will decrease by 0.012. This is statistically significant (t-value of -3.59). The DAX return lag has a statistically insignificant coefficient of -0.035. The NIKKEI return lag has a coefficient of -0.055, showing that with every unit increase the future FSTE return will decrease by 0.055. This is statistically significant (t-value = -3.29). The DOW return lag has a coefficient of 0.362 showing that with every unit increase, the future FTSE return will increase by 0.362. The result is highly significant (t=16). The HANG SENG return lag and the SHANGHAI return lag coefficients are statistically insignificant (Note 6).

The results from the OLS model with the Newey-West standard error shows that the overall model is statistically significant at the .000 level (F-statistic = 28.58). Examining the regression coefficients of the Newey-West model, the FTSE return lag has a coefficient of -0.102, showing that with every unit increase in the past the FTSE return and the future FTSE Return will decrease by 0.102. This is statistically significant (t= -2.55). The DAX return lag is statistically insignificant. The NIKKEI return lag has a coefficient of -0.055 suggesting that with every unit increase the future FSTE return will decrease by 0.055. The results are statistically significant (t=-2.61). The DOW return lag has a coefficient of 0.362. The result is highly statistically significant (t=12.2). The HANG SENG return lag and the SHANGHAI return lag coefficients are statistically insignificant.

The evaluation of the GARCH model shows a highly significant χ^2 value, which is statistically significant at the .000 level. Examining the regression coefficients, FTSE return lag has a coefficient of -.072, showing that with every unit increase in the past FTSE return the future FTSE return will decrease by .072. The result is statistically significant (t=-2.71). The DAX return lag has a coefficient of -0.056, which is statistically significant (t= -3.05). The NIKKEI return lag has a coefficient of -0.036. This is statistically significant (t= -2.58). The coefficient the DOW return lag is 0.323, showing that with every unit increase, the future FTSE return will increase by 0.323. This is highly significant (t= 15.5). The coefficients of the HANG SENG return lag and the SHANGHAI return lag are insignificant.

The results from all three of the regression models have supported our first prediction showing the global indices have an effect on the future return of the FTSE index. Not all indices affect on the future return of the FTSE index, however. Discussing the results from the OLS and Newey-West tests; the FTSE return lag, DAX return lag, and DOW return lag have a statistically significant effect on the future return of the FTSE. The HANG SENG return lag, NIKKEI return lag, and the SHANGHAI return lag are not statistically significant in predicting FTSE future returns.

The GARCH model show similar results supporting our first prediction that the performance of some past global indices has a statistically significant effect on future FTSE index returns.

Insert Table 5 Here

We use ANOVA to test for statistically significant differences between the standard error of the OLS model and the Newey-West model. Table 5, Panel A shows a statistical difference between the mean of the two models. The F-static of 220.62 is statistically significant at a .000 level. The results support the prediction that the different regression model will produce different results. The difference between the OLS and Newey-West is the treatment of the standard error. In the Newey-West model, the standard error is inflated, which reduces the t-statistic resulting in a lower likelihood of a Type 1 error. We also used ANOVA to test if there is a significant difference between the predicted values of the GARCH compared to the predicted values of the OLS models. Evaluating the results in Table 5, Panel B, there is a statistically significant difference between the predicted values of the GARCH and the OLS model with an F-static of 9.452, which is statistically significant at a .000 level. This result also supports the second prediction showing that there is a difference between the OLS and GARCH models.

4. Discussion

The results support both predictions that we test in our study. When analyzing the effect of global indices, three results show that past performance of the two indices and in the case of the GARCH model, three indices have an effect on FTSE returns. The lag variable of the FTSE is statistically significant but the negative coefficient suggests that past behavior of the FTSE has a negative effect on the future return of the FTSE. This is an interesting finding since it suggests that a positive FTSE index performance does not carry forward. On the other hand, the results also suggest that a negative return will carry a positive reaction towards the future price of the FTSE index. The DOW return lag has the most substantial effect towards the future return of the FTSE with the greatest t-value and highest coefficient. This is the only variable that has a positive effect on the future price of the FTSE. It shows that a positive return on the DOW will carry a positive return toward the future return of the FTSE. All three regression models support this finding. The other indices have a negative effect on the future price of the FTSE showing that a positive return will have a negative impact on the future returns of the FTSE index. In evaluating the regression models, is important to examine the results of the coefficients for the variables in each model. The three models all suggest the same coefficient direction for all variables, and that the GARCH model is different in the sense that the NIKKEI return lag is statistically significant. It is not statistically significant in the two other regression models. This is an important finding, because although the models produce different predictive values, the effect of the variables is the same when examining the coefficient direction. This study also shows that OLS under-estimates the standard error, thus increasing the likelihood of a Type 1 error while the Newey-West model reduces the possibility of a Type 1 error. Both OLS and the Newey-West model have similar predictive power because the coefficients of the betas are the same. The GARCH model, on the hand, not only helps in reducing the likelihood of a Type 1 error, but the predictive power of the model increases as a result of allowing time varying variances.

5. Conclusion

We offer two types of conclusions in this paper. First, this study supports the hypothesis that some international indices have predictive powers toward the future performance of the FTSE index. All three regression models support the main result. Our study also shows that the three regression models will provide different results concerning predictive variables but that all variables maintain the same direction of the coefficients. The results suggest that although the regression models are different, they do support each other's findings. Future studies should examine the different effects that other international indices have on the return of the FTSE. With constantly changing global capital markets, information is being processed and past along faster than ever. This could cause even smaller indices to have an effect on larger global indices, not only the other way around. This should be examined in future studies. Our study only covers a time frame of ten years, from July 1997 to July 2007. The results may not hold when evaluating different time frames. Second, the results show that the predictive power of the OLS and Newey-West models are similar but the Newey-West model is more efficient. Based on the results of our study, we conclude that OLS and Newey-West models should only to be used to explain results when dealing with time series data. With respect to predicting an outcome, a GARCH model should be used.

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Notes

Note 1. Many studies use the US as the core country.

Note 2. Becker, Finnerty and Friedman (1995) argued, based on reactions of UK traders to US announcements, that the two markets are linked. While we refer to these articles in our paper, we argue that tests similar to Becker et al (1995) are not direct tests of integration, co-movements and spillover effects. Rather, they are tests of consistent trader behavior across markets implying market integration.

Note 3. Becker, Finnerty, and Gupta (1990) found that there is no linkage between the open and closed returns of the US markets.

Note 4. Note that the OLS and the Newey-West error term naturally will have the same predicted value because the coefficients do not change. It is only the standard error that changes.

Note 5. We use one-time lagged indices (t-1) of independent variables to forecast the FTSE (t). This approach does not take into account national holidays and time-zone bias, if any.

Note 6. We apply an arch test for heteroskedasticity and the Durbin-Watson alternative test for autocorrelation. The results of the arch test show a chi-square value of 134.98, rejecting H_0 that there is no arch effect. The results for the Durbin-Watson test also show a chi-square value of 19.392, rejection H_0 that there is no serial autocorrelation. OLS assumes that the error variance is constant and that the error terms are independent. These results suggest that the OLS coefficients may be inefficient and biased, which is why we employ Newey-West and GARCH methods.

Table 1. Descriptive Statistics

Variable	Mean	Std. Dev.	Skewness	Kurtosis
FTSE Excess Return	0.0000127	0.0112889	-0.1011822	5.678615
FTSE Excess Return Lag	0.0000172	0.0112906	-0.1020578	5.675576
DAX Excess Return Lag	0.0002433	0.0158327	-0.1064937	5.825191
NIKKEI Excess Return Lag	0.0000346	0.0140197	0.0307086	5.228309
DOW Excess Return Lag	0.0001459	0.0108305	-0.1176092	7.397954
HangSeng Excess Return Lag	0.000184	0.0165701	0.5017384	16.50039
Shanghai Excess Return Lag	0.0005568	0.0144491	0.1915438	8.833616
Total Observations: 2608				

Table 2. Graph of FTSE Independent Variables
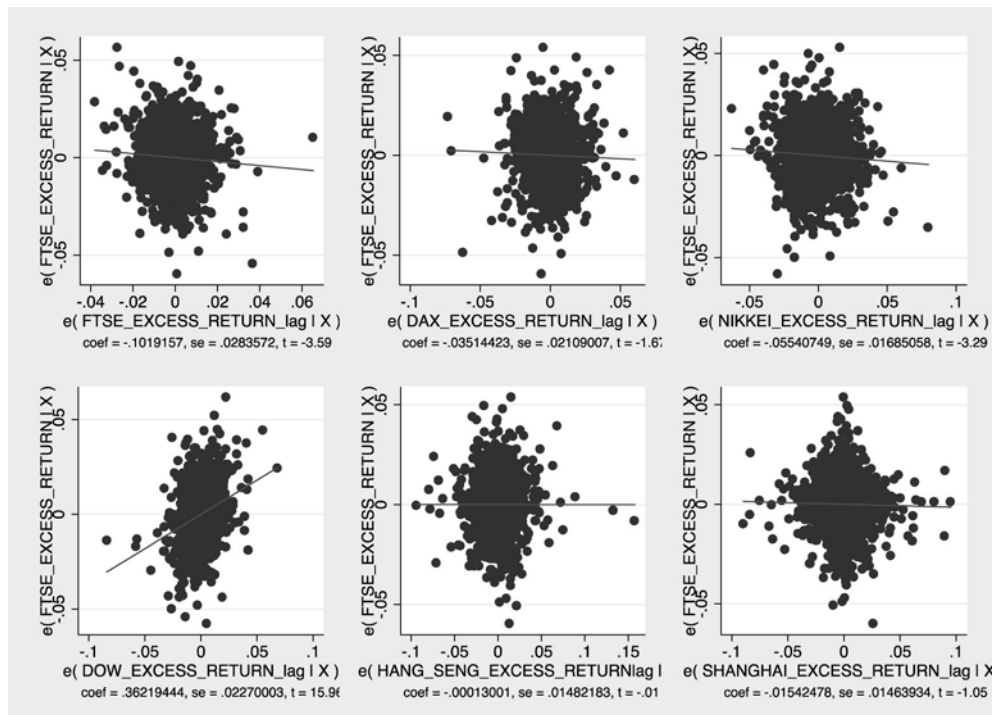
Table 2 shows the linear relationship between the dependent and the independent variable (independently). The FTSE, DAX, NIKKEI, DOW, and SHANGHAI return lag variables all show some linearity toward the dependent variable. The HANG SENG return lag shows no linearity towards the dependent variable. The evaluation of the linearity of the variables shows that only the DOW return lag has a substantial linear relationship with the FTSE Return

Table 3. Correlation Matrix

		1	2	3	4	5	6	7
1	FTSE Excess Return	1						
2	FTSE Excess Return Lag	-0.0064	1					
3	DAX Excess Return Lag	0.0371	0.7428	1				
4	NIKKEI Excess Return Lag	-0.0638	0.2456	0.2228	1			
5	DOW Excess Return Lag	0.2707	0.428	0.5107	0.1215	1		
6	HangSeng Excess Return Lag	-0.0369	0.3377	0.3222	0.4433	0.1322	1	
7	Shanghai Excess Return Lag	-0.0286	-0.0204	-0.0044	0.0547	-0.0211	0.0916	1

Table 4. Regression Results

	OLS Model			Newey-West Model			GARCH Model		
Variables	Coefficients	Std. Error	t-statistic	Coefficients	Std. Error	t-statistic	Coefficients	Std. Error	t-statistic
Intercept	-0.000019	0.000210	-0.09	-0.000019	0.000211	-0.09	0.000259	0.000157	1.65
FTSE Excess Return Lag	-0.101916	0.028357	-3.59	-0.101916	0.040041	-2.55	-0.072516	0.026720	-2.71
DAX Excess Return Lag	-0.035144	0.021090	-1.67	-0.035144	0.030570	-1.15	-0.056286	0.018471	-3.05
NIKKEI Excess Return Lag	-0.055408	0.016851	-3.29	-0.055408	0.021196	-2.61	-0.036234	0.014021	-2.58
DOW Excess Return Lag	0.362194	0.022700	15.96	0.362194	0.029686	12.2	0.323260	0.020858	15.5
HangSeng Excess Return Lag	-0.000130	0.014822	-0.01	-0.000130	0.017495	-0.01	-0.008448	0.012659	-0.67
Shanghai Excess Return Lag	-0.015425	0.014639	-1.05	-0.015425	0.014465	-1.07	-0.012697	0.010194	-1.25
F-Values / Chi(2)	47.02			28.58			258.58		

Table 5. ANOVA Results

Panel A: Standard Error OLS/Newey-West					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.000015011	1	0.000015011	219.47	0
Within Groups	0.000356616	5214	6.8396E-08		
Total	0.000371626	5215			
Panel B: Predict OLS/GARCH					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.000094417	1	0.000094417	8.57	0.0034
Within Groups	0.057473467	5214	0.000011023		
Total	0.057567884	5215			

Factors Influencing Levels of Corporate Social Responsibility Disclosure by Libyan Firms: A Mixed Study

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Abstract

This paper explores whether company age, industry type and company size have a potential influence on levels of Corporate Social Responsibility Disclosure (CSRD) in the annual reports of Libyan companies. In this study quantitative and qualitative methods were used to collect data to determine the level CSRD in Libyan firms. Hypotheses are tested using regression analysis on a sample of 40 annual reports from Libyan companies' from 2007 to 2009. In addition, thirty one of the financial managers and information managers express their perceptions about the determinants of CSRD in Libya. The quantitative findings reveal that there is a positive relationship between company age and industry type and the level of CSRD. The qualitative findings show a positive relationship between all factors influencing levels of CSRD used in this study and level of CSRD in Libyan companies.

Keywords: Corporate Social Responsibility (CSR), Corporate Social Responsibility Disclosure (CSRD), Stakeholder theory, Annual report, Company Size, Company age, Industry type, Libya

1. Introduction

CSR refers to a company's voluntary contribution to sustainable development which goes beyond legal requirements (Gamerschlag et al., 2010). During the last 10 years, there has been a growing public awareness of the roles and responsibilities of corporations in society (Hackston & Milne, 1996). While companies have been credited with contributing to economic and technological progress, they have also been criticised for creating social problems. Therefore, companies have started to engage in CSR activities and corresponding disclosure of these activities. At present, there are many large and older companies in particular that invest a great deal of effort and money to disclose information on their CSR performance. In this context, contribution and disclosure vary across industry sectors (Gray et al., 2001; Gray et al., 1995; Hackston & Milne, 1996; McGuire et al., 2003; Waddock & Graves, 1997). For example, companies in the oil sector are more focused on environmental issues, while companies in the food sector are involved more in community, health and food related CSR activities.

Previous studies on CSR, are characterised by three kinds of empirical research (Reverte, 2009). Firstly, there are 'descriptive studies' which report on the extent and nature of CSR with some comparisons between countries and periods. Secondly, 'explicative studies,' focus on the potential factors influencing levels of CSR reporting. Thirdly,

there are studies on the effect CSR information has on various users with an emphasis on market reaction. This study is explicative, as it analyses whether company size, company age and type of industry are potential factors influencing levels of CSRD practices by Libyan companies.

This paper is focused on the Libyan context for the following reasons. First, most of the present literature is based on the United States and the United Kingdom and thus evidence should be added about other contexts. Second, there are no known empirical studies on factors influencing CSRD by Libyan companies. Third, there are limited studies, which attempted to explore and explain these factors in developing countries. Finally, in contrast to the comprehension of CSR from common law developing countries, the factors influencing levels of CSR in Arabic countries are still relatively unknown. Therefore, the purpose of this paper is to explore whether company characteristics (company age, industry type and company size) have a potential influence on levels of CSRD practices on annual reports as disclosure media by Libyan firms.

The next section sets out the literature review, theoretical framework and development hypothesis about this topic. Section 3 describes the research methods used which includes quantitative and qualitative methods. Section 4 presents the findings and the final section sets out the conclusions.

2. Literature Review

Major corporate ethical disasters impacting on the environment, human resources, and the community have heightened the demand for public firms to voluntarily disclose their corporate social responsibility (CSR) activities to stakeholders. As a result, corporate social responsibility has become an important issue in the business world (Waller & Lanis, 2009). In addition, CSRD is an extension of the financial disclosure system, which reflects the wider anticipation of society concerning the role of the business community in the economy. Furthermore, with the rapid collapse of cross-border economic barriers and the globalization of business, the role of CSR is being debated in an international arena (van der Laan Smith, Adhikari, & Tondkar, 2005). The World Business Council for Sustainable Development (WBCSD) (1998, p. 3) defined CSR as: 'the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large'. Also Mathews (1993) has defined social and environmental disclosure as: organisations voluntarily disclosing both quantitatively and qualitatively about their CSR activities in order to inform their stakeholders. Companies engage in CSR activities and its disclosure due to some motivations.

There are a number of motivational bases that explain the importance and benefits of company participation in CSR. These motivations are widely classified into strategic and altruistic (Lantos, 2001), positioning the economic motives and moral motives are considered as CSR involvement (Hillman & Keim, 2001; Joyner & Payne, 2002). Both scientific evidence (Margolis & Walsh, 2003) and consumer reaction (McWilliams & Siegel, 2001) have signalled to companies that engagement in CSR activities and its disclosure can be rewarded through improving company performance. In this regard, companies that engage in CSR activities and its disclosure can foster various stakeholder relations (McWilliams & Siegel, 2001), thus reducing the company's business risk (Boutin-Dufresne & Savaria, 2004). For these reasons, the strategic value of CSR is becoming increasingly recognized (Porter & Kramer, 2002).

On the other hand, a range of company-level attributes can influence company CSR participation, and understanding these effects is essential, as companies try to derive strategic value from CSR. One of these effects, the issue of company size is identified as both relative and vital but yet unexamined (Madden, Scaife, & Crissman, 2006). Adams and Hardwick (1998) indicate that CSR activities and CSRD can be affected by company size that can affect strategic motivation i.e. strategic motivation can have a positive impact on CSR and CSRD. As larger companies tend to have a bigger CSR impact, given the scale of their activities (Cowen Linda & Scott, 1987), larger companies are becoming increasingly aware of the importance and benefits of CSR and CSRD. Second, the issue of company age is also considered as an important factor that can affect levels of CSRD. Delaney and Huselid (1996) indicate that company age has a positive relationship with CSR and CSRD. Third, the issue of type of industry plays an important role in identifying the level of CSR activities and CSRD (McGuire, et al., 2003). For example, the level of CSR activities and CSRD differ from manufacturing sector to service sector (Kolk, 2003).

The majority of empirical studies on CSRD practices have focused on developed countries in particular the USA, the UK, Australia, Canada, Germany, Japan, New Zealand. Few studies have examined developing countries such as Malaysia, Singapore and Arabic countries (e.g. Libya, Egypt, Qatar and the UA). Most of the empirical studies into US practices have tended to employ the extensive survey evidence of Ernst and Ernst (1978), Guthrie and Parker (1990). Gray et al. (1987, 1995) provide survey evidence from the UK, with the later study including every year from 1979 to 1991. Surveys from Australia include Trotman (1979) and Guthrie (1983). Three surveys by Naser et

al. (2006) and Mashat (2005) have provided some descriptions of CSRD in developing countries such as Libya and Qatar. This paper builds on previous research in developing countries by using content analysis of annual reports and personal interviews with managers to identify whether there are factors influencing levels of CSRD in Libya.

3. Theoretical Framework

CSRD has been the subject of substantial academic accounting research. Gray et al. (1987, p. 4) define CSRD:

...as the process of providing information designed to discharge social accountability. Typically this act would be undertaken by the accountable organisation and thus might include information in the annual report, special publications, or even socially oriented advertising.

To that effect, there are a number of theories that have been used to interpret why companies voluntarily disclose CSR information in their reports. In a review of accounting research, theory development related to CSRD in general is fragmented and rudimentary (Maali, Casson, & Napier, 2006; Sadeghzadeh, 1995). The former effect is also identified with systems oriented theories such as legitimacy, agency theory, positive accounting, stakeholder and political economy theories (Deegan, 2002). In this context, the political and social contexts have been revealed to be major determinants of the decision to disclose CSR information (Roberts, 1992; Williams, 1999). While there are some similarities, the agency or positive accounting, legitimacy, and stakeholder theories essentially differ on the basis of fundamental assumptions. The agency or positive accounting theory makes the assumption of rational, wealth-maximizing individuals operating within the environment of efficient capital markets, while the stakeholder and legitimacy theories make no assumption of rationality. Woodward et al. (1996) have illustrated that a company is an important part of the wider social system in accordance with both stakeholder theory and legitimacy theory. Moreover, stakeholder theory suggests that some groups within the society are more powerful than others such as shareholders and employees, whereas legitimacy theory looks at society as a whole. The paper draws on Stakeholder theory and legitimacy theory to explain CSRD. Thus, the theoretical framework development here will incorporate both influences. The proposed model is presented in Figure 1 (see appendix 1).

Figure 1 explains the effects of company characteristics on CSRD using stakeholder theory. This model is based on the stakeholder's pressure in Libyan companies. First, stakeholders in large companies are more aware than small and medium companies about the importance of CSR activities for a company (H1:4). Large companies also tend to disclose more CSR information than small and medium companies. Moore (2001) and Branco and Rodrigues (2008), in particular, illustrated that amount of CSR disclosure in large companies is higher than smaller companies. Second, stakeholders in older companies have realized the role of CSR activities in improving a company's profits (H5:8). In addition, many studies found that the older companies provide more information about CSR activities than small companies. For instance, Delaney and Huselid (1996) revealed that company age has a major effect on levels of CSRD. Finally, the interests of stakeholders vary from industry to other (H9:12). Some sectors tend to disclose more information about some categories of CSRD than others. For instance, the oil sector is higher disclosure in environmental categories than others, while the manufacturing sector is more disclosed about community, safety and health related to CSR categories. Therefore, it can be seen that, company size, company age, and type of industry play an important role to affect levels of CSRD through the stakeholder's pressure.

4. Development Hypotheses

There are a number of empirical studies that have examined the link between CSRD and influences on levels of CSRD (Branco & Rodrigues, 2008; Gray, et al., 1995; Murray, Sinclair, Power, & Gray, 2006; Richardson & Welker, 2001). The majority of these studies have found relations between CSRD and these factors (e.g. size, age, type of industry). The previous empirical studies relied on different theories (e.g. stakeholder theory, agency theory) to justify these relationships. Hence, in this paper, the researchers have used a multitheoretical framework in order to explain the differences in CSRD practices between listed firms. Next, the researchers discuss each of the explanatory factors used.

4.1 Company Size

Most empirical studies provide evidence that company size has an impact on the amount of CSRD (Branco & Rodrigues, 2008; Gao, Heravi, & Xiao, 2005; Gray & Bebbington, 2001; Haniffa & Cooke, 2005; Parsa & Deng, 2008). These researchers found a significant and positive association between company size and amount of CSRD. The findings clarified the importance of this relationship. In addition, large companies tend to disclose more CSR information than small and medium companies. Moore (2001) and Branco and Rodrigues (2008) illustrated that the amount of CSRD in large companies is higher than small companies, because stakeholders expect greater CSRD from large companies than small companies. Large companies are also more able than small companies to communicate their CSR activities to external stakeholders (Rettab, Brik, & Mellahi, 2009). Supporting that Cowen

Linda and Scott (1987, p. 121) illustrate that "Corporate size appears to have significant impact" and argue that "social disclosure are correlated to company size for the reason that large companies have more stakeholders who might have concerns about the social activities undertaken by the company". Furthermore, large companies have more diverse ownership, and thus higher agency costs which management will attempt to reduce by disclosing more voluntary information (Meek, Roberts, & Gray, 1995). Parsa and Deng (2008) indicate that a positive change in company size leads to positive and significant change in amount of CSR disclosure. However, some empirical studies found no relationship between size and amount of disclosure (Freedman & Jaggi, 1988; Roberts, 1992). They found that large companies tend to report environmental information if they have weak economic performance. Hence, the discussion above leads to the hypotheses that:

H1: There is a positive significant relationship between company size and level of environmental disclosure.

H2: There is a positive significant relationship between company size and level of consumer disclosure.

H3: There is a positive significant relationship between company size and level of community involvement disclosure.

H4: There is appositive significant relationship between company size and level of employee disclosure.

4.2 Company Age

A number of studies used company age as one of the most important factors that can affect level of disclosure, in particular CSRD (Delaney & Huselid, 1996; Rettab, et al., 2009; Xianbing Liu & Anbumozhi, 2009). Some studies revealed that there is a positive and significant relationship between level of CSRD and company age (Delaney & Huselid, 1996). They think that the older companies provide more information about CSR activities than small companies. For instance, Delaney and Huselid (1996) found a positive link between CSR information and company age. However, some studies found that there is a negative association between the amount of CSRD and company age. For example, Rettab et al. (2009) revealed a negative relationship between CSR and company age, while Xianbing Liu and Anbumozhi (2009) found a negative relationship between environmental disclosure and company age. Hence, the discussion above leads to the hypotheses that:

H5: There is a positive significant relationship between company age and level of environmental disclosure.

H6: There is a positive significant relationship between company age and level of consumer disclosure.

H7: There is a positive significant relationship between company age and level of community involvement disclosure.

H8: There is appositive significant relationship between company age and level of employee disclosure.

4.3 Type of Industry

Level of disclosure and activities in CSR categories largely depends on type of industry in a company (Waddock & Graves, 1997). For example, the manufacturing sector discloses more about community, safety and health related to CSR categories, while in the oil sector higher disclosure in environmental categories occurs. Therefore, type of industry plays an important role in determining amount of CSRD.

Several empirical studies have found a positive and significant relationship between CSRD and type of industry (Branco & Rodrigues, 2008; Cowen Linda & Scott, 1987; Gray, 2002; Newson & Deegan, 2002; Parsa & Deng, 2008; Wanderley, Lucian, Farache, & de Sousa Filho, 2008). The previous results of empirical studies indicate that level and type of disclosure is significantly different, when companies are from different industries. This difference refers to stakeholder's pressure (D. Patten, 1991) and regulation imposed on some industries (Dierkes & Preston, 1977). In addition to that, certain industries tend to disclose more CSR information due to their nature, and consumer-oriented firms are likely to exhibit more concern to demonstrate their social responsibility to their community, to enhance their image and increase profits (Cowen Linda & Scott, 1987). Hence, the discussion above leads to the hypotheses that:

H9: There is a positive significant relationship between industry type and level of environmental disclosure.

H10: There is a positive significant relationship between industry type and level of consumer disclosure.

H11: There is a positive significant relationship between industry type and level of community involvement disclosure.

H12: There is appositive significant relationship between industry type and level of employee disclosure.

5. Research Methods

The paper employs quantitative and qualitative research methods to collect and analyse data using a triangulation approach (Jick, 1979). The use of purely quantitative methods in social science have been criticised because they are

positivist and reductionist and therefore do not necessarily promote a good understanding of social constructs (Silverman, 2004). Quantitative methods are often treated as 'ad hoc procedures to define, count and analyse its variables' (Silverman, 2004, p. 13). It may not be adequate to obtain conclusive results by inferring that some directions of inquiry are meaningless because there are no statistically quantifiable answers (Patton, 1990). For instance, some outcomes inferred from statistical instruments alone may not be enough to explore and/or investigate some phenomena, nevertheless, these phenomena can often warrant further qualitative investigation (Hammersley, 1992). A purely positivist approach may thus exclude important information about the interrelationships between levels of CSRD and factors influencing of levels of CSRD. In this regard, the task of the social scientist is not only to gather facts and quantitatively measure how often certain patterns occur, but, also understand different constructs and interpret events with regard to the meanings people bring to them (Denzin & Lincoln, 2000). Therefore, the use of qualitative methods by the researcher in this paper supports the quantitative methods, allows a deeper understanding, and results in data being more reliable and trustworthy. In order to support the interpretation between the two methods (Creswell 2009; Somekh & Lewin 2005), mixed methods also enable the application of quantitative results to support the interpretation of qualitative results (Creswell 2009). Finally, mixed methods builds strong outcomes and avoid social bias (Gorard & Taylor, 2004; Johnson & Onwuegbuzie, 2004; Kreuger & Neuman, 2006).

5.1 Sample and Data Collection

The sample represents four different sectors. These sectors include (based on the classification presented by the Libyan Public Control Office) Manufacturing companies, service companies, banks and insurance companies, and mining companies. The four sectors were chosen in this paper, because they are considered the most important sectors in Libya (Mashat, 2005). The sample (population) for the current paper included 135 Libyan organisations across the four sectors. The sample encompassed 32 manufacturing companies, 8 mining companies, 20 banking and insurance companies, and 75 services companies.

For the quantitative analysis a three-year period from 2007 to 2009 was chosen for this paper. A final sample of 40 firms was collected [see tables 1 (appendix 2) and 2 (appendix 3)]. Annual reports were obtained for each of the years in a three year period from 40 companies. To overcome the barriers of secrecy in Libya which might affect the response rate, an approach similar to that of snowball sampling was adopted. The annual reports of this paper were collected through using the company web pages and/or by visiting the company office. Personal relationships were utilized to find contacts who could obtain the required annual reports.This means that the 40 companies included in the study12 (37.5%) were manufacturing companies, 1 mining company, 13 banking and insurance companies, and 14 were services companies [see table 1 (appendix 2)]. This paper also employed content analysis as a systematic method of categorising and analysing the content of texts. Company characteristics and levels of CSRD were collected from annual reports by using content analysis method.

For the qualitative analysis,, the paper gathered information using face to face semi-structured interviews with key internal stakeholders such as financial managers and information managers. In addition, knowledge gathered from consulting with other researchers in CSRD and literature reviews enabled the researchers to design an interview guide with common questions to ask the interviewees [see table 3 (appendix 4)].

This paper consists of the above mentioned 40 firms which data were collected from in the quantitative stage. Thirty one managers were interviewed to gain insights into their perceptions about the effect of company size, company age and type of industry on levels of CSRD. Data gathered from interviews with financial managers and information managers was recorded by a note and tape recorders to enable the researchers to gain deeper insights for the purpose of this research. The interviews took place between October 2010 and February 2011. The meetings were held in the manager's office.

5.2 Empirical Models

A number of empirical studies have used quantitative method which included statistical techniques to examine the relationship between levels of CSRD and factors influencing of levels of CSRD (Branco & Rodrigues, 2008; Gamerschlag, et al., 2010; Gray, Javad, Power, & Sinclair, 2001; Hackston & Milne, 1996; Reverte, 2009). The Reverte's study (2009) used the statistical analysis technique which included the use of linear regression models by Spanish Listed Firms to analyse the relationship between CSRD and each of the influencing factors of CSRD such as company size, industry sensitivity, profitability, concentrated ownership, international listing, media exposure, and leverage. The statistical analysis technique was also employed by Gamerschlag et al. (2010) to identify determinants of voluntary CSR disclosure in German firms. Company visibility, profitability, shareholder structure and relationship with stakeholders were utilized in the linear regression models as the influencing factors of CSRD in German firms. In addition, the Branco and Rodrigues study (2008) used linear regression to investigate whether

there is an association between international experience, company size, industry affiliation, environmental sensitivity and media exposure with CSRD in Portuguese Companies. The statistical analysis techniques which includes a linear regression is adapted to exmine the relationship between the factors in this study and levels of CSRD.

The purpose of multivariate regression was used to measure, explain and predict the degree of linkage among variables (Hair, Black, Babin, & Black, 2006). Therefore, this paper used the following regression models through SPSS program to examine the relationship between factors influencing levels of CSRD and CSRD as being proposed by the following multivariate regressions.

$$ENVD = \alpha + \beta_1 \text{ SIZE} + \beta_2 \text{ AGE} + \beta_3 \text{ INDTY} + \varepsilon \tag{1}$$

$$COND = \alpha + \beta_1 \text{ SIZE} + \beta_2 \text{ AGE} + \beta_3 \text{ INDTY} + \varepsilon \tag{2}$$

$$COMD = \alpha + \beta_1 \text{ SIZE} + \beta_2 \text{ AGE} + \beta_3 \text{ INDTY} + \varepsilon \tag{3}$$

$$EMPD = \alpha + \beta_1 \text{ SIZE} + \beta_2 \text{ AGE} + \beta_3 \text{ INDTY} + \varepsilon \tag{4}$$

Where CSRD represents the dependent variables (Environment (ENVD), Consumers (COND), Community involvement (COMD) and Employee (EMPD)), SIZE refers to the Size of the firm that was measured by the number of years since establishment in Libya as independent variable (Rettab, et al., 2009), AGE refers to the Age of the firm that was measured by total of assets as independent variable (Branco & Rodrigues, 2008), INDTY refers to the Industry type that was measured by a dummy variable that takes the value of "1" if a firm is in a manufacturing and mining sector, and the value of "0" if otherwise as independent variable (Elsayed & Hoque, 2010), and B is the coefficient of the independent variables.

5.3 Interview Analysis

Miles and Huberman (1994) approach was used to analyse the qualitative data. CSR activities were classified into four categories (employee commitment, community involvement, consumer and product and environment). Analysis of the qualitative data employed two stages. First, the researcher classified the interview content (transcript) into similar or different responses. Second, key, substantive points were identified and put into categories (Gillham, 2000). Identifying a code was the first analysis process with each transcript. Then all the transcripts were read more than one time by the researcher. At the same time, substantive statements related to the research focus were highlighted (Gillham, 2000; Marshall & Rossman, 1999). After a review of all the transcripts, tape recordings were reviewed in order to find any intonations and statements that required highlighting (Kamla, 2007). Statements from interviews were drawn from this stage, which involved further composition. Highlighted statements were allocated simple headings through derivation of a set of categories for the responses to each question (Gillham, 2000). These categories and headings were checked against the highlighted statements and any necessary amendments were made. The researcher repeated this procedure more twice to ensure that no categories and headings were missed (Hanafi, 2006). A matrix was prepared by analysing the transcripts and assigning each highlighted statements to a category (Gillham, 2000). In addition, the researcher maintained a second separate file to record the overall observations to enhance the meaning of the data for all interviews.

6. Results

6.1 Content Analysis of Annual Reports

This paper employed content analysis as a systematic method of categorising and analysing the content of texts. The form of content analysis analyses the CSRD of each category using a "yes/no" or (1, 0) scoring methodology. If there is information of subcategories (items), these subcategories will gain a score of 1, whereas a score of 0 will be awarded if no information subcategory is disclosed .The aggregate score for each company is determined by adding up scores of 1 (Al-Tuwaijri, Christensen, & Hughes, 2004). Finally, the final disclosure score indexes for each category are calculated using the following formula:

$$XI = \sum_{\tau=1}^{mj} \frac{X\tau}{N}$$

This index indicates the level of CSR disclosure for a firm j, where N is the maximum number of relevant subcategories a firm may disclose and Xτ is equal to 1 if disclosed or 0 if not (Branco and Rodrigues, 2008).

In the case of the manufacturing sector, environmental disclosure total was 32 of 84 scores; for consumer disclosure total was 19 of 48 scores; for community disclosure was 5 of 60 scores; and for employee disclosure was 43 of 108 scores (CSRD total was 99 of 300 scores). In the case of mining sector, environmental disclosure was 7 of 7; for

consumer disclosure was 1 of 4 scores; for community disclosure was 1 of 5 scores; and for employee disclosure was 4 of 9 scores (CSRD total was 13 of 25 scores).

CSR information disclosed in the annual reports in both tables 3 (see appendix 5) indicates that consumer information and employee information are high compared with community information and environmental information which are low in the four sectors. The consumer category are in two subcategories (product and consumer safety (74.54%) and provision for difficult to reach consumers (24.54%), followed by consumer complaints (20.90%) and provision for disabled (2.72%), whereas employee others such as benefits presented to employees during the time work (86.36%), employee data (75.54), health and safety (42.72%) and pension data (31.81%) are subcategories with a high visibility in employee information.

The results of Mashat's study (2005) and Elmogla's study (2009) are similar to the results of table 3 (see appendix 5). For instance, employee information disclosed represents a significant part of the CSRD made by companies in these sectors, while community information receives the lowest disclosure in these sectors.

6.2 Quantitative Results

6.2.1 Descriptive Analysis

Table 4 (see appendix 6) presents descriptive statistics for all the variables of interest. The average indexes illustrate higher disclosure on consumer information (mean = 0.382), employee information (mean = 0.358), and community information (mean = 0.255) and less disclosure on environmental information (mean = 0.216). The maximum and minimum values of consumer information are 0 and 1, the values of employee information are 0.11 and 0.56, the values of community information are 0 and 0.80, and the values of environmental information are 0 and 1 respectively.

The data showed in Table 4 (see appendix 6) illustrates the perceived effect of company size on levels of CSRD can be ranked as (1), followed by the perceived effect of company age on levels of CSRD (21.70), whereas type of industry (0.33) can be ranked as (3). The maximum and minimum values of size are 5543094 and 17287053953, ages are 1 and 52 years, and types of industry are 0 and 1 respectively.

The descriptive statistics (skewness and kurtosis) for the dependent, independent and control variables showed in Table 4 indicate that the overall disclosure index and all dependent variables are normally distributed (both skewness and kurtosis coefficients are not significantly different from zero at the 0.05 level of significance).

6.2.2 Correlation Analysis

The Pearson and Spearman's Rho Correlation coefficients for the association between some company characteristics and level of CSRD in under four categories are reported in Table 5 (see appendix 7).

Table 5 (see appendix 7) presents a preliminary indication that some independent variables are associated with levels of CSRD indexes. The correlations are significant and positive between some independent variables and the CSRD indexes. The perceived influence of type of industry results in higher correlations with environmental disclosure (0.519 and 0.545, p-value < 0.01) than the majority of independent variables. In addition, the perceived influences of company size and company age have higher correlations with consumer disclosure (0.392, p-value < 0.05) and (0.429 and 0.468, p-value < 0.01). These results mean that they are significantly positively correlated indicating that in this sample, as company size and company age increase, level of environmental disclosure also increases. Furthermore, At the significant level of 1% and 5%, there is a positive correlation coefficient of (0.355, 0.439) and (0.443, 0.465) respectively between company size and company age with employee disclosure, which indicate that an increase in company size and company age leads to an increase in the amount of employee disclosure. As can be seen from Table 5 (see appendix 7), two dependent variables have more than one correlation with independent variables. However, only community disclosure has not significantly correlated with company size, company age and type of industry indexes. The results pertaining to correlations between dependent variables and independent variables in both Pearson correlation and Spearman's Rho correlation tables are relatively similar.

6.2.3 Multivariate Regression Analysis

Tables 5 (see appendix 7) and 8 (see appendix 10) are utilized to check multicollinearity. If the coefficients of correlation between continuous independent variables exceed 0.800, that is indicative of serious Collinearity (Guajarati, 1995). Table 5 (see appendix 7) shows that the correlations between the continuous independent variables are low, indicating no serious multicollinearity. In addition, Table 8 Collinearity statistics illustrate that there is no problem with multicollinearity, because the highest variance inflation factor (VIF) in the regressions are less than 3. Kennedy (1992) considers that based on the VIF, multicollinearity is a serious problem if continuous independent variables exceeds 10. In Table 8 data are also checked for homoscedasticity and linearity.

A residuals analysis is applied to the results, the problem of linearity and heteroscedasticity does not exist in the data. (Noruésis, 1995, p. 447) defined Residuals as 'what are left over after the model is fit and they are also the difference between the observed value of the dependent variable and the value predicted by the regression line'.

The Durbin-Watson (DW) is utilized to test the independent errors (autocorrelation), at a level of significance of 0.05. The result of the Durbin-Watson d value can be a range from 0 - 4. If d value of the Durbin-Watson equals 2, this leads to the independent error. For accuracy, the Durbin-Watson d value that is greater than 3 or less than 1 is definitely reason for concern (Field, 2009). The Durbin-Watson d values in these data are between 1 and 2 and they are not greater than 3 or less than 1. Therefore, autocorrelation does not present a problem with the data.

Multivariate regression models are applied to test the relationship between company characteristics in terms of company size, company age and type of industry, and levels of CSRD in annual reports of the years for 2007-2009 using the four sectors in the next paragraphs.

With regard to the regression models, the regression results of these models are given in Tables 6, 7 and 8 (see appendix 8, 9 and 10) respectively. Social scientists use a cut of point of 0.05 as their criterion for statistical significance. Hence, because the observed significance value is less than 0.05 the results indicate that there was a significant impact of some factors influencing levels of CSRD on levels of CSRD, these values are between equal 0.004 and 0.031 shown in table 7 (see appendix 9). However, the results of the regression model 3 illustrated no significant effect of factors influencing levels of CSRD on the levels of CSRD, this value are 0.329 shown in table 7 (see appendix 9). This means that the relationship between company size, company age, and type of industry with levels of CSRD is to some extent positive which affirms the hypotheses drawn. Additionally, it indicates that, as long as company size, company age and type of industry increase environmental disclosure, consumer disclosure and employee disclosure thus will increase, this emphasis the theoretical view of stakeholder theory. The following two tables 6 and 7 (see appendix 8 and 9) show the descriptive results of the Model Summary and the regression models.

Although the data in table 8 (see appendix 10) do not find a significant and positive relationship between company size and levels of CSRD, and the three factors and employee disclosure, the coefficients drawn in table 8 (see appendix 10) suggest that the independent variable is associated with the dependent variable. Accordingly, it is shown that as company age increases, levels of environmental and consumer disclosure also increase. This means that company age is positively associated with levels of CSRD, and type of industry is a significant and positively associated with levels of environmental disclosure.

6.3 Qualitative Results

The accounting literature review showed a number of studies which revealed the link between company size, company age and type of industry and levels of CSR information disclosed (see the literature review section). The literature review illustrated that there is a strong association between these factors and the amount of CSR information disclosed. Therefore, the following question was asked of all interviewees:

Does the size, age of your organization, and industry type affect the level of CSR information provided by your organization, If yes, how?

The results of interviews for this question are shown in table 9 (see appendix 11) below.

Table 9 (see appendix 11) shows the opinion of financial managers and information managers about the relationship between CSR information disclosed and some factors such as company size, company age and type of industry. Most interviewees believe that level of CSR information in annual reports can be influenced by age of the company as it enabled the companies to obtain expertise and competence sufficient for improving the preparation of all information.

Longevity of the business gives the company expertise and adequate competence to improve the preparation of information through the annual report from market needs for this information and its impact on company performance.

Most interviewees mentioned that large companies disclosed more CSR information than smaller companies due to difference of companies' activities and size. Furthermore, they stated that stakeholders in the large companies can influence the management of these companies for disclosing CSR information compared with others. Moreover, they believe that the management of large companies realized the importance of CSRD more than small companies as illustrated in the following comments:

I think that the large companies have the highest level of social disclosure due to them realizing the importance of social activities and most decisions are based on this information... more services and more social and

environmental information... the volume of dealings and the multiplicity of stakeholders need to provide a variety of information and much information to meet the requirement of stakeholders... and its impact on stakeholders is reflected on the company's performance in the market.

Size does not only affect in terms of the commitment of the company but it affects volume of information and this is due to the administration being convinced of the importance of dissemination of this information in order to benefit from disclosure.

The financial managers and information managers mentioned a significant effect of type of industry on level of CSR information in annual reports. The majority of interviewees believe that level of CSR information in annual reports differs from one sector to another due to variation of activity type:

I believe, type of industry has a major impact on the amount of social information disclosed, particularly with regard to industrial companies because the company possesses and exposes all kinds of CSR information.

However, one of the financial managers believes that the policy of management about the importance of disclosing CSR information plays an important role in increasing the amount of CSR information in their annual reports:

Yes, In addition to these elements, the policy of senior management and its orientation towards social disclosure significantly affects the quantity and quality of information disclosed in annual reports.

One of financial managers stated that private companies that are listed in the stock market give more details about CSR information disclosed than public companies, because the private companies seek to meet the requirements of a bigger number of stakeholders through disclosing all information in their annual reports:

Yes, but the private companies that possess shares in the stock market and the bigger number of stakeholders have a higher level of disclosure than the public companies regardless size, age and type of industry.

To sum up, the findings of the interviews support the research. First of all, the findings reveal that company size, company age and type of industry can affect a level of CSRD in Libyan companies. Second, there is a positive relationship between these factors and a level of CSRD. Finally, these findings also support some quantitative results in this study.

7. Conclusion

This paper provided an analysis of whether company size and company age, as well as type of industry, are potential determinants of CSRD practices by Libyan companies. Empirical studies have shown that CSR activities and CSRD varies across companies due to the difference of size, age and industries (Gray et al. 1995; Hackston & Milne 1996). They have also shown that this activity and its disclosure are important and systematically determined by company characteristics that affect the relative levels of CSR information disclosure and its performance (Cormier et al. 2005; Hackston & Milne 1996; Patten 2002; Reverte 2009).

The quantitative findings of this paper present evidence that older companies have higher levels of CSRD in terms of environmental disclosure and consumer disclosures compared with companies with lower levels of CSRD. In addition, higher levels of CSRD belong to more environmentally sensitive industries (such as manufacturing sectors) compared with insensitive industries. However, neither company age and nor type of industry seem to explain differences in community disclosure and employee disclosure practices in Libyan companies.

Furthermore, levels of CSRD do not seem to be affected by company size in Libyan companies. The most influential variable for explaining companies' variation in levels of CSRD is company age, followed by industry type. In contrast with the quantitative findings in this paper, the qualitative findings indicated a stronger effect of company size, company age and type of industry on levels of CSRD. According to the qualitative findings, company size, company age and type of industry can explain differences in levels of CSRD in Libyan companies. Therefore, it appears that the results of this paper align with stakeholder theory, as captured by those variables related to social visibility in terms of stakeholders' interests as the most relevant theory for explaining CSRD practices of Libyan companies. Thus, Libyan companies report on CSR activities mainly to act and be seen to be acting within the bounds of what is considered acceptable according to the expectations of stakeholders about how their operations should be conducted.

This paper provides three main contributions to CSRD research: first, it presents the first empirical data related to Libyan companies and adds to the previous research on CSRD; second, it extends previous research that links company characteristics with level of CSRD using stakeholder theory. Third, it reveals the nature of the relationship between company characteristics and level of CSRD and is important to encouraging firms to improve CSR data in their annual reports in Libya.

However, this paper has a number of limitations: first, this paper focuses only on CSRD in annual reports, although these companies use other mass communication mechanisms. Second, although it consists of most of the relevant Libyan companies, this sample is likely to be considered small; hence the use of a larger sample by Libyan companies are likely to add new insights to analyse of CSRD. Finally, it is probable that content analysis issues might contribute to the level of subjectivity in the coding process.

There are several directions for future research that flow from this paper. First, the quantitative study of this paper used a range of data analysis techniques to identify findings including linear regression. Future research should use nonlinear regression. This phase used some independent variables such as company size, company age and industry type on a small and less diverse sample, therefore future research would require adding / using other variables such as profitability, culture and regulations on a larger and more diverse sample. In addition, because content analysis is associated with the level of subjectivity involved in the coding process, future research should use more refined content analysis methods, analyses of the categories of CSRD taken individually, and the use of larger samples of companies.

The qualitative study in this paper collected data from internal stakeholders such as financial managers and information managers. Future research should use external stakeholders or both of them to understand the effect of company characteristics on level of CSRD. It can also compare perceptions of internal stakeholders and external stakeholders to comprehend the link between company characteristics and CSRD.

In conclusion, the results of this paper suggest that company size, company age and type of industry that affect CSRD practices of Libyan companies are not significantly different from companies in developed countries which are affected by similar factors influencing levels of CSRD. This confirms the results of Cormier and Magnan (2003), who suggest that disclosure strategies are determined, regardless of a given country's socio-cultural context.

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Appendix 1. Conceptual model of Factors Affecting of CSRD
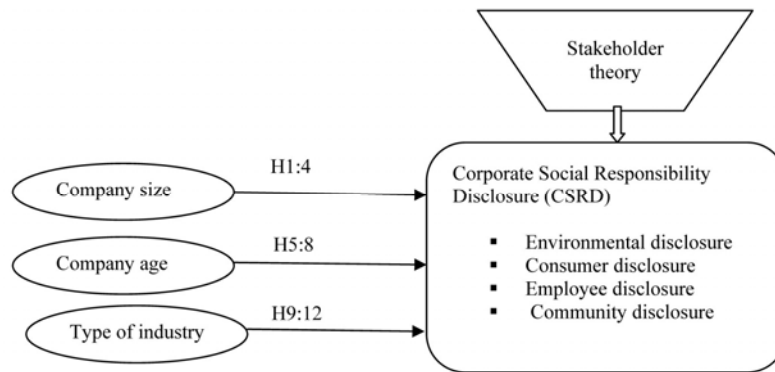
Appendix 2. Response Rate (content analysis)

Sector	Manufacturing	Mining	Banking and Insurance	Services	Total
Population (a)	32	8	20	75	135
Final sample (b)	12	1	13	14	40
Sample Rate (b/a) %	37.5%	12.5%	65%	19%	30%

Appendix 3. List of the Libyan Surveyed Business Enterprises

1	Al- Gafela Company	21	Water Company
2	Inma Company for Buying Cars	22	Development Bank
3	National Commercial Bank	23	Libya Insurance Company
4	Trust Company for The Import and Process	24	The Agricultural Bank
5	Sahara Company for Insurance	25	The national post & Telecommunication Company
6	Savings Bank and Real Estate Investment	26	Libyana Mobile Company
7	National Company For Trade and Development	27	The Libyan Iron and Steel Company
8	The General Electronic Company	28	AL-Jamhoria Bank
9	Libya Telecom of Technology (LTT)	29	The Arabian Cement Company
10	The Libyan Arab Foreign Bank	30	General National Maritime Transport Comp
11	Al-Medar Communication Company	31	The Libyan Tractor Company
12	Bank of Commerce and Development	32	Inma Company for Engineering Industries
13	Al- Sahara Bank	33	Inma Company for Pipe Industries
14	Sharara Company for Oil Services	34	National Company for Flour Mills and Foods
15	Rahela Company for Oil Services	35	The General Tobacco Company
16	National Company for Furniture Industries	36	The Libyan Truck and Bus Company
17	Wehda Bank	37	The General Company for Chemical Industry
18	United Bank For Commerce and Investment	38	Brega for oil selling
19	The National Trailer Company	39	The National Electricity Company
20	Serafa Company for Financial Services	40	Acacus Company For Oil Operating

Appendix 4. Profiles of Interviewees

Sector Name	Financial Managers	Information Managers	Total
Manufacturing	8	4	12
Services	11	1	12
Banks and Insurance	4	2	6
Mining	1	0	1
Total	24	7	31
Participants rate	77%	23%	100%

Appendix 5. CSRD Areas

Categories and subcategories of CSRD	Annual Reports	
	No	%
• Environmental disclosure:		
1- Environmental policy or company concern for the environment.	32	29.09
2- Environmental management, systems and Environmental audit.	18	16.36
3- Environmental-product and process.	20	18.18
4- Environmental financially.	3	2.72
5- Sustainability.	4	3.63
6- Energy.	8	7.27
7- Environmental other.	26	23.36
• Consumer disclosure		
1- Product and consumer safety	82	74.54
2- Consumer complaints	23	20.90
3- Prevision for disabled	3	2.72
4- Provision for difficult-to- reach customers.	27	24.54
• Community involvement disclosure		
1- Charity and political donations	25	22.72
2- Support for education.	6	5.45
3- Support for public health.	3	2.72
4- Support for the arts and culture.	24	21.81
5- Sponsoring sporting or recreational projects.	18	16.36
• Employee disclosure		
1- Employee data	83	75.54
2- Pension data	35	31.81
3- Consultation with employees	7	6.36
4- Employment of disabled	3	2.72
5- Value added statement	3	2.72
6- Health and safety	47	42.72
7- Share ownership	5	4.54
8- Equal opportunities	3	2.72
9- Employee other	95	86.36

%: Disclosing companies as a percentage of total samples.

Appendix 6. Descriptive Statistics for All Variables

Dependent Variables	Minimum	Maximum	Median	Mean	Std. D	Skewness	Kurtosis
ENVD	0	1	0.14	0.21675	0.256359	1.435	1.354
COND	0	1	0.25	0.3825	0.2033533	0.804	1.153
COMD	0	0.80	0.20	0.2550	0.2218223	0.843	0.197
EMPD	0.11	0.56	0.33	0.35825	0.1174709	-0.477-	-0.217-
Independent Variables							
Size	5543094	17287053953	275901300	2191544745	4012904299	2.769	7.935
Age	1	52	18	21.7	14.676	0.277	-1.112-
Industry	0	1	0	0.33	0.474	0.777	-1.473-

Note. This table presents descriptive statistics for all the variables of interest (environmental disclosure (ENVD), consumer disclosure (COND), community disclosure (COMD), employee commitment (EMPD), size, age and type of industry).

Appendix 7. Pearson (above) and Spearman'S Rho (below) Correlation Coefficients between Company Characteristics and CSRD

Variables	Size		Age		Type of Industry	
	Correlation	Coefficients	Correlation	Coefficients	Correlation	Coefficients
ENVD	-0.199-	0.230	0.120	0.460	0.519**	0.001
	-0.009-	0.959	0.235	0.145	0.545**	0.000
COND	0.135	0.417	0.429**	0.006	-0.059-	0.717
	0.392*	0.015	0.468**	0.002	-0.073-	0.656
COMD	0.041	0.809	0.160	0.325	0.264	0.099
	0.240	0.147	0.284	0.076	0.292	0.067
EMPD	0.355*	0.029	0.443**	0.004	0.190	0.240
	0.439**	0.006	0.465**	0.003	0.209	0.196
Size	1		0.548**	0.000	-0.310	0.058
			0.601**	0.000	-0.279	0.090
Age	0.548**	0.000	1		0.056	0.733
	0.601**	0.000			0.042	0.799
Type of Industry	-0.310	0.058	-0.056	0.733	1	
	-0.279	0.090	0.042	0.799		

**.Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Appendix 8. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	0.563	.317	.256	.1969708	.317	5.253	3	34	.004	1.575
2	0.477	.227	.159	.1895650	.227	3.336	3	34	.031	1.183
3	0.308	.095	.015	.2218244	.095	1.188	3	34	.329	1.790
4	0.516	.266	.201	.1051482	.266	4.112	3	34	.014	1.537

The independent variables are company size, company age and type of industry.

The dependent variable is Corporate Social Responsibility Disclosure (ENVD, model1; COSD, model2; COMD, model3 and EMPD, model4).

Appendix 9. ANOVA

Model No:	Model details	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.611	3	0.204	5.253	0.004
	Residual	1.319	34	0.039		
	Total	1.931	37			
2	Regression	0.360	3	0.120	3.336	0.031
	Residual	1.222	34	0.036		
	Total	1.581	37			
3	Regression	0.175	3	0.058	1.188	0.329
	Residual	1.673	34	0.049		
	Total	1.848	37			
4	Regression	0.136	3	0.045	4.112	0.014
	Residual	0.376	34	0.011		
	Total	0.512	37			

a. Predictors: (Constant), Company Size, Company Age and Industry Type.

b. Dependent Variable: Corporate Social Responsibility Disclosure (ENVD, model1; COSD, model2; COMD, model3 and EMPD, model4).

Notes: The table shows the ANOVA statistics for the regression models. The F statistic and the associated significance value show that the regression model explains a significant amount of the variation in the levels of CSRD.

Appendix 10. Coefficients

Model No:	Model details	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	Constant	.044	.064		.688	.496		
	Company Size	.000	.000	-.263	-1.466	.152	.623	1.606
	Company Age	.005	.003	.353	2.064	.047	.686	1.457
	Industry Type	.203	.073	.418	2.775	.009	.887	1.128
2	Constant	.236	.062		3.341	.001		
	Company Size	.000	.000	-.182	-.953	.347	.623	1.606
	Company Age	.008	.003	.552	3.031	.005	.686	1.457
	Industry Type	-.021	.070	-.049	-.305	.762	.887	1.128
3	Constant	.176	.072		2.440	.020		
	Company Size	.000	.000	.080	.388	.701	.623	1.606
	Company Age	.001	.003	.097	.491	.627	.686	1.457
	Industry Type	.142	.082	.298	1.722	.094	.887	1.128
4	Constant	.268	.034		7.850	.000		
	Company Size	.000	.000	.267	1.436	.160	.623	1.606
	Company Age	.002	.001	.304	1.716	.095	.686	1.457
	Industry Type	.064	.039	.254	1.631	.112	.887	1.128

Notes: This table reports the value of the coefficients for the variables and their significance. Although the relationship between some variables are insignificant, still the value of the coefficients is to some extent explains that the independent variable is associated with the dependent variable.

Appendix 11. The Impact of Company and Industry Factors on CSR Information Disclosed

Factors	Number of interviews	The percentage of interviews
Company size	17 out of 31	55%
Company age	18 out of 31	58%
Type of industry	21 out of 31	68%

Voluntary Disclosure in a Changing Regulatory Environment – Evidence from Chinese Stock Market

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Abstract

This paper investigates the voluntary disclosure made by 297 Chinese listed firms in their 1995-2006 annual reports. It aims to determine how firms in the Chinese stock market have responded to the coercive pressure exerted upon them by the market regulatory body, the Chinese Security Regulatory Commission (CSRC) in terms of providing transparent information to the stock market. The findings show that over the study period, listed firms have gradually increased their voluntary disclosure. This paper also explores the main characteristics of voluntary disclosure made by listed firms in the Chinese stock market. It is concluded that voluntary disclosure has been adopted by firms to achieve institutional legitimacy in the stock market.

Keywords: Institutional theory, Voluntary disclosure, The Chinese stock market

1. Introduction

After more than three decades' development, the Chinese stock market has been transformed into the largest emerging stock market in the world. It is the biggest stock market in Asia outside Japan with total market capitalization equivalent to US$2.6 trillion at 2009 (CSRC, 2009). The institutional environment in which Chinese listed firms operate is characterised by heavy government involvement and intervention. This reflects the main characteristic of China's so called "socialist market economy". The regulatory agent of the Chinese government, the Chinese Security Regulatory Commission (CSRC) has closely managed and monitored listed firms in the Chinese stock market since it was established in the early 1990s. With the economy's hunger for direct foreign investment, the CSRC has the political power over listed firms to ensure that the political anxiety of the Chinese government is minimized. The CSRC recognizes the importance of "investor protection" as the foundation of the future prospects of the stock market and has employed a series of strategies and actions to improve stock market efficiency. These actions include stipulating corporate disclosure regulations, establishing a corporate governance regime, providing training for investors and independent directors, and imposing public sanctions against listed firms. These actions have sent a clear and strong signal to listed firms that they need to devote themselves to transparent disclosure.

The aim of this paper is to investigate how Chinese listed firms have responded to the pressure exerted by the CSRC in respect of their information disclosure behaviour. It examines empirically the voluntary disclosure made by 297 listed firms between the 1995 and 2006 financial reporting periods. The findings of this longitudinal study represent the long-term trend of voluntary disclosure in the Chinese stock market and present the characteristics of these voluntary disclosures. Voluntary disclosures are the disclosures made by firms in excess of mandated disclosure requirements. They represent free choices on the part of management to provide information deemed relevant to the decision needs of users of their annual reports (Meek *et al.*, 1995). Eng and Mak (2003) classify voluntary disclosure into strategic information, financial information and non-financial information. It is asserted that voluntary disclosure reduces firms' cost of capital and improves transparency by reducing information asymmetry and investors react to information voluntarily disclosed to the stock market, meaning voluntary disclosure is value-relevant to investors' decision-making (FASB, 2001).

The strategic importance of the Chinese stock market provides the motivation for this study. The establishment of the Chinese stock market is a direct outcome of the economic reform in China. The Shanghai and Shenzhen Stock Exchanges were officially opened in 1990 and 1991, respectively. The development of China's stock market is pivotal to the privatization of the country's state-owned enterprises (SOEs). One of the essential factors supporting sustainable economic development in China is the development of its capital market. The 1992 *State Government Report* indicated explicitly that the standardization and prosperity of the capital market in China would serve to optimize the allocation of resources, thereby promoting the growth of the national economy. The established regulatory framework of the Chinese stock market, aiming to protect investors' interest and attract more foreign investment to China, sends a strong signal to Chinese society and global markets that the development of a capital market is essential to China's long-term economic prosperity. However, the effectiveness of the government's regulatory framework in respect of listed firm's disclosure is unknown.

The theoretical framework developed in this paper is based on a system-orientated theory, namely institutional theory, which addresses the importance of the impact of the institutional environment on organizations' behaviour. Institutional theory suggests that institutional pressures may be felt as force, as persuasion, or as an invitation to join in collusion. Organizational change is a direct response to government mandate (DiMaggio & Powell, 1983). Voluntary disclosure is adopted by firms for the purpose of institutional legitimacy. In other words, voluntary disclosure could be seen as firms' response to the pressure exerted on them by regulatory bodies. Adopting institutional theory, this study predicts that Chinese listed firms would change their disclosure behaviour when confronted with the pressure from the CSRC in respect of transparent information disclosure.

This study will make two main contributions to the existing voluntary disclosure literature. First, while the factors motivating firms to voluntarily disclose information have been widely investigated and firm characteristics including profitability, leverage, size, industry classification and firms' corporate governance attributes such as ownership structure, composition of board of directors and existence of audit committee have been identified as determinants of voluntary disclosure (Meek *et al.*, 1995; Eng & Mak, 2003, Xiao & Yuan, 2007), the trend of voluntary disclosure has not been well addressed, especially in the context of emerging and developing stock markets. The development of the Chinese stock market during the past twenty years provides a good research opportunity to explore voluntary disclosure practices in the Chinese context through a longitudinal study. A long-term trend of voluntary disclosure since the early days of the Chinese stock market and any changes related to it can also be traced by repeating observations of the same sample firms. The trend of change will reflect the impact of the institutional environment on firms' disclosure behaviour. In China's case, the trend of voluntary disclosure over the years will reflect the effectiveness of the Chinese government's regulatory framework on firms' disclosure decision-making. Second, this study contributes to the voluntary disclosure literature by providing evidence, showing the characteristics of the content of voluntary disclosure in a developing stock market.

The remainder of the paper is organized as follows. The second section examines and reviews the relevant literature for this study. This is followed by a discussion of the institutional environment of the Chinese stock market. The hypotheses are then developed followed by a description of the research method, sample selection and data collection. Lastly a discussion and analysis are provided, followed by the conclusion.

2. Literature Review

Institutional theory asserts that interacting organizations are linked by symbiotic relationships that can create institutional pressures limiting the set of rational choices they can use in demonstrating legitimacy to the public (Carpenter & Feroz, 1992). Institutional theory implies that the interests, objectives and actions of those external to any given organization may also be critically important in understanding an entity's accounting and disclosure choices. DiMaggio and Powell (1983) propose three classifications that relate to the motivation to adopt institutional

practices – coercive isomorphism, mimetic isomorphism and normative isomorphism. Isomorphism refers to the adoption of an institutional practice by an organization.

Coercive isomorphism results from both formal and informal pressures exerted on organizations by other organizations upon which they are dependent, and by social expectations in the society within which they operate. Deegan (2006) relates this form of isomorphism to stakeholder theory and observes that an entity will use voluntary corporate reporting disclosures to address the economic, social, environmental and ethical values and concerns of those stakeholders who have the most power over the entity. Mimetic isomorphism is a process that takes place when an organization attempts to imitate a more successful referent organization, a process that is often due to the uncertainty and lack of guidance in its own environment. Normative isomorphism stems from professionalization, that is, the collective struggle of members of an occupation to define their conditions and methods of work. In terms of voluntary disclosure, normative isomorphic pressures could arise through less formal group influences from a range of both formal and informal groups to which managers belong – such as the culture and working practices developed within their workplace.

Institutional theory provides a complementary perspective in explaining corporations' disclosure behaviour and in understanding how corporations respond to changing social and institutional pressures and expectations. Carpenter and Feroz (1992) draw on institutional theory to explain the state of New York's decision to adopt GAAP. The evidence indicates that the role of professional élites was an important factor in accelerating the mimetic and coercive isomorphic processes that were creating institutional pressures for New York to adopt GAAP. Various elements of the institutional environment (the nation/state, the professions, resource providers and the public) used powerful representatives to create institutional pressure for adopting GAAP.

3. Regulatory Environment in the Chinese Stock Market

The Chinese government continues to maintain its important influence on the development of the Chinese stock market. Its main regulatory agency, the CSRC, has been actively engaged in the regulation, administration and operation of listed firms in the stock market. La Porta *et al.* (2000) argue a legal approach is a more fruitful way to promote corporate governance and to protect minority investors in a country's stock market. In China, although the Chinese government has enacted the *Company Law* and the *Security Law* in recent years, the overall legal system is still relatively primitive by the standards of capitalist countries (Berkman, 2008). One successful civil suit over fraudulent financial information the first 12 years of the Chinese stock market is a testament to the lack of legal redress in securities cases (Chen *et al.*, 2005). Under the *Security Law*, a civil case against a listed firm can only be brought to the court after the CSRC has made an investigation. Class action lawsuits are not possible in China and so a lawsuit brought by an individual investor is very costly and has a low probability of success (Chen *et al.*, 2005). Given the weak legal mechanism in China in respect of investor protection, the question that needs to be raised is who is in the best position to play this role in the Chinese stock market? Glaeser *et al.* (2001) suggest that in emerging markets with relatively weak legal systems, regulators can provide an effective substitute for ineffective judicial enforcement. This hypothesis is arguably particularly relevant to the Chinese stock market.

3.1 Corporate Disclosure Framework

The primary purpose of a corporate disclosure regulatory framework in China is to improve the efficiency of the Chinese stock market and protect investors' interests (CSRC, 1996). In 1993, the CSRC issued *Detailed Rules for Implementation of Information Disclosure of Publicly Listed Firms*. This regulation marks the beginning of a series of specific disclosure rules and requirements stipulated by the CSRC in order to strengthen the transparency of information disclosure made by listed firms. In early 1994, the CSRC released the *Contents and Formats of Listed Firms' Annual Reports*. It is the first regulation for the content and format of annual reports in the Chinese stock market. In 1997, the CSRC established the formal draft and later amended it in 1998, 1999, 2001 and 2002 respectively. A series of revisions have significantly increased the information that listed firms are mandatorily required to disclose to the market. In addition to financial information, listed firms are required to disclose information related to corporate governance, such as ownership structure and the working experience and education background of directors and management personnel. Hu (2002) indicates that there have been several steps taken by the CSRC in improving the information usefulness of the annual report. First, this regulation explicitly requires firms to disclose the information related to earning distribution. When companies make a profit but decide not to distribute dividends to investors, listed firms are required to disclose reasons and a plan of how the retained profit will be used. This requirement reflects the CSRC's concern for public investors' interest protection. Second, listed firms are required to disclose whether there is a complete separation of management personnel, assets and the financial system between listed firms and their parent entities. Listed firms are supposed to be the pioneer of modern enterprises in China; it is the CSRC's expectation that listed firms should undertake a leadership role in corporate

governance. Third, this regulation addresses specifically the independent role of accounting and auditing firms. An annual report must be accompanied by an auditor's report.

3.2 Corporate Governance Regime

In January 2001, the CSRC issued its *Code of Corporate Governance for Listed Companies in China*, based on the *OECD Principles of Corporate Governance,* 1999. This code signals a new direction in the development of China's corporate sector and has been used as an important tool for raising the standard of corporate governance in China (Tomasic & Andrews, 2007). The *Code* addresses the rights of shareholders and stakeholders, the responsibilities the directors and management of listed firms should undertake, and the importance of information disclosure.

In August 2001, the CSRC released the *Guide Opinion on Establishing Independent Director System by Listed Companies*, with the intention that independent directors would take on more of the monitoring responsibilities that would result in greater transparency in listed firms. In the new regulations, the main responsibility of independent directors is to protect investors' rights, especially public minority investors. Independent directors are authorized to submit proposals to call shareholders' meetings, to recruit or dismiss accounting firms and invite independent auditors to certify independent financial reports, apart from their normal duties as board members. Major related-party transactions have to be approved by independent directors and independent directors can serve as chairs of the auditing, compensation and nomination committees and they must be in the majority on those committees. The independent director system has contributed positively to the credibility of corporate information disclosure and increasing minority investors' wealth (Tomasic & Andrews, 2007).

3.3 Enforcement of Investor Protection

Over the years, investor protection has been acknowledged by the CSRC as one of the most important measures to support the steady growth of the Chinese stock market. Aiming to promote and protect investor interest, the CSRC introduces, on average, twenty major policies each year to address the stock issue system, trading and supervision of listed firms (People's Daily, 2005b). Since the establishment of the CSRC in 1992, more than 300 regulations, rules, standards and guidelines concerning the securities market have been stipulated by the MOF and the CSRC. In respect of its enforcement, the CSRC declares that its major responsibilities are supervising security markets and exercising vertical power of authority over the regional and provincial supervisory institutions of the market, and investigating and penalizing activities violating security laws and regulations. The CSRC acknowledges that investors are expecting stronger supervision of listed firms' information. Firms that fail to provide the capital market with timely, adequate and transparent information will face severe penalties from the CSRC (People's Daily, 2005a). In the early and mid-1990s, the CSRC enforcement actions were weak and punishment was lax. Thus, in the earlier days, the CSRC was viewed as being ineffective (Chen *et al.,* 2005). From 1998, the CSRC gained overall regulatory power and has over-riding control over the securities industry.

The CSRC has also publicly pledged to improve the transparency of its own work to ensure the efficiency of capital market reforms and to curb corruption. In 2005, the CSRC further implemented the stock market reform plans mapped out by the State Council and steadily opened up the market. According to Shang Fulin, the former chairman of the CSRC, strong protection of the interests of public investors is the priority for the reforms, and an accountability culture needs to be developed (CSRC, 2000). The "transparency" principle of the CSRC can be reflected by the composition and work of its listing approval committee. The Committee, which reviews and approves the listing applications of domestic companies, was established by the CSRC in 2003. The members are made up of representatives from other government departments, securities businesses, lawyers, accountants, fund managers and academic scholars who can represent various interest groups and present professional opinion on listings. Since 2003, the names of the members that review each stock or bond issue application have been released on the CSRC's website to ensure transparency. In fighting against corruption in the process of listing approval, the CSRC has also pledged to create legal access for normal communications between listing committee members and the listing applicants, such as giving the latter more opportunities to introduce their enterprises and respond to problems raised during the reviews (CSRC, 2005).

4. Hypothesis Development

Hypotheses developed in this section draw from the review of institutional theory literature and discussion of CSRC's role in managing the Chinese stock market and are used to predict and explain listed firms' voluntary disclosure. The pressure exerted by the CSRC on listed firms to provide transparent information disclosure forms the foundation of the prediction that listed firms would gradually increase the level of voluntary disclosure in their annual reports between 1995 and 2006. Adopting the institutional perspective, the regulatory agent of the Chinese stock market, the CSRC, has created coercive isomorphism in the form of government mandated information disclosure requirements, corporate government regime and strong enforcement of its regulations. Therefore,

coercive isomorphism, in the context of the Chinese stock market, results from pressure exerted on listed firms by the CSRC, the organization that listed firms are dependent on. The dependent relationship between the CSRC and listed firms is reflected by heavy involvement of the CSRC in firms' Initial Public Offer (IPO) process, trading suspension and de-listing decisions (CSRC, 2009).

The CSRC has always encouraged firms to voluntarily disclose information which is relevant to investors' decision-making, in addition to their mandatory information disclosure. For example:

1. The *Standards of Contents and Formats of Information Disclosure by Public Issuing Companies* (1993, 2001 and 2003 versions) states: "*This regulation represents the minimum requirement of information disclosure of listed firms. Firms should also disclose any other information which will affect investors' economic decision-making, no matter this information is required to be disclosed by this regulation*".

2. The *Code of Corporate Governance for Listed Companies in China* (2001) states: "*In addition to disclosing mandatory information, a company shall also voluntarily and timely disclose all other information that may have a material effect on the decisions of shareholders and stakeholders, and shall ensure equal access to information for all shareholders*".

3. The *Guidance of the Relationship between Listed Firms and Public Investors* (2005) states: "*One of the basic principles of establishing a good investor-firms relationship is to have transparent information disclosure. In addition to mandatory disclosure, firms should voluntarily disclose other information which the investors care about*".

As the CSRC strongly advocates that listed firms voluntarily disclose information, it is expected that firms will adopt voluntary disclosure as a means of achieving institutional legitimacy, in order to gain CSRC's support and approval to firms' capital funding raising and trading through the stock market. Therefore, it is expected that the level of voluntary disclosure would have increased in the Chinese stock market across the 1995-2006 reporting periods.

4.1 Longitudinal Disclosure Levels

This study investigates listed firms' voluntary disclosure during the period 1995 to 2006. The entire testing period is further divided into three distinct testing phases: Phase I, 1995-1998; Phase II, 1999-2002; and Phase III, 2003-2006. These three phases represent three distinct phases of the history of the Chinese stock market. According to the main features of each phase, for the purpose of this study, they are named as the "developing phase", "corporate governance regime phase" and "established phase", respectively. The opening of two stock exchanges, one in Shanghai and one in Shenzhen in 1990 and 1991 respectively, marks the establishment of the Chinese stock market. Of the three testing periods, the 1995-1998 periods represent the initial, developing phase of the Chinese stock market. During this testing phase, the regulatory agency, the CSRC, undertook an administration role in the stock market, rather than strategically managing its development. It was not until mid-1992 that the CSRC started to promulgate a series of accounting and reporting regulations to regulate financial information disclosure in the stock market. Therefore, the level of voluntary disclosure in the reporting periods 1995-1998 is expected to be lower than in the later two phases.

The second testing phase covers the reporting periods 1999-2002. During this phase, the CSRC had further committed to the development of the stock market regulatory framework. Significant accounting and reporting regulations implemented during this phase included a series of Chinese accounting standards, the Securities Law and more information disclosure rules. The CSRC changed its emphasis from market administration to public investor protection. The *Guidelines for Establishing Independent Directors System for Listed Companies* and the *Code of Corporate Governance for Listed Companies* released by the CSRC in 2001 and 2002, respectively, highlighted the regulatory agencies' belief that strong corporate governance among listed firms would play a positive role in improving investor interest protection. Several high-profile legal actions against listed firms caused by misleading and fraudulent information disclosure, increased demands from the investment community for improved disclosure. The pressure from the CSRC increased dramatically during this phase. Therefore, the level of voluntary disclosure in this phase is expected to be higher than that in the reporting periods 1995-1998.

The last testing phase includes the reporting periods 2003-2006. In this phase, as required by CSRC regulation, listed firms have all implemented the independent director system, and at least one-third of the directors on their boards are independent directors. The CSRC's aim of establishing the independent director system was to further improve corporate governance of listed firms and protect the interests of investors in the Chinese stock market. The level of voluntary disclosure in this phase is, therefore, expected to be higher than that in both the "developing phase" and the "corporate governance phase". For the longitudinal disclosure level, it is proposed that:

Hypothesis 1: The level of voluntary disclosure increased in the Chinese stock market throughout the 1995-2006 reporting periods.

Hypothesis 2: The level of voluntary disclosure increased in the Chinese stock market statistically significant in the "corporate governance phase".

5. Research Method

The longitudinal approach adopted in this study provides valuable insight into the characteristics of voluntary disclosure made by sample firms and reports the trends and switch points in their voluntary disclosure. To be included in the sample, listed firms must have satisfied the following two selection criteria: (1) Firms must be listed continuously on either the Shanghai Stock Exchange or the Shenzhen Stock Exchange spanning 1995-2006 and, thus, twelve years' annual reports are available for examination; (2) Firms must belong to an industry classification other than banking and financial institutions, which are subject to a different accounting system and disclosure requirements in China. The first selection criterion is to ensure the continuous observation of the disclosure behaviour of the same group of listed firms during the entire testing period to satisfy the minimum requirement of a longitudinal study. The second selection criterion is to ensure that all sample firms are under the same regulatory regime in respect of their information disclosure. In such a way, the information disclosed by sample firms is comparable. Application of the above criteria results in a sample of 297 firms. A voluntary disclosure checklist was designed to capture the level of voluntary disclosure across three testing phases is used. The design of the checklist was based on a survey of the academic literature and reference to the voluntary disclosure framework recommended by the Financial Accounting Standards Board (FASB) in the United States (US). Following the method adopted by Eng *et al.* (2001), Eng and Mak (2003), a different level of importance is attached to different disclosure categories and to each specific item in order to reflect the significance of different types of information to investors' decision-making during the development of the Chinese stock market.

6. Results

The average numbers of firms voluntarily disclosing strategic information are 116 (39%) in Phase I, 250 (84%) in Phase II and 271 (91%) in Phase III. In respect of financial information disclosure, on average 58 (20%) firms made voluntary disclosure in Phase I, 124 (42%) firms in Phase II and 152 (51%) firms in Phase III. For non-financial information, 49 (17%) firms made voluntary disclosure in Phase I, 101 (34%) firms in Phase II and 104 (35%) in Phase III. These results show that, first, there is a progressive increase in the number of firms making voluntary information disclosures over the three testing phases. Secondly, there is a significant increase in the number of firms voluntarily disclosing information during Phase II. The average number of disclosing firms in Phase II is double the average number of disclosing firms in Phase I. The examination of the number of firms disclosing information indicates that listed firms in the Chinese stock market responded positively to the pressure exerted by the CSRC over the three testing phases, especially during Phase II (1999-2002) when the CSRC strengthened the financial reporting and disclosure regulations. Therefore, the results support both Hypothesis 1 and Hypothesis 2.

6.1 Descriptive Statistics of Information Disclosure

The mean voluntary disclosure score (VDS) of each specific information disclosure item during the three testing phases were calculated. Further analysis of the mean of disclosure items within disclosure categories determines listed firms' voluntary disclosure preferences.

General corporate information: this category has five disclosure items, covering the history of the firm, organization structure, main business activities the firm is engaged in, principal products and market. There is no information disclosed voluntarily by listed firms to illustrate their firms' history and organization structure throughout the three testing phases. The mean VDS of General Description of Business Activities is changed from zero in Phase I, to 0.5 in Phase II and 1 in Phase III. The example of voluntary disclosure is a detailed description of the scope of firms' business assets and properties. Voluntary disclosures are made in respect of principal products and markets throughout the three testing phases. Firms are found detailing their products, brand names and registered trademarks in their annual reports. The strongest disclosure made under this information category is the principal market. Firms choose to indicate which provinces in China are their current markets and where their potential markets are located, both domestically and internationally. The mean VDS increase from 0.75 in Phase I, to 7.75 in Phase II and 11.75 in Phase III.

Corporate strategy: this category covers firms' current and future strategies and their impact on firms' results in the present and in the future. Voluntary disclosures are found for all five disclosure items throughout the three testing phases. Examples of current management strategies disclosed in annual reports are strategies to control operating expenses and strategies for spending on research and development. Strategies to develop new products with

high-technology components, future acquisitions and expanding overseas markets are examples of future disclosures. The Future Strategy disclosure item sees the strongest trend in voluntary disclosure, with mean VDS increases from 13.25 in Phase I, to 84.5 in Phase II and 193.8 in Phase III. This is followed by the Current Strategy disclosure item. Few firms voluntarily disclose the impact of their strategies on current and future results. The voluntary disclosures of the impact of strategies on current and future results are qualitative rather than quantitative possibly indicating that the sample firms have difficulty in measuring and predicting the impact accurately.

Management discussion and analysis: this category focuses on firms' operations. It includes management's overview of a whole year's operation, firms' business environment, significant events during the year and changes in business input and output. Stronger disclosures are found for the review of operations, changes in sales, profits, expenses and market share. Details of growth or decline in market share in the main market and newly expanded markets are found in annual reports. Changes in sales, profits and expenses are discussed based on comparisons between the previous year and current years. Firms reporting decreased sales revenue often detail the reasons causing the decline, while firms with increased sales rarely provide more details. The low mean VDS of Competitive Environment and Significant Events of the Year show sample firms are not keen to disclose information in those two areas. It can be seen that listed firms avoid pointing out their main competitors or making comparisons with competitors in terms of sales and market share. Changed state government legislation and firms' lawsuits are two typical examples disclosed under Significant Events during the year.

Future prospects: this category consists of forward-looking information disclosure items. They are new developments, forecasts of sales/profit and assumptions underlying the forecasts. The strongest voluntary disclosure can be seen from New Developments, with its average disclosure score increasing from 27.25 in Phase I, to 87.5 and 195.5 in Phase II and Phase III, respectively. Examples of new developments are detailed descriptions of products in the developmental stage, and new plans for expansion and brand introductions to specific domestic and international markets. Intensive investment in research and development activities is frequently mentioned as one of the most important measures to achieve new developments. Forming joint ventures with international partners is disclosed as a way for listed firms in China to expand their market. The mean VDS of forecasts of sales or profit increase significantly from only 2 in Phase I, to 53.75 in Phase II and 117.8 in Phase III. Many firms choose to quantify their targets for growth in revenues, net income and gross margin in the following financial year. Twenty–five observations are found to forecast a loss for the next year due to cash-flow liquidity problems and heavy interest payments associated with borrowing. Interestingly, firms disclosing their forecast are reluctant to disclose the underlying assumptions on which the forecast is based.

Performance indicators (not from financial statements): several important financial performance ratios and historical figures constitute this disclosure category. Very little voluntary disclosure is found describing or comparing firms' historical performance over the past five years or more. Only one firm from the sample is found offering the past five years' comparative information, and three firms from the sample are found disclosing the past three years' financial performance indicators in both Phase II and Phase III. The order of the mean VDS of the four financial performance ratio disclosures, from highest to lowest, is: liquidity ratios, cash flow ratios, profitability ratio and gearing ratios.

Financial review: there are two items under this category, disclosure of intangible assets and dividend payout policy. The mean VDS of Disclosure of Intangible Assets shows that sample firms voluntarily disclose information related to firms' initial recognition and subsequent measurements of their goodwill, trademarks and brands across the three testing phases. However, the mean VDS increases from 29.75 in Phase I to 34.50 in Phase II, but reduces to 30.25 in Phase III. In respect of intangible asset impairment, sample firms disclose impairment according to the mandatory requirements of the relevant Chinese Accounting Standard, and there is no discussion of the indicators of asset impairment and circumstances surrounding the impairment decisions. The mean VDS of Dividend Payout Policy are 2, 3.75 and 3 for the three testing phases, respectively; showing that voluntary disclosure in this area is much lower than firms' disclosure of intangible asset-related information.

Projected information: this category addresses cash flow forecasts, capital expenditure and/or R&D expenditure forecasts and earnings forecasts. Strong voluntary disclosure of earnings forecasts is consistent with the strong disclosure of forecast sales/profit under the strategic information section. The mean VDS of earning forecasts is increased significantly from 3.3 in Phase I and 18.5 in Phase II, to 55.25 in Phase III. Voluntary disclosure of cash flow forecasts involves in-depth discussion of actions taken by sample firms to collect outstanding debts, and disclosure of heavy interest payments on loans. One of the issues commonly mentioned in annual reports is the difficulty they have experienced in collecting outstanding debts. This reflects the cash flow liquidity problem found by listed firms in the Chinese stock market. A gradually increasing mean VDS for capital expenditure and/or R&D

expenditure forecasts reflects the view that capital expenditure and R&D expenditure are important factors contributing to firms' long-term success.

Foreign currency information: this category covers the impact of foreign exchange fluctuations on current results, foreign currency exposure management descriptions and major exchange rates used in the accounts. Strong voluntary disclosure in this category reflects the interactions between listed firms in China and their overseas counterparts as a result of the "Open Door" policy implemented by the Chinese government. Voluntary disclosure of the impact of foreign exchange fluctuations on current results has the highest mean disclosure score in the three phases, followed by the major exchange rates used in the accounts. Foreign currency exposure management, however, is relatively low, with mean VDS increased from 4 in Phase I, to 8.8 in Phase II and 17.8 in Phase III reflecting the lack of risk management associated with foreign exchange rate fluctuations among Chinese listed firms.

Stock price information: this category includes market capitalization at year end, market capitalization trends, size of shareholdings and type of shareholder. There is no voluntary disclosure for the whole disclosure category in Phase I. Voluntary disclosures of the size of shareholdings and type of shareholders are only found during Phase III, with the mean VDSs being 0.75 and 1.25, respectively. Mean VDS of market capitalization at year end and market capitalization trends during Phase II are 0.75 and 0.5, respectively. During Phase III, the mean VDS of market capitalization trends remains the same, while the mean VDS of market capitalization at year end increases to 2 in Phase III.

Information about directors: information about the director category consists of two disclosure items, commercial experience of the executive directors and other directorships held by executive directors. The mean VDS of Chief Executive Officer (CEO) duality shows that there is no voluntary disclosure of CEO duality in Phase I. In Phase II, the mean VDS are 14 and increases to 16.5 in Phase III. Although there was a gradual increase, these results show voluntary disclosure of CEO duality was relatively low throughout the entire testing period. The voluntary disclosure of commercial experience of CEOs does not show any consistency. The mean VDS of the commercial experience of executive directors increase from 4.75 in Phase I, to 10.5 in Phase II and reduce to only 3 in Phase III.

Employee information: the seven disclosure items under this category can be combined into three groups: employee training-related, safety-related and redundancy-related. The mean VDSs of the three phases show that all three groups experience low voluntary disclosure in Phase I, increased disclosure in Phase II and a decline of voluntary disclosure in Phase III. The employee training-related group has the strongest increase over Phase I and Phase II. The mean VDS of the nature of training increased from 5.5 in Phase I to 10.5 in Phase II. Together with the amount spent on training, categories of employees trained and number of employees trained, the increased disclosures in this area indicate that listed firms wish to signal to investors the skills and knowledge of their employees and, accordingly, the better quality of their workforce. Disclosures of redundancy among listed firms reflect the loss of job security in Chinese society since the economic reforms. The employee safety-related area has the lowest mean VDS under the Employee Information category.

Social policy: this category covers four disclosure items, namely, safety of products, environmental protection programs, charitable donations and community programs. Both the safety of products and charitable donations show strong voluntary disclosures over the years, with their mean VDS ranging between 25 and 45. Firms list various awards granted by state or local government for good quality products or contributions made to the community. Charitable donations reflect firms' commitment to Chinese society. Strong voluntary disclosure in this area shows listed firms' interest in developing a good reputation in society.

It is worthwhile to note that the voluntary disclosure of environmental protection programs achieves a relatively low mean VDS throughout the three phases, with 2.5 in Phase I, and 7 for both Phase II and Phase III. Only a few firms discuss briefly the actions taken to reduce environmental pollution. This result supports the research findings of Guo (2005). Listed firms in China have not established the awareness that to be a good "corporate citizen", enterprises should take social responsibility and leadership in environmental protection.

6.2 Comparison between Three Information Disclosure Sections

This section combines and compares the levels of disclosure of the three information sections. Table 1 sets out the changes of the three information disclosure sections in the three testing phases. It is interesting to note that among the three sections of voluntary disclosure, strategic information disclosure achieves the highest mean voluntary disclosure score in each individual testing phase, followed by the financial information section, and this leaves the non-financial information section having the lowest mean disclosure scores. The mean disclosure score achieved by the sample firms in disclosing strategic information is increased significantly from 0.65 in Phase I, to 2.44 in Phase II and 3.94 in Phase III. The voluntary disclosure score for financial information also increases over the entire

testing period; however, the increment is not as significant as that seen in the strategic information section. The mean disclosure score of the sample firms changed from 0.33 in Phase I, to 0.76 in Phase II and 0.96 in Phase III. The non-financial information section experienced slow growth in voluntary disclosure. The mean disclosure scores for non-financial information disclosure achieved by sample firms are 0.07, 0.21 and 0.14, respectively, in the three testing phases. The results do not show a general trend of increased voluntary disclosure of non-financial information in the three testing phases.

Insert Table 1 here

6.3 Characteristics of Voluntary Disclosure in The Chinese Stock Market

The proceeding analysis suggests that listed firms' voluntary disclosure behaviours in the Chinese stock market exhibit three characteristics in the 1995-2006 periods. First, there is a significant increase of voluntary disclosure in both the number of disclosing firms and the extent of voluntary disclosure during Phase II. Second, listed firms are selective with their voluntary disclosure. Third, the level of forward-looking information disclosure is significantly higher than for other types of information disclosure.

1. Significant increase in voluntary disclosure during 1999-2002

Table 2 reports the descriptive statistics on the comparison of disclosure categories between Phase I and Phase II, and Phase II and Phase III. The comparison of the mean VDS of disclosure categories between Phase I and Phase II shows that the *p* values of corporate strategy, management analysis and discussion, future prospects and projected information are all significant at 1 percent level, meaning that the mean VDS of these disclosure categories in Phase II is increased significantly when compared with Phase I. The *p* value of the total combined disclosure categories is also significant at 1 percent level, meaning that, overall, the VDS increased significantly from Phase I to Phase II. Comparing Phase II and Phase III, there is no significant increase in Phase III. Therefore, in the three testing phases, it can be concluded that there is a significant increase in voluntary disclosure during Phase II which includes the 1999-2002 financial years and Hypothesis 2 is supported.

The institutional pressure exerted on listed firms in Phase II is marked by CSRC's actions in stipulating investor protection regulations, and the strengthening of their enforcement. Phase II witnesses the changing role of one of the main stakeholders of listed firms in the Chinese stock market, namely, the regulatory agency group. The 1998 *Securities Law* empowers the CSRC as the overall regulator of the Chinese stock market. Between 1999 and 2002, the CSRC accomplished its changing role, from its initial function of undertaking some administrative roles, including approving the listing and transferring of non-tradable shares among institutional investors, to regulating listed companies' information disclosure and fostering good corporate governance. The CSRC sees itself as a pro-active regulator in fostering corporate governance, in enforcing rules, in safeguarding the integrity of the Chinese stock market, and in championing the rights of public investors (Tomasic & Andrews, 2007). The CSRC also implements some important strategies to promote corporate governance among Chinese listed firms. In early 2001, the CSRC declared a "year of market supervision". During the same year, the CSRC issued the *Code of Corporate Governance for Listed Companies in China* and the *Notice of Establishing an Independent Directors System in Listed Firms*. The primary aim of these initiatives was to increase transparency and enhance the credibility of financial statements. Increased voluntary disclosure during this period of time could be regarded as one way that listed firms in the Chinese stock market responded positively to pressure of the CSRC for the purpose of institutional legitimacy.

Insert Table 2 Here

2. Selective information disclosure

The comparison between the three information disclosure sections in Table 3 indicates clearly that, despite the increase in the quantity of information disclosed overall, listed firms in the Chinese stock market are selective in choosing the information to disclose. Voluntary disclosure of strategic information is much higher than the disclosure of financial information and non-financial information. The mean disclosure score of strategic information disclosure for the entire testing period reached 7.03, while the average scores of financial information and non-financial information are only 2.06 and 0.43, respectively.

Table 3 further reports the comparison of sensitive information and non-sensitive information by using the *T* test. Fifty checklist items are divided into two groups: a sensitive information group and a non-sensitive information group. There are nine items that can be classified in the sensitive information group and they are: dividend payout policy, foreign currency exposure management description, market capitalization at year end, market capitalization trend, CEO's commercial experience, CEO duality, data on accidents, cost of safety measures, and redundancy information. In the *T* test, these items are coded as 1 whereas other items are coded as zero. The results show the *F*

test of equal variances is significant; therefore, the unequal variance t value, 2.45, is the appropriate value to use. The mean VDS of the non-sensitive information group are 78, while the mean VDS of the sensitive information group are only 24. The *p* value is significant at 1 percent level, meaning the mean VDS of the sensitive information group are significantly lower than that for the non-sensitive information group.

These results indicate clearly that listed firms in the Chinese stock market feel more comfortable disclosing information on their operational areas, such as changes in sales/profit, expenses, inventory levels and market share. Firms are also keen to disclose their future strategy, new projects or products under development, and their forecast of earnings for the near future. On the other hand, firms choose not to disclose more sensitive information, such as CEO duality and data on accidents. Information such as stock price performance, market capitalization at year end or market capitalization trends are rarely discussed by the majority of listed sample firms, although some firms disclosed their size of shareholdings and type of shareholders. It is interesting to note that no information on year end stock price was voluntarily disclosed until 2001. A low level of voluntary disclosure is consistent with the research finding of Liu (2005) that listed firms do not disclose sensitive information such as year-end share price and share price trends.

In respect of corporate governance disclosure, the voluntary disclosure of CEO's commercial experience is only significantly higher in Phase II, with a mean VDS of 10.5, compared to 4.75 and 3 in Phase I and Phase III, respectively. The disclosure of the commercial experience of CEOs is relevant to investors because commercial experience can be used as one of the benchmarks to assess the quality of firms' senior management. In the early stage of corporatization of SOEs, the senior managers, the board and supervisory committee members were Chinese Communist Party (CCP) officials without any commercial experience (Xu & Wang, 1999). The appointment of non-commercially experienced CEOs of listed firms was caused by the majority holdings by the state. Tam (1995) conducted a survey which confirmed that nearly 54% of board vice-chairmen in listed firms in the Chinese stock market were members of the CCP committee. Tam (1995) also suggests a high percentage of CCP members on boards reflect the nature of the continuing bureaucratic power of the administrators and the CCP members. The CSRC suggests the selection of management personnel of listed firms should be carried out in a fair and transparent manner. The nominated candidates should possess relevant professional knowledge and the capacity to make good business decisions. A significant increase in voluntary disclosure in this area during Phase II reflects the listed firms' realization of how value-relevant the commercial experience of CEOs is to investors.

The sample firms start to disclose their CEO duality from Phase II. CEO duality is another main corporate governance issue among Chinese listed firms, as Tam (1995) and Firth *et al.* (2007) point out. CEO duality has impacted on the effectiveness of a board in its various functions as it undermines the board's independent ability to oversee the senior managers. The board's role as an effective guardian of stockholders' interests in the system of corporate governance may also be jeopardized. It has been argued that separating the two roles allows the development of initiatives, innovation and more effective leadership of the firm (Fama & Jensen, 1983). The survey conducted in China by Tam (1995) revealed 60% of board chairmen among listed firms were also the CEOs of firms, and 25% of vice-chairmen were either CEOs or Deputy CEOs. This issue is significant enough to attract the regulatory body's attention. In 2001, the CSRC recommended that listed firms separate the roles of CEO and chairman. Xiao and Yuan (2007) showed that in 2002, there was only 11% CEO duality among the 559 listed firms investigated in their study. The disclosure of CEO duality in Phase II and Phase III could be seen as firms' responses to the CSRC's pressure during this period of time.

Insert Table 3 Here

3. High level of forward-looking information disclosure

Disclosure items, including future strategy, new developments, forecasts of sales/profit, current strategy and earnings forecasts, have all presented strong voluntary disclosures over the years. The results show that listed firms in the Chinese stock market give preference to forward-looking information disclosure. Forward-looking disclosure involves financial forecasts such as next years' products, strategies, plans, forecasted performance and the anticipated earnings, revenues and cash flows. Forward-looking disclosure also involves risks and uncertainties that could significantly affect actual results and cause them to differ from projected results.The results in Table 4 further confirm this disclosure characteristic. Table 4 compares forward-looking information and non-forward-looking information disclosure. Forward-looking information items are coded as 1, while non-forward-looking information items are coded as zero for the *T* test. The forward-looking information classification in the *T* test follows Clarkson *et al.* (1994), Bryan (1997) and Kent and Ung (2003). The forward-looking information group includes a statement of corporate goals or objectives, current strategy, impact of strategy on current results, future strategy, impact of strategy on future results, review of operations, competitive environment, significant events of the year, changes in

sales/profit, changes in expenses, changes in inventory, changes in market share, new development, forecasts of sales/profit, assumptions underlying the forecast, cash flow forecasts, capital expenditure and/or R&D expenditure forecasts and earnings forecasts.

Given the F value is 6.25 and p value is less than 0.0001, it is appropriate to use the unequal variance t value, -4.78. The mean VDS of the forward-looking information group are 117, while the mean VDS of the non-forward-looking information are 24. The p value of unequal variances is 0.001, indicating the mean VDS of the forward disclosure group is significantly higher than the mean VDS of the non-forward-looking information group. The importance of forward-looking information for users of corporate financial information has been addressed by official pronouncements in the US and Canada in the *Jenkins Committee Report* (AICPA, 1994), the Financial Accounting Standards Board (FASB, 2001) and the Canadian Institute of Chartered Accountants (CICA, 2002). Benefits of forward-looking information and factors attributed to the level of forward-looking disclosure have been investigated by Bryan (1997), Clarkson *et al.* (1999) and Schleicher and Walker (1999).

In China, the forward-looking information is addressed by one of the most important regulations stipulated by the CSRC - *The Standards of Contents and Formats of Information Disclosure by Public Issuing Companies*. Under the 1999 version of this regulation, the CSRC only encouraged listed firms to disclose their operational plan in the next financial period, including progress to be made on new projects. Under the 2003 version, Article 39 expands forward-looking information disclosure by stating that the board of directors of listed firms may disclose an annual business plan, including (but not limited to) income, cost and expenditure budget, new operational goals such as increasing sales, market share, reducing cost and budget for research and development expenditure. Firms that disclose the above information should also give information on strategies that need to be implemented and actions that will be taken in order to achieve the above goals. If listed firms wish to disclose the forecast for the next financial year's profit, the forecast needs to be verified by their CPA firms.

Although disclosure of forward-looking information is not mandated by the CSRC, the results in this study show listed firms actively respond to the CSRC's calls for forward-looking information disclosure. The forward-looking information found from sample firms' annual reports include forecasts of sales for the coming year, discussion of the growth opportunities of major customers, next year's targets for growth in revenue, projected cash flow, projected earnings, percentage growth goals for revenue, earnings per share (EPS) and return on equity (ROE). However, a common characteristic of the above disclosure is that listed firms prefer to disclose positive and qualitative forward-looking information, rather than negative and quantitative information. This result is similar to the findings of Kent and Ung (2003), which suggest most Australian companies do not provide quantitative earnings forecasts in annual reports. Although more than half of the firms under investigation disclose forward-looking information relating to future earnings, they do not specifically disclose point estimates for the future, and they mostly supply qualitative information with a positive bias. Disclosing more forward-looking information among listed firms, therefore, provides further support to Hypothesis 1.

Insert Table 4 Here

7. Conclusion

This paper investigates the response of listed firms to the institutional environment created by the Chinese government regulatory agency of the Chinese stock market, the CSRC, over the years in respect of their voluntary disclosure. Using institutional theory, this paper argues that the regulatory body of the stock market in China has created coercive isomorphism, in order to promote transparent information disclosure and investor protection to listed firms. Depending on the CSRC's approval and support, listed firms are able to get access to the capital market in raising capital funds from investors. Therefore, this paper suggests that for the purpose of institutional legitimacy, listed firms would increase their voluntary disclosure to the stock market.

The investigation is conducted by examining the voluntary disclosure made by 297 listed firms in their 1995-2006 annual reports. The findings of this study show the trend of voluntary disclosure made by listed firms across the early stage to the established phase of the Chinese stock market and main characteristics of voluntary disclosure. The voluntary disclosures made by listed firms in the Chinese stock market increased over the three testing phases. The number of disclosing firms increased significantly from Phase I to Phase II for all three disclosure sections. Consistent with the number of disclosing firms, the voluntary disclosure scores of the three disclosure sections also increased dramatically during Phase II. These results show that listed firms positively reacted to the coercive isomorphic created by the CSRC in the stock market. Among the three disclosure sections, strategic information disclosure is found to have the highest voluntary disclosure scores, followed by financial information and non-financial information. Close examination of the three disclosure sections demonstrates that listed firms are selective in their information disclosure. Forward-looking information, under both the strategic information and

financial information sections, was found to have a strong connection with voluntary disclosure, meaning that to satisfy the information demand of regulatory agencies and the investment community, listed firms used voluntary disclosure for the purpose of institutional legitimacy in the Chinese stock market.

There are two implications for future research. First, it would seem desirable that future studies address the information usefulness of voluntary disclosure in the Chinese stock market by exploring, first, value relevance of voluntary disclosure and, second, the linkage between voluntary disclosure and economic benefits. Second, one of the findings of this study is that listed firms are in favour of forward-looking information disclosure. Future research could examine whether the forward-looking information voluntarily disclosed by listed firms possesses accuracy and predictability in the Chinese stock market.

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Table 1. Descriptive statistics of the three information sections in the three testing phases

Testing phase	Disclosure section	Mean	Max.	Q3	Median	Std. Dev.
Phase I	Strategic information	0.653	6.000	1.000	0.000	0.917
	Financial information	0.334	3.000	1.000	0.000	0.659
	Non-financial information	0.076	3.000	0.000	0.000	0.292
Phase II	Strategic information	2.436	10.00	4.000	2.000	1.807
	Financial information	0.761	5.000	1.000	0.000	0.991
	Non-financial information	0.210	4.000	0.000	0.000	0.583
Phase III	Strategic information	3.937	14.00	5.000	4.000	2.409
	Financial information	0.961	6.000	2.000	0.000	1.256
	Non-financial information	0.143	4.000	0.000	0.000	0.544

Table 2. Descriptive statistics on Phase I, Phase II and Phase III - comparisons of disclosure categories

| | Comparisons between Phase I and Phase II | | Comparisons between Phase II and Phase III | |
| | | *p*-value | | *p*-value |
Category	*t*-stat	(two-tailed)	*t*-stat	(two-tailed)
GI	3.0	0.25	3.0	0.25
CS	7.5	0.01*	7.5	0.06
MA	4.0	0.01*	14	0.02
FP	7.8	0.01*	7.0	0.05
OUS	4.0	0.15	3.0	0.25
PI	14	0.01	5.0	0.13
FR	1.5	0.50	-1.5	0.50
PRI	12	0.01*	3.0	0.25
FC	3.0	0.25	-0.5	1.00
ST	1.5	0.50	3.0	0.25
OUF	4.0	0.15	4.0	0.15
DIR	1.5	0.50	-0.5	1.00
EI	7.5	0.06	-12	0.05
SP	4.0	0.25	-2.0	0.50
OUN	1.5	0.50	-1.5	0.50
TOTAL DISCLOSURE	39.5	0.01*	28.5	0.07

*Significant at 1 % level

Table 3. Comparison of sensitive information and non-sensitive information

Variable : mean of disclosure					
Sensitive information	N	Mean	Std Dev	Std Error	Maximum
0	41	78.28	92.65	16.64	310
1	9	24.04	32.45	7.443	125
Variances	*t-stat*	DF	*p-value*		
Unequal	2.45	48.00	0.010		
Equal	2.98	40.50	0.005		
For H0: Variances are equal		F = 8.15		DF = (30, 18)	Pr> F = <0.0001

Table 4. Comparison of forward-looking information and non-forward-looking information

Variable : mean of disclosure					
Forward looking information	N	Mean	Std Dev	Std Error	Maximum
0	32	24.09	39.20	6.930	156
1	18	117.4	98.01	23.10	310
Variances	*t-stat*	DF	*p-value*		
Unequal	-4.78	48.00	0.001		
Equal	-3.87	20.10	0.001		
For H0: Variances are equal	F = 6.25			DF = (17, 31)	Pr> F = <0.0001

Do Monetary Policy Transparency, Independence and Credibility Enhance Macro-Financial Stability?

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Abstract

This paper, using panel data approach, evaluates the effect of, respectively, the central bank transparency, independence and credibility on, respectively, the level and variability of realized and expected economic performance. It also analyzes the effects of central banks characteristics on the level and variability of Government bond rate. The results obtained suggest that central bank independence does not influence the realized and expected level and variability of economic performance. As for the central bank transparency, our findings are consistent with the view that greater transparency could have a desirable reputational effect that lowers inflation expectations and long-term nominal interest rates. Finally, our results show that central bank credibility negatively influences the level and variability of Government bond rate.

Keywords: Central bank transparency, Credibility, Independence, Financial market, Macroeconomics variables

1. Introduction

The role of central bank credibility (CBC) is of great importance in order to improve macroeconomic and financial outcomes. On the one hand, it leads to price stability by anchoring private sector inflationary expectations and is also associated with sustainable growth (Cechetti and Krause, 2002). On the other hand, by lessening monetary policy uncertainty, it induces a smaller variability of financial assets since the anchoring of inflation expectations will lead to a reduction in the level of the interest rates (Fisher hypothesis). However, the conduct of monetary policy is made in face of tremendous uncertainty concerning the economy as a whole (supply or demand shocks). Kydland and Prescott (1977) showed that only an unanticipated monetary policy could affect macroeconomic variables in an environment where economic agents form their anticipations rationally. In this respect, Barro and Gordon (1983) demonstrated that there is always a trade-off between credibility and flexibility. Indeed, the difference between output stabilization and price stability can be viewed as the main difference between discretion and rules.

In fact, monetary policy rules seem to be optimal in terms of credibility but they lack of flexibility. Therefore, the time consistent monetary policy is the one conducted in a discretionary manner, but it evolves an inflationary bias. Rogoff (1985) proposed to delegate the monetary policy to conservative and independent central banks in order to gain in credibility and be able to reduce the created bias. Both theoretical and empirical researches identify central bank independence (CBI) as the institutional device associated with lower inflation and no less growth (Note 1). Indeed, CBI is instituted in most of the central banks but raises the question whether it is democratic or not to consider unelected officials in the conduct of monetary policy (Stiglitz, 1998). Hence, the role of central bank transparency (CBT) appears to be crucial because it renders central bankers accountable but also more credible in the eyes of the public. According to Cukierman (2001), Faust and Svensson (2001), and Geraats et al., (2006), the advantages of greater transparency on the credibility, as well as reputation and flexibility, derive from the fact that transparency makes it easier for the private sector to infer the central bank's intentions regarding monetary policy

decisions, improving though central bank's credibility. Central bank incentives to build reputation increase as private sector inflation expectations become more sensitive to monetary policy actions and outcomes that are not associated with economic shocks. Simultaneously, central bank flexibility is enhanced by the fact that monetary policy decisions that are intended to offset economic shocks are transparent, leading to a better stabilization of the economy without affecting private sector inflation expectations. Those advantages of transparency should able to deliver better overall policy outcomes, reduce uncertainty related to the monetary policy, decrease the heterogeneity in agents expectations and lower the risk premium related to future inflation and the interest rates level (Geraats et al., 2006).

In the empirical literature, a large strand of empirical research is focused on the effects of CBC, CBT and CBI on the macroeconomic variables of inflation and output growth (level and variability). Several empirical studies including Alesina (1988; 1989), Grilli et al., (1991), Cukierman et al., (1992), Ismihan and Ozkan (2004) and Brumm (2006) find that CBI is associated with lower levels of inflation (Note 2). In contrast to the early empirical studies, Cecchetti and Krause (2002) find no influence of CBI on the level and variability of inflation. Concerning the effects of independence on output, Alesina and Summers (1993) and Cecchetti and Krause (2002) find no relation between the variability of output growth and the CBI. As for the effect of CBT, several papers highlight empirically the beneficial effect of higher transparency at the level of inflation (Kuttner and Posen, 1999, Chortareas et al., 2002; Sterne et al., 2002; Siklos, 2003; Fatas et al., 2006, Demertzis and Hughes Hallett, 2007; Dincer and Eichengreen, 2007).

These studies do not consider the effect of central bank characteristic on the private sector expectations. This latter effect are considered by few authors, such as Corbo et al., (2001), Johnson (2002), Gulkaynak et al., (2005) and Crowe (2006). All these authors analyze the effect of a greater transparency, implied by the adoption of Inflation-Targeting, on the expected inflation. The findings of these studies are ambiguous. Indeed, Crowe find that better public information is most beneficial for forecasters with bas private information, whereas Johnson find that neither the forecasts variability nor their absolute errors are reduced by Inflation-Targeting. As for Corbo et al., they find a fall in forecast errors among countries that adopt Inflation-Targeting, although the fall seems to precede the adoption of Inflation-Targeting in many cases.

As we can notice, authors, cited in the previous paragraph, analyze only the effect of a greater transparency, implied by the adoption of Inflation-Targeting, on the expectation of inflation. A greater transparency implied by all other measures could also affect the expectation of agents as well as a greater credibility or independence can also influence the expectation of agents. In this context, we contribute to literature by taking into account the effect of CBC, CBT and CBI on expected inflation and output, respectively.

Our second implication rests on the effects of central bank characteristics on the financial market. Alesina and Summers (1993) argue that interest rate variability is decreasing with higher CBI, suggesting that more credible central banks benefit from less variable interest rates. As for the effects of CBT, there is only few studies examining empirically the direct effects of CBT on financial market. Siklos (2004) notices that nominal interest rates are lower for countries with a clear inflation objective. As for Geraats et al., (2006), analyzing the effects of various transparency changes, they found that greater transparency have had a significant beneficial effect on the level of interest rates. As we notice, these studies are very limited compared to our objectives, which consist to analyze the effects of CBI, CBC and CBT on the level and the variability of interest rates.

Finally, many of the existing empirical studies are based on very limited country samples (see for example Eijffinger and Geraats, 2006 and Demertzis and Hallett, 2007) or utilize evidence for a single point in time (see for example Cecchetti and Krause, 2002). However, cross-section approach presents several disadvantages. Cross-section analysis does not permit the inclusion of country fixed effects. In contrast, transparency and economic outcomes may be picking up the effects of other country characteristics that are difficult to detect. In addition, a cross-section approach does not take into account the meaningful temporal variation in existing measures of CBI, CBT and CBC and in other variables retained in the estimation. During the early nineties some economies experienced dramatic changes in CBI and CBT (Note 3).

In order to take into account the country specific effects and the meaningful temporal variation in dependent and explanatory variables, we use panel data approach. That way we evaluate the effect of CBT, CBI and CBC on the level & the variability of realized and expected economic performance (inflation rate and gross domestic product rate). Furthermore, we analyze also the effects of central banks characteristics on the level and variability of Government bond rates. In particular, we analyze the relation between financial & macroeconomic variables and CBI, CBT and CBC for a long period.

This paper is structured as follows: Section 2 describes the data and the methodology used in our analysis. In Section 3, we present and discuss the results and section 4 concludes.

2. Data and Methodology

This paper investigates the relation between financial & macroeconomic variables and CBI & CBC, respectively, for the period 1991-1998. We also analyze the relation between these macroeconomic & financial variables and the CBT for the period 1999-2005. For each analysis, we consider about 20 OCDE countries (Note 4).

2.1 Data

2.1.1 Central Bank Independence, Transparency and Credibility Index

Several methods (Note 5) to construct the index of CBI are proposed in the literature. The most widely employed index is due to Cukierman et al., (1992). Based on this method, Polillo and Guillén (2005) construct an index of independence for a large sample of countries (92 countries) and for a longer period of time (1989-2000). Accordingly, we use their index in our analysis.

In the same way, in the literature, several CBT indexes are proposed (Fry et al., 2000; Mahadeva and Sterne, 2000, Bini-Smaghi and Gros, 2001; Siklos, 2002; De Haan et al., 2004; Eijffinger and Geraats, 2006; Dincer and Eichengreen, 2007). These authors construct the index either for a very limited number of central banks or a single point in time, in the exception of Dincer and Eichengreen. These authors construct an index for a large range of central banks (124) and a long period (1998-2005) (Note 6). Their index is more suitable for cross section time series analysis, and therefore we retain it in our analysis.

Finally, concerning the credibility index in the literature the most frequently used method is this proposed by Cukierman and Meltzer (Note 7) (1986). This methodology defines CBC as "the absolute value of the difference between the policymaker's plans and the public's beliefs about those plans". We use this methodology, described in appendix, to determine the CBC.

2.1.2 Macroeconomic and Financial Variables

Concerning the financial data, we use the level and variation of 5-year & 10-year government bond rates, respectively. As for the macroeconomic variables, we retain the expected & realized inflation and the expected & realized gross domestic product (GDP) growth. All data are annual and extracted from Datastream.

2.2 Model

In order to take into account the country specific effects, the meaningful temporal variation in CBI, CBT and CBC index, we use panel data approach to evaluate the effects of the CBT, CBI and CBC respectively on the macroeconomic and financial variables respectively. In this model, the dependent variable (y) can be expressed as:

$$y_{j,n,t} = a_{i,j,n,t} + b_{i,j}.x_{i,n,t-1} + \varepsilon_{i,j,n,t}, \qquad n=1,...,N; t=1,...,T \qquad (1)$$

Where x_i denotes explanatory variables that are independent of the error of the equation, ε_{it}. This explanatory variable represents the CBI, CBT and CBC index, respectively. As for the dependent variables (y_j), they correspond to the expected inflation, realized inflation, expected GDP growth, realized GDP growth, 10-year bond rate level, 10-year bond rate variation, 5-year bond rate level and 5-years rate variation. The regressions are implemented in univariate terms in order to examine the effect of the index in question on the moment of a given macroeconomic and financial variable. For instance, we regress the transparency index (x_i) on the 10-year bond rate variation (y_j).

In order to take into account the country specific effect, we use "fixed effects" and "random effects" models. Hausman (1978) test enables us to choose between the "fixed effects" and the "random effects" model.

3. Results

We now present and discuss our results.

3.1 The Effects of Central Bank Independence (CBI)

The results in table 1 indicate a negative but statistically not significant relation between the CBI and the level of realized and expected inflation respectively. Our findings are in line with results obtained by Cecchetti and Krause (2002) and Ismahan and Ozkan (2005). Similarly, we find that the variability of inflation and inflation expectations is not affected by CBI. The above results do not confirm previous theoretical suggestions (Rogoff, 1985) and are also in contrast with empirical results obtained by several authors, as Grilli et al., (1991), Cukierman et al., (1992), Alesina and Summers (1993) and Brumm (2006). Moreover, table 1 shows that the CBI does not influence the level of expected & realized GDP growth, and the level & variability of GDP growth respectively. This result is also not

consistent with theory (Rogoff, 1985). However, our observations are in line with results obtained by some authors, as Alesina and Summers (1993) and Cecchetti and Krause (2002). Finally, table 1 suggests that CBI negatively affects the level and variability of both interest rates. The negative effect on the variability of the interest rate can be explained by the reduction of uncertainty related to monetary policy. As for the reduction of the bond rate level, it is obtained through the anchoring of expected long-term inflation.

3.2 The Effects of Central Bank Transparency (CBT)

Our results show that CBT reduces the level of realized inflation & inflation expectations, but has no influence on inflation variability. These findings are consistent with recent empirically literature (Chortareas et al., 2002; Mishkin, 2004).

More information about monetary policy is not associated with sustainable growth (Table 2). Indeed, our results show that CBT negatively influences the level of economic growth and the expected economic growth respectively. We observe that our findings are not in line with previous empirical and theoretical studies on this subject (see for instance Demertzis and Hallett, 2007). Concerning now the variability of realized & expected economic growth; we notice that CBT has no implications for both variables. These observations confirm the previous empirical results (Sterne et al., 2002, Fatas et al., 2006; Demertzis and Hallett, 2007) but not the theoretical propositions of Demertzis and Hallett (2007). This latter proposition suggests that a more transparent monetary policy may be associated with more output volatility because it prevents the authorities from using policy actively to offset output fluctuations.

Finally, table 2 suggests that CBT is negatively related to 5 year and 10 year bond rate level, respectively. The results concerning the level of interest rates are in accordance with theoretical and empirical results obtained by Geraats et al., (2006). In fact, our findings are consistent with the view that greater transparency could have a desirable reputational effect that lowers inflation expectations and long-term nominal interest rates.

3.3 The Effects of Central Bank Credibility (CBC)

In order to provide a stable environment for financial market, that facilitates the task to the central bank in reaching its target, central banks seek to reduce the interest rate variability (Goodfriend, 1990; Froyen and Waud, 1995; Goodhard, 1996; Woodford, 1999). To reduce the financial instability, central banks started to enhance their credibility (Faust and Svensson, 2001). Greater credibility of central bank leads to the reduction of financial speculation and reduces the heterogeneity of markets operators' expectations about the future monetary authorities' decisions. Thus, greater credibility increases the predictability of central bank decisions and reduces the level of the interest rate and financial market volatility. Results in table 3 confirm the expected impacts of CBC on the financial market. Indeed, according to these results, CBC negatively influences the level & variability of bond rates.

Our results also show a negative relation between CBC and observed & expected inflation level. Greater CBC should improve macroeconomic outcomes. Particularly, CBC leads to price stability by anchoring private agents inflationary expectations (Cecchetti and Krause, 2002). Moreover, we find evidence suggesting an increase in the variability of realized & expected inflation. Finally, we find a negative impact of credibility on realized economic growth.

4. Conclusion

The conduct of monetary policy has moved during the past decade to a new paradigm which gives accent to central bank's credibility, independence and transparency. It is generally agreed that the above changes in the central bank's operational framework have produced better overall policy outcomes. In this paper, we investigate the empirical relationships between economic and financial performance, and the central bank characteristics described above.

We find that central bank independence has a negative affect on the level and the variability of both interest rates. Our results do not show statistically significant relations between central bank independence and all the other dependent variables. Considering the effects of central bank transparency on macro-financial variables, our results show that central bank transparency reduces the level of inflation and inflation expectations as well as the level of realized economic growth. We also suggest that central bank transparency is negatively related to 5-year and 10-year bond rate level, respectively. Finally, regarding the effects of credibility on macroeconomic and financial performance, we observe that central bank credibility negatively influences the level and variability of bond rates as well as the level of inflation and inflation expectations.

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Notes

Note 1. An overview of the theoretical and empirical cases for CBI can be found in Eijffinger and De Haan (1996), Cukierman (1998) and Kißmer and Wagner (1998).

Note 2. Cukierman et al., (1992), Eijffinger and de Haan (1996) and Walsh (2003, Chapter 8) provide an excellent summary of the empirical work.

Note 3. In their study on the effect of the transparency degree on the financial market variability, Geraats et al., (2006) notice that the variability of the interest rate and the variability of the transparency index can be very different. As a result, cross-section correlations between the (level or average of the) interest rate and transparency could be very misleading.

Note 4. These countries are listed in the Table 4 in the appendix.

Note 5. See Eijfinger and De Haan (1996), De Haan (1997) and de Haan et al., (2003) for a literature review.

Note 6. Dincer and Eichengreen used the methodology proposed by Eijffinger and Geraats,

Note 7. Bomfim and Rudebusch (2000) proposed also a method but less popular than Cukierman and Meltzer method.

Note 8. See Mishkin and Schmidt-Hebbel (2007) for the values of the inflation targets of the industrialized and emerging countries retained in this paper.

Note 9. Table 4 in Appendix displays the value of the credibility index for the countries retained in our study.

APPENDIX

In Cukierman and Meltzer's (1986) approach, the credibility index can be expressed as:

$$Cre = \begin{cases} 1 & if \quad E(\pi_t) \le \pi \\ 1 - \dfrac{(E(\pi_t) - \pi^t)}{0.2 - \pi^t} & if \quad \pi^t \le E(\pi_t) \le 20 \\ 0 & if \quad E(\pi_t) \ge 20 \end{cases}$$

Some authors, as Cecchetti and Krause (2002), while using this approach, supposed the same level for the inflation target for all the countries they retained in their study. In addition, they also assume that the expected inflation used in order to construct the credibility index is based on the realized inflation of the previous period. Contrary to these authors, we fix the same inflation target for the industrialized countries and the same target for the emerging countries. For the industrialized countries, we suppose that the inflation target is 2.125 (Note 8), which corresponds to the average of the target fixed by some central bank of industrialized countries practicing inflation target. As for the emerging countries, we suppose that the inflation target is equal to 3.25. Furthermore, the expected inflation is obtained using data from Datastream (Note 9).

Table 1. The effects of central bank independence on macro-financial variables

Dependent variables	constant	independence$_{t-1}$	model type	test Haussman
Observed inflation level	6.561**	-3.169	random effect	-3.71
	(3.46)	(-1.20)		
Expected inflation level	2.518	-2.877	random effect	-0.11
	(1.60)	(-1.15)		
Observed inflation variation	-0.915	-0.173	random effect	-88.12
	(-0.95)	(-0.09)		
Expected inflation variation	-0.171	0.009	random effect	-4.67
	(-0.30)	(0.01)		
Observed GDP level	3.914**	4.242	random effect	-4.28
	(2.00)	(1.34)		
Expected GDP level	5.792**	4.273	random effect	-0.13
	(2.78)	(1.32)		
Observed GDP variation	-0.608	1.685	random effect	0.00
	(-0.92)	(1.19)		
Expected GDP variation	-0.402	-0.726	random effect	-5.70
	(-0.50)	(-0.47)		
10-y rate level	7.382**	-3.710**	random effect	-241.27
	(11.16)	(-2.92)		
5-y rate level	8.212**	-4.242**	random effect	-123.22
	(12.52)	(-3.69)		
10-y rate variation	0.683**	-0.379**	random effect	-0.06
	(8.02)	(-2.23)		
5-y rate variation	0.792**	-0.459**	random effect	-0.13
	(8.51)	(-2.45)		

** and * indicate that the corresponding coefficient is statistically significant at the 5% and 10%, respectively.

Table 2. The effects of central bank transparency on macro-financial variables

Dependent variables	constant	transparence $_{t-1}$	model type	test Haussman
Observed inflation level	6.691**	-6.889**	random effect	-415.98
	(8.54)	(-5.54)		
Expected inflation level	8.032**	-8.134**	random effect	-207.49
	(6.54)	(-4.61)		
Observed inflation variation	-0.223	0.359	random effect	-74.35
	(-0.33)	(0.32)		
Expected inflation variation	-0.577	0.832	random effect	-72.55
	(-0.66)	(0.58)		
Observed GDP level	25.743**	-32.674**	random effect	-55699.20
	(8.60)	(-7.15)		
Expected GDP level	13.379**	-13.164**	random effect	-6730.85
	(6.16)	(-3.81)		
Observed GDP variation	-0.023	-0.747	random effect	-5620.79
	(-0.01)	(-0.27)		
Expected GDP variation	-0.791	0.964	random effect	1.46E-38
	(-0.86)	(0.62)		
10-y rate level		-9.574**	fixed effect	8.98
		(-9.26)		
5-y rate level	10.119**	-10.027**	random effect	-39.00
	(10.21)	(-7.77)		
10-y rate variation	0.224**	0.016	random effect	-5.53E-4
	(6.61)	(0.30)		
5-y rate variation	0.283**	-0.009	random effect	-2.71E-3
	(5.78)	(-0.12)		

** and * indicate that the corresponding coefficient is statistically significant at the 5% and 10%, respectively.

Table 3. The effects of central bank credibility on macro-financial variables

Dependent variables	constant	credibility$_{t-1}$	model type	test Haussman
Observed inflation level	19.293**	-14.639**	random effect	-2579.91
	(4.78)	(-3.41)		
Expected inflation level	23.668**	-21.748**	random effect	-7949.84
	(14.87)	(-12.59)		
Observed inflation variation	-8.041**	7.884**	random effect	-1058.09
	(-6.61)	(5.96)		
Expected inflation variation	-3.013**	3.155**	random effect	-174.26
	(-2.38)	(2.31)		
Observed GDP level		-7.913**	fixed effect	2061.20
		(-3.06)		
Expected GDP level	30.256**	-24.490**	random effect	-10084.15
	(7.64)	(-5.86)		
Observed GDP variation	-1.519	1.775	random effect	2,00E-45
	(-1.12)	(1.23)		
Expected GDP variation	-7.232**	7.080**	random effect	-2437.72
	(-3.49)	(3.20)		
10-y rate	14.733**	-8.756*	random effect	-3270.75
	(3.28)	(-1.91)		
5-y rate	17.090**	-10.563**	random effect	-2771.07
	(4.19)	(-2.54)		
10-y rate	1.635**	-1.167**	random effect	-0.68
	(3.10)	(-2.17)		
5-y rate	2.056**	-1.520**	random effect	-1.78
	(3.48)	(-2.53)		

** and * indicate that the corresponding coefficient is statistically significant at the 5% and 10%, respectively.

Table 4. Central bank credibility index

	1991	1992	1993	1994	1995	1996	1997	1998
Australia	0.99	1.00	1.00	1.00	0.92	1.00	1.00	1.00
Austria	0.97	0.94	0.95	0.97	1.00	1.00	1.00	1.00
Belgium	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Canada	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Denmark	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Espagne	0.89	0.88	0.92	0.91	0.90	0.95	1.00	1.00
Finlande	0.92	0.98	1.00	1.00	1.00	1.00	1.00	1.00
France	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Germany	0.89	0.89	0.91	0.98	1.00	1.00	1.00	1.00
Greece	0.67	0.68	0.66	0.72	0.76	0.76	0.86	0.88
Hungary	0.87	0.89	0.84	0.83	0.54	0.50	0.53	0.58
Iceland	0.84	0.95	0.94	1.00	1.00	1.00	1.00	1.00
Ireland	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Italy	0.88	0.90	0.92	0.94	0.87	0.92	1.00	1.00
Japon	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Korea	0.86	0.95	1.00	0.92	0.99	0.96	0.97	0.79
Mexique	0.33	0.47	0.67	0.78	0.00	0.00	0.00	0.00
Netherland	0.98	0.98	1.00	0.99	1.00	1.00	1.00	1.00
New Zeland	0.99	1.00	1.00	1.00	0.92	0.99	1.00	1.00
Norway	0.97	1.00	1.00	1.00	1.00	1.00	0.99	1.00
Poland	0.78	0.75	0.67	0.56	0.48	0.54	0.61	0.67
Portugal	0.76	0.76	0.84	0.88	0.92	0.97	1.00	0.98
Sweden	0.70	1.00	0.88	1.00	0.99	1.00	1.00	1.00
Switzeland	0.85	0.92	0.95	1.00	1.00	1.00	1.00	1.00
USA	0.94	0.99	0.98	1.00	0.99	0.97	1.00	1.00

The Effect of Bank Activity Restriction on Life Insurers' Efficiency: Evidence from European Markets

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Abstract

This paper examines the relation between bank entry restrictions into insurance operations and life insurers' operating efficiency for a sample of 21 European countries over 1995-2003. Controlling for insurance market penetration, insurance risk retention, legal environment, and the economic development of the hosting country, we document that insurers operate more efficiently in markets with lower bank entry restrictions. Our results suggest that financial deregulation has positive spill-over effect, supporting the deregulation efforts in the global financial markets.

Keywords: Bank entry restrictions, Financial deregulation,Operating efficiency,Spill-over effect

JEL Classification: G2, G22, L11;

1. Introduction

Over the past twenty years, the global trend of financial deregulation and liberalization has had major impact on the operations of financial intermediaries such as banks and insurance companies. Banks are traditionally banned from engaging in non-banking services such as cross-selling insurance products, real estate management, and securities underwriting. Following deregulation, banks have greatly expanded their products and services and have been competing with brokers, investment banking firms, and insurance companies. Economics theory predicts competition within an industry enhances efficiency and prevents monopolistic behavior. There is scant research examining the cross-industry regulation effect. To the best of our knowledge, Carow (2001) is the only empirical research that addresses this topic in the financial industry. Building on theory of contestable markets (Baumol, 1982; Baumol, Panzar, and Willig, 1983), he hypothesizes that when banks are permitted by law to offer insurance services; the incumbent insurers are less likely to extract economic rents. Given that stock price is the discounted value of future cash flow, he predicts and documents a negative stock price reaction of insurance companies to the Supreme Court Rulings that allow banks to sell insurance products.

We extend Carow (2001) by testing the effect of bank regulation on insurers' efficiency using a cross country panel dataset. We use the bank activity index from World Bank banking supervision database as a proxy of the stringency of bank regulation. This index has three components measuring the restrictiveness of bank activities in the areas of (1) security underwriting; (2) insurance underwriting and selling, and (3) real estate investment. In this paper, we focus on area (2). We hypothesize that the degree of restriction on banks' insurance operations should have an adverse effect on insurance market competition which leads to less efficient operations of incumbent insurers. To test this hypothesis, we assemble the aggregate life insurers' operating performance data and banking market regulations information for a sample of 21 European countries over 1995-2003. We document higher operating efficiency in markets with less bank entry restrictions. Moreover, markets that raise bank entry restrictions experience a negative change in operating efficiency for life insurers. As a robustness check, we also explore the relation between the composite bank activity index (i.e. the restrictions in all three areas as mentioned above) and life insurers operating performance and find similar support for our view.

We contribute to literature in two ways. First, we provide additional empirical evidence in support of the theory of contestable markets. Previous studies in this area focus on banking market. Our research is the first using a large cross country insurance dataset. Second, we join a growing body of research that explores the benefits of bank-insurance structure by documenting efficiency gains to insurers by lowering entry restrictions to banks. Our

findings support the policy initiatives aiming at lowering entry barriers to competition, thus to enhance efficiency and increase welfare of consumers. The spill-over effect documented in our study also has strong policy implications.

The rest of the paper is organized as follows. Section 2 discusses related research and hypotheses development; Section 3 describes our sample and variable constructions. Section 4 presents the empirical results. Section 5 concludes.

2. Related Research and Hypothesis Development

2.1 Barriers for Entry to Banks and Insurance Market Competition

Carow (2001) examines U.S.bank and insurance companies' stock price reactions to the Supreme Court rulings allowing banks to sell annuities and other insurance products and finds no significant changes in bank stock price and negative changes in insurance stock price. He focuses on the application of the theory of contestable markets in the insurance market. (Note 1) The main argument of the contestable market theory is that market can be contestable with a small group of incumbents with low entry barrier which creates "hit and run" opportunities. Banks are more adapt at offering products in the life and health insurance areas. As such, he shows that life and health insurance companies experienced most significant stock market losses following the Supreme Court rulings. Moreover,Carow (2001) shows that insurers wealth losses to these rulings are also related to the distribution methods, i.e., do they directly underwrite the insurance products, or use exclusive agents, independent agents, or brokers. Banks are most likely to use insurance brokers to underwrite these products. As such, insurers that use the broker distribution method are least affected by these court rulings.To our knowledge, Carow (2001) is the only empirical study that tests the impact of bank entry restrictions on insurers' performance.

With the passage of the Gramm–Leach–Bliley Act (1999),commercial banks, investment banks, securities firms, and insurance companies compete more aggressively against each other. Outside the U.S., Europe in particular, the practice of the universal banking encourages banks and the insurers both compete and cooperate. Bancassurance, i.e., marketing insurance products and services via bank networks becomes a very popular means of insurance distribution in several European markets such as France, Italy, Spain and Portugal (Legrand 2008). Empirical evidence suggests that merging bank and insurance business provides diversification benefits (Brown, Genetay &M olyneux, 1996; Genetay & Molyneux, 1998; Lown, Osler, Strahan & Sufi, 2000; Nurullah & Staikouras, 2008; Deng & Elyasiani, 2008). Others document efficiency gains through the bancassurance   structure (Fields, Fraser & Kolari, 2007a, b). Studies also stock market reactions to the announcements of bank-insurance deals (Fields, Fraser & Kolari, 2007a, b; Chen, Li, Moshirian & Tan, 2007; Staikouras, 2009). We add to this strand of literature by exploring the efficiency gains in the insurance sector by lowering bank entry restrictions into insurance operations.

2.2 Financial Deregulation in Europe

The European financial market began its major deregulation efforts in the 1980s. Aiming at creating a common market for insurance, the European Union (EU) initiated a series of reforms including the first and second insurance directives, passed between 1973 and 1990 and the third generation insurance directives in 1994. The single passport proposal was adopted which permits insurance companies to offer EU wide services through a branch office upon approval by the local regulatory authority. Consumers are free to purchase insurance from any insurer based in the EU. These reforms lead to a major wave of mergers and acquisitions (M&As) in the European markets. ((Note 2)Rees and Kessner (1999) examine the impact of a series of insurance directives aiming at harmonizing European insurance markets. They argue that these initiatives do not have the intended effect of stimulating competition across borders until there is a set of unified insurance laws across these markets. Prior research show mixed results on efficiency gains of consolidation in the financial services industry (Berger and Humphrey 1997). Berger (2003) conducts a research review on the efficiency effects of a single financial services market in Europe. He finds that the creation of a single market is unlikely to result in strong efficiency gains.Hussels, and Ward (2004) document an efficiency improvement in German life insurance industry post the adoption of the third Generation Insurance Directive. Cummings and Rubio-Misas (2001) examine the effects of deregulation and consolidation in Spanish insurance industry (1989 ~ 1998). As a result of major consolidations, the number of insurers declined significantly − small, inefficient, and financially under-performing firms were eliminated through liquidation. However, they also find that some large insurers still operate inefficiently.

Research reviewed above focus on the direct impact of financial regulation on either banks or insurance companies with the exception of Carow (2001), we extend his research by testing the spill-over effect of banking regulation on insurers using a large cross-country panel dataset. Our main hypothesis is formally stated as follows:

Hypothesis I: restrictions on insurance operations by banks are inversely correlated with the efficiency of insurance companies.

Finding support for this view would be consistent with the theory of contestable markets. Moreover, we conjecture that insurance companies operate more efficiently following a decrease in banking regulations.

3. Data and Variable Construction

3.1 Sample

We assemble country-level life insurers' net premium, operation expenses, insurance market penetration, and risk retention ratio for a set of 21 European countries from 1995 to 2003 using Organization for Economic Cooperation and Development (OECD) bank profitability and insurance statistics database. (Note 3) Our measure of bank entry barrier is based on the bank activity index from the bank regulation and supervision surveys conducted by the World Bank. (Note 4) This survey contains a set of three bank activity regulatory variables measuring the extent to which banks are permitted to engage in underwriting and selling (1) securities; (2) insurance; (3) real estate; In this study, we focus bank activity regulations in area (2) and construct a variable *Insure* index which takes on integer values of 1 ~ 4 indicating four levels of restrictiveness:

Insure =1: Unrestricted - A full range of activities in the given category can be conducted directly in the bank.

Insure =2: Permitted - A full range of activities can be conducted, but all or some must be conducted in subsidiaries.

Insure =3: Restricted - Less than a full range of activities can be conducted in the bank or subsidiaries.

Insure =4: Prohibited - The activity cannot be conducted in either the bank or subsidiaries.

The first World Bank regulation and supervision survey covers 117 countries between 1998 and 2000. (Note 5) It also updated this data in 2003 and 2008 respectively. Since our OECD insurance statistics database ends in 2003, the final sample is the intersection of these two data sources. Our final sample is unbalanced and consists of 169 country year observations from 1995 to 2003. The bank activity index thus contains the original World Bank survey and the 2003 update information. See Appendix A: Distribution of Insurer Index by Country for time period 1(1995-1999 survey I) and 2 (2000 – 2003 survey II).

3.2 Regression Model

We use the standard panel data estimation technique — a country fixed effect model specified as follows (Equation (1) & (2)).(Note 6) See Appendix B for variable definitions.

$$OE = \beta_0 + \beta_1 Insure + \beta_2 Penetration + \beta_3 Retention + \beta_4 Law + \beta_5 Log(GDPpercap) + \varepsilon \qquad (1)$$

$$OE = \beta_0 + \beta_1 Insure\_H + \beta_2 Penetration + \beta_3 Retention + \beta_4 Law + \beta_5 Log(GDPpercap) + \varepsilon \qquad (2)$$

3.2.1 Operating Expense Ratio (OE)

Our measure of insurance market operating efficiency is the total operating expenses tonet premium ratio. High OE indicates low operating efficiency.

3.2.2 Insure Index (Insure, Insure_H)

Our primary variable of interest is Insure Index as described in section 3.1. We also include a binary variable Insure_H (Equation 2) to account for possible non-linear effect of bank regulation. Insure_H is set to 1 if a country's insure index is above median and zero. A positive and significant coefficient (β_1) supports our hypothesis.

3.2.3 Market Penetration (Penetration)

Market penetration is the ratio of a nation's gross insurance premiums to its gross domestic product (GDP) ratio. It captures the relative importance of the insurance industry in the domestic economy. We expect that insurers operate more efficiently in more developed insurance markets, i.e., a negative and significant coefficient (β_2) is expected.

3.2.4 Retention Ratio (Retention)

Cummins and VanDerhei (1979) find a significant positive relationship between riskretention and expense ratio for the insurance companies. We use the ratio of net written premiums to total gross premiums to measure the proportion of retained business and expect a positive and significant coefficient (β_3).

3.2.5 Rule of Law (Law)

La Porta et al. (1997 and 1998) first introduce the significant role of legal environments in the development of financial system and markets. Markets with strong shareholder and creditor protections should be able to allocate

capital more efficiently. Hussels et al. (2005) discuss the importance of Legal systems in facilitating insurance demand and affect insurance company's insolvency. We include the rule of law factor (Kaufmann et al., 2008) and predict a negative coefficient on this variable. (Note 6)

3.2.6 Economic Development (Log(GDP))

We use the log of Gross Domestic Product (GDP) per capita to control for the effect of economic development. Prior insurance literature shows a non-linear relationship between economic development and insurance penetration − insurance penetration initially rises with the GDP. After the GDP reaches a certain level, penetration plateaus. There exists no direct evidence on the relationship between insurance efficiency and GDP per capita. We predict a negative coefficient on this variable, i.e. a positive relationship between economic development and insurers' operating efficiency.

4. Empirical Results and Discussions

Below we first present the time trend plot of European insurance market development, followed by some descriptive statistics, univariate tests, and regression results.

4.1 Time Trend Plot

Figure 1 presents the time trend plots of life insurance penetration by insurance index for the full sample. It appears both high and low insurance index countries experienced significant growth in insurance penetration up to year 2000. This is the period leading up to the establishment of the Economic and Monetary Union of Europe. Low insurance index markets have much higher insurance penetration compared to their counterparts.

To further explore the impact of *Insure* index on insurance market efficiency, we examine the subsets of markets that experienced either an increase or a decrease in bank activity restriction (insure index risers vs. decliners). Our full sample contains 169 country year observations. About 1/3 of the sample experienced no change in bank insurance regulations based on World Bank supervision and regulation survey 1 & 2 results. We have 112 country year observations that had either an increase or decrease in Insure index. From this subsample, we construct two groups − index risers, i.e. markets that raisedinsure index in survey 2 period; and indexdecliners, i.e. markets that lowered insure index in survey 2 period. Using these two groups, Figure 2 plots the time trend of their respective operating expense ratio. We identify a steady increase in operating expense ratio for index risers. By contrast, index decliners exhibit lower operating expense ratio post 1999. These results are consistent with our hypothesis that lowering bank entry barriers promote competition. As such, the incumbent insurers are forced to operate more efficiently.

4.2 Univariate Results

Table 1 presents the summary statistics. Table 2 presents the results of the test of mean differences of between high and low *Insure*index markets. It shows that life insurers operate significantly less efficiently in high *Insure* index markets. These results are consistent with previous trend plots and provide some preliminary support for our hypothesis that operating efficiency of insurers is positively related to market openness to bank entry.

4.3 Regression Results

Table 3 presents country fixed effect regression results. The coefficient estimates with t-statistics have been adjusted for heteroskedasticity as in White (1980). As predicted, equations (1) and (2) both show a positive coefficient on insure index, however, it is only significant for the binary variable, suggesting that the effect of bank regulation on insurance performance may be non-linear. (Note 7) Similar to Cummins and VanDerhei (1979), we also find a significant and positive relationship between risk retention and expense. In addition, we find a significant and negative relationship between the rule of law and operating expense, consistent with Sylvester et al. (2005) showing law enforcement as a determinant of insurance market effectiveness. The negative coefficient on the log of GDP per capita supports the view that developed financial markets have more efficient insurance operations, *ceteris paribus*.

4.4 Robustness Check

As a robustness check, we replace the insurer index with the overall banking activity index (*OVER3AR*). This index measures restiveness on banking operations in areas of (1) security underwriting; (2) insurance underwriting and selling, and (3) real estate investment. High OVER3AR indicates banks have less flexibility in diversifying and competing in the non-traditional banking areas. Our hypothesis is supported using this variable.

5. Summary and Conclusion

This paper examinesthe spill-over effect of regulation on banks' insurance underwriting and selling activities on insurers' performance. Using a sample of 169 country year panel data set from 21 European nations, we show that

markets with higher levels of restrictions on banks' insurance activities have lower insurance operating efficiency. Second, markets that raised restrictions on banking activities experience significant drop in operating efficiency. Together, these findings support the contestable markets theory – low entry barriers encourage hit and run new entrants to compete with incumbents, as a result, incumbents are unable to earn economic rents in the long run. Our finding has important policy implications – regulators need to consider the "spill-over" effect when design and implement new rules and regulations.

Our study has a few limitations. Due to data limitations, our tests are conducted on a country wide basis rather than at individual firm level. Even though we document statisticalsignificance for our key variables, these results do not imply causality.Our sample period overlaps with the major deregulation insurance initiatives in the European markets. As discussed in section 2, prior research has examined the topic of consolidation and efficiency in the financial services industries and document mixed results. We do not directly control for the effect of consolidation due to data unavailability given that the major regulatory developments affect all of our sample markets.

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Notes

Note 1. The theory of contestable marketsholds that markets can be competitiveeven in the presence of a small number of firms as long as the entry barrier is low. In that case, incumbents cannot earn economic rents in the face of "hit and run" entrants.

Note 2. Cummins and Weiss (2004) document a total of 2,595 M&As involving European insurers between 1990 and 2002.

Note 3. OECD members include countries outside Europe continent. We restrict our analysis to EU countries considering these markets are more homogeneous to each other than those outside Europe. For example, Australia, Japan, and Korea are OECD members, but they are not included in our analyses.

Note 4. See Barth, Caprio, and Levine (2001) and Beck, Demirgüç-Kunt, and Levine (2001) for more discussions on this data.

Note 5. Most data was collected as of 1999.

The Hausman test statistics indicates fixed country effect is more appropriate than random effect mode.

Note 6. Kaufmann et al. (2008) developed a series of six governance indicators that examine the effect of legal and government factors on a nation's financial market development. Their Worldwide Governance Indicators include: (1) voice and accountability, (2) political stability, (3) absence of violence, (4) government effectiveness, (5) rule of law and (6) regulatory quality. Sylvester et al (2005) noted law enforcement as a factor leading to insurance market effectiveness. Hence, we chose the rule of law factor rather than the other governance factors to be included in our efficiency model. The correlation analysis also indicates these six factors are highly correlated.

Note 7. We run regression with a quadratic term of insure index and find a positive coefficient for the quadratic term. This suggests that the adverse impact of restriction on bank operations on insurers performance starts after the insure index reaches a certain level.

The Impact of Socioeconomic Factors and Financial Access on Microfinance Institutions

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Abstract

This paper is an attempt to unravel new factors that contribute to the success of microfinance institutions "MFIs." We investigate whether countrywide socioeconomic characteristics and financial access can impact MFIs' performance. Using data on 222 MFIs we find that countrywide socioeconomic characteristics such as fertility, income and education are important determinants of MFIs' performance. For example, profitability of MFIs is more likely to fall and default on loans is more likely to rise if fertility rate increases. We also find that countrywide financial access indicators have significant impact on MFIs' performance. For example, access to commercial banks deposit accounts has a significant and positive impact on MFIs' success. Access to loans and commercial banks outreach appear to have a negative impact on MFIs' performance. These results are important as they contradict the generally accepted assumption that commercial banks and MFIs operate in two different market segments and, hence, they are not direct competitors. Overall, the results suggest that several socioeconomic characteristics and financial access elements are important ingredients in evaluating MFIs' performance.

Keywords: Microfinance, Sustainability, Socioeconomic, Financial access

1. Introduction

Access to credit is seen as one strategy to reduce poverty in developing countries. Lack of collateral, cost of screening and monitoring, and cost of enforcing contracts are some factors that make lending to the poor unprofitable. In the past couple of decades, a growing number of financial institutions have developed alternative lending mechanisms reversing the conventional wisdom that lending to poor households is doomed to failure. Microfinance institutions (MFIs) provide small loans to poor households for starting productive business activities or expanding their current ones. The number of MFIs is estimated around 10,000 providing loans to more than 100 million small entrepreneurs worldwide.

The cost of providing microfinance services is high due to the high costs of transaction and information. To cover these costs, a large number of MFIs still depend on donors' subsidies. Depending on subsidies however cannot guarantee the provision of microfinance services on a long-term basis. Financial sustainability of the MFIs therefore becomes a critical issue. Financial sustainability is broadly defined as the ability to cover cost without external subsidies from donors or governments. Given the role that microfinance can play in combating poverty, this paper evaluates some factors of success and failure that affect the sustainability of the MFIs. One strand of literature focuses on factors related to institution-specific characteristics and practices such as contract design, organizational structure, client targeting policies and management techniques. See for example Cull et al. (2007), Armendariz de Aghion and Morduch (2005), Kaboski and Townsend (2005), and Luzzi and Weber (2006). Another strand focuses on the effect of macroeconomic conditions, macro-institutional elements, and overall financial development on the MFIs' performance. See for example Honohan (2004), Ahlin et al. (2010), Hartarska and Nadolhyak (2007), and Gonzales (2007).

The effect of countrywide socioeconomic factors on MFIs' performance has been overlooked in the literature. Microfinance institutions operate in different countries with diverse socioeconomic environments. We specifically investigate the following questions: Do socioeconomic factors matter for MFIs' performance? Is it easier for an MFI to grow within a more educated society? Does income per capita have any implications on the MFIs' performance? Do MFIs perform differently depending on the religion of the country? Do MFIs grow faster or slower if borrowers families are large?

Despite the perception that making loans to the poor is a bad debt, returns to MFIs rival those of commercial banks. High return on lending to the poor has convinced commercial banks such as Citigroup and Deutsche Bank that the poor are no longer un-bankable. Large commercial institutions are now showing more interest in microfinance which increases the poor's access to credit. While the effect of county-level financial environment on MFIs has been investigated in the literature, this paper seeks to understand the consequences of using different set of relevant financial indicators on MFIs. More specifically, this paper considers the effect of the expansion of commercial banks and therefore the diffusion of financial services on MFIs performance.

The effects of socioeconomic factors and commercial bank expansion on MFIs' performance do not have absolute answers in economic theory. We believe that different components of socioeconomic factors and different indicators of financial access may affect MFIs' performance in different directions. This paper empirically investigates the nature of direction of these relationships.

The rest of the paper is organized as follows. Section 2 provides an overview of related literature. Section 3 describes estimation methodology. Data and variables used are discussed in section 4. For readability and smoothness reasons, the priori expectations and the empirical results are presented together in Section 5. Section 6 provides limitations to this study and section 7 contains concluding remarks.

2. Literature Review

There is a significant literature on financial performance and financial efficiency of MFIs. Yaron (1994) devised what is called the *Subsidy Dependence Index* (SDI) to indicate the minimum level of interest rate charged to borrowers in order for the institution to cover all operating costs. Using this index, Hulme and Mosley (1996) showed that the vast majority of the institutions in their sample were still dependent on subsidy. Similarly, Morduch (1999) showed that if Grameen Bank had to pay 15.3% for loans in 1996 then Grameen would have to charge its borrowers a nominal interest rate of at least 40%.

Chaves and Gonzalez-Vega (1996) examined the factors of success of the Rural Financial Intermediaries (RFIs) in Indonesia. They concluded that the RFIs who have the financial resources but lack access to the required information and contract information tools can take advantage of local agents who have inexpensive access to information and monitoring by recruiting them with a system of compatible incentives.

Armendariz de Aghion and Morduch (2005) put together the conventional and controversial issues surrounding subsidies. Acknowledging the fact that subsidies can be a good investment, the authors expressed some concerns; proper usage of the subsidy, reliance on subsidies that limit the scale of operation, donors' strong push for financial sustainability has forced some MFIs to devise innovations to reduce subsidies suggesting that the cost-benefit analysis may overstate the benefits of subsidies, and the eventual "donor fatigue" when subsidies disappear as donors choose to move on.

Cull et al (2007) pioneered the use of cross-country and cross-MFI data. The data set contains 56 individual lenders, 48 group-based lenders and 20 village banks drawn from 49 countries. They found that raising interest rates to very high levels does not guarantee higher profitability or cost minimization. Up to a certain level, profitability of

individual-based lenders that charge higher interest rates is larger than others. Beyond that threshold interest rate, profitability falls because of greater loan defaults and falling demand for credit. In contrast, financial performance of group-based lenders does not improve as interest rates increase. They found that individual-based lenders with higher cost of labor are more profitable. According to the authors, individual-based lenders are careful about selecting and monitoring customers which required more labor force. For group-based lenders, who use local information to select and monitor borrowers, they found that labor costs had no significant impact on their profitability.

Using data for 435 MFIs over the period 1997-2007, Hermes et al (2009) investigated the relationship between financial development and MFIs efficiency. The authors find that more developed financial systems contribute to more efficient MFIs. Generally, efficiency gains are attributed to competitive pressure that stimulates MFIs to diversify their financial services and to spell-over effects.

In a more recent work, Ahlin et al (2010) use data on 373 MFIs and merge it with more than 70 country-level economic and institutional data. They found that economic growth has a significant and beneficial impact on MFIs performance and that MFIs in more financially developed economies are associated with lower operating costs, lower default rates, and lower interest rate, suggesting that competition benefits micro-borrowers. They also documented the adverse impact of labor force participation rates and the share of manufacturing in the economy on the growth of the MFIs. The authors' overall results suggest that the country macroeconomic and institutional environments are important determinants of MFIs performance.

Our paper differs from the literatures in its emphasis on some new factors that may affect MFIs sustainability. First, it focuses on the effects of the countrywide socioeconomic conditions that are overlooked in the literatures. Second, it uses a new set of financial indicators to examine the nature of the relationship between MFIs performance and commercial banks expansion.

3. Estimation Methodology

The estimation Methodology of this paper follows Ahlin et al (2010). Let y_{ijt} be a year-t outcome of MFI i located in country j; M_{it} be a set of MFI-specific control variables at time t; X_{jt} be a set of socioeconomic factors describing country j; and Z_j be a set of financial access proxies for country j at time t. Following Ahlin et al (2010), we also include a set of macroeconomic variables. Let W_{jt} be a set of macroeconomic variables capturing country j at time t. The baseline specification is

$$y_{ijt} = a_1 + \alpha_2 M_{it} + \alpha_3 X_{jt} + \alpha_4 Z_j + \alpha_5 W_{jt} + \varepsilon_{ijt}. \tag{1}$$

This specification pools all MFIs and estimates. The outcome of the MFIs is measured using four variables; operational self-sufficiency, sufficiency index, write-of-ratio and at risk ratio. The MFI control variables include a quadratic in age and institutional legal status dummies. The socioeconomic factors include a quadratic lagged per capita GDP (income), education index, fertility rate, and the main religion in each country. The financial access factors include access to deposits, deposits capacity, loan access, loan liability, and commercial bank outreach. The macroeconomic variables include annual growth in real GDP, manufacturing value added, workforce measured as labor force to population aged 15-64, foreign direct investment as percentage of the GDP, and inflation.

Similar to Ahlin et al (2010), we estimate conditional median functions rather than conditional mean functions. This is because errors may be correlated with MFIs and outlier problems can be potentially severe. Coefficient estimates of the conditional median functions minimize the sums of absolute residuals rather than the sum of squared residuals. Conditional median functions tend to be less susceptible to outlier problems compared to least squares. To account for within MFI standard errors correlations, we use bootstrap standard errors, clustering by institution. We use 1000 repetitions.

4. Data and Variable Description

We use the microfinance institution data from Mix Market. This organization provides financial performance data from microfinance institutions worldwide, as well as some business information from market facilitators and leading donor organizations and investors in the microfinance field. The data is available online on exchange Mix Market (www.mixmarket.org).

We select the data based on their level of reliability. To do so, we only include MFIs with four and five diamonds. Mix Market classifies the MFIs into five diamond categories according to the reliability of the data. The MFIs rated with four and five diamonds provide the most reliable data. Our dataset includes observations from 2000 to 2008

with a minimum of five observations or more for each of the four dependent variables. Therefore, for every MFI's performance variable, we require having at least five observations during the period 2000 to 2008.

Description of the variables and summary statistics are provided in Table 1. We use four variables to proxy for the MFI performance; operational self-sufficiency (*OSS*), sufficiency index (*SI*), write-off-ratio (*WOR*) and at-risk-ratio (*ARR*). The first two variables measure profitability while the other two measure risk. Operational self sufficiency is the ratio of annual financial revenue to annual total expense. The higher this ratio is, the better the performance of the MFIs to meet their expenses and to generate profits. Sufficiency-index is the ratio of financial revenue to total expense plus financial revenue.

The write-off-ratio is the average value of loans written-off during a year to the average gross loan portfolio. This ratio indicates the magnitude of losses of MFIs due to unpaid loans and is therefore a proxy for financial risk. Finally, the at-risk-ratio is defined as the values of loans unpaid for more than 30 days to the average gross loan portfolio. While the first risk ratio proxies for realized losses, the second focuses on expected losses.

The MFI control variables include the institutional type and the age of the MFI. This data is also obtained from the Mix Market. The age of the MFI is the number of years since it was established (*AGE*). We include age and its square to control for the fact that the relationship between age and MFIs performance may change over time. To control for the fact that different types of MFIs may have different levels of profitability and risk, we consider four institutional-type dummies: banks, Non-Government Organizations (*NGO*), Non-Banking Institutions (*NBI*) and Credit Unions (*CU*). We use banks as the base institutional type.

This paper also investigates the effect of socioeconomic factors on MFIs. To do so we select a set of variables that shows the overall countrywide socioeconomic characteristics. These variables include a quadratic in lagged per capita GDP (*INCOME*); an education index (*EDUCATION*), and average fertility per female (*FERTILITY*). The education index used is for 2007. According to the Human Development Report the education index is defined as "Mean of years of schooling for adults aged 25 years and expected years of schooling for children of school going age. Mean years of schooling is estimated based on duration of schooling at each level of education (for details see Barro and Lee, 2010). Expected years of schooling estimates are based on enrolment by age at all levels of education and population of official school age for each level of education. The indicators are normalized using a minimum value of zero and maximum values are set to the actual observed maximum values of the indicators from the countries in the time series, that is, 1980-2010. The education index is the geometric of two indices." Another socioeconomic variable used is the religion of the borrower which may impact commitment to repay the debt. We include three dummies to indicate the main religion of country *j*; *CHRISTIAN*, *MUSLIM* or *HINDU*. In our sample, almost 60% of MFIs are located in Christian countries, 26% in Muslim countries, 7% in Hindu countries and 7% in countries with other religions such as Buddhism. Other religions are used as the base religion. Data on income per capita and fertility rate, education index, and religion are obtained from World Bank, the United Nation 2010 Human Development Report, and from the Association of Religion Data Archives respectively. Data used for income per capita, fertility rate and religion cover the period 2000-2008. Data used for education is only for the year 2007.

One important research question in this paper is the impact of borrowers' access to commercial banking on the performance of MFIs. Data on financial access are obtained from the Consultative Group to Assist the Poor (CGAP) 2009's report. The CGAP collected the first set of indicators of financial access in countries around the world in 2005 and updated these indicators for selected countries in 2008. Building on this work, Financial Access in its first annual series of 2009 introduces new data from a survey of financial regulators in about 139 countries. It includes indicators of access to savings, credit, and payment services in banks and regulated non-bank financial institutions. Variables used to proxy for financial access to commercial banks are access to deposit (*DEPOSIT ACCESS*), deposits capacity (*DEPOSIT CAPACITY*), loan access (*LOAN ACCESS*), loan liability (*LOAN LIABILITY*), and commercial bank outreach (*CB-OUTREACH*). Access to deposits is defined as the number of deposits opened with commercial banks per 1000 adults; deposit capacity is the average deposit balance divided by per capita income; loan access is the number of loans given by commercial banks per 1000 individuals; loan liability is the average loan balance divided by per capita income; and commercial bank outreach is number of bank branches per 100,000 adults.

Given the evidence of complementarities between MFI performance and the broader economy found by Ahlin et al (2010), we include annual growth rate in real GDP (*GDP GROWTH*), manufacturing value added (*MANUFACTURING*), workforce measured as the labor force to the population aged 15-64 (*WORKFORCE*), foreign direct investment as a percentage of the GDP (*FDI*), and inflation (*INFLATION*); same as those used by Ahlin et al (2010). The country-level data were obtained from the 2010 World Development Indicators Report.

5. Results

The results are reported in Tables 2 and 3. Table 2 reports the main regression results with respect to the effect of the countrywide socioeconomic and financial access variables on MFIs' profitability and risk ratios. The combined effects including macroeconomic variables are reported in Table 3. Table 3 corroborates Ahlin et al. (2010) findings that reveal the importance of macroeconomic environment in understanding and evaluating the success of MFIs.

5.1 Control Variables

Similar to those found by Ahlin et al (2010), the results show that there is an evidence of learning curve effect. An increase in the age of the MFIs initially improves profitability. After a turning point, at an age of 18 years in our study, a further increase in age worsens MFIs' profitability. The overall results indicate that the type of the MFI matters. Unsurprisingly, the overall results show that credit unions types of MFIs have higher profitability than non-profit counterparts.

5.2 Socioeconomic Factors

This section discusses our a priori expectations and the empirical results on the effect of different socioeconomic aspects on MFIs' profitability and risk.

Income: For low income countries, the demand for microfinance services is expected to be high. Also, at low income levels, an increase in income is expected to increase the demand for goods and services produced by microenterprises. These two factors may therefore help MFIs to thrive. In richer economies, however, the demand for microfinance services is expected to be low and the demand for goods and services produced by microenterprises are expected to be low as people move away toward higher quality goods and services generally produced by large and well established firms. Growth of MFIs is therefore expected to be limited in richer economies. The relationship between per capita income and MFIs' performance therefore is expected to be nonlinear. To capture this nonlinearity we include *INCOME* and its square root *INCOME2*.

While the signs on *INCOME* and *INCOME2* are consistent with our expectations in both tables, the results in Table 2 show that income level has no significant impact on profitability and risk factors of MFIs. In the full model in Table 3, income has a statistically significant impact on MFIs through its effect on the write-off-ratio. As income, *INCOME*, increases from low levels the ratio of unpaid loans to total loan portfolio falls. A further increase in income (*INCOME2*) seems to increases the risk variables but the effect is statistically insignificant. We also considered the linear function of INCOME. The effect of INCOME was found to be statistically insignificant in all models. In general, these results moderately corroborate our expectations according to which MFIs face more uncertainty in relatively richer economies.

Education: The impact of education on MFIs' sustainability does not have a definite answer. On one hand, we would expect the demand for microfinance services to fall as potential borrowers get more educated. More education increases the chance of getting employed by either the public or private sector and increases access to commercial banks that offer larger loans at lower interest rates than MFIs. Potential borrowers with higher education are therefore expected to be less credit rationed; have less unfulfilled demand for credit. Consequently, commitment of the more educated borrowers for loan repayment from MFIs might be less than the commitment of the less educated borrowers with higher unfulfilled demand for credit. These factors may negatively impact the MFIs sustainability. On the other hand, within MFIs' borrowers, more educated people are expected to be more productive in their microenterprises which strengthen their ability in loan repayment. Higher repayment rates induced by more educated borrowers may improve MFIs sustainability. In terms of signs, the overall results on *EDUCATION* in Tables 2 and 3 seem to favor the first explanation. Education shows a positive and statistically significant impact on only the unpaid loans of the MFIs, *WOR*. The results suggest that the need of microfinance services and the commitment for loan repayment among the less educated borrowers may actually help the MFIs growing faster.

Religion: MFIs do not provide grants to the poor; they provide loans at significantly higher interest rate than those provided by commercial banks. It is legitimate at this point to ask if differences in religion beliefs of borrowers have any impact the MFIs' sustainability. Lending at interest or excessive interest has been intensely criticized on religious grounds. Old Hinduism and Buddhism expressed sentiments of contempt for interest rate. Currently, while condemned in principle, interest charged above the prevailing range is no longer prohibited or controlled in any significant way in both Hinduism and Buddhism. Early Christianity started out by prohibiting interest on lending. Increasingly thereafter Christianity allowed acceptable levels of interest rate; however, an excessive rate has not been acceptable. The criticism of interest rate in Islam was well established and prohibited in the Holy Quran but the interpretation of interest rate has not been universally accepted or uniformly applied in the Islamic countries (Visser and MacIntosh (1998)). Demand for microfinance loans can therefore be reduced based on religious prescriptions

and this may affect MFIs sustainability. Religion beliefs can also affect the sustainability of the MFIs by encouraging borrowers to be productive in their enterprises and by assuming honest intention in repaying the debt.

In general, the results in Tables 2 and 3 show that the religion dummies are not strong predictors of the MFIs profitability and risk. Except for the positive and significant effect of *MUSLIM* on the at-risk-ratio, the differences in the effect of religion on all other dependent variables are statistically insignificant. An explanation of the positive effect of *MUSLIM* on the at-risk-ratio may lie in the following: In Islam borrowing at non-zero interest rate is prohibited. However, such Islamic law is usually not applied in most Islamic countries. This may reduce the demand for MFIs services by the relatively religious potential borrowers and may affect the performance of some MFIs. In fact, to alleviate this potential problem, some MFIs attempt not to explicitly use the concept of interest and refer to it as "cost of borrowing" or as "administrative fees" instead. For some MFIs to expand, they may need to take some more risk and be more lenient in terms of late repayment which increases at-risk-ratio.

Fertility: Fertility could be an indication of the magnitude of financial obligations on the family head which reduces the family's repayment capacity. On the other hand, larger family size could also indicate the availability of free family-labor to utilize the microcredit loans. This reduces the cost of running a micro-enterprise and enhances the family repayment capacity and therefore the MFIs' profitability. Therefore, the relationship between fertility and MFIs is not straightforward. The average number of children per female, *FERTILITY*, shows a negative and statistically significant impact on MFIs' profitability and a positive and statistically significant impact on MFIs' risk. The results suggest that higher rates of fertility thwart MFIs' sustainability. Fertility might be a drain for micro-enterprise profit due to the increase in households' consumption and the reduction in their repayment capacity and consequently the MFIs' sustainability.

This result can be of particular interest knowing that seven out of ten microfinance clients worldwide are women. See for example Daley-Harris (2003). Indeed, the results in part may provide a rationale of the women-empowerment's mission carried out by many MFIs through fertility reduction. Microfinance programs may affect fertility decision by increasing the opportunity cost of women's time; urging them to reduce family size in order to increase education and health expenditures and improve their repayment performance. Pitt et al (2003), Da Vanzo and Mizanur (1998), and Armendariz and Roome (2008) are among many studies that examine the relationship between MFIs and women empowerment. To the best of our knowledge, this paper is the first to record the effect of fertility on MFIs' sustainability.

5.3 Financial Access

This section discusses our a priori expectations and the empirical results on the effect of different financial indicators on MFIs' profitability and risk.

Deposit Access: Results in tables 2 and 3 show that *DEPOSIT ACCESS* and *DEPOSIT CAPACITY* both have positive and statistically significant impact on MFIs' profitability but show no effect on risk variables. The fact that more deposit access and capacity improve the MFIs' profitability seems inconsistent. Indeed, we would expect lower income individuals to have greater access to commercial bank deposit services as these become widely available. Put differently, the MFIs' share of the deposit services provided and their profitability are expected to fall as the penetration of commercial bank deposit service rises. However, it is important to notice that deposit services are usually directed to the relatively higher income clients, not to the poor. Microfinance industry has focused its attention in providing loans to the poor with little emphasis in expanding deposit services. In fact, more than 80 percent of deposit services are provided by commercial banks. Cooperative, specialized state financial institutions, and microfinance institutions provide around 20 percent. Microfinance institutions hold only about 1 percent of deposits, concentrated mostly in developing countries as documented by the CGAP 2009 report.

How then can one explain the positive impact of commercial bank deposit access on MFIs' profitability? We offer two possible explanations. First, the availability of deposit services in a country is influenced by some factors including the overall level of economic activities, economic development and trust in the financial system. All these factors may play a positive and an important role on the profitability of the MFIs. In this, deposit access can be thought as an indicator of the overall macroeconomic conditions that may positively impact the MFIs' performance. Second, the increase in access to deposit services and deposit capacity both reduce the amount of loans provided by the informal moneylenders to the poor leaving the MFIs with a larger population of borrowers to serve. Greater deposit access may siphon away potential borrowers from the informal moneylenders which increases the demand for the MFIs' loans and enhances the MFIs' profitability.

The positive impacts of deposit access and deposit capacity on MFIs' profitability support the findings of both Ahlin et al (2010) and Hermes et al (2009) that financial development complements MFIs' performance.

Loan Access: We would expect commercial banks to start offering loans to the relatively richer clients and then move to lower income clients as they expand. An increase in the access of lower income clients to loans from commercial banks leads borrowers to substitute their loans from MFIs for loans from commercial banks. Lower borrowing costs, larger loan sizes, and more borrowing options provided by commercial banks divert borrowers from MFIs to commercial banks. This substitution effect reduces the demand for loans from the MFIs which in turn reduces the MFIs' profitability. In addition to this, an increase in loan access with larger loans by the poor allows them to get multiple loans from different financial institutions which may have negative impact on their repayment performance with the MFIs. Lower repayment rates by borrowers would reduce profitability of the MFIs. Our results show that the effects of *LOAN ACCESS* and *LOAN LIABILITY* on profitability measures are all negative as expected in both Tables 2 and 3. Except for the effect of *LOAN ACCESS* on the first profitability measure in Table 3, however, the effect of the loan access variables are not statistically significant.

While *LOAN ACCESS* shows significant and positive impact on the risk of the MFIs, *LOAN LIABILITY* unexpectedly shows significant and negative impact on the MFIs' risk variables. More access to loans is expected to increase the MFIs' risk for two possible reasons. First, as mentioned above, an increase in loan access reduces MFIs repayment rates and increases MFIs' risk. Second, MFIs might be forced to take more risk and be more aggressive in lending as they face more competitive environment. The effect of *LOAN LIABILITY* on the risk variables, however, seems to be counter intuitive. The overall results on *LOAN ACCESS* and *LOAN LIABILITY* suggest that the expansion of commercial banks hamper the sustainability of the MFIs.

Commercial Banking Outreach: The effect of *CB-OUTREACH* on profitability measures is negative and statistically significant in both Models 2 and 3. The effect of *CB-OUTREACH* on the risk variables is statistically insignificant. The results on the outreach of commercial banks support the general theme that competition reduces profit. As commercial banks' penetration, in terms of the number of bank branches per 1000 adults, increases, MFIs' profits fall.

Results on credit and commercial bank outreach contradict the general conclusion by Ahlin et al (2010) and Hermes et al (2009) that financial development complements MFIs. Our results show that different financial indicators can have different effects on the performance of the MFIs. For example, our results suggest that while access to deposit in commercial banks has positive impact on MFIs' profitability, access to loans from commercial banks and commercial bank outreach both have negative impacts on MFIs' performance. We believe that the overall effect of financial development on MFIs' performance needs further analysis.

5.4 Macroeconomic Variables

While the emphasis of this paper is not on the effect of the broader economy on MFIs' performance, we believe it is crucially important to include macroeconomic features in our model. Ahlin et al (2010) and Ahlin and Lin (2006) find that the success of MFIs is significantly affected by the macroeconomic environment. They found an evidence of complementarities between MFIs performance and the broader economy. In Table 3, we include similar macroeconomic variables to those used in Ahlin and Lin (2006). We use the original macroeconomic variables used by Ahlin and Lin (2006).

The overall results in Table 3 validate Ahlin et al (2010) findings. This is most obvious in the effect of growth in GDP on both profitability and risk variables, *OSS* and *ARR*.

6. Limitations

While this paper establishes a significant relationship between socioeconomic variables and MFIs' performance and between the degree of financial access and MFIs' performance, it still has some limitations: First, the causal effect of socioeconomic factors and financial access cannot be perfectly established. For example, strong MFIs can be thought as a source of improving socioeconomic factors and enhance the demand for commercial banking services. However, given the small size of the MFIs reverse causality would be implausible. For example, while MFIs may affect fertility and income of its clients, it is unlikely to affect these variables at the national level given that MFIs clients usually make small part of the overall population. By the same token, we can ask whether a sound microfinance sector increases the income of its clients and therefore increases the access to formal financial sector. Once again it is unlikely for this to happen given the small size of the MFIs' borrowers relative to the overall pool of borrowers served by the formal financial sector. Second, we believe that omitted variable bias is still a problem. The range of factors that lead to a sound MFI can be vast; degree of credit rationing, methodology of lending (group vs. individual), diversification of financial services provided, gender target, and the use of technology are among many of these factors. Studying the impact of these variables may lead to possibly more interesting results. Finally, the main focus of this paper is to examine the importance of socioeconomic and financial access factor in evaluating MFIs' performance, not to draw policies.

7. Conclusion

Given the role that microfinance can play in combating poverty, this paper evaluates some components of success and failure that affect the sustainability of the MFIs. In particular, it evaluates the effects of socioeconomic and financial access factors on MFIs' performance using two hundred and twenty two MFIs worldwide.

This paper highlights an interesting relationship between socioeconomic factors and the performance of MFIs. The most evident and prominent among those is the negative impact of fertility on the MFIs' performance. Higher fertility rate of borrowers increases their consumption needs and financial obligations which lead to slower growth in MFIs. Even though the evidence is not as strong, education appears to increase the MFIs' risk in terms of unpaid loans while income reduces it.

While borrowers' access to deposits, and deposits capacity appear to improve MFIs' sustainability, borrowers' access to loans, loans liability and commercial bank outreach appear to worsen sustainability. This result raises an important question. Does financial development complement or rival MFIs? Our paper suggests that different aspects of financial development have different effects on MFIs performance. For example, access to deposit may reflect the overall economic activity and trust in the financial system, which in return may help MFIs' expansion and sustainability. Also, the participation of commercial banks in wholesale lending to the MFIs would help MFIs' expansion. On the other hand, commercial banks outreach and access to loans are found to hinder MFIs' sustainability.

In conclusion, we believe that, among other factors, the overall socioeconomic and access to formal banking are imperative in understanding and evaluating MFIs performance.

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Table 1. Variables Description and Summary Statistics.

Variable	Obs	Description	Mean	Std. dev.	Median	25th percentile	75th percentile
OPERATING SELF SEFFICIENCY (OSS)	1307	Financial revenue / (Financial expense + Loan loss provision expense + operating expense)	121.83%	41.78%	117.78%	103.03%	135.91%
SUFFICIENCY INDEX (SI)	1307	Financial revenue / (Financial expense + Loan loss provision expense + operating expense + Financial revenue)	53.62%	7.90%	54.08%	50.75%	57.61%
WRITE-OF RATIO (WOR)	1256	Annual value of loan written off / annual average gross loan portfolio	1.70%	4.20%	2.81%	0.00%	1.75%
At risk ratio (ARR)	1358	Value of loans at-risk >30 days / annual average gross loan portfolio	4.97%	7.85%	2.81%	0.01%	0.06%
INCOME	1416	Real GDP per (1000s of constant 2000 $)	1.32	0.04	1.00	0.40	2.02
EDUCATION	1416	Education composite index 2007	76.45%	16.23%	88.10%	64.30%	89.10%
MUSLIM	1416	Dummy that takes 1 if the main religion of the country is Islam	--	--	--	--	--
CHRISTIAN	1416	Dummy that takes 1 if the main religion of the country is Christianity	--	--	--	--	--
HINDU	1416	Dummy that takes 1 if the main religion of the country is Hinduism	--	--	--	--	--
FERTILITY	1416	Average number of children per female	3.17	1.27	2.84	2.39	3.64
DEPOSIT ACCESS	1328	Number of Deposit accounts opened with Commercial Banks per 1,0000 adults	560.36	453.36	516.90	273.70	716.40
DEPOSIT CAPACITY	1248	Average deposit balacnce / per capita income	221.29	219.30	165.50	62.50	259.10
LOAN ACCESS	1019	Number of loans with Commercial Banks per 1,0000 adults	160.73	158.92	71.60	38.30	349.00
LOAN LIABILITY	908	Average loan balacnce / per capita income	2,427.33	6,042.65	632.90	141.50	1,374.60
CB-OUTREACH	1402	Number of bank branches per 100,000 adults	10.57	13.51	7.50	4.00	11.60
GDP GROWTH	1416	Annual growth rate in real GDP	5.17%	4.58%	4.55%	2.67%	7.22%
MANUFACTURING	1407	Manufacturing vaue added (% of GDP)	15.38%	5.39%	15.93%	13.55%	18.12%
WORKFORCE	1416	Labor force / Population aged 15-64	72.53%	9.32%	72.61%	66.48%	77.10%
FDI	1416	Net Foreign direct investement inflows (% of GDP)	4.25%	6.04%	2.79%	1.16%	5.00%
INFLATION	1415	Annual consumer price inflation	7.28%	6.68%	5.80%	3.42%	9.09%

Notes: We provide summary statistics for the dependent variables and for the independent variables used in our regressions for the period 2000 to 2008. We also provide the description of each variable.

Table 2. Baseline (Pooled) Results

	Profitability				**Risk**			
	OSS		SI		WOR			ARR
	Estimate	Stadard Error	Estimate	Stadard Error	Estimate	Stadard Error	Estimate	Stadard Error
Control Variables								
AGE	2.362***	0.489	0.501***	0.127	0.0114	0.021	0.103	0.064
AGE2	-0.0606***	0.013	-0.0129***	0.003	0.000164	0.001	0.00179	0.002
CU	15.77*	8.467	3.192**	1.618	-0.581	0.419	-1.387	0.872
"NBI	"	1.136	2.849	0.0381	0.544	-0.157	0.199	-0.753
NGO	-10.29***	3.582	-2.228***	0.774	-0.404**	0.205	-1.117	0.727
Socioeconomic Variables								
INCOME	-1.172	6.172	-0.135	1.288	-0.277	0.256	-0.941	0.604
INCOME2	-0.329	0.714	-0.113	0.179	0.0343	0.041	0.0989	0.073
EDUCATION	0.0211	0.213	0.00281	0.046	0.0137**	0.006	0.00861	0.021
MUSLIM	4.795	7.044	1.085	1.307	0.119	0.467	2.195***	0.666
CHRISTIAN	8.512	6.193	1.561	1.438	0.241	0.415	1.479	1.064
HINDU	-14.06	10.740	-3.014	1.912	0.0217	0.402	0.0193	0.654
FERTILITY	-7.940***	1.960	-1.586***	0.457	0.13	0.100	1.095***	0.348
Financial Access Variables								
DEPOSIT ACCESS	0.0418	0.027	0.00832	0.006	-0.000707	0.001	0.000948	0.001
DEPOSIT CAPACITY	0.0353**	0.015	0.00733**	0.003	0.000426	0.001	0.00201	0.001
LOAN ACCESS	-0.0385	0.037	-0.00611	0.009	0.00245*	0.001	0.0104***	0.004
LOAN LIABILIT	-1.84E-04	4.92E-04	-3.32E-05	1.12E-04	-3.67E-05	1.82E-05	-7.29E-05	7.08E-05
CB-OUTREACH	-1.011**	0.455	-0.205**	0.096	0.00328	0.009	-0.0241	0.022
CONSTANT	111.7***	22.800	52.66***	4.750	-0.757	1.056	-4.820**	2.300
N	823		823		789		856	

Notes: In each column we run a median regression using the profitability and risk as dependent variables. The significance level used are 10%, 5% and 1% denoted by *, **, and *** respectively.

Table 3. Baseline (Pooled) Results with Macroeconomic Variables

	Profitability				Risk			
	OSS		SI		WOR		ARR	
	Estimate	Standard error	Estimate	Standard error	Estimate	Standard error	Estimate	Standard error
Control Variables								
AGE	1.954***	0.578	0.411***	0.136	0.038	0.028	0.124*	0.071
AGE2	-0.0541***	0.014	-0.0115***	0.003	-0.00053	0.001	0.00142	0.002
CU	17.28**	8.319	3.933**	1.614	-0.299	0.415	-2.007*	1.035
NBI	0.803	3.192	0.152	0.574	-0.12	0.214	-0.94	0.662
NGO	-9.432**	3.905	-2.229**	0.949	-0.399*	0.211	-1.326*	0.710
Socioeconomic Variables								
INCOME	10.7	8.498	2.498	1.877	-0.687*	0.368	-1.114	0.680
EDUCATION	-0.2	0.249	-0.0428	0.057	0.0232***	0.008	0.0154	0.026
MUSLIM	7.858	7.191	1.734	1.161	0.123	0.433	1.595**	0.764
CHRISTIAN	10.48	7.019	2.004	1.482	0.278	0.473	0.313	1.027
HINDU	-5.449	13.830	-0.783	2.634	-0.352	0.398	0.428	0.920
FERTILITY	-9.671***	2.808	-2.217***	0.576	0.15	0.119	1.226***	0.365
Financial Access Variables								
DEPOSIT ACCESS	0.0465*	0.027	0.00824	0.005	-0.000465	0.001	-0.00176	0.002
DEPOSIT CAPACITY	0.0335**	0.016	0.00610**	0.003	0.00042	0.001	0.000588	0.001
LOAN ACCESS	-0.0725*	0.041	-0.0146	0.010	0.00282*	0.002	0.0176***	0.005
LOAN LIABILITY	-4.80E-04	5.26E-04	-1.15E-04	1.31E-04	-1.52E-05	2.21E-05	-1.68E-05	8.76E-05
CB-OUTREACH	-0.979**	0.495	-0.181*	0.104	-0.00677	0.014	0.0425	0.029
Macroeconomic Variables								
GDP GROWTH	0.747**	0.376	0.121	0.087	-0.00611	0.020	-0.148**	0.067
MANUFACTURING	-0.569	0.874	-0.16	0.174	0.00473	0.015	0.0837*	0.0482
WORKFORCE	0.641	0.404	0.156*	0.094	-0.0255*	0.016	0.0414	0.034
FDI	-0.231	0.420	-0.0671	0.090	-0.000183	0.016	-0.115***	0.042
INFLATION	-0.0932	0.307	-0.028	0.066	0.000219	0.005	0.0079	0.032
CONSTANT	85.91**	42.430	47.83***	8.489	0.386	(1.412)	-8.248**	3.643
N	823		823		789		856	

Notes: In each column we run a median regression using the profitability and risk as dependent variables. The significance level used are 10%, 5% and 1% denoted by *, **, and *** respectively.

The Determinants of Mergers and Acquisitions: Evidence from Turkey

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Abstract

This study examines the financial variables that predict the merger and acquisition targets in Turkey. Cox regression with segmented time-dependent covariates is used to determine the factors that predict target companies for mergers and acquisitions. The firms that are analyzed are among the top 500 industrial enterprises in Turkey. We find that a lower pretax profit margin is associated with an increased chance of being a merger or an acquisition target. In addition, the lower the debt ratio, the more likely the firm will be a target for a merger or an acquisition.

Keywords: Mergers and acquisitions, Targets, Cox regression, Cox proportional hazards model, Turkey

1. Introduction

The mergers and acquisitions (M&As) literature denotes that companies that are targets of M&As attain significant positive abnormal returns (e.g., Jensen and Ruback, 1983; Huang and Walkling, 1987). Consequently, numerous studies that are motivated to identify target companies establish prediction models for M&As. The literature considers certain firm characteristics to contribute to being a target company. The size hypothesis argues that smaller firms are more likely to become acquisition targets due to lower costs of absorbing smaller targets into the acquirers' organizational structures (Palepu, 1986; Walter, 1994). The inefficient management hypothesis argues that bidders tend to acquire poorly run firms and benefit from value-enhancing changes (Manne, 1965; Palepu, 1986). Financial leverage hypothesis argue that firms with high unused debt capacity are attractive M&A targets (Palepu, 1986; Stulz, 1988). The liquidity hypothesis contends that the likelihood of merger increases with an increase in the liquidity of the target because excess liquidity makes it possible for the acquirer to finance the acquisition with the target's own resources. The growth-resources imbalance hypothesis argues that firms with a mismatch between their growth and liquid financial resources provide potential gains to acquiring firms. Asset undervaluation hypothesis argues that firms with low market-to-book ratios are viewed as undervalued and are attractive for M&As.

Empirical studies that test these hypotheses result in contradictory findings. To our knowledge, there is only one study that examines the financial variables that predict the target companies in Turkey. Ucer (2009) finds that the probability of being acquired increases with an increase in size, financial performance and financial leverage for the firms listed on the Istanbul Stock Exchange. The author provides evidence that is counter to hypotheses regarding size, inefficient management and financial leverage.

This paper contributes to the literature by providing the first attempt to predict M&A targets in the Turkish context using the financial data of a group of top industrial enterprises. Segmented time-dependent Cox regression model is used to determine the effect of financial variables on M&As. Results show that a firm faces a higher chance of being a target for a merger or an acquisition with a decrease in its pretax profit margin and debt ratio.

This paper is organized as follows. Section 2 includes a review of the theoretical and empirical literature on the issue of financial characteristics of M&A targets. Section 3 describes the data and section 4 depicts the research methodology. Section 5 presents the variables. Section 6 discusses the empirical results of the study and section 7 concludes.

2. Literature Review

Stevens (1973) argues that acquisitions compete with other capital budgeting decisions for limited funds. Thus, acquisition decisions should be consistent with shareholder wealth maximization criteria and financial characteristics of the targets should be considered in the decision process. The literature presents several firm attributes that are hypothesized to contribute to the possibility of M&As. It is suggested that size is an important

explanatory variable in M&As and smaller companies are more likely to become acquired than larger companies. (Palepu, 1986; Walter, 1994) It is argued that there are several size-related costs of acquisitions. The costs of competition with the other bidders and costs associated with the adaptation of the acquired company to the acquirer's culture can be given as examples for these size-related costs. Size hypothesis is based on the premise that these costs increase with the size of the acquired company and firms acquire smaller firms because size related costs of acquisitions will be lower for them.

Inefficient management hypothesis suggests that inefficiently managed firms whose managers fail to maximize shareholder wealth are more likely to be M&A targets (Manne, 1965; Palepu, 1986). Brealey and Myers (2010) argue that M&As are simple and practical ways to improve management.

Financial leverage hypothesis contends that the likelihood of an acquisition increases with a decrease in company debt. Firms with high unused debt capacity are regarded as attractive merger targets because low leverage reduces the risk of default and increases the debt capacity of the joint firm (Palepu, 1986; Stulz, 1988). Low leverage can also trigger a leveraged buyout transaction. Additionally, a low debt ratio can also be seen as a signal of incompetent management and the potential acquirer can hope to increase value by assuming additional debt when control is gained.

Liquidity hypothesis argues that the likelihood of being acquired increases with an increase in liquidity (Song and Walkling, 1993). Cash rich companies are attractive for acquisitions because excess liquidity gives the bidder the opportunity to finance the acquisition with the target's own resources.

The growth-resources imbalance hypothesis submits that firms with a mismatch between their growth opportunities and liquid financial resources are regarded as attractive merger targets (Palepu, 1986). A firm that has growth opportunities, but is cash poor should be an attractive merger target for a company with the reverse features. Conversely, a firm that has limited growth prospects, but has high liquidity should be an attractive merger target for a company with low growth and high liquidity.

Asset undervaluation hypothesis argues that firms with low market-to-book ratios are attractive for acquisitions because they are viewed as undervalued. Hasbrouk (1985) suggests that companies that wish to expand through acquisitions compare the cost of new investment with the cost of acquisition of an existing firm and take the cheaper option.

Empirical studies which generally use discriminant analysis and logistic regression to test the hypotheses of M&A target attributes show contradictory findings. Monroe and Simkowitz (1971) find that acquired firms were smaller in size in the U.S. However, liquidity and profitability were not important discriminators between acquired and nonacquired firms. Dietrich and Sorenson (1984) also find that the likelihood of being a target is negatively related to size in the U.S. Palepu (1986) provide support for the size, inefficient management, financial leverage and growth-resources imbalance hypotheses. Cudd and Duggal (2000) also provide support for the size hypothesis, the inefficient management hypothesis and the growth-resources imbalance hypothesis for the US. Meador, Church and Rayburn (1996) provide evidence that long-term debt to total assets ratio has a positive effect on M&As. Agrawal and Jaffe (2003) show that acquired firms do not financially underperform the nonacquired firms in the US.

Camerlynck, Ooghe and Langhe (2001) find that the profitability ratios of acquired companies are higher than industry profitability medians in Belgium. Tsagkanos, Georgopoulus and Siropolis (2006) show that takeover targets are larger and older companies with higher labor productivity and better financial performance in Greece. Hyde (2009) shows that the likelihood of being a target is positively related to profitability, and it is negatively related to size, growth, liquidity and leverage in Australia. Pasiouras, Doumpos and Kosmidou (2004) provide evidence that acquired firms have lower management efficiency and lower leverage than nonacquired firms in Greece. Basu, Dastidar and Chawla (2008) find that bidders acquire targets with lower operating efficiency, larger size, lower leverage and higher liquidity in India.

Brar, Giamouridis and Liodakis (2009) show that firm size is important for takeovers since acquired companies have on average smaller capitalization, lower market share, lower sales and a smaller number of employees than nonacquired companies in Europe. The authors could not find support for the inefficient management hypothesis and financial leverage hypothesis. Pervan, Pervan and Kljaic (2010) show that acquired companies are larger in size than nonacquired companies in Croatia. They also demonstrate lower financial performance.

Barnes (1999) shows that historical accounting data in the UK does not have sufficient predictive ability to identify takeover targets.

To the best of our knowledge, there is only one study that uses financial ratios to distinguish between acquired and non-acquired Turkish firms. The study is done on firms that are listed on the Istanbul Stock Exchange. Ucer (2009)

finds that acquired firms are larger in size, and they have higher profits than non-acquired firms. The author also shows that target firms are highly leveraged, and the increase in their total debt in the year before acquisition is also higher compared to that of the non-targets. Ucer argues that the acquisition of Turkish firms may be the result of their need for financing.

3. Data

Our sample is composed of firms that are among the top 500 industrial enterprises in Turkey. We conduct Cox regression with time-dependent covariates on 37 merged and acquired firms and 173 non-merged and non-acquired firms for the period 2004-2010. The term merger is defined as a transaction in which two companies are combined either by the creation of a new organization or by the absorption of one company by the other. Acquisition is defined as a transaction in which the majority ownership of a firm is acquired.

The distribution of the sample according to industry is presented in Table 1. Table 2 provides the yearly frequency of M&As.

4. Research Methodology

This paper employs the Cox regression with segmented time-dependent covariates as its statistical model. The Cox model is based on a modeling approach to survival data analysis, and it can be used to analyze the effect of several predictor variables on survival (Cox, 1972). The final model from a Cox regression analysis will yield an equation that is similar to that of the multiple regression analysis, except that the dependent variable is the hazard function.

The hazard function is the chance that an individual will experience an event (for example, death) at time t, given that the individual has not experienced the event until time t. The function is calculated by the division of the number of individuals experiencing the event during the time period starting at t by the number of individuals that has not still experienced the event at the start of time t multiplied by the interval width between times.

The Cox regression model with k time-dependent covariates is in this form:

$$h_i(\mid z(t)) = h_o(t) . \exp \sum_{j=1}^{p} \beta_j z_j^i(t) \qquad (1)$$

where $h_i(\mid z(t))$ is the time-dependent hazard function for firm i at time t. $z_j^i(t)$ gives the value of the jth covariate at time t for firm i. β_j is the corresponding regression coefficient for $z_j^i(t)$. $h_o(t)$ is the baseline hazard at time t which represents the hazard with all the covariates equal to 0.

The coefficient for each predictor variable is analyzed to interpret the Cox model. A positive coefficient on a predictor variable implies that the hazard of the event increases with an increase in the predictor variable. A negative coefficient implies that the hazard decreases with an increase in the predictor variable.

Because our M&As data can be interpreted as survival data, we use the Cox regression with time-dependent covariates to determine the factors that predict M&A targets. The analysis is conducted by the SPSS 20.0 software package.

5. The Variables

The financial variables used in our study are shown in Table 3. Financial data of the firms is provided by Istanbul Chamber of Industry. Data on M&A cases for publicly-traded firms are provided by Istanbul Stock Exchange. M&A cases for non-public firms are identified by news search across several news sources. Because our financial variables have different values each year and are not systematically related to time, we define them as segmented time-dependent covariates. We do not include any variable that causes multicollinearity in our estimation. Variance Inflation Factor (VIF) values above 4 indicate multicollinearity. Because none of the independent variables have a VIF value above this cutoff value, there is no problem of multicollinearity in our data.

We test the size hypothesis by using total assets as a proxy for size. Pretax profit margin, return on equity, capital productivity and labor productivity are used as indicators of management efficiency. With these variables, we have the chance to test the inefficient management hypothesis. Financial leverage hypothesis is tested by taking the debt ratio as a covariate. In addition, we look at whether merged and acquired firms and non-merged and non-acquired firms differ in terms of capital intensity and export intensity. Exposure to foreign trade leads to a greater range of experiences and skills acquisition. These experiences and skills gained should lead to a superior level of financial performance. Bidders can acquire firms with a low export intensity and benefit from the value-enhancing changes as the export intensity of the firm is improved. Therefore, we expect to find that a lower export intensity increase the chance of being a target for a merger or an acquisition.

6. Empirical Findings

Table 4 presents the results of our Cox regression analysis. The omnibus tests of model coefficients is significant at the 0.01 level showing that at least one of the covariates significantly contributes to the explanation of duration to event. We have three variables that have significant coefficients. The estimated coefficient for pretax profit margin is statistically significant at the 0.05 level. The coefficient indicates that the lower the pretax profit margin, the more likely that the firm will be a target for a merger or an acquisition. This finding provides partial support for the inefficient management hypothesis which states that acquiring firms prefer poorly run targets. The covariate effect of our other indicators of management efficiency, which are return on equity, capital productivity and labor productivity, cannot be assumed to be different from zero.

The estimated coefficient for export intensity is statistically significant at the 0.05 level. However, the coefficient indicates that export intensity has a minuscule effect on the likelihood that the firm will be a merger or an acquisition target. The estimated coefficient for debt ratio is statistically significant at the 0.10 level. The coefficient shows that a lower debt ratio is associated with an increased chance of being a target for a merger or an acquisition. This finding provides support for the financial leverage hypothesis.

Size and capital intensity do not have statistically significant coefficients. A non-significant coefficient for size shows that we cannot provide support for the size hypothesis.

7. Conclusions and Limitations of the Study

The M&As literature considers certain firm characteristics to contribute to being a target company. Research on the issue of financial characteristics of acquired companies in Turkey is deficient. This study examines the relationship between financial variables and M&As. Our sample is composed of 37 merged and acquired firms and 173 non-merged and non-acquired firms for the period of 2004-2010. The firms in the sample are among the top 500 industrial enterprises in Turkey. Because our M&As data can be interpreted as survival data, Cox regression with segmented time-dependent covariates is employed as the statistical model.

We find that the lower pretax profit margin, the more likely that the firm will be a merger or an acquisition target. This finding provides partial support for the inefficient management hypothesis which argues that bidders tend to acquire poorly-run targets to benefit from value-enhancing changes. It also suggests some degree of market discipline for the firms with poor profitability through the threat of a takeover. Our other indicators of management efficiency, which are return on equity, capital productivity and labor productivity, do not have statistically significant coefficients. In addition, we find that the lower the debt ratio, the more likely that the firm will be a merger or an acquisition target. This finding provides support for the financial leverage hypothesis which argues that firms with high unused debt capacity are attractive targets for M&As.

There are important limitations that must be acknowledged regarding our study. Because of unavailability of data, we cannot test the liquidity hypothesis and the growth-resources imbalance hypothesis. For the same reason, we cannot perform model validation with a holdout sample. Our research is constrained by the limited amount of acquired firms in our sample. Additional research with a larger dataset of acquired firms is required to verify the results. Moreover, this study uses only quantitative variables. Future studies should include qualitative variables that represent nonfinancial characteristics of firms.

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Table 1. Distribution of the sample according to industry

Industry	Number of Firms
Mining and Quarrying	2
Food, Beverages and Tobacco	33
Textile, Wearing Apparel, Leather and Shoe	26
Forest Products and Furniture	8
Paper, Paper Products and Printing	8
Chemicals, Petroleum Products, Rubber and Plastic Products	37
Non-Metal Mineral Products	23
Basic Metal	33
Metal Products and Machinery	23
Automotive	17
TOTAL	210

Table 2. Yearly frequency of M&As

2004	2005	2006	2007	2008	2009	2010
-	9	9	8	6	3	2

Table 3. Description of the predictor variables used in Cox regression analysis

Predictor Variable	Description
Pretax Profit Margin	Net Profit before Taxes/Net Sales
Return on Equity	Net Profit before Taxes/Stockholders' Equity

Table 3. continued

Capital Productivity	Gross Value Added/Total Assets*
Labor Productivity	Gross Value Added / Number of Employees (million TL, 2004 prices*)
Size	Total Assets (million TL, 2004 prices**)
Capital Intensity	Total Assets/Number of Employees (million TL, 2004 prices*)
Export Intensity	Exports/Net Sales
Debt Ratio	Total Debt/Total Assets

A full set of industry dummies is included.

*Net value added is calculated as the sum of gross wages, paid interest, paid rent and operating surplus.

Gross value added is obtained by adding depreciation and indirect taxes less subsidies to net value added.

**Inflation adjustment is done by calculating the change in wholesale price index, 2003=100)

Table 4. Results of Cox Regression with Segmented Time-Dependent Covariates

Goodness of Fit Measure		
	Chi-Square	Sig.
Omnibus Tests of Model Coefficients	104,70	0,000
Parameter Estimates		
	B	Wald Chi-Square	Sig.
Pretax Profit Margin	-10,32	4,22	0,040
Return on Equity	10,98	0,03	0,862
Capital Productivity	-10,80	0,03	0,864
Labor Productivity	-0,00002	0,00	0,974
Size	-0,00000005	0,04	0,838
Capital Intensity	-0,00000001	1,64	0,201
Export Intensity	-0,000013	4,90	0,027
Debt Ratio	-7,67	2,84	0,092

The Influence of Chief Executive Officers' Traits on Financial Risk Management Perceptions: Evidence from Malaysia

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Abstract

The main aimed of this study is to examine the Chief Executive Officers' (CEOs') traits in relation to the perceptions of financial risk management during three time periods, namely, before the financial crisis 1997, during the crisis and after the crisis. A survey questionnaire was designed and distributed to CEOs of public listed companies under the Malaysian Bourse. A total of 54 CEOs responded to the survey. The main findings of the study are as follows: a) Before and after the crisis, CEOs gave the highest priority to business risk as compared to financial risk; b) During the crisis, CEOs gave a higher priority to financial risk; c) Younger CEOs attributed the highest priority to financial risk; d) More experienced CEOs attributed the highest priority to foreign exchange and interest rate risk and e) Malay CEOs gave a higher priority to financial risk than Chinese CEOs.

Keywords: Financial Risk Management, Chief executive officers traits, Public listed companies, Malaysia

1. Introduction

Financial risk management has become a critical issue among Malaysian major companies since the Asian Financial crisis in 1997. Before the crisis most of the Malaysian companies were very complacent in managing financial risk (Yazid et al., 2011). As a result, many companies suffered huge financial losses. For example, the Malaysian Airline System experienced foreign exchange losses amounting to M$718.4 (Business Times, May 30, 1998).

It was argued by many authors (e.g., Yazid et. Al, 2011; Stoh, 2005) that company could benefit from a proper implementation of risk management program. Risk management is a proactive way of managing risks exposed by companies. In particular, financial risk management is a structured approach of managing financial risks, namely, foreign exchange risk, interest rate risk and commodity price risk.

When come to managing risks, MacCrimmon et. al (1990) suggested that CEOs' traits may influence their perception to risk and thus, may lead to differences in financial risk management practices. Thus, the main objective of this study is to investigate the relationship between CEOs' traits and their perceptions and financial risk management practices in the context of Malaysian major corporations during three time periods, namely, before the 1997 financial crisis, during the crisis and after the crisis. This paper is structured as follows: next section discusses several definitions of financial risk management, CEOs' traits and their perceptions of financial risk management. This is followed by examining the perceptions of financial risk by the CEOs as well as relationship between CEOs' traits and financial risk management perceptions. Finally, this chapter ends with a brief summary of important findings and some concluding remarks.

2. Significant of the Study

Financial risk management has become one of the critical factors in determining corporate survival. Lessons learnt during the Financial Crisis in 1997 have taught many companies not to be complacent in managing risk.

Furthermore, studies on financial risk management have been very scarce for developing countries such as Malaysia. Thus, this study adds to the existing literature and provides a better understanding on how CEOs' trait might influence their perceptions of financial risk management.

3. Literature Review

3.1 Definitions of Financial Risk Management

One of the earliest definitions of financial risk management was given by Shapiro *et al.* (1985). They referred to financial risk management as a risk-reduction technique involving the lowering the debt-equity ratio, the buying and selling forwards or futures contracts, and the purchase of insurance. Campbell and Kracaw (1993) defined financial risk management as the design and implementation of systems or procedures for controlling financial risks. Accordingly, financial risk management is a systematic approach that can be used by a firm to manage commodity prices, foreign exchange rates and interest rate risks. In this context, it has been argued that the use of financial risk management will ensure not only a firm's survival but also increase its value (Rawls, *et. al,* 1990; Nance, *et. al*, 1993).

Santomero (1995) referred to financial risk management as a process whereby a firm engages in financial transactions that reduce the volatility of its earnings. Financial risk management using financial market instruments like futures, options, and forwards can achieve these goals. Eales (1995) interpreted financial risk management as the controlling of the possibility or chance of suffering a monetary loss. In the context of corporate finance, the activities involved in controlling such risk are often referred to as hedging.

The definitions given by the previous authors have several commonalties. Most of them view financial risk management as the steps taken by a firm to avoid or minimise financial risks. These steps, in turn, are assumed to involve the use of financial instruments such as forwards, futures, options and swaps.

For the purpose of this study, financial risk management is defined as the steps taken by a firm to avoid, minimise or control financial risks by using financial instruments like futures, forwards, options and swaps.

3.2 CEOs' Risk Perceptions

The role of CEOs was expected to be crucial in influencing the management of risks. A study by Penafort *et. al* (1996) suggested that top management including CEOs play a crucial role in ensuring firms' strategies are successfully implemented. It was further argued by Ankrom (1974) that foreign exchange risk management must involve top level management. Accordingly, the decision to engage in financial risk management must be made clear by CEOs so that CEOs feel comfortable undertaking financial risk management for their firms. MacCrimmon and Wehrung (1990) conducted a study on more than 500 top-level executives in an effort to examine their risk taking behaviours. They examined their behaviour in accordance to: a) hypothetical situations underlying the theory of risk; b) revealed choices in naturally occurring events; and c) attitudes towards risk taking. They found that the most successful executives were the biggest risk takers and older executives were the most risk averse. In addition, Brehmer (1987) argued that people's attitude towards risk taking may depend on their judgement based on personal experience. If they remember a certain event that led to losses in the past, they may give higher consideration for that risk and vice-versa. Thus, CEOs' experience may affect their decisions on the management of financial risks.

In another study on risk, Hovden and Larsson (1987) suggested that CEOs' risk taking behaviour to some extend depend on culture. In addition, Theil and Ferguson (2004) argued that culture influences the way people perceive and manage risks. In the Malaysian context, Manab (2008) showed that culture plays a significant role in Enterprise Wide Risk Management practices. Therefore, it is expected that there are some differences and similarities between groups in a society. In the case of Malaysian companies, their top management usually comprises of either Malays or Chinese. Hence, it is appropriate to examine the ethnic groups of CEOs in relation to their perceptions and practices of financial risks.

Therefore, the above discussions provide incentive for the researcher to examine the CEOs' traits in relation to financial risk management perceptions.

4. Methodology

4.1 Population and Sample

The population under study consists of public listed companies under the Malaysian bourse excluding financial companies. The financial companies were not included for obvious reason that they have different risk exposures. For the purpose of this study a sample of ninety (90) companies was selected at random.

4.2 Data Collection

The unit of analysis for this study was CEOs of the Malaysian companies listed in the Malaysian Bourse. A survey questionnaire was sent to a sample of 90 companies and 54 companies responded which represent about 61 percent

response rate. The survey response rate was considered high compared to a typical mail survey of 20 to 30 percent (Vaus, 1993).

4.3 Data Analysis

Data was analysed using SPSS. Descriptive analysis was first undertaken in particular bar graph on CEOs' risk perceptions. Kruskal-Wallis test was used to examine the CEOs' traits and risk management perceptions.

5. Findings and Discussions

5.1 CEOs' Perceptions of Major and Financial Risks

Question 2 in Section B of the survey questionnaire asked CEOs about their perceptions of major risks. The major risks considered in this study were business risks, financial risks, and political risks. Question 3 in Section B of the survey questionnaire asked about CEOs' perceptions of financial risks, namely, interest rate, foreign exchange and commodity price risks.

As shown in Figure 1, among CEOs who managed financial risks, 35.3% gave the highest priority to business risks in the period before crisis as compared to 11.8% and 2% for financial risks and political risks, respectively. During the crisis, their perceptions of risks changed. The percentage that attributed the highest priority to financial risks and political risks increased to 52.9% and 11.8%, respectively. However, the percentage for business risks decreased to 33.3%. Finally, in the period after the crisis, the percentages for business risks, financial risks and political risks were 44.2%, 40.4% and 17.3%, respectively.

For CEOs who did not manage financial risks, 17.6% perceived business risks to be the highest priority in the period before the crisis as compared to only 5.8% for financial risks (Figure 2). During the crisis, 23.5% attributed the highest priority to financial risks as compared to only 15.6% for business risks. However, in the current period, 23% attributed the highest priority to business risks while the percentage for financial risks decreased to 7.7%.

Both groups seemed to give more priority to business risks in the period before crisis and in the period after the crisis, while financial risks were given the highest priority during the crisis. This could be due to a broader definition of business risks which includes uncertainties in firms' overall activities that were outside their control.

The results also show that only 19.6% of CEOs in companies with financial risk management practices perceived the highest priority to foreign exchange risk in the period before crisis. However, the percentages increased to 56.9% during the crisis and 30.8% in the period after the crisis (Figure 3). These CEOs appear to have given little attention to foreign exchange risk in the period before the crisis. Only after the crisis did they begin to give attention to the risk. On the other hand, the percentages for CEOs in companies without financial risk management who perceived foreign exchange risk as important were 9.9%, 9.8% and 11.5% for the three periods, respectively (Figure 4). Accordingly, it is not surprising that they were not involved in financial risk management.

Financial risks were given lesser priority in the period before crisis. Consequently, they also gave less priority to interest rates, foreign exchange and commodity price risks. This result is possibly due to the stable Malaysian ringgit and a booming economy. However, it is not surprising that these companies gave a higher priority to financial risks during the crisis due to high volatility in interest rates and foreign exchange rates at this time. Therefore, many of these companies attributed a higher priority to foreign exchange risk because they were involved in international business, thus exposing themselves to foreign exchange risk. In the meantime, since many of them were highly leveraged, they attributed higher importance to interest rate risk. On the whole, among the three financial risks, foreign exchange risk was given the most priority, especially during the crisis.

In the period after the crisis, after the government had imposed the capital and currency control, the percentage who gave higher priority to financial risks declined again. Consequently, the percentage who attributed the highest priority to interest rates, foreign exchange and commodity price risk also decreased as compared to the crisis period. Thus, the results imply that these companies did not learn from their experience during the crisis period. They tended to ignore these risks again. Even though foreign exchange risk was not that significant due to the pegging of the Malaysian ringgit against the US dollar, they were still exposed to currency fluctuations when the US dollar weakened or strengthened against other currencies. In the short term, they might be successful with less dependence on foreign risk management, but in the long term, it could be damaging.

Overall, political risks were given the least priority for the three periods under consideration. One possible reason for these findings could be that the huge fluctuations of foreign exchange and interest rates during the crisis resulted in more attention being paid to these risks than to political risk. Many companies who had been complacent in managing financial risks before were shocked with the huge devaluation of Malaysian ringgit.

Other reason for this phenomenon could be due to political stability in the country as well as in the ASEAN countries where most of the investments were made. However, during the crisis, the number of companies that gave the highest priority to political risk increased slightly. This possibly due to political instability at home and abroad. For example, the government of Malaysia faced a strong challenge from opposition parties especially when the Prime Minister sacked the former Deputy Prime Minister, Anuar Ibrahim (Asiaweek, January 22, 1999). The political situations in other ASEAN countries were also unstable. For example, the former President of Indonesia, Suharto, resigned due to political pressure from students (Asiaweeek, June 5, 1998).

The non-users of financial risk management gave less priority to major and financial risk as compared to the users. Business risks were given the highest priority before crisis, probably for the same reasons given for users of financial risk management. They gave the highest priority to interest rate risk due to the fact that many of them were highly leveraged. In fact, this was one of the characteristics of Malaysian companies. On the other hand, foreign exchange risk was given less priority possibly due to relatively small foreign currency exposure.

5.2 CEOs' Traits and Financial Risk Management Perceptions

The CEOs' characteristics examined in the present study were age, experience and ethnic group. Questions 2 and 3 in Section A of the survey questionnaire related to their age and experience of financial risk management. The age and experience of these CEOs were divided into five categories so that they were approximately normally distributed. They were arranged in ascending order, taking values from one to five. On the other hand, the ethnic groups of these CEOs comprised of either Malays or Chinese. It was believed that these factors would influence perceptions of risks and, thus, have differing impacts on the way that financial and foreign exchange risk was managed.

5.2.1 Results: Major and Financial Risks

As shown in Table 1, there were significant differences between CEOs' age and their perceptions of major risks in the period before crisis. In particular, 76.9% of the older CEOs gave the highest priority to business risk compared to 33.3% of the younger CEOs (Table 2). As argued above, this could be due to the broader definition used for business risk, which includes all uncertainties in relation to companies' operations. Thus, the older CEOs being more consecutive attributed greater importance to business risk. However, the younger CEOs attributed the highest priority to financial risks. This was probably due to younger CEOs being more active and willing to take more risks than the older CEOs. During the crisis and in the current period their perceptions towards major risks were the same. Perhaps all CEOs, irrespective of age, thought that higher priority must be given to major risk, especially financial risks due to foreign exchange and interest rate volatility. Furthermore, there was no significant difference between age groups for interest rate, foreign exchange and commodity price risks.

As noted earlier, experience of CEOs in financial risk management may affect their risk perceptions. The results (Table 1) showed that there was a significant difference between experience and perceptions of financial risks during the current period. More experienced CEOs (73.3%) gave higher priority to financial risks compared to 50% of the less experienced CEOs. This implies that experience did not influence their perceptions of risks before and during crisis. During the crisis, the majority of the CEOs, irrespective of experience gave higher priority to financial risks. Considerable financial losses suffered during crisis may have led them to perceive higher importance to major risks, especially financial risks. This is consistent with Brehmer's (1987) argument that CEOs would normally remembered past bad experience. In such cases, their experiences may have leaded them to attribute higher priority to financial risks in the current period.

However, there was a significant difference between experience of CEOs and perceptions of interest rate and foreign exchange rate risks during crisis (Table 1). To be more specific, less experienced CEOs attributed higher priority to interest rate risk (66.7%) while more experienced (100%) ones gave a higher priority to foreign exchange risk. In addition, there was also a significant difference between CEOs' experience and perceptions of interest rate risk in the current period. About 67% of the less experienced CEOs gave a higher priority to interest rate risk as compared to 20% of the more experienced ones. This was probably due to their familiarity with interest rate futures available from the MME. Incidentally, this is the only product offered by MME and the future is only in Malaysian dollars. It appears that more experience is needed for the inclusion of other financial products, such as options and swaps.

Lastly, ethnic groups were examined in order to study their influence on risk perception. As shown in Table 1, there was a significant difference between ethnic groups and perceptions to financial risks before the crisis and in the current period. In particular, more Malay CEOs (35.7%) attributed higher importance to financial risks than the Chinese (5.3%) in the period before crisis. Similarly, in the current period, more Malay CEOs (78.6%) gave a higher priority to financial risks than the Chinese (52.6%). This result is possibly due to the risk averse culture of the

Malays. Another possible reason could be due to the fact that Malays are still new to corporate business, especially international business.

As shown in Table 3, during the financial crisis, significant differences were evident among the CEOs' risk perceptions. For the same period, the younger CEOs' perceived the highest priority to financial risks, in particular, foreign exchange risk. This was possibly due to the volatility of foreign exchange rates during the crisis period. However, more experienced CEOs attributed the highest priority to foreign exchange risk before the crisis. One possible reason for this discrepancy could be that their increased involvement in international businesses increased their experience. And due to interest rates uncertainties, they attributed greater importance to interest rates risk in the current period. As before, more experienced CEOs gave a higher priority to interest rate risk than the less experienced ones. There was no significant difference in the perception of foreign exchange risk during crisis, probably because of the huge devaluation of the Malaysian dollar. Thus, all CEOs irrespective of experience thought that this risk must be given the most priority. Possibly due to the capital and currency control, all CEOs perceived that foreign exchange risk was not significant in the current period.

5. Conclusion

Some of the interesting findings from this particular study are as follows: a) Before and after the crisis, CEOs gave the highest priority to business risk as compared to financial risk; b) During the crisis, CEOs gave a higher priority to financial risk; c) Younger CEOs attributed the highest priority to financial risk; d) More experienced CEOs attributed the highest priority to foreign exchange and interest rate risk and e) Malay CEOs gave a higher priority to financial risk than Chinese CEOs.

As concerned ethnicity, the survey indicated that Malay managers relied more heavily on financial risk management than Chinese managers. These findings add to the understanding of financial risk management since earlier research did not include these variables. Malay managers, probably due to their risk averse culture and their lesser exposure to international business, tended to manage more foreign exchange risk. This, again, indicates that there may be a need for training, especially in relation to instruments used for hedging risks.

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Table 1. CEOs' Traits and Risk Perception – Kruskal-Wallis Test

	Chi-Square Values
Age	**Before crisis** Business risks – 6.179* Financial risks – 10.944*** Political risks – 7.056*
Experience	**Before crisis** Commodity price risk– 6.917* **During crisis** Interest rate risk– 7.668** Foreign exchange risk – 7.454* **Current period** Financial risks – 7.495* Interest rate risk – 7.770**
Ethnic groups	**Before crisis** Financial risks – 6.669*** **Current period** Financial risks – 2.610**

*** significant at 5%   ** significant at 10%   *   significant at 20%

Table 2. CEOs' Traits and Risk Perception – Kruskal-Wallis Test

	Chi-Square Values
Age	**During crisis** Financial risks – 6.491* Foreign exchange risk – 10.149*** Commodity price risks – 6.480*
Experience	**Before crisis** Foreign exchange risk– 7.392* **Current period** Interest rate risk – 9.851***

*** significant at 5%   * significant at 20%
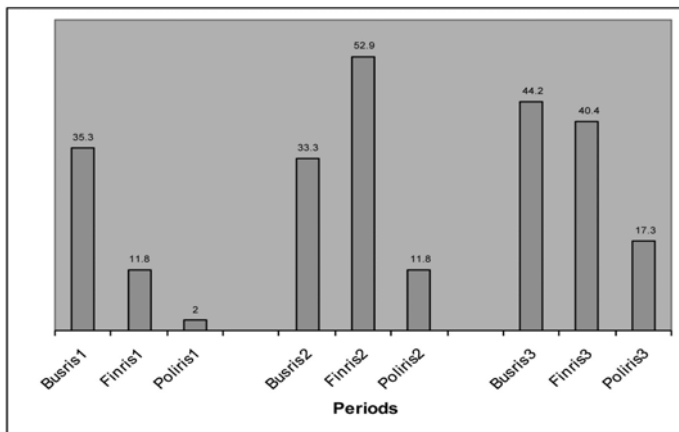
* 1 = Before crisis; 2 = During crisis; 3 = After crisis

Figure 1. CEOs' Perceptions of Major Risks Among Companies With Financial Risk Management
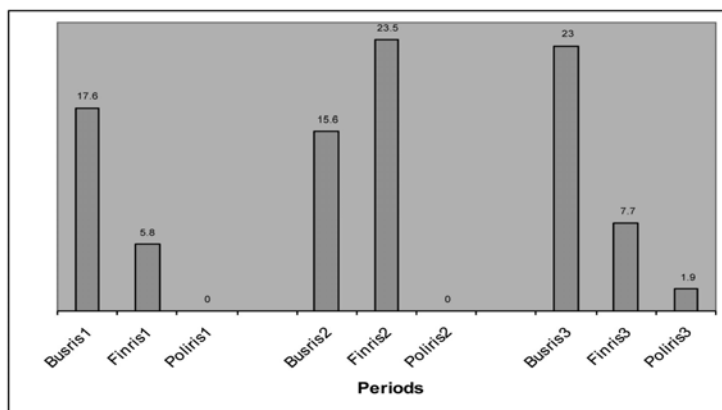
Figure 2. CEOs' Perceptions of Major Risks Among Companies Without Financial Risk Management
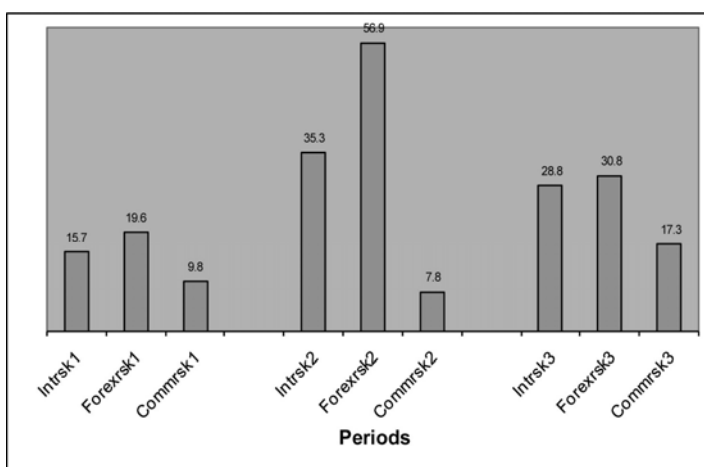
Figure 3. CEOs' Perceptions of Financial Risks Among Companies With Financial Risk Management
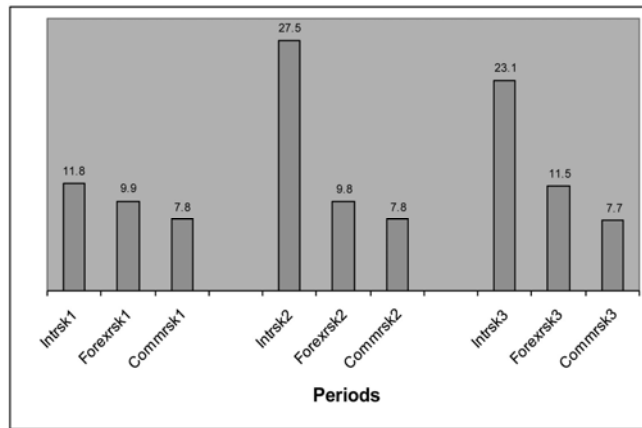
Figure 4. CEOs' Perceptions of Financial Risks Among Companies Without Financial Risk Management

Financial Performance Analysis of the Jordanian Arab Bank by Using the DuPont System of Financial Analysis

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Abstract

This study attempts basically to measure the financial performance of the Jordanian Arab commercial bank for the period 2000-2009 by using the DuPont system of financial analysis which is based on analysis of return on equity model. The return on equity model disaggregates performance into three components: net profit margin, total asset turnover, and the equity multiplier. Arab bank is one of the largest financial institutions in the Middle East and is ranked amongst the largest international financial institutions. The bank witnessed a continuation of challenges brought on by the global financial crisis. It was found that the financial performance of Arab Bank is relatively steady and reflects minimal volatility in the return on equity. Net profit margin and total asset turnover exhibit relative stability for the period from 2001 to 2009.The equity multiplier also show almost stable indicators for the period from2001-2005 and the ratios declined from 2006-2009 which indicates that the Arab bank had less financial leverage in the recent years, which means the bank is relying less on debt to finance its assets.

Keywords: DuPont, Return on equity, Net profit margin, Equity multiplier, Asset utilization

1. Introduction

For any business in the private sector there are numerous of models to describe how well the business is running. Among these the DuPont model was created in the early 1900s but is still a model valid to use for assessment of the profitability. Using the DuPont model for risk analysis is not very common but if you as a risk analysis specialist wants to talk the language of the business, it can be valuable to you.

The model was created by F. Donaldson Brown who came up with the model when he was assigned to clean up the finances in General Motors and has ever since been an important model for financial analysis. Remarkably it has not been used in the security community for risk prioritization or impact analysis. The original DuPont method of financial ratio analysis was developed in 1918 by an engineer at DuPont who was charged with understanding the finances of a company that DuPont was acquiring. He noticed that the product of two often-computed ratios, net profit margin and total asset turnover, equals return on assets (ROA). The elegance of ROA being affected by a profitability measure and an efficiency measure led to the DuPont method becoming a widely-used tool of financial analysis Liesz, (2002). In the 1970's, emphasis in financial analysis shifted from ROA to return on equity (ROE), and the DuPont model was modified to include the ratio of total assets to equity. Regarding this fact the researcher have taken the challenge to use this model for Arab bank the largest bank in Jordan.

Banks and other financial institutions are a unique set of business firms whose assets and liabilities, regulatory restrictions, economic functions and operating make them an important subject of research, particularly in the conditions of the emerging financial sectors. Banks' performance monitoring, analysis and control needs special analysis in respect to their operation and performance results from the viewpoint of different audiences, like investors/owners, regulators, customers/clients, and management themselves. Different versions of financial ratio analysis are used for the bank performance analysis using financial statement items as initial data sources. The usage of a modified version of DuPont financial ratio analysis is discussed in the article. Empirical results of the Arab commercial banking system performance analysis are also presented in the article from (2000-2009).

As with Little, et al (2009), the modified DuPont model of financial ratio analysis is used to identify the drivers of financial success under alternative business strategies. Firms in the retail industry are categorized according to their high/low relative net operating income to sales and operating asset turnover ratios. Firms with high relative net operating income to sales and low relative operating asset turnover are assumed to be pursuing a differentiation

strategy and those with high relative operating asset turnover and low relative net operating income to sales are assumed to be pursuing a cost leadership strategy. The performance variable used is return on net operating assets.

In this article, the researcher present one of the possible approaches to such financial analysis using the modified version of DuPont analysis see Cole, (1973), which is similar to Dietrich's (1996) approach, and the novel matrix approach which is was firstly presented in Vensel, (1997) see also Vensel, (2001).

This study attempts basically to measure the financial performance of the Jordanian Arab commercial bank. As a matter of fact banks are classified according to their financial characteristics and financial indicators which can be presented from the banks financial statements. The other objectives will attempt to find out the ratios of net profit margin, asset utilization, equity multiplier and return on equity from the period of 2000-2009.

Net profit margin ratios are an indication of how effective a company is at cost control. The higher the net profit margin is, the more effective the company is at converting revenue into actual profit. This study also aims at finding out the asset utilization of the Arab bank for the same period. The asset utilization ratio calculates the total revenue earned for every dollar of assets a company owns. This ratio indicates a company's efficiency in using its assets. An equity multiplier analysis is used in this study which is a formula used to calculate a company's financial leverage, and the debt a company uses to finance its assets. The equity multiplier is also a kind of leverage ratio, which is any method of determining a company's financial leverage. It can be calculated by looking at a company's balance sheet and dividing the total assets by the total stockholder equity. One of the most important profitability metrics is return on equity (ROE). Return on equity reveals how much profit a company earned in comparison to the total amount of shareholder equity found on the balance sheet. A business that has a high return on equity is more likely to be one that is capable of generating cash internally. For the most part, the higher a company's return on equity compared to its industry, the better.

The paper is organized as follows. Section I introducing the importance and objectives of study. Section II discusses the relevant literature review. Section III gives a brief overview on the Arab Jordanian banking system-the most important recent developments in the bank .DuPont financial ratio analysis modified methodology and empirical results of the banking system performance are discussed in Section IV. In Section V The paper ends with some concluding remarks.

2. Literature Review

In order to more effectively evaluate operational managers, Nissim & Penman (2001) suggest using a modified version of the traditional DuPont model in order to eliminate the effects of financial leverage and other factors not under the control of those managers. Using operating income to sales and asset turnover based on operating assets limits the performance measure of management to those factors over which management has the most control. The modified DuPont model has become widely recognized in the financial analysis literature. See, for example, Pratt & Hirst (2008), Palepu & Healy (2008), and Soliman (2008). In addition, Soliman (2004) found that industry-specific DuPont multiplicative components provide more useful valuation than do economy-wide components, suggesting that industry-specific ratios have increased validity.

In carrying out bank performance analysis, it is important to emphasize that banks differ in their corporate governance from firms in other, less regulated industries. These differences, in turn, present their own challenges for bank managers, regulators, depositors, investors, and other stakeholders. "Bank managers live in a more complex environment than their peers in industry due to bank regulations. In addition to the demands placed on them by shareholders, regulators have strong incentives to influence managerial action, and this may be in conflict with shareholder demands" Harm (2002). Governance is a set of mechanisms with which the providers of capital and other stakeholders are defending their interests against the firm. The firm is run by managers, and this a point where conflicts of interests starts. An excellent survey of recent literature (both theoretical and empirical) is also presented by Harm (2002).

Macey and O'Hara (2003) argue that bank officers and directors should be held to broader (if not higher) set of standards than their counterparts in less regulated non- financial firms, and banks pose special corporate governance problems. Kose and Qian (2003) consider another important theme in the corporate governance of banks – the effect of the incentive features built into the compensation schemes of bank mangers. Adams and Mehran (2003) focus also on the differences between the corporate governance of banks and manufacturing firms and support the theory that governance structures are industry-specific. In general, the components of firm's governance structure are determined by various different factors, which all will influence also performance analysis aims and techniques: the nature and structure of firm's assets and liabilities (leverage, share of financial assets, business risk, cash- flow patterns), firm size, industry, regulations, etc.

Various measures of rates of return are used mainly for that purpose. We fully agree with the opinion that "Relaying too heavily on just a few indicators of bank profitability can be misleading. While ROA, ROE, and interest margin (and non interest expenses) to gross income remain the key measures, they should ideally be supplemented by the analysis of other operating ratios" Sundararajan, et al (2002).

Brigham and Houston, (2001) The modified model was a powerful tool to illustrate the interconnectedness of a firm's income statement and its balance sheet, and to develop straight-forward strategies for improving the firm's ROE.

Hawawini and Viallet (1999) offered yet another modification to the DuPont model. This modification resulted in five different ratios that combine to form ROE. In their modification they acknowledge that the financial statements firms prepare for their annual reports (which are of most importance to creditors and tax collectors) are not always useful to managers making operating and financial decisions.

3. Arab Bank

Arab bank is one of the largest financial institutions in the Middle East. Established in Jerusalem in Palestine in 1930 as a small bank, it has evolved into a group with the largest worldwide Arab network with over 500 branches in 30 countries on five continents, participating in financial markets and centers.

Since its establishment in Jerusalem on May 21, 1930 as Arab Bank Limited, the Arab Bank has continued to grow and improve. On January 31, 1990, the name changed to Arab Bank plc in accordance with Section 318 of the Jordanian Companies Act # 1 of 1989.Arab Bank was the first public shareholding company listed in the Amman Stock Exchange in 1978.

The Bank is constantly improving its disclosure levels and introducing higher levels of transparency through its financial statements, enabling both shareholders and customers to appreciate its ever-growing earning power, its low risk level, and its strong financial position.

The bank works in developing Arab economies through financing strategic infrastructural projects across the Middle East /North Africa region (MENA). With Headquarters based in Amman, Jordan, the Arab Bank constitutes the first private sector financial institution in the Arab World.

The Arab Bank is ranked amongst the largest international financial institutions, with a rating of A- from Fitch, A- from Standard & Poor and A3 from Moody's. The bank has a capital base of over USD 5.5 Billion and Total Assets of over USD 50 billion. Pretax Income reached over USD 1 Billion in 2008, with a Net Income of USD 850 Million for the year 2008.

The year 2010 witnessed a continuation of challenges brought on by the global financial crisis, which started more than two years ago at an unprecedented scale, with its prolonged negative repercussions deeply impacting all the world's economies, affecting countries, institutions and individuals alike. Many countries around the world are still experiencing difficult economic conditions and the work and investment environments still need more time before emerging out of the current status. The consequences of the global financial crisis continue to have a negative impact on the various aspects of economic and financial environments in most parts of the world. In addition, the reach of the crisis continues to expand carrying increased losses for countries and institutions and threaten to further poverty and unemployment at an international level.(Arab bank Annual Reports 2010).

4. A Financial Analysis Model for Financial Institutions

Saunders (2000) provides a model of financial analysis for financial institutions based on the DuPont system of financial analysis return on equity model. The return on equity model disaggregates performance into three components: net profit margin, total asset turnover, and the equity multiplier. The profit margin allows the financial analyst to evaluate the income statement and the components of the income statement. Total asset turnover allows the financial analyst to evaluate the left-hand side of the balance sheet: assets. The equity multiplier allows the financial analyst to evaluate the right-hand side of the balance sheet: liabilities and owners equity.

Return on equity analysis provides a system for planning as well as analyzing financial institution performance. The profit margin allows the analyst to develop a pro forma income statement. That is, net income is equal to revenues less expenses. Thus, the financial planner can determine the revenue level necessary to achieve the net income target. The total asset turnover ratio allows the analyst to project the total asset level necessary to generate the projected revenue level. The total asset requirement can be used to project the pro forma levels of all of the asset accounts. The fundamental equation of accounting is that assets equal liabilities plus owners equity. Thus, the equity multiplier ratio can be used to project the pro forma financial needs and the financial structure of the financial institution.

Return on equity, ROE, is first decomposed into return on asset, ROA, and the equity multiplier, EM. Return on assets is decomposed into net profit margin and total asset turnover:

ROE = (ROA) (EM)

ROA = (NPM) (TAT)

Where,

ROE = return on equity   **ROA = return on assets**

EM = the equity multiplier   **NPM = net profit margin**

TAT = total asset turnover

Return on equity is net income divided by total equity capital and return on assets is net income divided by total assets. The equity multiplier is the ratio of total assets and total equity capital.

ROE = (NI) / (TEC)

ROA = (NI) / (TA)

EM = (TA) / (TEC)

Where,

NI = net income

TA = total asset

TEC = total equity capital

DuPont Model
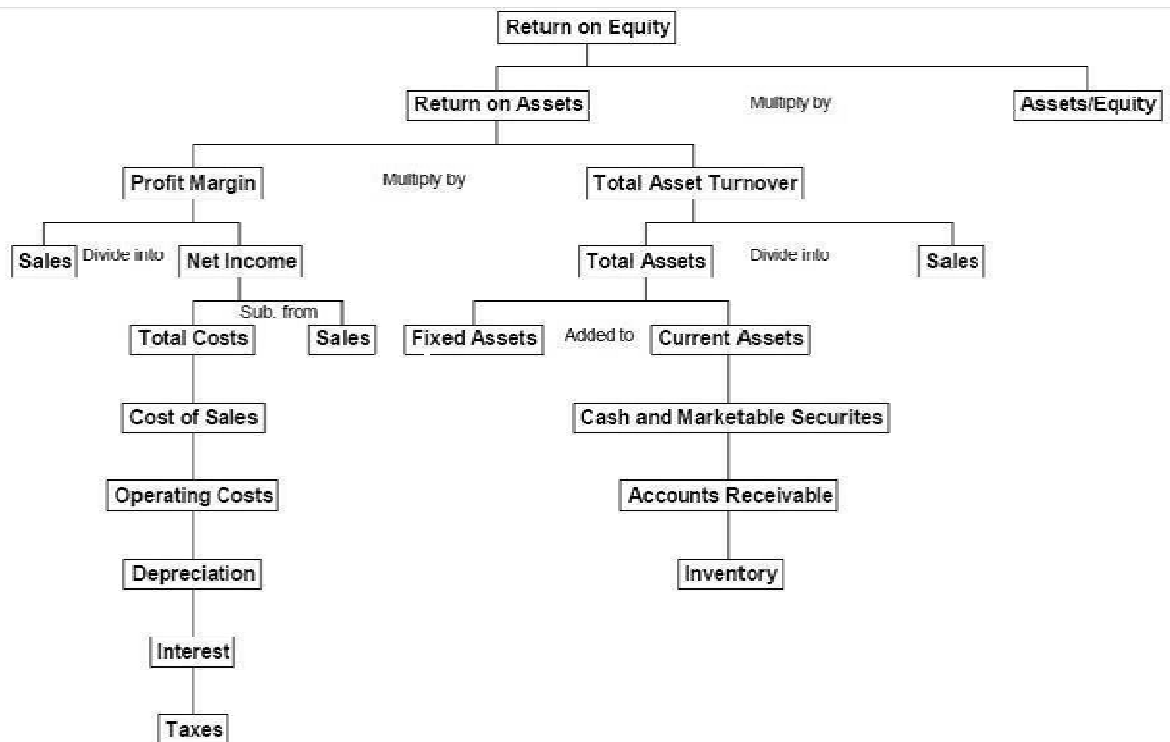
Net profit margin can be decomposed into both the income and expense components. Total asset turnover can be decomposed into interest and non-interest income components

The net profit margin ratio can be used to develop a pro forma income statement. The total asset turnover ratio can be used to estimate the pro forma left-hand side of the balance sheet. The equity multiplier ratio can be used to estimate the pro forma right-hand side of the balance sheet. Thus, the DuPont system of financial analysis can be used to construct a financial plan for the bank. The DuPont system of financial analysis provides a means for the firm to monitor performance through the planning period and to post-audit the planning process.

A. Balance Sheet Items

Arab Bank has four major categories of assets – cash, customer loans, securities and deposits as well as fixed/other assets. Cash has fluctuated from Jordanian Dinars (J.D) 1.4 billion in 2000 to a high of JD 4.0 in 2009 with an average of RM 2.3 billion (Note:1 Jordanian Dinar is equal to 1.43 USD). The customer loans account has decreased from a high of JD 3.33 billion in 2000 to JD2.78 billion in 2009 and an average of billion JD 3.57. Securities and deposits are highest at JD 8.67 billion, in 2000 and increased steadily to billion JD10.57 in 2005 before increasing to JD 15.76 billion in 2009 and with an average of billion JD 11.41. Fixed assets increased from a low of billion JD 0.43 in 2000 to billion JD 0.56 in 2009 and with an average of 0.48 JD. Arab Bank has three major liability accounts – corporate and retail deposits, other liabilities and shareholder funds. Corporate and retail deposits increased from billion JD12.34 in 2000 to the billion JD 18.78 in 2009 with an average level of 15.03 JD billion. Other liabilities decreased from RM 1.06 billion in 2000 to JD 0.52 billion in 2009 with an average of JD 0.56 billion. Shareholder funds increased from JD .45 billion in 2000 to JD 1.86 billion in 2005 and then increased to JD 3.8 billion in 2009 with an average 2.17.

B. Income Statement Items

Arab bank has three sources of income – interest income, non-interest income and gains, and net income. Interest income has fluctuated from JD 894 million in 2000 to JD 724 million in 2005 and then increased to JD 917 million in 2009 with an average of JD 818 million. Net income from non-interest income and gains increased from JD 129 million in 2000 to JD184 in 2003 and fluctuated during 2005 to 2007 ending at JD 246 million in 2009. Net income increased from JD 130 million in 2000 to JD 200 million in 2005 and ended the period at JD 250 million in 2009.

Arab bank has four expense categories: interest expense, provisions for bad loans, overhead costs, and income tax. Interest expense has fluctuated from JD 633 million in 2000 to JD 369 million in 2005 to JD 398 million in 2009 with an average of JD 443 million. Provision for bad loans decreased from JD 34 million in 2000 to JD 6 million in 2005 and increased to JD 85 million in 2009. Overhead costs increased from JD 195 million in 2000 to JD 320 million in 2005 and increased to JD 354 million in 2009. Income tax has increased from JD 31 million in 2000 to JD 75 million in 2009 with an average JD 51.5 million.

C. Discussion of Financial Ratios

As a percent of total assets of Arab Bank, cash averages 12.71% of total assets with a high of 17.34% in 2009 and a low of 10.16% in 2000. Customer loans average 20.93% of total assets with a high of 26.26% in 2002 and a low of 12.05% in 2009. Net securities average 63.64% with a high of 69.65% in 2008 and a low of 59.26% in 2002. Fixed assets average 2.71% with a high of 3.10% in 2000 and with a low of 2.38% in 2004. Corporate and retail deposits average 85.14% with a low of 80.64% in 2006 and with a high of 89.18% in 2001. Other liabilities average 3.34% with a low of 2.25% in 2009 and with a high of 7.62% in 2000. Shareholder funds average 11.51% with a low of 3.23% in 2000 and with a high of 16.79% in 2006.

D. DuPont Analysis of Arab Bank

Return on equity for Arab Bank for the study period averages 11.47% but with a range from 29.12% in 2000 to 10.76% in 2005 and then to 6.58% in 2009. Net profit margin averages 19.82% with a range of 21.51% in 2009 to 17.6% in 2003 and to 12.72% in 2000. Total asset turnover averages 0.057 times with a range from 0.074 times in 2000 to 0.044 in 2004 and then to 0.050 times in 2009. The equity multiplier averages 11.04 times with a range from 13.26 times in 2001 to 5.96 times in 2006 and then to 6.08 in 2009. Return on equity volatility results from significant variability in net profit margin and the equity multiplier. The equity multiplier has decreased steadily from 30.96 times in 2000 to 9.04 times in 2005 and then decreased to 6.08 times in 2009. Net profit margin fluctuates from the low 12.72% in 2000 to 25.74% n 2008 and then to 21.51% in 2009. Arab Bank, which operates in 30 countries represents the largest Arab banking net work in the world, was effected by the global financial crisis as a reflection of those countries reaction to the crisis. Despite the difficult challenges and changes experienced by the world as a result of that crisis, Arab bank has continued to march, with confidence, down the path of outstanding work that it began more than eighty years ago. The Bank was also able to continue growing under very difficult circumstances, supported by a commitment to its values and historical principles, which enabled the Bank to excel and succeed. The total asset turnover was increased though the world enterprises were suffering from the recent world financial crisis. Arab bank is listed on Amman Stock Exchange (ASE), but as a market leader, Arab Bank <ARBK> is ranked number 1 by market capitalization and represents 28% of the Amman Stock Exchange.

5. Summary and Conclusions

This paper presents a model for the financial analysis of a bank based on the DuPont system of financial analysis as presented in Saunders (2000). The bank return on equity is decomposed into net profit margin, total asset turnover

and the equity multiplier. This model is applied to Arab Bank of Jordan which is one of the largest banks in Jordan. The DuPont system of financial analysis shows the performance of The Arab Bank over the years from 2000-2009 and the impact of the world financial crisis that hit the region in the recent years. Though there was a negative impact of the recent financial crisis on most banks of the world but this impact hit slightly the performance of Arab Bank of Jordan.

Beginning with 2000, Arab Bank had high return on equity as well as high equity multiplier as compared to other years under study. After 2001 until 2008, the financial performance of Arab Bank is relatively steady and reflects minimal volatility in the return on equity components except for the year 2009 the ratio declined due to the impact of the recent financial crisis. Net profit margin and total asset turnover exhibit relative stability for the period from 2001 to 2009.The equity multiplier also show almost stable indicators for the period from2001-2005 and the ratios declined from 2006-2009 which indicates that the Arab bank had less financial leverage in the recent years, which means the bank is relying less on debt to finance its assets. Net profit reached approximately 25.74 percent with an average 19.82 percent, total asset turnover of about 7.39 percent and an average of 5.71 percent, and the equity multiplier leveled out at about 30.96 percent with average of 11.04 percent.

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Table 1. Arab Bank of Jordan Financial Statements (2000-2009) (In Thousand Jordanian Dinars "000")

Income Statement – Income	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average
Interest Income	894257	775153	585661	499583	539934	723986	931750	1183122	1128629	916739	817881
Non Interest Income and Gains	129380	149916	149157	183509	199460	225741	194756	217951	270627	245732	196623
Income Statement Expenses											**Average**
Interest Expenses	-632790	-506754	-325469	-251086	-262550	-368730	-464662	-640236	-576012	-398367	-442665
Provision for Bad Loans	-34415	-41511	-31435	-35848	-24853	-6746	-23202	-11341	-6620	-85499	-30147
Overheads	-195364	-211735	-222765	-246878	-266723	-320103	-309371	-332778	-346816	-353942	-316042
Income Tax	-30868	-25869	-24949	-26745	-39844	-54056	-65994	-82062	-89668	-74624	-51468
Net Income	130200	139200	130200	120200	144200	200092	263277	334656	360174	250039	-207224
Balance Sheet- Assets	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**Average**
Cash	1406023	1629226	1735788	2103607	2253477	2044984	1940964	2894720	3026127	4004819	2303974
Customer Loans	3336626	3755995	3864377	3770014	3444403	3683586	4321512	3507125	3263567	2782746	3572995
Securities and Deposits	8673176	8766706	8719974	9215561	10688100	10573816	11642611	14258893	15846624	15756920	11414238
Fixed and Other Assets	429279	396908	394014	387930	400048	513418	535051	559293	614684	555006	478563
Total Assets	13845104	14548835	14714153	15477112	16786028	16815804	18440138	21220031	22751002	23099491	17769770
Balance Sheet -Liabilities											**Average**
Deposits	12342462	12974264	12966576	13599191	14582887	14366500	14870546	17161380	18638502	18777745	15028005
Other Liabilities	1055480	398976	461551	444395	602762	589674	475644	510657	532546	520540	559223
Shareholder Funds	447162	1096932	1286026	1433526	1600379	1859630	3093948	3547994	3579954	3801206	2174676
Total Liabilities & Shareholders Equities	13845104	14548835	14714153	15477112	16786028	16815804	18440138	21220031	22751002	23099491	17769770

Table 2. Arab Bank Ratio Computation

Income Statement Items	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average
Interest Expenses	61.82%	54.78%	44.29%	36.76%	35.51%	38.80%	41.25%	45.70%	41.17%	34.27%	34.27%
Provision for Loan Facilities	3.36%	4.49%	4.28%	5.25%	3.36%	0.72%	2.06%	0.81%	0.47%	7.35%	3.22%
Staff and Other Overheads	19.09%	22.89%	30.32%	36.48%	36.24%	33.70%	27.46%	23.75%	24.79%	30.45%	28.52%
Income Tax	3.02%	2.80%	3.40%	3.92%	5.39%	5.70%	5.86%	5.86%	6.41%	6.42%	4.88%
Net Income	12.72%	15.05%	17.72%	17.60%	19.50%	21.07%	23.37%	23.89%	25.74%	21.50%	19.82%
Total Income Statement	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100%
Balance Sheet Assets	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**Average**
Cash	10.16%	11.20%	11.80%	13.59%	13.42%	12.16%	10.53%	13.64%	13.30%	17.34%	12.71%
Customer Loans	24.10%	25.82%	26.26%	24.36%	20.52%	21.91%	23.44%	16.53%	14.34%	12.05%	20.93%
Securities, Net	62.64%	60.26%	59.26%	59.54%	63.67%	62.88%	63.14%	67.12%	69.65%	68.21%	63.64%
Fixed and Other Assets	3.10%	2.73%	2.68%	2.51%	2.38%	3.05%	2.90%	2.64%	2.70%	2.70%	2.71%
Total Assets	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Balance Sheet- Liabilities	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**Average**
Deposits	89.15%	89.18%	88.12%	87.87%	86.88%	85.43%	80.64%	80.87%	81.92%	81.29%	85.14%
Other Liabilities	7.62%	2.74%	3.14%	2.87%	3.97%	3.51%	2.58%	2.41%	2.34%	2.25%	3.34%
Shareholders Equities	3.23%	7.54%	8.74%	9.26%	9.53%	11.05%	16.79%	16.72%	15.74%	16.46%	11.51%
Total Liabilities & Shareholders Equities	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100%
DuPont Ratios	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**Average**
Net Profit Margin (NPM)	12.72%	15.05%	17.72%	17.60%	19.50%	21.07%	23.37%	23.89%	25.74%	21.51%	19.82%
Asset Utilization (TAT)	7.39%	6.36%	4.99%	4.41%	4.40%	5.65%	6.11%	6.60%	6.15%	5.03%	5.71%
Equity Multiplier (EM)	30.96%	13.26%	11.44%	10.80%	10.49%	9.04%	5.96%	5.98%	6.36%	6.08%	11.04%
Return on Equity (ROE)	29.12%	12.69%	10.12%	8.38%	9.01%	10.76%	8.51%	9.43%	10.06%	6.58%	11.47%

Source: Calculated from the Arab Bank Annual Financial Reports 2000-2009
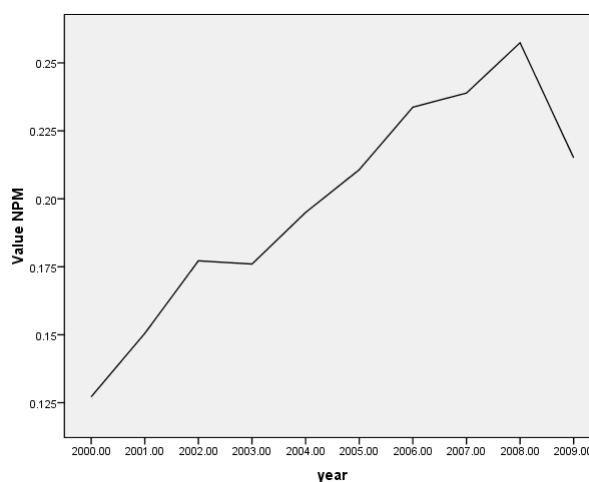
Graph 1. Arab Bank of Jordan
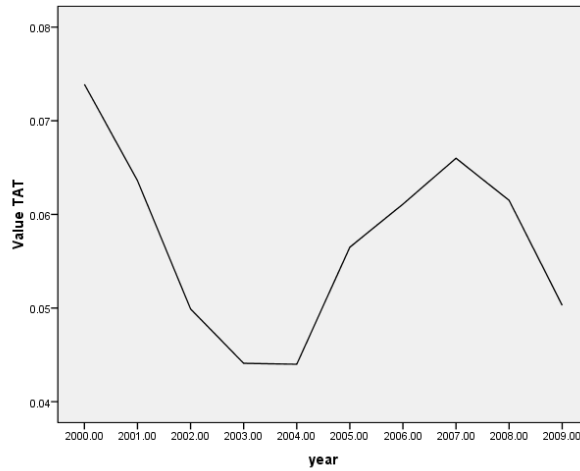
Graph 2. Arab Bank of Jordan
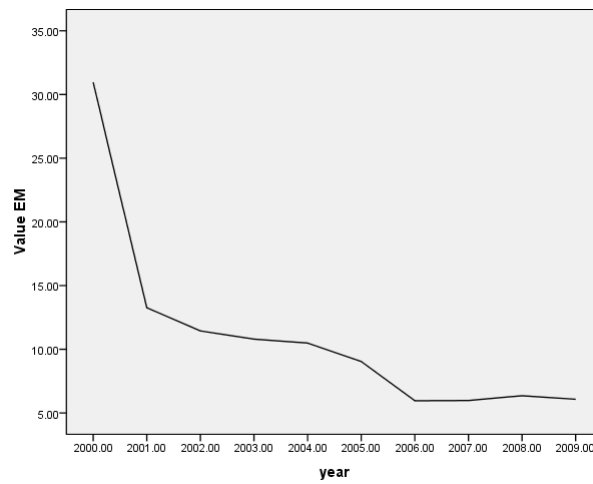
Graph 3. Arab Bank of Jordan
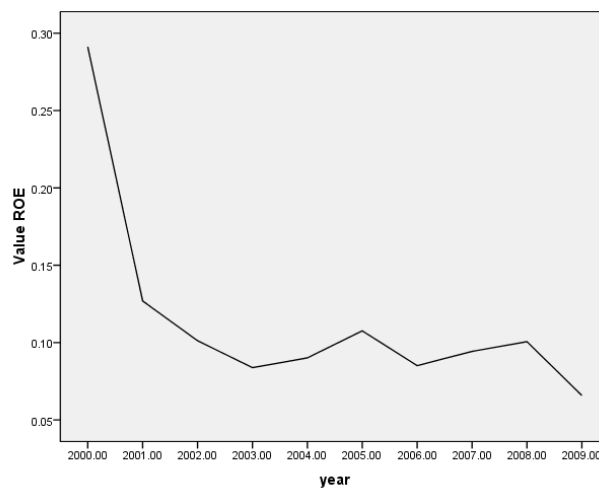
Graph 4. Arab Bank of Jordan

Exports, Foreign Direct Investment and Economic Growth: An Empirical Application for Nigeria

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Abstract

The paper examines the relationship among exports, Foreign Direct Investment (FDI) and economic growth in Nigeria over the period 1960-2009. The time series properties of the variables are examined using the Phillips-Peron technique due to its robustness to a wide variety of serial correlation and heteroscedasticity. The results of Johansen cointegration test indicate existence of at least six cointegrating vectors. The error correction coefficient shows that deviation from long run RGDP path is corrected by about 48% over the following year. As a way of correcting for multicollinearity, we re-estimate the models of the static regression using a Fully Modified Least Squares Method (FMOLS) and error correction coefficient. We find out that the removal of Degree of openness (DOP) variable may be detrimental even though the percentage deviation from equilibrium does not seem to change. The paper therefore concludes by shedding more light on the relevance of the degree of openness and this can facilitate more FDI inflows capable of accelerating the growth process. The paper thus recommends immediate focus on more reforms/policies that will create enabling environment for FDI inflows and export growth thereby reducing the growth and development barriers in Nigeria.

Keywords: Exports, FDI, Economic growth, Cointegration and ECM

JEL Classification Codes:　C32, F21, F43, O11, O16

1. Introduction and Background

The role of exports and FDI in promoting economic growth has much been recognized across the world. This has gradually established the importance of openness and of course disappearance of import substitution policy in the modern development economic literature and policy (Maneschiold, 2008). Exports have already been considered as the most important source of foreign exchange, that are required most by developing countries to ease their balance of payments problem and reduce unemployment through generation of job opportunities. Exports help the country to integrate in the world economy. Exports and FDI also allow domestic production to achieve a high level of economies of scale (Ullah, Uz-Zaman, Farooq, & Javid, 2009; Abou-Stait, 2005; Musonda, 2007; Al-Yousif, 1999).

The experience of many developed, some emerging economies and more precisely the Asian Tigers such as Singapore, Hong Kong, Taiwan, South Korea and recently China has provided good example of the importance of

the export sector to economic growth and development. This has not only made economists to stress the vital role of exports and FDI as the engine of economic growth but also engaged the attention of researchers and policy makers in that direction (Abou-Stait, 2005). Nevertheless, the Nigerian economy too was well known for its exports-driven growth particularly before the discovery of oil when the country used to record a huge success in the export of non-oil products especially agricultural produce. It is obvious that for long the non-oil exports in Nigeria had been taken over by the oil sector, even though the performance of the economy in the last decade was quite very surprising. This is partly because of the country's stronger ties with developed and emerging economies especially after the transition to civilian rule in 1999 and partly the recent global economic and of course Niger Delta crises, which rendered the oil sector at disadvantage when it comes to the sector's contribution to the growth of the economy. This underscores the need to not only diversify the economy but also target the country's rate of growth through agricultural and non-oil exports. This is also particularly important when one considers the comparative advantage the country has had in agricultural and non-oil exports as a labour abundant economy with huge minerals and arable but uncultivated lands.

Generally, the driving factors of surge in FDI inflows to developing countries and Nigeria in particular are basically abundance of natural resources, large market or favourable business environment, political and institutional reforms, among others. Structurally, the oil and extractive sectors of the economy dominate in attracting FDI into Nigeria.

Historical data on Nigerian economy indicate that between 1960 and 1970, total exports grew from $475.19 million to $1.24 billion while FDI also grew from almost zero to $1.40 billion. The real GDP was also on the increase from $3.48 billion to $4.41 billion during the same period. The economy also witnessed increase in the three macroeconomic variables of interest during the period 1970-1980. By the year 2009, total exports stood at $59.04 billion while FDI and RGDP stood at $2.95 and $3.53 billion respectively. It is worthy of note that between 2000-2009, naira highly depreciated against US dollar and this accounted for the lower values of the three variables when compared to what is obtainable in terms of Nigerian currency (naira).

Today, many empirical works support the export led economic growth hypothesis, even though there is no consensus on this issue as others did not find much support to it (Holman, & Graves, 1995; Chen, 2009; Anwar & Sampath, 1997). Thus, the present paper not only incorporates FDI but also examines the long run relationship amongst exports, FDI and economic growth in Nigeria including possible adjustment processes.

The paper is organized into five sections including this introduction. Section two covers the literature while section three discusses methodological issues and data. Section four presents the empirical results and discussion while section five concludes the paper.

2. Theoretical Framework and Empirical Evidence

2.1 Theoretical Framework

The argument concerning the role of exports as one of the main deterministic factors of economic growth is not new. It goes back to the classical economic theories by Adam Smith and David Ricardo, who argued that international trade plays an important role in economic growth, and that there are economic gains from specialization. It was also recognized that exports provide the economy with foreign exchange needed for imports that cannot be produced domestically. Thus, the relationship between exports and economic growth is theoretically rooted in the export-led growth (ELG) hypothesis. The hypothesis argues for government restriction of import trade and encouragement of strategies that support manufacturing sector with a view to promoting potential comparative advantage and growth (Elbeydi, 2010). It is based on a notion that international trade could promote specialization in the production of export products and reallocation of resources from relatively inefficient non-export trade sector to the more productive exports trade sector thereby leading to growth (Edwards, 1992; Lucas, 1988; Helpman, & Krugman,1985; Feder, 1983). The ELG paradigm has received renewed attention following the highly successful East Asian export-led growth strategy during the 1970s and 1980s, and especially when compared with the overall failure of import substitution policies adopted by African and Latin American countries (Abou-Stait, 2005).

Theoretically, export-led growth appears among neoclassical economists after the victorious story of newly industrialized Asian countries. They argue that, for instance, Taiwan, Hong Kong, Singapore and Korea, the Four Asian Tigers, have been successful in achieving high and persistent rates of economic growth since early 1960s; because of their free-market, outward-oriented economies. Thus, the emergence of endogenous growth theories put emphasis on the benefits resulting from a dynamic export trade in a framework that will lead to increasing returns to scale and diffusion of technological and managerial effects from abroad to the other sectors of the economy (Alisana, & Rodrick, 1999; Feder, 1983). The theoretical arguments are further supported by some empirical studies as seen in the next section.

2.2 Some Empirical Evidence

The empirical studies on the relationship between exports and economic growth are usually classified into two broad categories depending on the type of data used for analysis i.e. the cross-sectional and time series studies. Although, evidences from both categories of studies have yielded a mixed result, there exist significant numbers of other studies that identify exports as an important factor in determining growth (Shirazi, & Manap, 2004). However, our focus in this paper is on those studies that utilized time-series data.

Erecakar (2011) for instance, analyzed the relationship among growth, foreign direct investment, trade and inflation in Turkey over the period of 1970 and 2008 using co-integration technique to establish their long run relationship. The results of the study indicated that only one co-integrating relation exists among the variables. The results further disclosed that while foreign direct investment, inflation and trade surplus have positive and statistically significant impact on GDP growth, the coverage ratio of exports for import has a negative impact on GDP growth.

Miankhel, et al. (2009) also investigated the impact of foreign direct investment and exports on economic growth of six (6) emerging countries of Chile, India, Mexico, Malaysia, Pakistan and Thailand using a multivariate VAR analysis approach. The results of the study have favoured exports led growth hypothesis in South Asian countries. The study has further provided evidence of Long-run impact of exports on growth of FDI and GDP in Latin-American countries of Mexico and Chile. Finally, the study established the existence of bi-lateral causality between GDP and FDI in Thailand, while no evidence of such relationship in the case of Malaysia.

Ullah, et al. (2009) examined the validity of export-led growth hypothesis in Pakistan for the period 1970-2008. The study employed cointegration and causality framework and the results revealed the existence of unidirectional causality from GDP to exports. Similarly, Pop Silaghi (2009) studied the exports-economic growth causality for 10 Central and Eastern European (CEE) countries over the period 1990 to 2006 using Johansen cointegration and the Vector Error Correction Modeling (VECM) techniques. The results of the study showed the existence of a feedback effect between exports and GDP in three out of 10 countries in the sample.

Jordaan and Eita (2007) studied the causal relationship between exports and economic growth in Namibia for the period 1970-2005. The study concluded that export-led growth strategy has had positive impact on economic growth.

Shirazi and Manap (2004) analyzed both the short-run and long-run relationship among real exports, real import and real output in Pakistan using the cointegration and Toda Yamamoto causality technique for the period 1960-2003. The study found strong evidence of unidirectional causality from exports to economic growth, even though Tang (2006) found no evidence of long-run relationship between exports and economic growth in China.

Thurayia (2004) investigated the relationship between exports and economic growth in Saudi Arabia and Republic of Sudan, using co-integration and error correction framework. The result of the study indicated strong evidence in support of export led growth hypothesis for Saudi Arabia but a week evidence for Sudan.

Anwar and Sampath (2000) examined export-led hypothesis using a large sampling of 97 countries and the result has shown evidence of positive impact of exports on economic growth.

Bahmani-Oskooee and Alse (1993) employed Error-correction modeling (ECM) technique to examine the relationship between exports and economic growth for nine developing countries. The results revealed strong evidence in favour of export-led growth hypothesis for all the countries. Ram (1987) examined the impact of exports growth on economic growth using a sample of 88 LDCs for the period 1960-82 and the study found evidence to validate the export-led growth hypothesis.

Hsiao (1987) study established the causality and exogeneity between exports and economic growth employing the Granger and Sim causality test techniques. The study could not provide evidence to support export-led growth hypothesis. Jung and Marshall (1985) also employed standard Granger causality test to examine export-growth relationship for 37 developing countries. The results showed evidence to support the export-led growth hypothesis in only four countries.

In the case of Nigeria, Chimobi and Uche (2010) studied the relationship between exports, domestic demand and economic growth using the Granger causality technique to determine the direction of causality. The results of the study showed that economic growth Granger caused both exports and domestic demand while exports caused domestic demand. Osinubi and Amaghionyeodiwe (2010) too carried out empirical investigation of foreign private investment and economic growth in Nigeria, using co-integration and error-correction framework over the period covering 1970 to 2005. The study found that foreign private investment, domestic investment growth and net export growth positively influenced economic growth in Nigeria. Similarly, Ayanwale and Bamire (2004), and Ayashagba and Abachi (2002) found positive effect of FDI on economic growth for Nigeria.

3. Methodological Issues and Data

As we observed in the previous section, many studies have used the cointegration and error correction specification. The present study adopts same as evident from existing literature such as Thuravia (2004), Shirazi and Manap (2004) and Pop Silaghi (2009) concentrating on a multivariate case.

Our key variables for this study are the Real gross domestic product(RGDP) representing the macroeconomy, Foreign direct investment(FDI), Real export (REXP), while the control variables are Degree of openness (DOP), Gross fixed capital formation(GFCF), Inflation rate (INF), Real exchange rate (REXR), Real import (RIMP) and Terms of trade(TOT). We use the normal series of the variables for all our computations without logarithmic transformation. This is due to the nature of the variables considered. For instance taking the log of DOP, EXR, etc may result in negative values, which seems not to make economic sense.

3.1 The Model

First, we observe the behaviour of each variable through some diagnostic test and this is followed by examination of the stochastic properties based on Phillips-Peron test. We adopt the Phillips-Perron (PP) test in our case on the ground that it is robust to a wide variety of serial correlation and heteroscedasticity. Phillips and Perron (1988) developed a generalization of the ADF test procedure that allows for mild assumptions regarding the distribution of the error process and thus it modifies the ADF test. The PP test is based on an AR (1) processes

$$\Delta y_t = \beta_0 + \beta_1 y_{t-1} + e_t \tag{1}$$

$$\text{and} \quad \Delta y_t = \beta_0 + \beta_1 t + \beta_2 y_{t-1} + e_t \tag{2}$$

Equation 2 includes a linear trend; the PP test is the t value associated with the estimated coefficients β_1 and β_2 < 0 and significant for no unit root.

Except for the case of all variables being I (0), we move on to the cointegration test based on the Johansen approach (Johansen & Juselius, 1990) is carried out in a multivariate frame. Consider using matrix notation for

$$Z_t = |Y_t, X_t, Q_t|, \quad Z_t = A_1 Z_{t-1} + A_2 Z_{t-2} + A_3 Z_{t-3} + \dots + A_k Z_{t-k} + \mu_t \tag{3}$$

The vector error- correction model representation is

$$\Delta Z_t = \Gamma_1 \Delta Z_{t-1} + \Gamma_2 \Delta Z_{t-2} + \Gamma_3 \Delta Z_{t-3} + \dots + \Gamma_{k-1} \Delta Z_{t-k-1} + \Pi Z_{t-1} + \mu_t \tag{4}$$

$$\Gamma_i = (1 - A_1 - A_2 - A_3 - \dots - A_k) \quad \text{for } i = 1,2,3,\dots,k-1) \text{ and } \Pi = -(1 - A_1 - A_2 - A_3 - \dots - A_k) \tag{5}$$

The Π matrix is a $3x3$ since we have 3 variables in $Z_t = |Y_t, X_t, Q_t|$ and contains information about the long-run relationships. We decomposed $\Pi = \theta_1 \theta_2'$ where θ_1 and θ_2' include the speed of adjustment to equilibrium coefficients and long-run matrix of coefficients respectively. Assuming $k = 2$ for simplicity, we can write

$$\begin{pmatrix} \Delta Y_t \\ \Delta X_t \\ \Delta Q_t \end{pmatrix} = \Gamma_1 \begin{pmatrix} \Delta Y_{t-1} \\ \Delta X_{t-1} \\ \Delta Q_{t-1} \end{pmatrix} + \Pi \begin{pmatrix} \Delta Y_{t-1} \\ \Delta X_{t-1} \\ \Delta Q_{t-1} \end{pmatrix} + e_t = \begin{pmatrix} \Delta Y_t \\ \Delta X_t \\ \Delta Q_t \end{pmatrix} = \Gamma_1 \begin{pmatrix} \Delta Y_{t-1} \\ \Delta X_{t-1} \\ \Delta Q_{t-1} \end{pmatrix} + \begin{pmatrix} a_{11} a_{12} \\ a_{21} a_{22} \\ a_{31} a_{32} \end{pmatrix} \begin{pmatrix} \beta_{11} \beta_{21} \beta_{31} \\ \beta_{12} \beta_{22} \beta_{32} \end{pmatrix} \begin{pmatrix} Y_{t-1} \\ X_{t-1} \\ Q_{t-1} \end{pmatrix} + e_t \tag{6}$$

Now the ECM part of

$$\Delta Y_t = Z_{t-1} = a_{11}(\beta_{11} Y_{t-1} + \beta_{21} X_{t-1} + \beta_{31} Q_{t-1}) + a_{12}(\beta_{12} Y_{t-1} + \beta_{22} X_{t-1} + \beta_{32} Q_{t-1}) \tag{7}$$

which shows two cointegrating vectors with speed of adjustment to equilibrium, a_{11} and a_{12}.

The Johansen approach uses two likelihood test statistics, namely the trace (λ_{trace}) and the maximum eigenvalue (λ_{max}). Consider hypothesis $H_1 : r_0 < r \leq k$, it can be tested using the statistic $\lambda_{trace}(r_0) = -T \sum_{j=r_0+1}^{k} \log(1 - \tilde{\lambda}_j)$ (8)

The test is so-called trace test because it verifies whether the smallest $k - r_0$ eigenvalues are significantly different from zero. Moreover, hypothesis $H_0: r \leq r_0$ can be tested against a more restrictive alternative $H_1 : r = r_0 + 1$ using

$$\lambda_{\max}(r_0) = -T \sum_{j=r_0+1}^{k} \log(1 - \tilde{\lambda}_j) \tag{9}$$

This alternative test is called the maximum eigenvalue test, as it is based on the estimated $H_1 : r = r_0 + 1$ largest eigenvalue (Verbeek, 2004).

For the specific case, the model linking RGDP, REXP, FDI and other control variables is:

$$RGDP = f(DOP, FDI, GFCF, REXP, REXR, RIMP, TOT, \varepsilon) \tag{10}$$

$$RGDP = \alpha_0 + \alpha_1 DOP + \alpha_2 FDI + \alpha_3 GFCF + \alpha_4 REXP + \alpha_5 REXR + \alpha_6 RIMP + \alpha_7 TOT + \alpha_8 \varepsilon) \tag{11}$$

Where $RGDP$ = Real gross domestic product, DOP = Degree of Openness, FDI = Foreign Direct Investment, $GFCF$ = Gross fixed capital formation, $REXP$ = Real exports, $REXR$ = Real exchange rate, $RIMP$ = Real import, and TOT = terms of trade. $\alpha_0, \alpha_1, \alpha_2 .... \alpha_6$ are slope coefficients except for α_0 and ε = error term

3.2 Data Source

The annual data used for this study were obtained from the Statistical Bulletin and Annual Reports published by the Central Bank of Nigeria (CBN) over the period 1960-2009. However, data for GFCF started from 1981, FDI data from 1962 and INF data from 1961. Those periods for which the data were not available are considered as missing values and tagged "not available (NA)" by the computational tool. Data for DOP were computed using ratio of sum of export and import to the GDP, the export and import data were deflated to get their real terms

4. Results and Discussion

The diagnostic test carried out first using time series plots displays the varying nature of the variables used. The plots show that most of the variables appear with trend but the exchange rate variable does not show a clear pattern of trend behaviour. The correlogram computed shows that for all the variables, the autocorrelations and partial autocorrelations at all lags (k) $\neq 0$ and nearly all the $Q - statistic$ denoted by $Q = T \sum_{k=1}^{m} \rho_k^{\ 2}$ are significant where

T = sample size, m = lag length happen and ρ_k = autocorrelation coefficient. Hence, we reject $H_0 = \rho_1 = \rho_2 = \rho_3 = ... = \rho_k = 0$ (12) in the present case (correlogram results are too cumbersome to display here but available upon request). Except for other variables, the largest probability value of 0.226 displayed by the inflation series makes it not to be significant at $k = 20$.

So far, the P-P test result displayed in appendix using Newey-West automatic based on Bartlett Kernel indicates that the highest number of times a series is differenced before attaining stationarity=number of unit roots=number of integration=2 and no series has a unit root, even though most have different order of integration. Only 22.2% of the variables used are I(0) and this includes INF and TOT, 44.4% are I(1) involving GFCF, REXR and RGDP and 33.3% are I(2) with DOP, FDI and REXP, this is evident from the P-P test statistic and their respective probabilities. Our results support the claim that most economic variables are I(1).

The Johansen test for cointegration was carried out and the result shown in appendix. The result indicates that at least 6 cointegrating vectors for trace test and 4 cointegrating vectors for max-eigen test. In other words, we accept the hypothesis $r = 0, r = 1, r = 2, r = 3, r = 4, r = 5$ and $r = 0, r = 1, r = 2, r = 3$ cointegrating equations for the trace and max-Eigen tests. The high number of cointegrating vectors supports the claim of stability of the system of equations, the higher the number of cointegrating vectors. Our finding of long-run relationship supports some findings in the literature. For example, it is in line with that of Erecakar(2011) who investigated the long run relationship among growth, FDI, trade and inflation in Turkey but contrary to Tang(2006) who found no evidence of long-run relationship between exports and economic growth in China. Explaining this on a theoretical ground, the existence of a long -run relationship among these variables is not surprising. The key variables RGDP, FDI and REXP and the control variables DOP, GFCF, INF, REXR, RIMP and TOT interact through a chain of transmission mechanism. For instance, a rise in export increases the degree of openness which may result in technological transfer through FDI and increasing the level of Gross fixed capital formation and then stability in the exchange rate and inflation rate. This may necessitate the terms of trade to be favourable and import on the decline. However, the analysis does not clearly show which of the variables is cointegrating with one another and by what magnitude.

The error correction result clearly shows that the error correction term is negative and significant (0.48). This implies that 48% of the adjustment takes place each period suggesting that deviation from long run RGDP path is corrected by about 48% over the following year. The RGDP equation showing the error correction term is

$$\Delta RGDP = 11868.00 - 891.96\Delta DOP - 0.06\Delta FDI + 0.04\Delta GFCF + 267.98\Delta INF - 0.38\Delta REXP + 36315.87\Delta REXR + 2.51\Delta RIMP - 4757.78\Delta TOT$$
$$- 0.48 ecm_{t-1}$$

$$\tag{13}$$

with the $t-statistic$ for $ecm_{t-1} = -3.01$ and is highly significant. The dynamic process of the variables used for the error correction computation was computed by the authors and is available on request.

The summary of the cointegrating regression determining the long run relationship is computed for the RGDP functions as indicated in table III and the full cointegrating regression results are contained in tables IV and V, all provided in the appendix.

From the cointegrating regression result using a fully modified least squares method, only the DOP, FDI, GFCF, REXR and TOT meet the theoretical expectation with FDI being significant. By implication, a 1 unit rise in DOP gives rise to about a rise of 715 units in the RGDP. This explains the relevance of openness of the economy through exposures to various trade interactions. Other variables for which a unit change would cause a very large change on the economy are INF, REXR and TOT. However, 1 unit increase in the RIMP creates about 31.2 units increase in the RGDP. Even though the variables FDI and GFCF have the expected signs, they have small unit increases in the RGDP for 1 unit rise in each of them compared to other variables with large impact. The FDI and GFCF, though, expected to remain as catalysts that can speed up the rate of growth, but this result may be deduced from the parasitic nature of FDI as described by some literature. If really, this holds, then there is possibility of FDI over-taking the domestic investment environment. The positive effects of FDI and GFCF support some findings in Nigeria such as Osinubi and Amaghionyeodiwe (2010) who found that foreign private investment, domestic investment growth and net export growth positively influenced economic growth. Our finding is also in agreement with the work of Ayashagba and Abachi (2002) who obtained a positive effect of FDI on economic growth for Nigeria. It is however, surprising that the REXP and RIMP are of the contrary sign to theoretical expectation, even though both are significant with REXP having a larger coefficient. This may be explained by the periods of macroeconomic fluctuations including the recessionary periods that tend to wipe out the potential gains from what may serve as an injection to the economy and then seemed to make external dependency a major growth driven. However, the inclusion of both the DOP and REXP in the RGDP function calls for concern especially on the stability of the estimated coefficients. We therefore tested for the presence of multicollinearity in the model. We first obtained the correlation matrix of the entire variables with the results being symmetrical. The diagonal elements are equal to 1 since they are correlations of same variables. We also noted that the correlation of DOP and REXP is as high as 0.956(about the highest apart from the diagonal elements) showing the possibility of the negative effects of multicollinearity. Theoretically, correlations among variables may not be enough to justify the presence of multicollinearity. We therefore compared the full model OLS to the one with omitted variable suspected to cause multicollinearity problem. In the full static regression model, apart from the contrary signs of the coefficients of some of the explanatory variables particularly the REXP, the standard error reads 51931.06 with $R^2 = 0.88$. Since our key variable is REXP, we dropped DOP from the new cointegrating regression and the summary of the result is contained in table III while the detailed one is presented in table V, both in the appendix.

Dropping the DOP increases the extent of the variables not being significant. For example, this has led to the non-significance of REXR which was initially significant when the DOP was included. Though in the two cases, all the explanatory variables have high explanatory power and are within close range with $R^2 = 0.865$ for the model with DOP and $R^2 = 0.863$ for the model excluding DOP. Meanwhile, the coefficients of the variables GFCF, INF and REXP also reduced. It is quite noticeable that the standard error of regression is higher than before, and this implies a larger variance. It seems, therefore, that removal of DOP from the model significantly changes the model structure; hence removal of DOP might be detrimental. The only outstanding feature noticeable is just that autocorrelation seems to have been corrected partly due to the increased Durbin-Watson Statistic in the model excluding DOP. We equally have same number of cointegrating vectors for both trace and max-Eigen tests as before. The error correction representation in this case is:

$$\Delta RGDP = 12314.77 - 0.05\Delta FDI + 0.04\Delta GFCF + 278.45\Delta INF - 0.12\Delta REXP + 35182.21\Delta REXR + 2.16\Delta RIMP - 7880.58\Delta TOT - 0.48ecm_{t-1}$$

(14)

with error correction term coefficient being negative and is highly significant $(t-ratio = -3.09)$. Even with DOP omitted, same percentage deviation from long run equilibrium position is corrected for.

5. Concluding Remarks

The study has examined the relationship among the exports, FDI and economic growth in Nigeria over the period 1960-2009. The results of the study have found among other things that FDI, capital formation, degree of openness, import and terms of trade played a significant role in the economy along side with other variables particularly as demonstrated by the long run relationship. As a matter of fact, this result is slightly different compared to the former when the DOP suspected to cause multicollinearity problem is dropped. The paper, therefore, concludes by shedding

more light on the relevance of the degree of openness and can facilitate more FDI inflows capable of accelerating the growth process. Finally, the paper recommends immediate focus on more reforms/policies that will create enabling environment for FDI inflows and export growth thereby reducing the growth and development barriers in Nigeria.

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Table 1. Phillips-Perron Unit Root Test Result Summary

Variable	P-P test statistic	5% level critical value	Order of integration	Probability
DOP	-13.01	-3.51	I(2)	0.00
FDI	-12.05	-3.51	I(2)	0.00
GFCF	-4.06	-3.59	I(1)	0.02
INF	-4.05	-3.51	I(0)	0.01
REXP	-20.32	-3.51	I(2)	0.00
REXR	-5.755	-3.51	I(1)	0.00
RGDP	-6.60	-3.51	I(1)	0.00
RIMP	-10.38	-3.51	I(1)	0.00
TOT	-4.51	-3.50	I(0)	0.00

Source: *Authors' computation. using Eviews.*

Table 2. Cointegration Test Results

Date: 10/22/11   Time: 18:29
Sample (adjusted): 1983 2009
Included observations: 27 after adjustments
Trend assumption: Linear deterministic trend
Series: DOP GFC INF REXP REXR RGDP RIMP TOT
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.954609	282.9651	159.5297	0.0000
At most 1 *	0.887609	199.4695	125.6154	0.0000
At most 2 *	0.822051	140.4536	95.75366	0.0000
At most 3 *	0.757954	93.84465	69.81889	0.0002
At most 4 *	0.564649	55.54173	47.85613	0.0080
At most 5 *	0.549307	33.08849	29.79707	0.0202
At most 6	0.335928	11.57031	15.49471	0.1787
At most 7	0.018983	0.517469	3.841466	0.4719

Trace test indicates 6 cointegrating eqn(s) at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level
 **MacKinnon-Haug-Michelis (1999) p-values.

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.954609	83.49569	52.36261	0.0000
At most 1 *	0.887609	59.01588	46.23142	0.0014
At most 2 *	0.822051	46.60893	40.07757	0.0080
At most 3 *	0.757954	38.30291	33.87687	0.0139
At most 4	0.564649	22.45325	27.58434	0.1980
At most 5 *	0.549307	21.51818	21.13162	0.0441
At most 6	0.335928	11.05284	14.26460	0.1516
At most 7	0.018983	0.517469	3.841466	0.4719

 Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level
 **MacKinnon-Haug-Michelis (1999) p-values

Source: *Authors' computation using Eviews.*

Table 3. Summary of Cointegrating Regression using Fully Modified Least squares (FMOLS) Method

	a. Model with DOP included			b. Model with DOP excluded		
EXP.VAR	**COEFF**	**T-STAT**	**DECISION**	**COEFF**	**T-STAT**	**DECISION**
DOP	715.73	0.238	not sig	------------	----------	------------
FDI	0.597	3.77	Sig	0.663	3.879	Sig
GFCF	0.032	1.5854	not sig	0.022	0.9299	not sig
INF	1472.072	4.1576	Sig	1435.94	3.5135	Sig
REXP	-18.081	4.4144	Sig	-18.678	-4.8463	Sig
REXR	25519.29	1.7872	sig	22959.65	1.36995	not sig
RIMP	31.201	5.8928	Sign	32.926	5.689	Sig
TOT	258823.1	5.6396	Sign	266902.8	5.354	Sig
C	-319798	-4.331		-337202	-4.0191	
R², DW	0.87,1.48			0.86, 1.55		

Key: sig. means statistically significant and not sig. means not statistically significant

Source: *Authors' computation using Eviews*

Table 4. Cointegrating Regression **with DOP**

Dependent Variable: RGDP

Method: Fully Modified Least Squares (FMOLS)

Date: 03/02/12   Time: 20:37

Included observations: 28 after adjustments

Cointegrating equation deterministics: C

Long-run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth

   = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DOP	715.7300	3001.874	0.238428	0.8141
FDI	0.596900	0.158317	3.770281	0.0013
GFCF	0.031991	0.020179	1.585359	0.1294
INF	1472.072	354.0629	4.157657	0.0005
REXP	-18.08109	4.095904	-4.414433	0.0003
REXR	25519.29	14279.05	1.787184	0.0899
RIMP	31.20121	5.294811	5.892790	0.0000
TOT	258823.1	45893.78	5.639612	0.0000
C	-319797.5	73835.66	-4.331207	0.0004
R-squared	0.865250	Mean dependent var		248001.0
Adjusted R-squared	0.808513	S.D. dependent var		123020.6
S.E. of regression	53832.81	Sum squared resid		5.51E+10
Durbin-Watson stat	1.479555	Long-run variance		1.09E+09

Source: *Authors' computation using Eviews.*

Table 5. Cointegrating Regression **without DOP**

Dependent Variable: RGDP

Method: Fully Modified Least Squares (FMOLS)

Date: 03/02/12   Time: 20:41

Included observations: 28 after adjustments

Cointegrating equation deterministics: C

Long-run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth

   = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI	0.662622	0.170815	3.879186	0.0009
GFCF	0.021588	0.023215	0.929917	0.3635
INF	1435.940	408.6869	3.513546	0.0022
REXP	-18.67843	3.854132	-4.846339	0.0001
REXR	22959.65	16759.43	1.369954	0.1859
RIMP	32.92594	5.787206	5.689437	0.0000
TOT	266902.8	49847.52	5.354386	0.0000
C	-337202.0	83899.32	-4.019127	0.0007
R-squared	0.862683	Mean dependent var		248001.0
Adjusted R-squared	0.814623	S.D. dependent var		123020.6
S.E. of regression	52967.10	Sum squared resid		5.61E+10
Durbin-Watson stat	1.552728	Long-run variance		1.51E+09

Source: *Authors' computation using Eviews.*
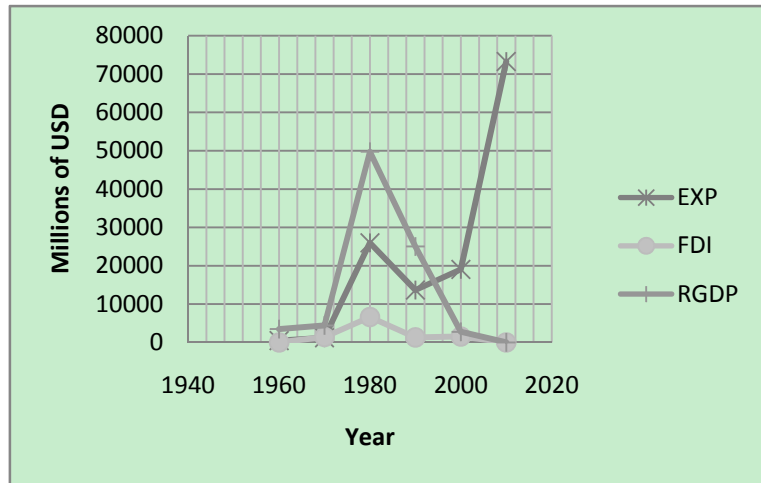
Figure 1. The Trends of Exports, Foreign Direct Investment and Real Gross Domestic Product in Nigeria (1960-2009)

Bounds Testing Approach to Find the Impact of Capital Inflow on Real Output Growth of Pakistan

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Abstract

The dollar recipient countries of the world utilize the funds to augment their developmental activities, curtail balance of payment distortions, enhance the pace of economic growth, and alleviating poverty. Capital flows into these economies, in two forms, firstly foreign direct investment and secondly, in the form of foreign aid. However, the present study is, mainly, conducted to check the impact of Foreign aid (FA) and foreign direct investment (FDI) on real output growth of Pakistan. To test the empirical relationship, the study utilized annual time series data set over the period 1970 to 2010. Econometric techniques include testing the stationarity of data by applying augmented Dicky Fuller (ADF) test and applying Autoregressive Distributed Lag (ARDL) method of estimation. Moreover, Short run and long run estimates were found. The findings suggested a robust and direct link between economic inflow of foreign capital and economic performance indicators. However, the magnitude of foreign aid impact was explored considerably low as compared to FDI. In the end, it is suggested that though impacts of capital inflows are positive but economies must rely upon the indigenous resources to promote development rather depending on external factors.

Keywords: Capital inflow, Bounds testing, Real output growth

1. Introduction

Developing countries of the world face the hazards of poverty and low level of living. To meet the challenge of sustained economic growth, they require financial resources. Against this background and rising macroeconomic imbalances among the developing world, investment needs to increase growth performance at high pace. A number of development programmes are launched by multilateral funding agencies (Note 1) to make better economic activities and achieve high growth rates in recipient countries (Ndambendia and Njoupouognigni, 2010). Consequently there is a shortfall of resources in the developing world which leads to resources inflow to meet deficiency of resources and fill two gaps, i.e. saving investment gap (Note 2) and import export gap (Ghulam, 2005). These funds flow either in foreign aid (Note 3) or foreign direct investment form, from rich nations to poor nations to trim down budget deficit, alleviating poverty, and help promoting the trade activities among the nations along with ensuring the overall macroeconomic stability (Khan, 2007). As a classical example, a number of aid recipient countries (Note 4) have extracted numerous benefits while going through their development stages, these countries experience relatively high growth rates after proper utilization of capital inflows (Mosley, 1987).

Foreign aid (Note 5) includes funds entering from surplus units i.e. developed and rich nations to deficit units i.e. Developing and poor countries of the world. Analysis of literature suggests that there are two contrasting arguments. First confirms a direct relationship between growth performance and official Developments Assistance(Note 6) Furthermore it is suggested that aid helps to maintain structural adjustment programs and macroeconomic stability. A World Bank Report asserts that international donor agencies has brought innovations in agricultural sector, enhanced investment activities, and helped millions of poor people all over the world to improve their lives. Another

point of view regarding its impact is about the ineffectiveness of these resources for enhancing economic development and economic growth. The major reasons accredited to this inadequacy are mis-governance of government, corruption and ill utilization of resources in these countries. According to UNCTAD (2006) FDI is a source for employment generation, it catalyzes high productivity and trade volume, a channel of technological spillover, and an element to affect directly the long-term development activities for the countries placed in third world countries. Bloomstrom and Wang (1992) mentioned benefits of foreign direct investment including the technological spillover as the major one; the maximum benefits are through inflow in manufacturing sector and services sector.

With the introduction of reforms and shift to market oriented economy Pakistan has emerged among one of the leading nations with high growth rate in South Asian region (Iqbal *et al*, 2010). Pakistan faced scarcity of financial resources; the resource inflow in the form of foreign aid has been started with the independence in different forms (Note 7). During the era of 1960s and 1970s Pakistan has been one of the largest aids receiving country in south Asian region (Khan, 2007). With emergence of economic reforms, Pakistan introduced reforms to enhance and encourage foreign direct investment in the country during the decade of eighties and nineties. Since the goal of developing nations is capital accumulation and achieving high welfare and growth rates, so foreign direct investment can also be considered as a supplement for foreign aid in third world countries. Ericsson and Irandoust (2005) state that foreign direct investment is an additional source of financing and serves as a supplement to savings and foreign aid.

Figures 4 below highlights the trends of foreign aid and foreign direct investment over the period 1970 to 2010. A world Development Report asserts that volume of funds available to developing countries in the form of FDI increased considerably during mid eighties to 2000. It rose from 0.2 billion US dollars to approximately 60 billion US dollars in Pakistan over 1990 to 2009 (WDI Indicators 2009). A time period of eighties and nineties in Pakistan is characterized by adoption liberalization programs of trade and investment regime. Restrictions on capital inflow were removed to increase competition and encourage foreign investors. These policies increased greatly the share received in the form of FDI by Pakistan during last twenty years. So the high FDI to GDP ratio has been observed during the post liberalization period (Khan, 2007)

The present study is an addition to empirical literature for Pakistan as it takes the both forms of capital inflow as a determinant of output growth in Pakistan. The robust methodology of ARDL is employed to find the short run as well as long run estimates. The brief organization includes: following the introduction section, section II presents brief literature of previous studies conducted to find the link between capital inflow and economic growth indicators. Section III presents methods and materials. Results are given in section IV, while final section concludes the study.

2. Review of Previous Studies

A number of theoretical as well as empirical studies have been found in the literature to highlight the significance of capital inflow in developing countries. Provided here is the brief review of a few studies, providing arguments in favor or against the FDI and foreign aid for economic growth performance. The section provides the literature on foreign aid and foreign direct investment separately in two sections.

2.1 Studies Related to Foreign Aid and Economic Growth Link

One view point on foreign aid states that foreign assistance in the form of foreign aid supports growth and development in developing countries, Durbarry *et al*. (1998) tested the statement by using both, panel and cross sectional techniques and found that aid accelerates economic growth but its effectiveness varies over the time depending upon its volume, geographical location and classification of country on the basis of income level. It was suggested that these fruits are conditioned upon stable macroeconomic policy environment. On the same lines Easterly (2003) checked the relation by developing a theoretical framework and also confirmed the relation empirically by panel analysis. It also tested its effectiveness on growth performance and found a positive and robust link of economic growth and foreign assistance. A common finding possessed by both studies suggested that a lack of investment friendly environment discourages inflow of FDI and therefore, most of the economies depend on foreign aid.

Regarding the effectiveness of aid flow, Ghulam (2005) analyzed the same case and found this assistance effective for the growth performance of Pakistan over the 1960 to 2002. The study asserted that foreign aid helped to boost economic growth through its positive and supportive impact on all sectors of the economy. The study also added that good fiscal and monetary policy is an important determinant of its effectiveness on growth. Ekanayake *et al*. (2003) also checked the impact of official development assistance for the economic growth for a sample of 85 underdeveloped countries (Note 8) over the period 1980 to 2007. It applied panel data techniques and found mixed evidence on tested link between economic growth and assistance via development funding agencies, these results

were country specific, according to which all countries get benefits different from other countries depending upon economic structure and special economic features.

African countries constitute a major block of developing countries, and represent an ample mark of aid recipient group, Malik (2008) applied co-integration analysis for a sample of six African countries and found that short run effects of investment, trade openness, foreign aid have been positive while the long run effects were found to be negative for foreign aid on economic performance. An empirical analysis conducted by Nyoni (1997) studied the impact of foreign aid on economic growth of Tanzania. Economic indicators included export performance, exchange rate, government expenses and economic growth. Co-integration methods for finding the long run link were used and short run link is evaluated through Error Correction Methods (ECM). Findings of the study suggested that government spending cause high value of exchange rate, while foreign aid inflows cause devaluation and depreciation of local currency. Major policy implications suggested that foreign assistance is required to be utilizing for the productive sector of economy. Furthermore it was suggested that liberalization and openness of economy causes a positive impact in long run.

Further literature on testing the impact of foreign aid and foreign direct investment jointly included Ndambendia (2010), who investigated the link between foreign direct investment, foreign aid and economic growth for a sample of 36 African counties. Using a data set for 1980 to 2007, this study applied dynamic fixed effect techniques and found a positive and robust link of both foreign direct investment and foreign aid for the growth of these countries. Policy implication suggested that countries are required to depend on internal factors for enhancing growth rather than relying on external sector. Similarly the joint impact of both capital forms has been tested by Bhandari *et al.* (2007) for the sample of European countries (Note 9). It used pooled data set with annual frequency of data set over a long range of time comprising of 1993 to 2002 and applied panel technique of fixed effects. Major findings include effectiveness of both forms of capital inflows for economic growth. It included that FDI inflow is an important determinant of economic sector performance while foreign aid did not play an important role to enhance growth for the sample of this country.

For Pakistan economy, during the decades of 60s and 70s there have been a significant inflow of aid, which reduced during late 1970s (Note 10). Over the time aid turned to be consisting of loans rather than grant or grant type loans. Share of aid to GDP dramatically increased due to entering the 'War against Terrorism'. There was about seven folds high aid available to Pakistan. The high aid received by Pakistan during different time periods could not be utilized for development purposes rather it remained within the hands of elites and politicians and there has also been debt problem due to conversion of aid to grant. According to Ishfaq (2004), Pakistan considered aid as a key determinant of financing, implementing and entertaining different socio-economic development programs. However, the accessible external aid has not always been utilized in formulation and implementation of effective programs, while a sensible use of external assistance has been instrumental in achieving accelerated development of many less developed countries of the world. Many nations have failed to use it optimally as a result such countries have accumulated significant amount of debt with not many benefits in terms of economic growth and living standard for the poor. The point of view is that foreign aid has adverse effect on the development of recipient countries**.** Khalidi (2008) selected a time period 1990 to 2005 and studied the impact of trends of foreign aid for economic development of Jordan. Statistical analysis revealed that capital inflow in the form of foreign aid has positive direct effect on economic growth.

2.2 Studies on Relationship between Foreign Direct Investment and Economic Growth

To attract Foreign Direct Investment (FDI) recipient countries introduce market reforms and policies which are more investment friendly and encourage competition Chenery and Strout (1966). Miankhel *etal*. (2009) regressed the foreign direct investment and exports on economic growth for South Asian and emerging economies (Note 11) and suggested a causal link exists between exports and economic growth while in long run FDI is a driving force to enhance economic growth in Pakistan and India. Multivariate VAR and Error correction Models (VECM), techniques found mixed but country specific outcomes. There is an increasing consensus among economists that technological spillover can enhance economic growth by the element foreign direct investment. An empirical analysis by Khan (2007) tested the new direction of relationship through introducing the financial sector development performance for Pakistan. A time series data ranging over 1972 to 2005 with annual frequency was used it applied Autoregressive Distributed Lag cointegration and found that benefits to economic growth can be achieved through improvement of financial sector performance in the host countries as it attract more funds from developed countries for investment.

Panel data techniques have also been tested by Zhang (2006) to test for growth driven by FDI for the China. This study illustrated the possible channels through which FDI causes positive as well as negative impacts on economic growth. It utilized provincial data set of inland and coastal areas over the period 1992-2004 and found that foreign

direct investment has positive impacts on economic growth and these effects have been found more robust for the coastal areas of China. Causal link between foreign direct investment and economic growth is also important in literature. A study conducted by Iqbal *et al.* (2010) tried to find the causal link between openness to trade, foreign direct investment and economic growth for Pakistan. it utilized quarterly data set over the period 1998-2009 and applied Vector Auto Regressive (VAR) model to test the existence of long run relationship. While direction of causality is found by multivariate VECM. Bidirectional causality between trade sector growth and economic FDI is detected, while a positive and robust link has been found between FDI and trade promotion in long run.

Small open economies depend on other sources for financing, studies for small economy of Ireland has been conducted by Kim and Bang (2008). The study tried to find the link between FDI and economic growth, by utilizing an annual time series data set over the period 1975-2006. Auto Regressive Distributed Lag (ARDL) method found that there exists a significant positive long run relationship in short run as well as long run. To find the direction of causality Granger causality test found that results indicated that foreign direct investment leads economic growth. Foreign direct investment helps creating job opportunities in host countries and supplements domestic financial resources, enhances competition along with technological spill over. In the same context another effort has been put forward by Athukorala (2003) to check the effects of FDI on economic growth indicators of Sri Lanka. Annual time series data set over the period 1959-2002 has been used with applying econometric techniques of cointegration and ECM. The findings have been little ambiguous because net effect of FDI on economic growth was not very much strong due to corruption, bad law and order situation and poor governance structure.

For Western European and US economy Katarina and John (2004) explored the dimensions of foreign direct investment and their impact for economic growth. Bayesian analysis is applied to find the nature of relationship between FDI and economic growth. This study does not support any significant relationship between these variables for Transition economies.

3. Methods and Materials

The data set utilized for this study consists of annual time series over 1970 to 2010. Data is collected through International Financial Statistics (IFS), various issues of Pakistan Economic Survey, and World Development Indicators. Major indicators include labor force, capital stock, real GDP per capita, foreign direct investment as a share of GDP, and foreign aid as a share of GDP. Auto Regressive Distributed Lag (ARDL) methodology is used for estimation on using Eviews software package (note 12). The methodology used here possesses certain characteristic features including: firstly, It is most suitable method of cointegration for small sample data set as also mentioned by Ghatak and Siddiki (2001), and secondly, it does not require all variables to be integrated of same orders, variables with different orders of integration can be used for estimation or this methodology does not depend upon the unit root properties of dataset. This ARDL approach consists of two steps, in first step F-test is applied to find out the existence of long run relationship and step two estimates short run and long run estimates of the model, short run elasticities of the model are found by ECM representation of the model. ECM version is used to calculate the speed of adjustment to equilibrium moreover, here stability test of CUSUM and CUSMSQ are also applied. The error correction form of ARDL model to be estimated can be written in this form:

$$\Delta \ln(RY) = \alpha_0 + \sum_{i=1}^{p} \phi_i \Delta \ln(RY)_{t-i} + \sum_{i=0}^{p} \theta_i \Delta \ln(FDI)_{t-i} + \sum_{i=0}^{p} \lambda_i \Delta(FA)_{t-i} + \sum_{i=0}^{p} \gamma_i \Delta \ln(SI)_{t-i}$$

$$+ \sum_{i=0}^{p} \psi_i \Delta \ln(LAB)_{t-i} + \upsilon_1 \ln(RY)_{t-1} + \upsilon_2 \ln(FDI)_{t-1} + \upsilon_3 \ln(FA)_{t-1} + \upsilon_4 \ln(SI)_{t-1} + \upsilon_5 \ln(LAB)_{t-1} + \nu_t$$

Where *ln(RY), ln(FDI), ln(FA), ln(SI)* and *ln(LAB)* are natural logs of real GDP, foreign direct investment, official development assistance, share of investment and labor force respectively. *p* is optimal lag length and Δ is first difference operator, $\phi_i, \theta_i, \lambda_i, \gamma_i$, and ψ_i are representing the short run effects of variables while $\upsilon_1, \upsilon_2, \upsilon_3, \upsilon_4,$ and υ_5 are to represent the long run elasticities.

4. Empirical Results

First step of estimation involves testing the time series properties of data (i.e. to find the order of integration) using Augmented Dicky Fuller (ADF)(Note 13) test. Second stage tests the existence of long run relationship using ARDL (Note 14) bound testing approach of cointegration proposed by Pesaran *et al.* (2001) Table 1, below reports the results of unit root test. These results show that real GDP, Share of FDI in GDP, Share of Foreign aid (FA) in GDP and Share of investment (a proxy to capture the effects of capital stock) in GDP are non stationary at their level and become stationary at first difference, while labor force (LAB) is non stationary at level. Unit root test provides

mixed results i.e. order of integration are different. Therefore, there is a justification for the application of ARDL cointegration. Cointegration test results are reported below in Table 2.

Cointegration test results are reported in Table 2 below. Here calculated F-stat is greater than critical value, so we reject null hypothesis, concluding that there is an evidence of long run relationship. After establishing the long run relationship, next step is finding short run as well as long run estimates of the model. Table 3 below is showing short run and long run estimates calculated through Eviews software packages. These results state that in short run foreign direct investment has negative effect, while this effect is positive for foreign aid. The signs possessed by coefficients of labor force and share of investment in GDP are negative and positive respectively which supported theoretically. Long run estimates are calculated using short run coefficients and long run relationship is given below in equation 4.1. Long run equation states a significant positive effect of foreign direct investment, as the inflow of FDI to developing nations provides a supplement for domestic credit and introduces new technology along with providing better employment opportunities to host country. On the contrary a negative and significant effect of foreign aid in long run is observed, because of poor disbursement of aid received, inefficient policies regarding inflation, trade openness, large and inefficient governance body of government (Whitaker, 2006). Labor force and investment have negative impacts, Pakistan is a developing country and characterized by surplus labor. Further increase in labor force causes negative impact on economic growth. Negative impact of capital stock is because of inefficient policies pursued by government. Short run diagnostic tests are applied and results are reported in Table 3. Here a reasonable value of R^2_{adj} is indicating that there is 67% variation in dependent variables explained by independent variables in the model. There is also no incidence of autocorrelation and F-stat shows that overall model is best fitted. Coefficient of LRY (-1) is negative and significant, and it is adjustment coefficient indicating 20% adjustment in long run equilibrium, if disturbed. Its negative sign also confirms cointegration among the variables. Furthermore the stability of parameters has been tested by Cumulative sum (CUSUM) and cumulative sum of square (CUSMSQ) test. The graphs for both are given in Figure 2 below. These graphs show that our estimated parameters are stable. The log run elasticities are found by normalization and taking the value of RY(-1) as one. Long run equation estimated is given here in equation (4.1).

$$LY = 0.45 + 0.75 \ (FDI) \ {***} - 0.35 \ (FA) \ {***} - 2.84 \ (LAB) - 0.03 \ (LSI){*} \qquad (1)$$

5. Conclusion and Recommendations

In this empirical analysis we tried to examine the relationship between foreign direct investment, foreign aid and economic growth for Pakistan specifically it is aimed to test the effectiveness of external factors. This study considered labor force and capital stock as internal factors while using neoclassical growth theory it incorporates external factors like official development assistance and foreign direct investment, to explain the changes in real GDP. An annual time series data set over the period 1970 to 2010 is utilized with application of recent econometric methodology of Auto Regressive Distributed Lag (ARDL). Recent data techniques are applied to diagnose and check the time series properties of data; later estimation was carried out where Short run and long run elasticities are estimated.

Our results state that capital stock and foreign direct investment are important factors which affect significantly and positively in short run as well as long run, while foreign aid seems to be an unimportant factor for economic growth in long run because of its inefficient utilization in developing countries, poor financial services along with infrastructure, the problem of bad governance and fiscal policy. Labor force had negative impact in short run as well as long run which can be attributed to the reason that Pakistan is a developing nation and it is endowed with surplus labor. More increase in labor force further causes negative impact on economic growth. Capital stock has positive effect in short run but these effects are negative in long run which is not supported theoretically, it is because of inefficient policies pursued by government. Our findings are consistent with the findings of Bhandari *et al. (2007),* Ndambendia (2010) and partially in line with Uphadhya and Kamal (2003).

A bidirectional Causality runs between foreign aid and economic growth. Official development assistance is causing foreign direct investment as well. So on the basis of overall results it is recommended that internal factors must be tried to achieve stability and developing countries should improve their infrastructure, fiscal situation and investment at domestic level to approach high economic growth index. Furthermore it is required that economies concentrate on their own resources rather than relying on financing from external sources to attain self-sufficiency and economic growth.

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Notes

Note 1. International Monetary Fund (IMF), World Bank (WB) and United Nation (UN).

Note 2. Due to low incomes, savings and investment remain low.

Note 3. Aid inflow is classified into three broad categories, firstly, official development assistance (ODA) which comprise of largest share of aid and given to middle and low income countries. Secondly, donated by countries of high per capita income to countries which have been formerly a part of Soviet Union. Thirdly, voluntary aid given by non government organizations and charity foundations (Radelet, 2006).

Note 4. Among them include Indonesia, Ghana, Vietnam and Uganda.

Note 5. Bandow (1985) states that takes its roots in the history from Marshall Plan for reconstruction and rehabilitation; it was built to accomplish the resource requirements of Western European economies

Note 6. Official Development Assistance and Foreign Aid are treated as synonyms here.

Note 7. Project as well as non project aid.

Note 8. Included sample form the regions of Africa, Latin America, Asia and Caribbean Countries

Note 9. Czech Republic, Estonia, Hungary, Latvia, Lithuania.

Note 10. Pakistan nuclear policy caused this decline in receiving aid by US.

Note 11. Emerging economies include India, Pakistan, Chile, Malaysia, Mexico and ThailandNote 12. Eviews 5.0

Note 12. Eviews 5.0

Note 13.It is an updated and modified form of Dicky Fuller test.

Note 14. ARDL methodology is introduced by Pesaran and Shin (1996); Pesaran and Pesaran (1997); Pesaran and Smith (1997).

Table 1. Unit Root Test Results

Variables	ADF at Level	ADF at First Difference	Decision
L(RY)	-0.6997	-3.5777*	I(1)
L(FDI)	-0.1459	-4.5661*	I(1)
L(FA)	0.4277*	-4.0286*	I(1)
LAB	2.1628*	-2.9159*	I(0)
SI	0.12272	-3.7497	I(1)

Note: Null hypothesis of testing unit root states that series is non stationary or contains a unit root. *shows significance at 5% level of significance.

Table 2. Bound Cointegration Test

F-Statistics	Probability
10 (4.01)	0.00001

Note: values in small brackets are the critical values which are used for bound cointegration test, taken from Pesaran, *et al.* (2002). Null hypothesis is existence of no cointegration, which is rejected if the calculated value of F-stat is higher than critical value. This estimation considers unrestricted intercept, no trend and number of regressors equal to 3.

Table 3. Short Run and Long Run Coefficients

Variables	Coefficients	Short run Diagnostic Tests	
C	-0.09		
D(LFDI)	- 0.34**	R^2_{adj}	0.67
D(FA)	0.15***	Serial Correlation LM Test	1.4768(0.1193)
D(LSI)	0.005*	Heteroscedisticity Test	2.3356(0.0413)
D(LAB)	-0.256	Ramsey Reset Test	1.3876(0.1988)
LRY(-1)	-0.20	Jarque-Bera Test	1.5677(0.3675)
LFDI(-1)	-0.15***	DW stat	2.06
L(FA(-1))	0.07***	F- Stat	10.15
LAB(-1)	0.568	S.E of Regression	0.02
LSI(-1)	0.006*		

Note: *significance at 1% level, **significance at 5%level. ***significance at 10% level.
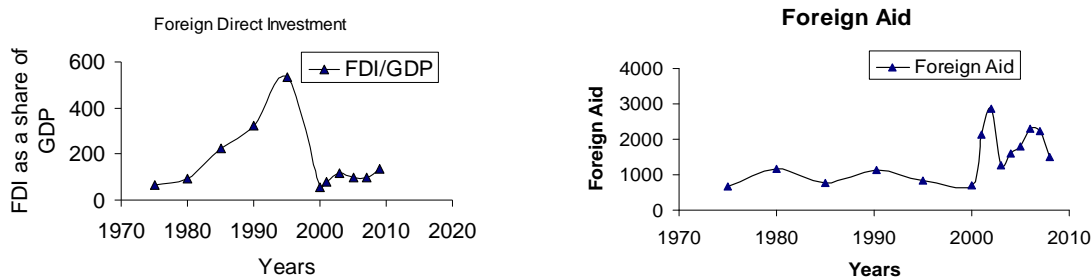
Source: Pakistan Economic Survey, Various issues, and world development indicators.

Figure 1. Statistics Showing Trends of FDI and ODA in Pakistan
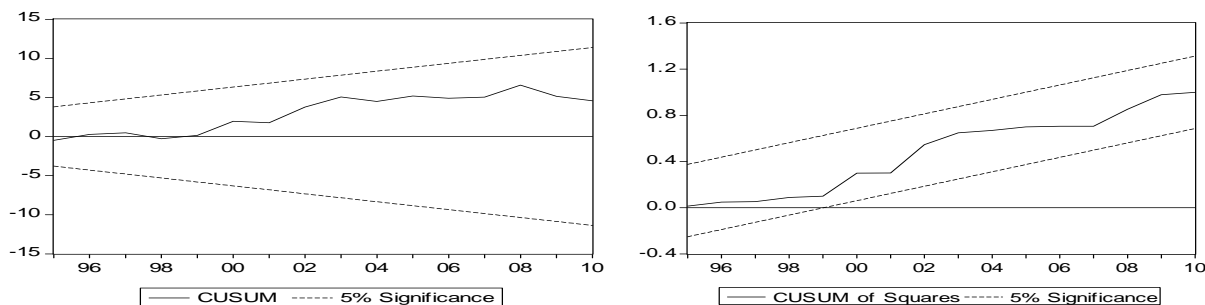
Figure 2. Graphs of CUSUM and CUSMSQ for Stability of Parameters

A New Perspective on Daily Value at Risk Estimates

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Abstract

Daily value at risk (VaR) estimates are sometimes calculated as if the institution is only concerned about short-term performance or risk position. In reality though, a risk manager may not consider changing the investment allocation in the foreseeable future, and with a highly-leveraged position daily VaR could be very misleading in terms of true risk to the financial institution. This paper recommends looking at VaR, taking the possibility that a financial institution will use the same assest allocation over a longer period of time while borrowing at over night rates. Finally, the paper introduces a more conservative estimate than the traditional VaR estimates.

Keywords: Bonferoni, Risk management, Value at risk

1. Introduction

Value at Risk (VaR) is used by risk managers to estimate the potential downside regarding a given time frame for a given confidence level (Jorion, 2007). There are many approaches to estimate VaR; e.g., using different probability distribution functions such as normal, pareto, Cauchy distributions, mixture distributions, etc. (e.g. Ruppert, 2004; Jorion, 2007; Haas, 2009; Dimitrakopoulos et al., 2010; Chin, 2008). These various ways to estimate VaR can yield widely different results (Beder, 1995; Pritsker, 1997, etc.). One of the shortcomings of the VaR measurement for accessing risk is that it does not yield insight into loss beyond the set VaR level α (Yamai and Yoshiba, 2005). Thus the amount one could lose when the portfolio value goes below the threshold at the significant level is unknown. From this perspective, VaR is a conservative measurement of the true amount that could be lost. In addition, as Dankelsson (2002) noted, data collected during good times do not yield much insight into what will occur when times are bad. Some people go as far as to say that VaR should not be used, as it is too misleading (Szegö, 2005). Regardless, it is very important to understand VaR better, as an excerpt from The Financial Crisis Inquiry Commision (2011) illustrates its importance.

"For example, as of 2007, the five major investment banks - Bear Stearns, Goldman Sachs, Lehman Brothers, Merrill Lynch, and Morgan Stanley - were operating with extraordinarily thin capital. By one measure, their leverage ratios were as high as 40 to 1, meaning for every $40 in assets, there was only $1 in capital to cover losses. Less than a 3% drop in asset values could wipe out a firm."

Given the limitations of VaR and the amount of risk various financial institutions may take on it is important to have more risk management tools. This paper focuses on daily VaR and introduces a new perspective, leading to a supplemental estimate of the traditional daily VaR estimates to aid in risk management.

2. Value at Risk Technical Notation

The 24-hour, daily, VaR at α means that there is only an α probability of a loss of such a magnitude or worse within a 24-hour time frame (Chan and Wong, 2006). Let R_t be defined as the daily return for day t and

$$R_t = \frac{(P_t - P_{t-1})}{P_t},$$
(1)

where P_t is the price for day t

P_{t-1} is the price for the previous trading day.

Let W_0 represent the initial investment and let R^α be the daily return at the $\alpha \times 100$ percentile. For example, $R^{0.05}$ is the return at the 5 percentile for a day. Thus R^α equals the return that yields the daily VaR for α given an initial investment of W_0. That is

$$VaR(\alpha) = -W_0 R^\alpha \tag{2}$$

From equation 2 it can be seen that the random component in the estimation of VaR is R^α, as W_0 is set by the financial institution. Although value at risk is a widely-used tool to estimate the amount of capital at risk over a given time period with confidence $100 \times (1-\alpha)$%, unfortunately there are many ways in which to estimate R^α (Chan and Wong, 2006; Jorion, 2007). In the following subsections, 2.1 and 2.2, the authors cover 2 common methods for estimating R^α. For both approaches, let $(R_1, \ldots, R_n)$ be independently, identically-distributed real random variables, with the common but unknown cumulative distribution function (cdf) $F(R)$.

2.1 Empirical Estimation of VaR

The empirical approach for estimating VaR uses the empirical distribution of the daily returns over time period n days. The empirical (cdf) is defined as

$$\hat{F}_n = \frac{1}{n} \sum_{i=1}^{n} I(R_i \leq r), \tag{3}$$

where

$$I(R_i \leq r) = \begin{cases} 1 \ if \ R_i \leq r \\ 0 \ if \ R_i > r \end{cases}$$

Assuming sufficient data, then the empirical distribution is assumed to be similar to the underlying cdf, as the empirical distribution asymptotically goes to the true cumulative distribution function,

$$lim_{n \to \infty} \hat{F}(r)_n \to F(r). \tag{4}$$

Finally, the empirical distribution is used to estimate R^α.

2.2 Normal Distribution Assumption for Estimation of VaR

Some researchers estimate VaR, assuming that the returns are normally distributed with a mean of μ and a standard deviation of σ, i.e. $R_t : N(\mu, \sigma)$. The population mean and standard deviation are typically estimated by the sample mean,

$$\overline{R} = \frac{1}{n} \sum_{i=1}^{n} R_i, \tag{5}$$

nd sample standard deviation,

$$S_R = \sqrt{\frac{1}{(n-1)} \sum_{i=1}^{n} (R_i - \overline{R})^2}. \tag{6}$$

Then the estimate of the value at risk is (Chan and Wong, 2006)

$$VaR(\alpha) = -W_0 \times (\overline{R} + Z_\alpha S_R), \tag{7}$$

where Z_α is the α percentile from the standardized normal distribution, $Z \sim N(0,1)$.

3. The Real Issue With Using Daily or Other Short Time Frame Var Estimates

Value at risk is used in part to determine capital requirements for financial institutions (Berkowitz and O'Brien, 2002; Jorion 2007). Daily VaR estimates provide the financial institution with an idea of a worst case scenario for the next day. Unfortunately, this can be very misleading, especially from a long-term perspective. For example, a

VaR(0.05) is expected to occur or worse once in 20 days, approximately once a month. To state that a daily VaR(0.05) has only a 5% chance of occurring on any one day is very misleading when one will perform the event multiple times, say more than 20 times. In quantitative research researchers perform hypothesis tests and they may set α to be 0.05 for the level of significance, but it is understood that multiple hypothesis tests do not exhibit an overall level of significance of α at 0.05. The latter reason is why one-way ANOVA is used to test the equality of population means over multiple, two-sample t-tests. If there are 6 factors to test if the population means are equal, then that would equal 15 hypothesis tests and the probability of making an error in at least one of the 15 hypothesis tests and rejecting it when the null is actually true is $1 - 0.95^{15} = 0.5367$, whereas with one-way ANOVA the overall significance level of stating a single factor differs from the other factors is still 0.05. Unfortunately, daily VaR estimates suffer from a shortcoming similar to multiple two-sample t-tests in quantitative research. It is true for that one day a VaR(0.05) may have only a 5% chance of occuring, just as with the probability of a type I error for each of the two-sample tests when considered individually; however, should they be considered individually, we know t-tests are not thus the reason for ANOVA. Now turning back to daily VaR, should daily VaR be treated and looked at as if it were to be performed only once or does an adjustment need to be made?

Let us assume the market is weak form efficient and that each day is independent of the other days (Jones, 2007). Under the latter assumption, then, the probability of $VaR(\alpha)$ occurring on any given day follows a Bernoulli distribution, with a probability of success α. Let X be a random variable equaling the number of times a daily $VaR(\alpha)$ is observed. When looking at a time frame of n days, then X follows a Binomial distribution $X \sim Bin(n, \alpha)$. Given the latter assumptions, Tables 1 and 2 were created.

Looking at Table 1, there is a probability of $VaR(0.01)$ occurring 0.9205545483 times within a year. In fact, we expect it to happen 2.52 times per year, as can be seen in Table 2. For $VaR(0.0001)$, a risk management advisor could say that there is a one in ten thousand chance of it occurring on a given day. Given this viewpoint, he tells his client or financial regulators not to worry. What if the investor thinks in the long term, say ten years hence? Then there is a 0.2227650558 probability of the VaR occuring on any one day within the ten years, Table 1. What if this event could cause severe damage to the investor's portfolio given his or her amount of leverage. In addition, this one in ten thousand event and the amount of damage it could cause are highly dependent upon the distribution assumed (see Table 3). As α approaches 0, the estimate of VaR becomes more dependent on the distribution chosen to estimate it; as an example the Standard Normal distribution is compared to the t-distribution, with 10 degrees of freedom (Table 3).

4. The New Approach for Daily Var

This new approach differs according to the way in which VaR is calculated. The authors estimate the daily VaR $\alpha = 0.05$ *and* 0.01 occurring once within 5 and 10 days, basically 1 and 2 work weeks, respectively. In essence, the value at risk for any given day within a given time frame, here being 1 and 2 weeks. The authors propose three methods for estimating the daily value at risk within a given time frame.

1. A Bonferoni type estimation (Neter et al., 1996) and using an assumed distribution. With this method we divide the desired α by the time frame, and here the authors divided α by 5 and 10 for 1 and 2 weeks, respectively. Next we assume a distribution of the underlying stocks, or funds, and estimate their parameters. Finally, we calculate the daily VaR but using the adjusted α.

2. A Bonferoni type estimation and using simulation techniques. According to this method, we divide the desired α by the time frame, and in this paper the authors divided α by 5 and 10 for 1 and 2 weeks, respectively. Next we use simulation to create an adequate sample size from the previous performance. Finally, we calculate the daily VaR but using the adjusted α.

3. Pure simulation techniques. For this paper we investigated VaR for 1 and 2 weeks time frame. The authors used simulation techniques to create a large population of returns. Then the population of returns was divided into sets of 5 for a week estimate and into sets of 10 for a 2-week estimate. The minimum of each set was taken to represent the worst day of the set. Then the unadjusted α percentiles were determined.

Major indices were used to investigate the VaR under the different approaches. Data were downloaded from Yahoo! Finance and the years studied were 2002 through 2011. The prices used for the calculation were the adjusted closing prices for the indices. There were approximately 2,500 returns for each index. Unfortunately, all of these approaches assume weak form market efficiency. For this reason a runs test was performed to investigate the assumption of weak form efficiency in subsection 4.3.

4.1 Under Normal Distribution

In Table 5, method 1 was investigated under the Normal Distribution.

4.2 Simulation Results

Samples of size 200,000 were taken for the simulations. The samples of returns were generated using simple random sampling with replacement.

4.3 Investigating Market Efficiency and Runs Test

The weak form efficiency assumption is used in Section 3 to discuss one of the shortcomings of VaR as is. In this subsection, we investigate weak form market efficiency. One test used for testing if the market is of weak form efficiency is the runs (McInish and Puglisi, 1982; Ojah and Karemera, 1999; Dickinson and Muragu, 1994, etc.). This test checks for streaks of positive or negative trading days. Streaks would imply a lack of independence. The assumption of independence is one of the assumptions in our new approach to VaR, as independence is needed to assume a Binomial distribution.

For the runs test let the expected number of runs be defined as m,

$$m = \frac{N(N+1) - \sum_{i=1}^{3} n_i^2}{N},$$
(8)

where N is the number of price changes and n_1, n_2, n_3 are the numbers of positive price changes, negative price changes, and number of no price changes, respectively. The standard deviation, σ_m, of the number of runs

$$\sigma_m = \left(\frac{\sum_{i=1}^{3} n_i^2 \left[\sum_{i=1}^{3} n_i^2 + N(N+1) \right] - 2N \sum_{i=1}^{3} n_i^3 - N^3}{N^2(N-1)} \right)^{1/2}.$$
(9)

The standardized variable

$$V = \frac{r + 1/2 - m}{\sigma_m},$$
(10)

has an approximately normal distribution, where r is the actual number of runs, and $1/2$ is the continuity correction.

5. Conclusion

Often we may think of risk in the short term, basically for this case what could I loose today, daily VaR, but when repeating the process over and over again for years, even nightmare scenarios should be expected. According to the simulation results in Tables 5, 6, and 7 that when one repeats the same asset allocation for a week to two weeks and pretends it is only for a day one can underestimate the VaR by approximately 23% to 132%. When assuming the Normal Distribution for determining VaR yielded very different and much smaller VaR results than with the empirical distribution. As can be seen in Table 5, using a Normal Distribution assumption, method 1, would lead one to believe that the VaR is underestimated by approximately 23% to 57%. The simulation results of methods 2 and 3 in Tables 6 and 7 yielded similar results. Many index results estimate that the VaR would be 100% larger than estimated treating it as daily when the process was repeated over two weeks.

When dealing with multiple hypothesis tests in quantitative research, researchers should and often do make adjustments to keep the overall type 1 error rate at the desired level. A similar example is the fact that researchers will use one-way ANOVA tests over multiple t-tests. VaR is not a hypothesis test, but it uses probabilities in a similar fashion. Unfortunately, given systemic risk, these nightmare scenarios and their probabilities are most likely understated, even in this paper.

Another issue is the possibility of these events happening back to back, two days in a row. That is two instances of observing a $VaR(0.05)$ one right after the other. This paper assumes a weak form efficient market, but as many state, the market is inefficient, and thus one can expect streaks if this is so (McInish and Puglisi, 1982; Ojah and Karemera, 1999; Dickinson and Muragu, 1994) which could be devastating to a portfolio. Thus the authors recommend that money managers consider this new perspective on VaR and should calculate it along with the traditional VaR estimates for a better perspective on overall risk and VaR.

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Table 1. The probability of a daily $VaR(\alpha)$ occurring within the various time horizons

Days	time frame	$\alpha = 0.05$	$\alpha = 0.01$	$\alpha = 0.001$	$\alpha = 0.0001$
1	single day	0.0500000000	0.0100000000	0.0010000000	0.0001000000
5	a week	0.2262190625	0.0490099501	0.0049900100	0.0004999000
10	two weeks	0.4012630608	0.0956179250	0.0099551198	0.0009995501
63	a quarter	0.9605009061	0.4690944570	0.0610861223	0.0062805097
252	one year	0.9999975658	0.9205545483	0.2228532539	0.0248863592
454	two years	0.9999999999	0.9895677413	0.3650615103	0.0443870101
1260	five years	1.0000000000	0.9999968352	0.7165247384	0.1183907077
2520	ten years	1.0000000000	1.0000000000	0.9196417761	0.2227650558

Table 2. The expected number of occurrences

Days	time frame	$\alpha = 0.05$	$\alpha = 0.01$	$\alpha = 0.001$	$\alpha = 0.0001$
1	single day	0.05000	0.01000	0.00100	0.00010
5	a week	0.25000	0.05000	0.00500	0.00050
10	two weeks	0.50000	0.10000	0.01000	0.00100
63	a quarter	3.15000	0.63000	0.06300	0.00630
252	one year	12.60000	2.52000	0.25200	0.02520
454	two years	22.70000	4.54000	0.45400	0.04540
1260	five years	63.00000	12.60000	1.26000	0.12600
2520	ten years	126.00000	25.20000	2.52000	0.25200

Table 3. The importance of the correct distribution when investigating VaR for a very small α

Distribution	$\alpha = 0.05$	$\alpha = 0.01$	$\alpha = 0.001$	$\alpha = 0.0001$
$z_\alpha =$	-1.644853627	-2.326347874	-3.090232306	-3.719016485
$t_{(10\alpha)} =$	-1.812461102	-2.763769458	-4.143700493	-5.693820101

Table 4. Bonferoni first row is back solving - $1-(1-\frac{\alpha}{n})^n$.

Time frame	Daily	Week	2 Weeks	Daily	Week	2 Weeks
New approach Daily VaR	5.000%	4.901%	4.889%	1.000%	0.996%	0.996%
Adjusted Alpha	5.000%	1.000%	0.500%	1.000%	0.200%	0.100%

Table 5. The daily VaR at various at 5% and 1% level within a one and two-week time frame. Using Bonferoni adjustments and assuming a Normal Distribution, method 1.

On a single Day VaR	5.000%					1.000%				
	VaR $W_0 = 1$			VaR $\div$ Daily VaR		VaR $W_0 = 1$			VaR $\div$ Daily VaR	
Time frame	Daily	Week	2 Weeks	Week	2 Weeks	Daily	Week	2 Weeks	Week	2 Weeks
Adjusted Alpha	5.000%	1.000%	0.500%	1.000%	0.500%	1.000%	0.200%	0.100%	0.200%	0.100%
S and P 500	0.0227	0.0321	0.0356	1.4167	1.5692	0.0321	0.0398	0.0427	1.2382	1.3297
Dow	0.0210	0.0298	0.0330	1.4175	1.5703	0.0298	0.0369	0.0397	1.2385	1.3301
Nasdaq	0.0255	0.0361	0.0400	1.4181	1.5711	0.0361	0.0447	0.0481	1.2387	1.3305
FTSE	0.0218	0.0309	0.0343	1.4165	1.5690	0.0309	0.0383	0.0411	1.2381	1.3296
DAX	0.0269	0.0382	0.0423	1.4172	1.5699	0.0382	0.0473	0.0508	1.2384	1.3300
CAC 40	0.0263	0.0371	0.0411	1.4140	1.5656	0.0371	0.0460	0.0493	1.2371	1.3282
NIKKEI 225	0.0261	0.0369	0.0408	1.4147	1.5665	0.0369	0.0456	0.0490	1.2374	1.3286
HANG SENG	0.0263	0.0373	0.0413	1.4194	1.5730	0.0373	0.0462	0.0496	1.2393	1.3312
STRAITS TIMES	0.0203	0.0288	0.0319	1.4199	1.5736	0.0288	0.0357	0.0384	1.2394	1.3315

Table 6. The daily VaR at various Bonferoni adjusted α levels within a one and two-week time frame, method 2

Daily VaR	5.000%					1.000%				
	VaR $W_0 = 1$			VaR $\div$ Daily VaR		VaR $W_0 = 1$			VaR $\div$ Daily VaR	
Time frame	Daily	Week	2 Weeks	Week	2 Weeks	Daily	Week	2 Weeks	Week	2 Weeks
S and P 500	0.0220	0.0415	0.0503	1.8845	2.2805	0.0415	0.0671	0.0881	1.6160	2.1203
Dow	0.0200	0.0368	0.0464	1.8382	2.3193	0.0368	0.0582	0.0733	1.5812	1.9940
Nasdaq	0.0253	0.0411	0.0507	1.6237	2.0054	0.0411	0.0580	0.0847	1.4131	2.0630
FTSE	0.0215	0.0397	0.0497	1.8430	2.3072	0.0397	0.0544	0.0716	1.3700	1.8045
DAX	0.0260	0.0496	0.0536	1.9115	2.0651	0.0496	0.0649	0.0701	1.3086	1.4134
CAC 40	0.0255	0.0460	0.0540	1.8063	2.1205	0.0460	0.0631	0.0683	1.3712	1.4859
NIKKEI 225	0.0241	0.0425	0.0556	1.7617	2.3030	0.0425	0.0938	0.0962	2.2061	2.2629
HANG SENG	0.0246	0.0477	0.0518	1.9403	2.1072	0.0477	0.0719	0.0830	1.5065	1.7390
STRAITS TIMES	0.0193	0.0335	0.0385	1.7323	1.9950	0.0335	0.0525	0.0734	1.5697	2.1938

Table 7. The daily VaR at the 5% and 1% level within a one and two-week time frame. The calculations in this table uses the minimum for a single day within n days, 1, 5 (week), or 10 (two weeks), method 3.

On a single Day VaR	5.000%					1.000%				
	VaR $W_0 = 1$			VaR $\div$ Daily VaR		VaR $W_0 = 1$			VaR $\div$ Daily VaR	
Time frame	Daily	Week	2 Weeks	Week	2 Weeks	Daily	Week	2 Weeks	Week	2 Weeks
S and P 500	0.0220	0.0403	0.0503	1.8280	2.2805	0.0415	0.0671	0.0881	1.6160	2.1203
Dow	0.0200	0.0368	0.0464	1.8382	2.3193	0.0368	0.0556	0.0733	1.5130	1.9940
Nasdaq	0.0253	0.0409	0.0507	1.6165	2.0054	0.0411	0.0580	0.0847	1.4131	2.0630
FTSE	0.0215	0.0395	0.0497	1.8342	2.3072	0.0397	0.0544	0.0716	1.3700	1.8045
DAX	0.0260	0.0496	0.0536	1.9098	2.0651	0.0496	0.0649	0.0701	1.3086	1.4134
CAC 40	0.0255	0.0460	0.0540	1.8063	2.1205	0.0460	0.0631	0.0683	1.3712	1.4859
NIKKEI 225	0.0241	0.0424	0.0556	1.7551	2.3030	0.0425	0.0938	0.0962	2.2061	2.2629
HANG SENG	0.0246	0.0477	0.0518	1.9403	2.1070	0.0477	0.0719	0.0830	1.5065	1.7390
STRAITS TIMES	0.0193	0.0335	0.0385	1.7323	1.9950	0.0335	0.0525	0.0734	1.5697	2.1938

Table 8. Two-sided Runs Test results

	Z-statistic	p-value
S and P 500	4.0526	0.0001
Dow	3.2937	0.0010
Nasdaq	0.5869	0.5573
FTSE	2.2351	0.0254
DAX	1.3404	0.1801
CAC 40	2.6594	0.0078
NIKKEI 225	2.3509	0.0187
HANG SENG	0.5002	0.6170
STRAITS TIMES	1.8807	0.0600

A Search for Rational Sources of Stock Return Anomalies: Evidence from India

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Abstract

In this paper we investigate the presence of the following asset pricing anomalies viz. size, value, momentum, liquidity, accruals, profitability and net stock issues in India. Size effect is the strongest with a difference of 4.4 % per month between small and big stock returns. A positive relationship is reported between accruals, stock issues and returns and a negative relation between profitability and returns which is in contrast to prior research. CAPM is unable to explain these anomalies with the exception of net stock issues. The Fama French (FF) model is able to capture value, profitability and accruals. While liquidity anomaly is explained by a liquid augmented FF model, the sector and earnings momentum factors do not contribute significantly towards explaining returns. Size and short term momentum are persistent and hence continue to pose challenge to rational asset pricing in India. Our findings shall be highly useful for investment analysts and portfolio managers. The research contributes to asset pricing literature especially for emerging markets.

Keywords: Size effect, Value effect, Stock momentum, CAPM, Fama French model

JEL code: C51, C52, G12, G14, G15

1. Introduction

Anomalies are empirical results that seem to beinconsistent with maintained theories of asset pricing behaviour and indicate market inefficiency or inadequacies in the asset pricing model (Schwert, 2003). There is now extensive evidence that market beta is not able to fully capture the cross-sectional differences in average stock returns in the way the CAPM model predicts. The six most prominent CAPM anomalies are firm size (Banz (1981), book equity to market equity (Stattman(1980), price earnings(Basu,1983), firm leverage (Bhandari, 1988), reversal (De Bondt and Thaler, 1985, 1987) and momentum returns (Jegadeesh and Titman, 1993).

To explain the pricing anomalies not captured by CAPM, Fama French (1993), developed a three factor asset pricing model which states that the expected return on a portfolio in excess of the risk free rate is explained by the sensitivity of its return to three factors: (i) the excess return on a broad market portfolio, (ii) the difference between the return on a portfolio of small stocks and the return on a portfolio of big stocks (SMB) and (iii) the difference between the return on a portfolio of high-book-to-market stocks and the return on a portfolio of low-book-to- market stocks (HML), where the last two are mimicking size and value factors respectively. The additional risk factors in the model are firm specific, yet they have proven to be very effective in explaining major anomalies of the CAPM.

However, recent studies have shown that there are patterns in average returns that even the Fama French model cannot explain. Significant among theses anomalies are momentum, accruals, net stock issues and profitability (Fama and French (2008) and liquidity (Hwang and Lu (2007)). Stock market anomalies that have gained attention in the literature over the past few years are size, value, momentum, liquidity, accruals, profitability and net stock issues.

Size effect-The size effect implies that small firms stocks provide higher risk adjusted returns than the stocks of large firms. Starting with Banz (1981), many papers (Roll (1981), Schultz (1983), Chan and Chen (1991), Perez-Quiroz and Timmermann (2000), Lettau and Ludvigson (2001) have explored the reasons for its existence in both mature and emerging markets. However search for an explanation has been unsuccessful.

Value effect – The value effect owes its existence to Stattman (1980) and implies that companies with relatively high distress (persistently low sales and earnings record) tend to outperform companies which are relatively better performing (persistently high sales and earnings record). Explanations for the value premium by Fama and French (1992, 1996) show that value strategies are fundamentally riskier, so the higher average return on value stocks reflects compensation for bearing this risk. Another explanation using the overreaction hypothesis is given by DeBondt and Thaler (1987), Lakonishok et al. (1994), and Haugen (1995).

Momentum – Momentum continues to be the premier anomaly across all markets. Jegadeesh and Titman (1993) found that trading strategies that buy stocks with high returns and sell stocks with low returns over the previous 3-12 months generate significant profits. The behavioural models which show investor under reaction or overreaction to firm specific news provide a partial explanation to momentum anomaly (Barberis, Shliefer and Vishny (1998), Daniel, Hirshleifer and Subrahmanyam (1998), Hong and Stien (1999). Chordia and Shivkumar (2002) attribute momentum to macroeconomic factors, while Hong et al (2000) attribute it to size and Moshowitz and Grinblatt (1999) to industry momentum.

Liquidity- Liquidity is generally described as the ability to trade large quantities quickly at low cost with little price impact. Amihud and Mendelson (1986) were the first to study the role of liquidity in asset pricing models and found that investors demand a premium for less liquid stocks so expected returns should be negatively related to the level of liquidity. Although Fama and French (1992) argue that liquidity need not be specifically measured, recent studies show that liquidity needs to be accounted for individually(Chordia et al, 2001), Amihud, 2002, Lee and Swaminathan,2000, and Keene and Peterson, 2007.

Accruals-The accrual anomaly was first documented by Sloan (1996). He argues that if investors naively fixate on earnings, then they will tend to overprice (underprice) stocks in which the accrual component is relatively high (low) since the lower persistence of earnings performance attributable to the accruals component of earnings is not fully anticipated. The mispricing is corrected when future earnings are realized to be lower (higher) than expected. When this happens the market reacts negatively (positively) to the earnings announcement, resulting in predictable negative (positive) abnormal stock returns. He shows that low (high) accrual stocks generate positive (negative) abnormal future returns and a hedge strategy that exploits this anomaly generates a significant annual abnormal return of 10.4% for the US market. Several studies have explored reasons for its occurrence which include post earnings announcement drift (Collins and Hribar, 2000), insider trading(Beneish and Vargus, 2002), abnormal accruals Xie, 2001), distress risk(NG, 2004),institutional and accounting structure(Pincus et al, 2007). Mashruwala et al. (2006) explains why accrual anomaly is not arbitraged away.

Profitability- Fama French (2008) and Cohen et al. (2002) report a positive relationship between corporate profits and returns. A possible explanation for this could be that profits are the reward for growth and innovation, which exposes entrepreneurs to greater risk thus resulting in higher returns. This argument is in line with Haugen and Baker (1996) who advocate that currently profitable firms have greater potential for future growth.

Net stock issues - The net stock issues anomaly refers to the negative relation between net changes in equity financing and future stock returns. Future returns are low after stock is issued (Loughran and Ritter (1995)) and high after stock is repurchased (Ikenberry et al, 1995). Lougran and Ritter (1995) have argued that a possible explanation for the underperformance of equity issuing firms is that investors under react to the adverse news of an equity issue. However, Eckbo, Masulis and Norli, 2000) and Eckbo and Norli, 2005) argue that issuing firms are viewed as less risky by investors and hence are priced to yield lower expected returns. A negative relation between net stock issues and equity returns is proved by Daniel and Titman (2006) and Pontiff and Woodgate (2008). Ikenberry et al (1995) find that on average, market under reacts to open market share repurchase announcements. They hypothesise that the market treats repurchase announcements with scepticism leading prices to adjust slowly overtime

Fama French (2008) explore the pervasiveness of five return anomalies viz. net stock issues, accruals, momentum, profitability and asset growth using sorts and cross section regressions for US market from 1963-2005. Examining

results separately for tiny as well as small and big stocks they find that the anomalous returns associated with net stock issues, accruals and momentum show up strongly in all size groups.

In this paper we attempt to investigate the existence of the following asset pricing anomalies viz. size, value, momentum, accruals, liquidity, profitability and net stock issues in India which is an emerging market. Although size, value and momentum have received a lot of attention in the Indian context (Note 1), literature on accruals, net stock issues, profitability and liquidity is still relatively sparse. The paper makes an attempt to fill this void in the literature. Subsequently our objective is to try and build a more comprehensive factor structure which could explain the presence of these anomalies. If anomalies still persist they may warrant possible behavioural explanations.

The paper is organised as follows. In the next section we describe the data and their sources. Section 3 describes the methodology followed. Section 4 gives the empirical results. In section 5 we try to provide explanations for the unexplained anomalies. The last section contains summary, policy implications and concluding remarks.

2. Data

The sample used consists of 493 companies that form part of BSE-500 equity index. The study uses month end closing adjusted share prices (adjusted for capitalisation such as bonus, rights and stock splits) from Jan 1996 to Dec 2010 (180 monthly observations) (Note 2). The Bombay Stock Exchange (BSE) -200 index is used as the market proxy. The month end share price series have been converted into percentage return series for further estimation. Various company characteristics which are used to form "stylized portfolios" are stated below.

- Market capitalisation (as size proxy) is calculated as the natural log of price times shares outstanding.

- Price to book value per share (inverse of BE/ME) (as value proxy) represents the security price over a company's book value.

- Trading volume (as liquidity proxy)- is defined as the average daily turnover in percentage during the portfolio formation period (see Lee and Swaminathan, 2000).

- Return on equity (as a measure of profits) is calculated as the income available to common stockholders for the most recent fiscal year divided by the average common equity and is expressed as a percentage.

- Accruals have been calculated using the balance sheet method (Sloan (1996)) as follows.

$$\text{Accruals} = (\Delta CA - \Delta Cash) - (\Delta CL - \Delta STD - \Delta TP) - Dep \qquad (1)$$

Where ΔCA is the change in current assets.

$\Delta Cash$ is the change in cash or cash equivalent.

ΔCL is the change in current liabilities.

ΔSTD is the change in short term debt.

ΔTP is the change in tax payables, and Dep is the depreciation and amortization expense . The value of accruals obtained is deflated by average total assets.

- Net stock issues (in year t) is the natural log of ratio of split adjusted share outstanding at calendar year end t-1 divided by split adjusted shares outstanding at calendar year end in t-2.

Global Industry Classification System (GICS) has been used for sector classification to form winner minus loser (WML) factor of sectors. GICS comprises of 10 sectors, namely Energy, Materials, Industrials, Consumer Discretionary, Consumer Staples, Health Care, Financials, Information Technology, Telecommunication Services and Utilities. Data on share prices, market index, all company characteristics and GICS has been obtained from the Thomsonone database of Thomson Reuters. The implicit yields on 91-day treasury bills have been used as risk-free proxy as is the standard practice in finance literature. The data for this has been taken from the RBI monthly handbook of statistics.

3. Methodology

Single sorted portfolios are formed based on each stylised characteristic. We evaluate the 12 months/12 months investment strategy for all the characteristic sorted portfolios.The 12-12 strategy for individual stocks is estimated as follows: In December of year t-1, the securities are ranked on the basis of the stylised characteristic under consideration. The ranked securities are then classified into five portfolios P1 to P5 and equally-weighted monthly excess returns are estimated for these portfolios for the next 12 months (t). P1 is the portfolio consisting of 20% of companies with lowest attribute while P5 consists of top 20% companies with highest attribute under consideration. P1 and P5 are referred henceforth as corner portfolios in the study. The portfolios are re-balanced at the end of

December of year t. In the case of momentum we also form a 6/6 investment strategy, where the formation and holding windows are kept as 6 months.

First, we observe the unadjusted mean excess returns across the portfolios created. If we a find a pattern in the unadjusted excess returns on the quintile sorted portfolios, then there exists an effect (corresponding anomaly).

Next, CAPM regressions are run on each of the five portfolios using the familiar "excess return" version of the market model equation.

$$R_{pt} - R_{ft} = a + b \ (R_{mt} - R_{ft}) + e_t \tag{2}$$

where $R_{pt} - R_{ft}$ is the monthly excess return on the portfolio i.e. return on portfolio P minus risk free return $(R_{ft)}$,

$R_{mt} - R_{ft}$ is the excess market return i.e return on market factor minus risk free return,

e_t is the error term,

a (intercept) is a measure of abnormal profits and

b is the sensitivity coefficient of market factor.

The CAPM implies that excess returns on a portfolio should be fully explained by excess market returns. Hence, the expected value of 'a' (the intercept term) should be 0. A significantly positive (negative) value of 'a' (intercept) implies extra-normal profits (losses). If there is a significant positive or negative intercept in the CAPM specification, then a CAPM anomaly exists. Significant intercepts imply that CAPM fails to explain the returns of the test portfolios. Then we attempt to evaluate if the excess returns of the stylized portfolios that are missed by CAPM can be explained using the three factor model of Fama and French (1993) specified as follows.

The FFModel is given by:

$$R_{Pt} - R_{Ft} = a + b \ (R_{mt} - R_{ft}) + s(SMB_t) + h(LMH_t) + e_t \tag{3}$$

Where SMB_t is the monthly return on the size mimicking portfolio,

LMH_t is the monthly return on the price-to-book mimicking portfolio,

s and h are the sensitivity coefficients of SMB_t and LMH_t

The other two terms are same as defined in equation (2).

Our estimation of the FF model differs in two respects. First we use LMH factor instead of HML factor in the FF regression. Hence our interpretation of the value factor will be inverse. Secondly unlike Fama and French (1993) who perform a 2*3 size-value partition, we construct a 2*2 size-value partition (Note 3). We modify the estimation of the SMB and HML as follows. In each year of the sample period t, the stocks are split into two groups- big (B) and small (S) - based on whether their market capitalization at the end of December of every year in the sample period is above or below the median for the stocks of the companies included. The price to book equity ratio is calculated in this month for all the companies. The stocks are now split into two equal P/B groups((L) and (H)). Then we construct four portfolios viz. S/L, S/H, B/L, B/H from the intersection of the two size and two P/B groups. Monthly equally weighted return series are calculated for all portfolios from Jan of year t to December of year t.

The Fama and French model uses three explanatory variables for explaining the cross section of stock returns. The first is the excess market return factor that is the market index return minus the risk-free return. The second is the risk factor in returns relating to size – small minus big (SMB). The simple average of the monthly returns of the two big size portfolios (B/L, B/H) is subtracted from the average of the two small size portfolios (S/L, S/H) to get the monthly return of the SMB factor. This factor is free from value effects as it has about the same weighted-average price to book.

$$SMB=(S/L+S/H)/2-(B/L+B/H)/2 \tag{4}$$

The third factor is related to value (LMH_t) .It is constructed as follows such that it is independent of size factor:

$$LMH=(S/L+B/L)/2-(S/H+B/H)/2 \tag{5}$$

If the intercepts from the FF regressions are insignificant and the intercepts from the CAPM regressions are significant, then this implies that the FF specification is able to capture cross sectional patterns in average stock returns that are missed by CAPM. On the other hand statistically significant intercepts of FF model shall suggest missing risk factors which one needs to identify for creating a complete factor structure. Greater sensitivity of sample portfolio returns to the size and value risk factors is shown by higher factor loadings i.e s and l for these factors.

We start by augmenting the FF model with a liquidity factor, which is calculated as the difference between returns on low liquidity stocks (P1) and high liquidity stocks (P5).The liquidity augmented FF model now is:

$$R_{Pt} - R_{Ft} = a + b\ (R_{Mt} - R_{Ft}) + s(SMB_t) + h(LMH_t) + l(LIQ_t) + e_t \qquad (6)$$

Where LIQ is the factor mimicking portfolio for liquidity and l tests the sensitivity of the liquidity factor (see Keene and Peterson(2007). The other terms are same as in equation (3).

Portfolios which are sensitive to the liquidity factor should exhibit a higher l coefficient. We further verify if the corner stylised portfolios (P1 and P5) comprise of stocks with particular attributes i.e small(big) size, low(high)P/B ratio and low(high) liquidity (Note 4). Such stock characteristic patterns in the sample portfolios shall support the strong performance if any of the FF model and the liquidity augmented FF model.

Next to evaluate if sector factor plays an additional role in explaining returns, we add a sector momentum factor as an additional risk factor in the liquidity augmented FF model (see Sehgal and Jain(2011) for details on factor construction). The sector factor has been formed as the difference of winner sector and loser sector, (WML).

The five factor model is as follows:

$$R_{Pt} - R_{Ft} = a + b\ (R_{Mt} - R_{Ft}) + s\ (SMB_t) + h\ (LMH_t) + l(\ LIQ_t\ ) + w\ (WML_t\ ) + e_t \qquad (7)$$

Where w is the factor sensitivity of WML factor and other terms are as defined in equation 6.

Finally we construct an earnings momentum factor and include the earnings based zero investment portfolio (PMN) as an additional factor in the liquidity augmented FF model (see Chordia and Shivkumar (2006) for details). We now extend the liquidity augmented FF model (6) by including the earnings based zero investment portfolio (PMN) calculated as the difference in returns between extreme SUE portfolios as an additional factor.

$$R_{Pt} - R_{Ft} = a + b\ (R_{Mt} - R_{Ft}) + s\ (SMB_t) + h\ (LMH_t) + l\ (LIQ_t\ ) + p(\ PMN_t\ ) + e_t \qquad (8)$$

Where p is the factor sensitivity of PMN factor and other terms are as defined in equation (6).

We have consciously introduced the two additional factors (sector momentum and earnings momentum) to the liquidity augmented FF model one at a time to understand their marginal impacts.

4. Empirical Results

In this section we discuss the empirical results obtained for each anomaly. Table 1 shows results of unadjusted excess returns. CAPM results are reported in Table 2, and Table 3 gives results of FF regressions. All results are analysed at 5% level of significance.

Size effect- The unadjusted returns on size sorted portfolios are larger for the small stocks as compared to large stocks confirming the negative relationship between size and average returns.The return differential between small and large stocks is 4.4% per month (t statistic=5.25) which is 53% per annum and robust. CAPM results show that the extra normal returns (after adjusting for market risk) is 4.4% per month for small stock and 0.07% per month for large stock portfolios. Small stock portfolios earn statistically significantly positive extra risk adjusted returns confirming the size effect. There has been no substantial difference between beta coefficient of small and large stock portfolios which indicates that market risk of small firms is not substantially larger than that of large firms. This is the reason why CAPM fails to explain size effect. Adj.R^2 is low for small stock portfolios vis-a-vis large stocks showing that the portfolios of small stocks have a very large unexplained variation in their returns. FF regressions show that both SMB and LMH coefficients are higher for P1 as compared to P5, confirming role of size and value factors in explaining size based returns. However these factors only partially explain the size effect, as the small size portfolio still provides an abnormal return of 2% per month which is statistically significant. Thus size is confirmed to be an asset pricing anomaly in Indian context unless one can find additional risk factor(s) to augment the FF model, which possibly captures this anomalous pattern in asset returns.

Value effect-Average returns are 3.2% per month for low P/B (high Book to market equity) compared to 1.49% per month for high P/B (low BE/ME). The return differential is as high as 1.77% per month (t-value=2.3) which is also statistically significant. This confirms the existence of a strong value effect. However size effect is almost 2 ½ times the value effect in the Indian context, which is in confirmation with findings for emerging markets (including India) (See Fama and French (1998).The market model results show that the intercept value is low for the high P/B portfolio as compared to the low P/B portfolio, suggesting that low P/B stocks generate higher CAPM based risk adjusted extra normal returns during the study period. However, CAPM is unable to absorb cross sectional differences on value sorted portfolios. The h coefficient is negative (-0.40) for high P/B (low BE/ME) and positive (1.15) for low P/B(high BE/ME) confirming the presence of value effect. The three factor model is robust as both the size factor and the value factor explain the cross sectional differences in returns.

Momentum - Results show the presence of strong momentum profits for both 6/6 aand 12/12 strategies over the study period. Unadjusted returns on momentum sorted portfolios show that the monthly mean return of the 6/6 (12/12) strategy for the losers portfolio (P1) is 2 % (2.4%) per month whereas the monthly mean return for the winners portfolio(P5) is 3.3% (3.2%)per month. CAPM results show that intercepts for winner portfolios are statistically significant for both strategies. Our findings confirm that market factor does not explain momentum. This could be attributed to the fact that there is very small difference in betas of the corner portfolios i.e. P1 and P5. The intercept of the winner portfolio is significant and provides an abnormal return of 1.5 % (1.3) % per month. The FF model fails to capture momentum owing to the fact that loser portfolio tends to load more heavily on value factor compared to winners portfolio which is in contrast to risk theory. Winners portfolio should have comprised of more distressed low P/B stocks for providing a risk explanation. So winner stocks are growth stocks. Further there is no significant difference between the sensitivity of winner and loser portfolios to the size factor. The regression results are verified by estimating size and P/B ratio for the sample portfolios. These are similar for both 12-12 and 6-6 strategies.

Liquidity - The winners (P5) and losers (P1) provide unadjusted excess monthly return of 3% per month and 1.7% per month respectively. CAPM regressions show that the intercept coefficient is higher for the low volume stocks (0.022) as compared to high volume stocks (0.006) as well as statistically significant. This can be explained by the fact that market betas are higher for high volume stocks than low volume stocks. Table 3 shows that the three factor adjusted return of the least liquid quintile portfolio remains significant and stands at 1.3% per month (t-stat=2.36).The SMB loading is high for the low volume stocks as compared to the high volume stocks and is highly significant in explaining liquidity factor. Thus low volume stocks load on size factor implying that small companies are low volume companies. This is again reconfirmed by our finding that illiquid stocks tend to be small sized value stocks. LMH does not seem to play any significant role in explaining the returns on liquidity sorted portfolios. Hence both CAPM and FF cannot fully explain return on liquidity sorted portfolios.

Profitability-Sorting on profits we find that average returns are significantly higher for low profitability stocks and significantly lower for high profitability stocks. We find that highly profitable firms are large sized growth stocks. From an investor's perspective who is developing a trading strategy for himself, a highly profitable firm is less risky and hence should provide more returns. Estimating the CAPM regression we find an abnormal return of 1.1 % per month(t-stat=2) on lowest profitability portfolio. CAPM betas are lower for highly profitable firms and higher for lower profitability firms. However intercepts of the corner portfolios are statistically significant confirming the presence of a profitability anomaly within the CAPM framework. The FF results show insignificant intercepts for corner portfolios owing to the additional contribution of the size factor. Hence the three factor model absorbs the profitability sorted returns that are missed by CAPM.

Accruals - Contrary to existing studies on mature markets we find that accruals are positively associated with average returns. The high accrual firms report an average monthly excess return of 2.3% (t-stat=2.54) while low accrual firms provide a monthly return of 1.9 % (t-stat=2.53). This implies that probably Indian investors are behaving contrary to the theory proposed by Sloan. They have learned from Sloan's (1996) initial study which subsequently led to a degeneration of excess returns from potential mispricing of accruals, eventually rendering the associated trading strategy useless. Our results are in line with Leippold and Lohre (2010) who finds that the unadjusted returns on low accruals sorted portfolios generate 1.9% per month while high accruals stocks generate 2.2% per month from May 1994 to April 2008 for the Indian market. Pincus et al (2007) do not find the presence of a significant accrual anomaly for India. The market model results show that an abnormal return of 0.8% per month (t-stat=2.09) is generated on low accrual firms and significant abnormal excess return of 1% per month on high accrual firms (t-stat=2.22). The market beta is lower for the low accrual portfolio as compared to the high accrual portfolio, which is in contrast to similar high betas found by Sloan (1996) for extreme quintiles for the US. We find that low accrual stocks are low P/B, illiquid but not small as compared to the high accrual stocks (in line with Leippold and Lohre (2010). This is understandable as big firms have stronger bargaining power compared to small firms and hence can generate more cash sales from customers. Table 3 shows that the FF model is successful in absorbing the extra normal returns that are missed by CAPM. This is made possible by additional contribution of the size factor. SMB value is low for low accrual portfolios vis-a-vis high accrual portfolios indicating that low accrual portfolios are big stocks contrary to small size firms in low accrual stocks found by other studies for mature markets. This is supported by the value of average market cap of the corner portfolios which we have estimated. LMH however does not play any significant role in explaining returns on accrual sorted portfolios. Thus the accrual anomaly does not pose any serious challenge to asset pricing in the Indian environment.

Net stock issues - The relation between average returns and share issues and repurchases is captured by the net share issues variable A positive value indicates issues of shares whereas a negative value implies repurchases. We will

discuss results for each case separately. Indian evidence shows that returns for companies with larger stock issues are high as compared to those with lower stock issues. Unadjusted excess return increase from 2% per month on lowest issues portfolio to 2.8% per month on the highest issues portfolio. This result is contrary to earlier findings for mature markets (see Loughran and Ritter, 1995). However, the CAPM absorbs this anomaly since we find insignificant intercepts for the corner portfolios. The beta of the highest issues portfolio is much larger than that of the lowest issues portfolio, indicating that the winners portfolio might be more risky and thus it is compensated by higher returns. We find that cash flow to assets ratio is lower for high stock issues firms compared to low stock issues firms both for the year prior to issue period and three years later (Note 5). The findings suggest that high stock issues firms persistently exhibit lower operating efficiency and hence are riskier than low issues firms. Our results are supported by the view of Jain and Kini (1994) who found that for 682 firms going public during 1976-1988 period, the median operating cash flow to assets ratio fell dramatically between the year prior to going public and three years later. We can therefore say that stock issues do not provide anomalous returns in the Indian context.

On the other hand higher repurchases (P1) provides positive unadjusted excess return of 2.9% per month (t-stat=2.74). Unadjusted excess returns are much smaller 1.7 % (t-stat=1.6) for less extreme repurchases (P2). Thus positive abnormal returns after repurchase are pervasive, which is consistent with existing literature. The market model results indicate insignificant intercepts implying that CAPM absorbs the anomalous pattern in excess returns. This is attributed to the higher beta for the larger repurchases portfolio. Thus stock issues and repurchases (net stock issues) anomaly does not pose serious challenge to standard asset pricing models for India.

5. Unexplained Anomalies

On the basis of our results in the previous section we conclude that net stock issues are explained by CAPM and value, profitability and accruals by the FF model. However size, momentum (6/6 and 12/12) and liquidity defy FF model at 5% level of significance. In this section we investigate whether these asset pricing anomalies can be explained by additional risk factor(s) which are used to augment the FF factor structure. A growing body of literature shows that the use of additional risk factor(s) like liquidity, sector momentum and earnings momentum in asset pricing models has been successful in explaining cross-sectional variation in asset returns. This motivates us to use them as additional explanatory variables in the FF model and test if they contribute in eliminating any of the above anomalies in the Indian case.

We begin with liquidity as an additional explanatory variable in the FF model following the work of Pastor and Staumbaugh (2003), Keene and Paterson (2007), Bali and Cakici (2004), Chan and Faff (2005), Mirralles and Mirralles(2006) who document the relationship between volume based liquidity factor and expected returns. Most of them assigned to liquidity a role of stock's common risk factor similar to SMB and HML (LMH in our case) in the framework of FF model and found liquidity to be an important factor affecting returns even after the effect of other known variables was taken into account. It is rational to believe that less liquid stocks(proxied by lower trading volume) expose investors to risk of marketability, leading to loss of asset value while trading, compared to high liquid stocks. Using the above arguments and that liquidity risk is a state variable (Pastor and Stambaugh, 2003), we start by augmenting the FF model with a liquidity factor (Note 6). Whether the inclusion of liquidity alters the effect of other variables on portfolio returns or alters estimated intercepts is known by comparing results of equation 6 with equation 3. The dependent variable in the above regression is the excess return on size sorted portfolio, liquidity sorted portfolio and momentum portfolios (6/6 and 12/12).

Results in table 4 show that the liquidity augmented FF model is able to mop up all the excess returns on the liquidity sorted portfolios which were missed by the FF model since intercept for low liquidity portfolio is not significantly distinguishable from zero. The augmented model is also a better descriptor of returns on size sorted portfolios (Table 4). Liquidity plays an important role in explaining size as it absorbs almost 40% of the extra normal returns generated from the FF model. But there are unexplained returns to the tune of 14.4% p.a which is significant at 5% level (Note 7). This shows the ability of the Liquidity augmented FF model to represent a well specified asset pricing model.

Pastor and Staumbaugh (2003) and Leipplod and Lohre (2009) find liquidity to be a crucial driver in governing momentum effects. However regression results of the four factor model on the winner portfolios (both 6/6 and 12/12) show significant intercepts (Table 4).This implies that the Liquidity augmented FF model fails to capture any extra normal returns reported by winner portfolios on both the trading strategies.

Given the failure of the liquidity augmented FF model in fully explaining size and momentum patterns in returns we include additional risk factors. A body of research debates the importance of industry or sectors in explaining momentum (Moskowitz and Grinblatt (1999, Grundy and Martin, 2001) and Liu and Zhang (2008). Moskowitz and Grinblatt (1999) document that once returns are adjusted for industry effects, momentum becomes significantly

weaker. Liu and Zhang (2008) show that the growth rate of industrial production is a priced risk factor in asset pricing tests and explains more than half of momentum profits. Using the above argument we purport that stock momentum may be caused due to sector momentum. It is possible that winner stocks belong to winner industries and winner industries have a higher sales growth potential than loser industries. These winner industries might be exposed to higher risks while they chase accelerated growth. This growth risk differential can be proxied by building a sector factor, which in turn can be constructed by taking return differential of the winner and loser sectors. We thus augment the liquidity augmented FF model with a sector momentum factor.

Results in Table 5, show significant intercept values for size sorted portfolios thus reflecting the inability of sector momentum factor in explaining the residual size effect. We also find significant intercepts for winner portfolio of momentum strategy (both 6/6 and 12/12) in the five factor model. This means that sector momentum factor does not account for returns on size and momentum based portfolios which are missed by the liquidity augmented FF model. This may possibly be because our existing factors absorb the role of sector momentum factor in stock returns. This is confirmed by a significantly high correlation between sector momentum and size and sector momentum and value factors .

Another argument in asset pricing literature relates to an earnings momentum factor. Earnings momentum refers to the fact that firms reporting unexpected high earnings subsequently outperform firms reporting unexpectedly lower earnings. Chordia and Shivkumar (2006) and Lieppold and Lohre (2009) state that price momentum is subsumed by the respective earnings momentum factor. Hong, Lee and Swaminathan (2003) find that price momentum exists only in those countries in which earnings momentum is profitable. Chordia and Shivkumar (2006) purport that the return on *PMN* (earnings based zero investment portfolio)is correlated with future growth in GDP, industrial production, consumption, labor income, inflation, and T-bill returns, and that *PMN* has a greater predictive power for future business conditions than the Fama–French factors. Perez-Quiros and Timmermann (2000) have evidenced that during recessions there are larger asymmetries in the risk and return attributes of smaller firms than those of larger firms. This shows that size effect may be caused by the fact that small sized stocks are more sensitive to business cycle conditions than big stocks. Given these links between momentum and size based returns with the business cycle factors and the fact that earnings momentum may proxy for business cycle conditions we introduce an earnings based momentum factor in our analysis.

When we augment the liquidity augmented Fama French model with earnings momentum factor we find that earnings momentum is not able to explain profits based on small stock portfolio that are missed by liquidity augmented FF model. However, abnormal returns from 12/12 strategy get absorbed whereas momentum from 6/6 strategy still persists (Note 8).

This may suggest that there may be a role for additional risk factors in explaining momentum.

5. Summary and Conclusions

The empirical results confirm the presence of asset pricing anomalies in the Indian context. The size effect is the strongest with the mean difference in returns of 4.4% per month between small and big stocks. Profitability is negatively correlated with returns contrary to the results of Fama and French (2008). We find a positive relationship between accruals and portfolio returns which is in contrast to the findings of Sloan (1996).Further we also find a positive relationship between size of stock issues and returns which is opposite to the findings of Loughran and Ritter (1995).

The CAPM is unable to explain these asset pricing anomalies with the exception of net stock issues. Value, profitability and accruals are captured by FF model. However size, momentum (6/6 and 12/12) and liquidity defy Fama French model at 5% level of significance.

The liquidity augmented FF model is able to mop up all the extra normal returns on the liquidity sorted portfolios as well as 40% of the returns on the smallest stock portfolios. Thus the four factors Liquidity Augmented FF seems to be a better descriptor of asset pricing compared to one factor CAPM and three factor Fama French. Other risk factors such as sector momentum and earnings momentum do not play a significant role in asset pricing framework. However size and short term momentum (6/6) persist as asset pricing anomalies which may be strategically useful information for portfolio managers.

The persistence of size and momentum anomalies may suggest that there is role for additional risk factors in returns. Factor identification continues to be a challenge for researchers especially when one is trying to develop a strong economic foundation for the risk story. Alternatively one might require a behavioural explanation. Perhaps Indian investors under react to accounting and financial information for small and momentum stocks. This may be caused due to poor and infrequent disclosures, lack of investor confidence in information and general investor neglect of

these small cap companies and winner companies. Investors may also be under reacting to past information for winner companies and possibly overreacting for loser companies in line with one of the many behavioural arguments provided in the literature (see Barberis, Shleifer and Vishny (1998), Daniel, Hirshleifer and Subrahmanyam (1998), Hong and Stien(1999) etc.)

The present research contributes to asset pricing and behavioural finance literature especially for emerging markets. A search for rational explanations of size and momentum continues to be a challenge for empirical researchers. Further research on the subject is warranted till these pricing anomalies are fully resolved.

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Notes

Note 1. See Sehgal and Tripathi (2005), (2007)), Sehgal and Balakrishnan (2008), Sehgal and Jain (2011).

Note 2. Due to paucity of data, sample period for accruals is from January 1997-December2010(168 monthly observations) and for net stock issues from January 2002 to December 2010(108 monthly observations).

Note 3. Correlation between SMB and LMH was significant at 0.7 when we used the 2*3 partition. However the correlation was only 0.31 with the 2*2 partition.

Note 4. Results have not been reported due to space constraints.

Note 5. High stock issues firms report a cash flow to assets ratio of 0.074 prior to issue and 0.078 on average for three years on post formation basis. Similar figures for low stock issues firms are 0.087 and 0.084 respectively.

Note 6. We find that correlation between the liquidity factor and SMB and liquidity factor and LMH factors are low and stand at 0.007 and -0.04.respectively.

Note 7. The size anomaly seems to be explained at 1% level of significance. However an abnormal return of 14% on an annualized basis cannot be ignored and warrants additional explanation.

Note 8. Results have not been reported due to space constraints.

Table 1. Unadjusted average monthly excess returns

Portfolio	P1		P5(P2 for repurchases)	
	Mean	t-stat	Mean	t-stat
Size sorted portfolio	0.054	5.046	0.010	1.568
Value sorted portfolio	0.032	3.12	0.0149	2.23
Momentum sorted portfolios6/6	0.020	2.313	0.033	4.204
Momentum sorted portfolios12/12	0.024	2.572	0.032	3.811
Liquidity sorted portfolios	0.029	3.856	0.017	2.049
Profitability sorted portfolios	0.022	2.46	0.015	2.197
Accruals sorted portfolios	0.019	2.533	0.023	2.542
Stock issues sorted portfolios	0.020	1.967	0.028	2.179
Stock repurchases sorted portfolios	0.028	2.749	0.017	1.600

Table 2. Empirical results based on one factor CAPM

Portfolio	a	b	t(a)	t(b)	Adj. R^2
Size sorted portfolios					
P1	0.044	1.017	5.139	10.054	0.358
P5	0.0007	0.989	0.443	47.717	0.927
Value(P/B) sorted portfolios					
P1	0.021	1.164	2.882	13.333	0.496
P5	0.005	0.961	2.090	29.92	0.833
Momentum sorted portfolios 6/6					
P1	0.010	1.125	1.820	17.253	0.623
P5	0.023	1.072	5.552	21.838	0.726
Momentum sorted portfolios 12/12					
P1	0.014	1.040	2.108	13.064	0.486
P5	0.021	1.125	4.733	21.275	0.716
Liquidity sorted portfolios					
P1	0.022	0.778	3.727	11.05	0.403
P5	0.006	1.220	1.574	27.184	0.804
Profitability sorted portfolios					
P1	0.011	1.166	2.078	17.810	0.638
P5	0.005	0.988	2.008	30.003	0.833
Accruals sorted portfolios					
P1	0.008	0.972	2.092	19.514	0.694
P5	0.010	1.194	2.222	22.371	0.749
Stock issues sorted portfolios					
P1	0.000	1.167	0.082	19.467	0.779
P5	0.004	1.346	0.641	15.466	0.690
Stock repurchases sorted portfolios					
P1	0.009	1.120	1.667	17.258	0.735
P2	-0.001	1.085	-0.161	12.895	0.607

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Table 3. Empirical Results for the three factor Fama French Model based on Market, Size and Value factors.

Portfolio	a	b	s	h	t(a)	t(b)	t(s)	t(h)	Adj.R^2
Size sorted portfolios									
P1	0.020	0.872	1.546	0.504	3.615	13.161	13.467	4.258	0.736
P5	0.000	0.979	0.031	0.072	-0.020	46.713	0.863	1.925	0.928
Value(P/B) sorted portfolios									
P1	0.000	0.961	1.169	1.155	-0.257	31.011	21.757	20.854	0.939
P5	0.002	0.988	0.385	-.403	1.253	38.783	8.739	-8.859	0.899
Momentum sorted portfolios6/6									
P1	0	1.058	0.641	0.273	-0.004	18.463	6.458	2.676	0.722
P5	0.015	1.047	0.591	-.064	4.199	24.317	7.926	-0.831	0.798
Momentum sorted portfolios 12/12									
P1	-.004	0.883	1.081	0.812	-1.263	20.258	14.321	10.427	0.852
P5	0.013	1.121	0.710	-.286	3.466	25.124	9.195	-3.590	0.806
Liquidity sorted portfolios									
P1	0.013	0.731	0.615	0.110	2.367	11.096	5.392	0.939	0.499
P5	-.001	1.184	0.551	0.050	-0.510	31.020	8.338	0.745	0.864
Profitability sorted portfolios									
P1	0.000	1.066	0.686	0.522	-0.120	20.983	7.794	5.759	0.791
P5	0.001	0.997	0.420	-.269	0.609	35.901	8.748	-5.433	0.886
Accruals sorted portfolios									
P1	0.000	0.927	0.487	0.130	0.170	21.022	6.414	1.648	0.769
P5	0.000	1.151	0.623	0.029	0.158	25.237	7.934	0.363	0.823
Stock issues sorted portfolios									
P1	-.004	1.139	0.241	0.023	-.792	18.787	2.025	0.169	0.789
P5	0	1.331	0.467	-.209	-0.113	15.153	2.707	-1.045	0.706
Stock repurchases sorted portfolios									
P1	0.008	1.143	0.330	-.374	1.433	17.445	2.563	-2.501	0.749
P2	-.004	1.080	0.298	-.165	-.572	12.444	1.747	-0.837	0.611

Table 4. Empirical results for the liquidity augmented Fama French model

Port.	a	b	s	h	l	t(a)	t(b)	t(s)	t(h)	t(l)	Adj.R^2
Size sorted portfolios											
P1	0.012	1.128	1.510	0.470	0.566	2.540	18.590	16.061	4.853	9.382	0.823
P5	0	0.976	0.031	0.072	-.005	0.028	41.500	0.870	1.928	-.252	0.928
Momentum sorted portfolios (6/6)											
P1	-.001	1.093	0.636	0.269	0.078	-.240	17.069	6.411	2.632	1.230	0.722
P5	0.014	1.086	0.586	-.069	0.085	3.803	22.663	7.895	-.903	1.794	0.801
Momentum sorted portfolios (12/12)											
P1	-.005	0.896	1.080	0.810	0.028	-1.349	18.321	14.258	10.378	0.580	0.851
P5	0.012	1.149	0.706	-.290	0.062	3.165	23.048	9.150	-3.640	1.265	0.807
Liquidity sorted portfolios											
P1	0.001	1.100	0.563	0.061	0.814	0.354	27.185	8.988	0.958	20.258	0.849
P5	0.001	1.100	0.563	0.061	-0.185	0.354	27.185	8.988	0.958	-4.609	0.878

Table 5. Empirical results for multifactor model involving market, size, value, liquidity and sector momentum factors.

Size sorted portfolio

Port.	a	b	s	h	l	w	t(a)	t(b)	t(s)	t(h)	t(l)	t(w)	Adj.R^2
P1	0.011	1.120	1.466	.467	.558	0.063	2.414	18.373	14.683	4.824	9.225	1.280	0.824
P5	0	0.981	0.053	0.074	-.002	-.032	0.183	41.642	1.391	1.984	-0.087	-1.664	0.929
Momentum sorted portfolio(6/6)													
P1	0	1.122	.783	.280	.104	-.215	0.147	18.253	7.778	2.878	1.708	-4.278	0.747
P5	0.014	1.089	0.602	-.067	0.088	-0.024	3.838	22.555	7.617	-0.884	1.843	-.617	0.800
Momentum sorted portfolio(12/12)													
P1	-.006	0.883	1.014	0.805	0.016	0.095	-1.585	18.197	12.759	10.448	0.346	2.405	0.855
P5	.012	1.143	0.675	-.292	.057	.046	3.050	22.804	8.222	-3.673	1.148	1.121	0.807

Human Capital and Economic Growth in Pakistan: A Cointegration and Causality Analysis

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Abstract

This study is an attempt to investigate the role of human capital in terms of education and health on economic growth of Pakistan during 1974-2009. Using annual data, ADF, PP and Ng-Perron tests are utilized to check the stochastic properties of the variables. Long-run relationship among variables is confirmed through Johansen and Juselius cointegration test whereas the long-run and short-run dynamics are observed by VECM specification. For causality purpose both VECM based causality and Toda-Yamamoto causality tests are employed. Stability of the model is confirmed through CUSUM and CUSUMSQ. The results indicate strong positive impact of human capital on economic growth despite the fact that Pakistan has been spending less percentage of GDP on education and health facilities to create human capital. The study concludes that in order to reap maximum benefits from human capital there is a need to formulate and implement effective economic policies related to the provision of education and health facilities to the people.

Keywords: Economic growth, Human capital, Education and health

JEL classification: F43, J24, I21, I11

1. Introduction

Sustained economic growth accompanied with social development is one of the notable macroeconomic objectives of every country and in this regard human capital is deemed as an essential ingredient. The initial theory of human capital dates back to pioneer work of Mincer (1958), Schultz (1961) and Becker (1962), who believe that human capital is just like physical capital and one can invest in it by means of education, health and training which, in turn, will raise output and contribute to economic growth. Furthermore, proponents of endogenous growth theory lay emphasis on human capital formation and regard it a factor which explains difference in growth performance of under developed and developed nations (for details, see, Romer, 1986, 1990; Lucas, 1988; Rebelo, 1991). Therefore, it can be concluded that human capital has gained significant importance in growth theories. However, its measurement is not addressed properly in economic literature. Various researchers have utilized different proxies for human capital, *e.g.* Mankiew *et al*. (1992) utilize secondary education enrollments. Barro and Lee (1993) and Bosworth *et al*. (1995) have used average years of schooling. The existing literature on human capital reveals that while acknowledging the role of human capital in economic growth macroeconomists express human capital solely in the form of education whereas microeconomists consider health as another important component of human capital beside education. They believe that health plays significant role in the formation of human resources because in order to ensure growth in productivity, people need to be healthy or protected from sickness. It means health and education both are primary ingredients of human capital formation.

The government of Pakistan has failed to reap the maximum benefits from human capital due to less emphasis and less budget allocation to social sector. Despite almost threefold increase in total expenditure of public sector since 2001, the government spending on health and education has remained low. In fact spending on health as a percentage of GDP has even declined over time as it was 0.72% of GDP in 2001 which declined to 0.54% of GDP in year 2009. In terms of education spending Pakistan is one of the lowest in the South Asia and in terms of human development index latest ranking of 2010, Pakistan ranked at 125th position whereas India ranked at 119th position, Maldives ranked at 107th position; Sri Lanka ranked at 91st position. The two other countries of the region, *i.e.* Bangladesh and Nepal, are considered to be low human developed nations and ranked at 129th and 138th respectively.

It is pertinent to highlight that since the past decade human capital development is highly prioritized in Pakistan and the national education and health policies are aimed at improving these sectors and for achieving MDGs (Millennium Development Goals) especially in health by 2015. The improvement in certain health indicators and in literacy rate have been observed during the past decade but overall it ranked poorly in this context. Regional comparison in terms of human development index and human capital indicators (education and health) during 1980-2009 is reported in the Table 1.

Table 1 shows that Pakistan's spending on education has improved over time but still it spends less percentage of GDP on education. However, improvement in literacy rate has been observed over the years, which in turn has contributed to economic growth but over all it still ranks poor in the world in terms of education. Health spending as a percentage of GDP has been low in Pakistan but during last two decades special attention has been given to provide health facilities to the people. As a result few positive outcomes have been observed, *e.g.* in terms of life expectancy (an indicator of health) it ranks better in the world and infant mortality rate at birth has also declined over the period. Hence, it can be concluded that not much improvement in education and health standards have been observed in Pakistan. Therefore, there is a dire urgency to invest more in human capital in the form of education and health for achieving sustained economic growth.

Most of the empirical research conducted on the subject matter on Pakistan economy has defined human capital in terms of education indicators or in terms of health indicators. These indicators alone fail to capture development and skills of the labor force; therefore, there is a need to conduct research on this aspect that uses much broader measure of human capital in the context of Pakistan economy. The present study is an attempt to use broader measure of human capital as it uses education index and health index as proxies for human capital. These indices are self-constructed and are based on methodology of UNDP (United Nations Development Program). For details, see Appendix I. Furthermore, this study uses more advanced econometric techniques (Toda-Yamamoto) for estimating the causal relationship between human capital and economic growth in Pakistan. To the best of our knowledge no study has used this causality test in analyzing the causal relationship between human capital and economic growth in Pakistan. The proper understanding of the relationship between human capital and economic growth enables policy makers to formulate and implement proper policies that may help in utilizing the human resources of the country properly.

The remaining study is organized as follows: section 1 throws light on empirical literature, section 2 presents research design, section 4 reports results and discussions and section 5 concludes the study with policy prescriptions.

2. Literature Review

During the past century, the focus of researchers remained on the impact of human capital on economic growth by increasing the facilities of education and health. A number of empirical studies have documented a strong and positive relationship between human capital and economic growth. However, this relationship between the variables remained ambiguous.

Schultz (1971) and Becker (1962) both have developed and analyzed growth models augmented with human capital and find significant positive association between economic growth and human capital formation. According to Pritchett (1996), empirical results of cross country macro studies are controversial and inconsistent whereas results of micro studies are consistent and both have shown positive impact of education and health (proxies for human capital) on individual's productivity and income.

Earlier cross country macro studies find significant positive impact of human capital (education) on economic growth, see for example, Barro, 1991; Kyriacou, 1991. World Bank's study "East Asian Miracle" in 1993 also highlights that growth in human capital has caused rapid development of East Asian countries. Rosenzweig (1990) points out that major determinant of high growth of developed countries and poor growth of under developed countries is difference in the human capital growth. Developed countries are characterized by high standards of living whereas developing countries are not.

Sachs and Warner (1997) find quadratic relationship in health-growth nexus. They assert that improvement in health standards do improve economic growth, however, when human capital increases, economic growth also increases but at a decreasing rate. Stewart *et al.* (1998) try to explore human development and economic growth nexus using cross country statistics (including 35 to 76 developing countries) during 1970-92. They identify two chains, *i.e.* one from human development to economic growth and other from economic growth to human development. According to them, there exists strong two way causation in human development versus economic growth nexus, however, strength of the positive relationship running from economic growth to human development depends on female education and share of public expenditure in social services whereas income distribution and investment rate determine the strength of positive relationship running from human development to economic growth. According to Fogel (1994), during 1970s and 1980s approximately one third of Britain's GDP growth have been observed due to substantial improvement in health facilities.

According to Taniguchi and Wang (2003), education and health both cause each other and thus contribute in economic growth. Weil (2001) findings related to health-growth nexus further strengthen the importance of health for economic growth. The study concludes that 17-20% of variations in income across countries is due to differences in health status. Agiomirgianakis *et al.* (2002) conduct panel study (consisting of 93 countries) on subject matter and find significant positive long-run impact of education (primary, secondary and tertiary) on economic growth. Bloom *et al.* (2004) try to investigate the impact of human capital on economic growth. By utilizing, 2SLS approach they find that schooling and life expectancy both positively contribute to economic growth. Improvements in health standards are associated with increase in output due to increased labor productivity and capital accumulation. Seebens and Wobst (2003); Moser and Eliot (2005) both have asserted that in the long-run education (human capital) increases substantially household income as well as economic growth. However, other studies including Bils and Klenow (2000), Easterly and Levine (2001), Temple (2001), Bosworth and Collins (2003) have failed to establish positive association between human capital (years of schooling) and economic growth.

In case of Pakistan, most of the studies have used micro data on human capital. These studies conclude that education brings significant positive returns for wage earners (for details see Nasir and Nazil (2001); Behrman *et al.* (2008)). Using macro data in a comparative analysis of Pakistan and India, Abbas and Qaiser (2000) find overall significant and positive impact of human capital (school enrollment rates as a proxy) on economic growth during 1970-1994. They use higher secondary, secondary and primary enrolment rates for observing the role of education in economic growth. They employ OLS on standard growth model augmented with variables of enrolment rates. The results of the study reveal that primary enrolment rate has positive and significant impact on economic growth only in case of India. Human capital measured by secondary and higher secondary enrolment rates have positive and significant impact on economic growth in Pakistan. The study indicates that positive and significant impact of human capital on economic growth in both countries when production function augmented with effective labour input is used in estimation. Khan (2005) tries to analyze the relationship between human capital and economic growth in 72 developing countries for the period 1980-2002. The study concludes that countries which invested significantly in human capital have achieved higher returns in terms of economic growth.

Malik (2006) using OLS fails to find positive association between human capital and economic growth in Pakistan and when he uses 2SLS estimation technique the results are totally opposite. Peck and Abbas (2008) also find positive impact of education and health on output during 1960-2003. Qadri and Waheed (2011) investigate the impact of human capital on Pakistan's economic growth during 1978-2007 and find it a highly significant determinant of economic growth. They utilize health adjusted education indicator as a proxy for human capital in Cobb-Douglas production function rather defining human capital solely in terms of health or education. Khatak and Khan (2012) use analytical techniques, *i.e.* OLS and Johansen cointegration to investigate the impact of human capital in economic growth of Pakistan for the period 1971-2008. The results support significant positive association between secondary education and economic growth.

After reviewing empirical literature on the subject matter it is evident that in case of cross country studies empirical results remained inconclusive whereas in a single country analysis mostly studies support positive association between human capital and economic growth. However, it is observed that different studies have used different proxies for human capital and difference in measurement of human capital may be a source of bias in their empirical results. Furthermore, it can be concluded that earlier studies have used education as a proxy for human capital and more recent studies lay emphasis on both health and education as a proxy for human capital. The existing literature on Pakistan economy shows that appropriate proxies of human capital are not used along with recent advances in dynamic modeling. There exists a gap in the literature regarding the role of human capital on economic growth in Pakistan. The present study is an attempt to bridge this gap by analyzing the causal relationship between human capital and economic growth using recent advances in dynamic modeling and more appropriate proxies for human

capital. The results of this study may be helpful for policy makers in designing appropriate policies giving priority to the development of human capital.

3. Data Set and Model Specification

This study has employed annual time series data covering 36 years from 1974-2009. Recent advances in dynamic modeling are used to observe the impact of human capital on economic growth in Pakistan. The data have been obtained from *Pakistan Economic Survey* (various issues), World Development Indicators and International Financial Statistics (IFS).

In order to investigate empirical association between human capital and economic growth following model is specified.

$$lPCY_t = \beta_0 + \beta_1 EI_{1t} + \beta_2 HI_{2t} + \mu_{1t} \qquad\qquad (+) \qquad\qquad (+)$$

Where

$lPCY_t$ = log of per capita income (in \$) as a proxy for economic growth.

EI_{1t} = Education Index (first proxy for human capital).

HI_{2t} = Health Index (second proxy for human capital). For details, see Appendix I.

Expected signs of the variables are reported in parenthesis.

4. Econometric Methodology

4.1 Unit Root Tests

In literature, it has been established that most of the economic time series variables are non-stationary and the use of non-stationary time series leads to spurious regression which cannot be used for precise decision. As a first step of empirical analysis, the order of integration of the variables included in the model is determined by using standard tests like ADF, PP and Ng-Perron. Most of the studies use ADF and PP tests for determining the order of integration of the variables. These tests have some weaknesses that make the results somewhat unreliable. Dejong *et al.* (1992) state that due to their poor size and power properties both ADF and PP tests are not reliable for small sample data set. Ng-Perron test has the superiority over ADF and PP, that it gives more reliable results even for small sample data set.

4.2 Cointegration Test

Cointegration is a statistical property that describes long-run relationship of economic time series. Johansen (1988) proposed an approach to investigate long-run relationship among non-stationary variables. This study uses Johansen and Juselius (1990) cointegration approach for exploring long-run relationship between economic growth and human capital.

4.3 Vector Error Correction Model

Short-run and long-run dynamics among variables are captured through vector error correction model. It is a special case of restricted VAR for the variables that are integrated of order one as well as having long-run relationship. Engle and Granger (1987) and Toda and Phillips (1993) have shown that representation of VAR in first difference form is mis-specified when there exists cointegration among the variables therefore VECM is suggested for co-integrated systems. The major purpose of VECM is to indicate the speed of adjustment from short-run equilibrium to long-run equilibrium state. Following system of equations are formulated under the specifications of VECM.

$$\Delta lPCY_{1t} = \alpha_{10} + \sum_{i=1}^{p} \alpha_{11,i} \Delta lPCY_{1,t-i} + \sum_{i=1}^{p} \alpha_{12,i} \Delta EI_{2,t-i} + \sum_{i=1}^{p} \alpha_{13,i} \Delta HI_{3,t-i} + \lambda_1 ECT_{t-1} + \varepsilon_{1t} \qquad (1)$$

$$\Delta EI_{2t} = \alpha_{20} + \sum_{i=1}^{p} \alpha_{21,i} \Delta lPCY_{1,t-i} + \sum_{i=1}^{p} \alpha_{22,i} \Delta EI_{2,t-i} + \sum_{i=1}^{p} \alpha_{23,i} \Delta HI_{3,t-i} + \lambda_2 ECT_{t-1} + \varepsilon_{2t} \qquad (2)$$

$$\Delta HI_{3t} = \alpha_{30} + \sum_{i=1}^{p} \alpha_{31,i} \Delta lPCY_{1,t-i} + \sum_{i=1}^{p} \alpha_{32,i} \Delta EI_{2,t-i} + \sum_{i=1}^{p} \alpha_{33,i} \Delta HI_{3,t-i} + \lambda_3 ECT_{t-1} + \varepsilon_{3t} \tag{3}$$

Where Δ is the difference operator, p is the optimal lag length, ECT_{t-1} is the lagged residual term.

4.4 VECM Based Causality

According to Granger Representation Theorem, if two variables are co-integrated and first difference stationary then there is an existence of causality in either direction. The present study uses multivariate causality test to explore all channels of causal relationship. Causality in systems (co-integrated systems) can be established if and only if lagged error correction term (ECT_{t-1}) that takes into account long-run dynamics and sum of the coefficients of the lagged variables that takes into account short run dynamics both are significant.

4.5 Toda-Yamamoto Causality

Toda and Yamamoto (1995) proposed causality test which is robust for cointegration and stationarity properties. They levied criticism on VECM based causality test that its results may not be correct because preliminary tests biases of cointegration and first difference stationarity can be a possible source of wrong inferences regarding causality. Following system of equations is proposed to check causality inferences under Toda-Yamamoto causality test and SUR (seemingly unrelated regression) technique is utilized to estimate the model because due to SUR estimation wald test experiences efficiency.

$$lPCY_t = \alpha_1 + \sum_{i=1}^{k+d_{max}} \beta_{1i} lPCY_{t-i} + \sum_{i=1}^{k+d_{max}} \delta_{1i} EI_{t-1} + \sum_{i=1}^{k+d_{max}} \lambda_{1i} HI_{t-i} + \mu_{1t} \tag{4}$$

$$EI_t = \alpha_2 + \sum_{i=1}^{k+d_{max}} \beta_{2i} lPCY_{t-i} + \sum_{i=1}^{k+d_{max}} \delta_{2i} EI_{t-1} + \sum_{i=1}^{k+d_{max}} \lambda_{2i} HI_{t-i} + \mu_{2t} \tag{5}$$

$$HI_t = \alpha_3 + \sum_{i=1}^{k+d_{max}} \beta_{3i} lPCY_{t-i} + \sum_{i=1}^{k+d_{max}} \delta_{3i} EI_{t-1} + \sum_{i=1}^{k+d_{max}} \lambda_{3i} HI_{t-i} + \mu_{3t} \tag{6}$$

In order to check that education does not granger cause economic growth in first equation, null hypothesis will be: $\delta_{1i} = 0 \forall_i \leq k$. If null hypothesis is rejected then we can infer that education granger causes economic growth. In a similar fashion all other possible causations can be checked.

4.6 Diagnostic Tests

In this study for conforming the validity of the fitted model three diagnostic tests are employed, *i.e.* LM test to check serial correlation problem, Jarque-Bera test to check normality and White heteroskedasticity test for observing the variance constancy of the residuals.

4.7 Stability Tests

The stability of the model is confirmed through CUSUM and CUSUMSQ proposed by Brown *et al.* (1975). These tests depend on cumulative sum of recursive residuals that provides analysis of parameter variations. If CUSUM cumulative sum of recursive residuals remains within the boundaries of 5 % critical lines in order to ensure stability. The same is valid in CUSUMSQ.

5. Empirical Results and Discussions

The degree of integration is confirmed through ADF, PP and Ng-Perron tests. The results of ADF, PP and Ng-Perron are reported in Tables 2 and 3.

The results of all the three tests show that per capita output and education index both are stationary at their first difference. The results of both ADF and PP show that health index is stationary at level but Ng-Perron test reports that health index is stationary at first difference, *i.e.* I(1). Keeping in view that Ng-Perron test is more powerful and appropriate for small sample data set, it is decisively concluded that health index is I(1). Since all the variables are integrated of the same order, cointegration analysis is justified.

5.1 Cointegration Results

After establishing degree of integration the study proceeds to estimate long-run relationship among variables. Before examining this relationship there is a need to determine optimal lag length of the model. For this purpose VAR test is applied and one lag length is selected on the basis of Akaik Information Criterion (AIC). The long-run relationship is tested through Johansen and Juselius cointegration approach. The results are reported in Table 4.

Both the trace and maximal eigen value tests reveal that there are two cointegrating vectors in the system at 5% level of significance. This suggests the existence of long-run relationship between the variables.

The results of the estimated long-run economic growth function are reported as follows:

$$LPCY_t = 20.51 + 4.01\,EI_t + 6.35\,HI_t$$

t-values $\qquad\qquad\qquad$ (2.29) $\qquad$ (1.86)

The long-run coefficients of both education and health indices are aligned with theory and are also statistically significant indicating that both measures of human capital contributes in economic growth during 1974-2009.

The results of the study strongly support the view that in the long-run educated and well-nourished healthy labour force significantly contribute to economic growth. The coefficients of education and health reveal the existence of a positive and significant long-run relationship between human capital and economic growth. It may be because of an increase in workers productivity due to the proper provision of health and educational facilities to the workers. The possible factors that can be cited in this regard are increase in labour force participation especially female participation in economic activity, imparting knowledge and skills related to production process, increase in labour efficiency due to increased health facilities and improved technology, building of professional ethics and attitudes.

5.2 Vector Error Correction Model Results

The results of equation (1) shows that in the short-run both lagged education and health indices have no role in economic growth as both coefficients are insignificant. The significant lagged error correction term EC_{t-1} has negative sign that is an indication of the existence of stable long-run relationship between human capital and economic growth. The feedback coefficient –0.21 shows that approximately 21% of disequilibrium is corrected in the next year.

From the results of equation (2), it can be deduced that two regressors, *i.e.* D(LPC Y_{t-1}) and D(EI_{t-1}) have established short-run relationship. The long-run relationship between the variables is evident from the negative and significant coefficient of the lagged error correction term. The fairly low coefficient of (EC_{t-1}) shows very low speed of adjustment towards long-run equilibrium.

As per results of equation (3), two regressors have established short-run relationship whereas long-run relationship is absent due to insignificant error correction term.

5.3 VECM Based Granger Causality Results

The cointegration among the variables is an indication of the expected Granger causal relationship among the variables in either direction. In order to capture the long-run and short-run causality the study uses multivariate causality test. This test helps in detecting long-run causality through the significance of lagged error term while the short-run causality may be confirmed through the joint significance of $\Sigma\chi^2$ and individual significance of regressors. VECM based Granger causality results are reported in Table 6.

The results of the study indicate that in case of first dependent variable (D($LPCY_t$) lagged residual term is negative and statistically significant that reveals stable long-run relationship among the variables. The absence of short-run causality is evident from insignificant $\Sigma\chi^2$. For second dependent variable (DEI_t) the negative and significant lagged residual term is an indication of the existence of the long-run stable equilibrium between the variables. $\Sigma\chi^2$ is statistically significant at 10% indicating the presence of short-run causality running from economic growth to education.

The negative and significant coefficient of lagged residual term of the dependent variable (DHI_t) confirms the existence of stable long-run relationship between the variables. However, on the basis of insignificant $\Sigma\chi^2$, it can be concluded that there is absence of active short-run causality between the variables.

5.4 Toda-Yamamoto Causality Results

The main objection on VECM based causality test is that it requires pre-test assumptions of same order of integration of the variables and if these pre-test assumptions are not correctly addressed, then biases can affect the

causality results. The present study uses Toda Yamamoto causality test which is more stable approach as compared to Error Correction Modelling (ECM). For details, see Yamada and Toda (1998).

Modified Wald test statistic, their probabilities and critical values of χ^2 are reported in Table 7. The optimal lag length is determined as 1 through AIC and the order of integration of the variables is determined as 1 through Ng-Perron test. So the VAR (2) is estimated through SUR estimation technique.

In contrast to VECM based causality results the study finds two additional causal flows running from per capita output to health and from education to health. Hence, it can be concluded that education and economic growth both affect health. The possible rationale behind this causal relationship may be that education reduces fertility; increases awareness related to health care facilities thus improves health whereas economic growth is associated with access to better health care facilities.

5.5 Diagnostic Tests Results

The results of diagnostic tests are reported in Table 8.

All diagnostic outcomes are found satisfactory thus supporting the validity of the estimates.

5.6 CUSUM and CUSUMSQ Test of Stability

The stability of the model is confirmed through CUSUM and CUSUMSQ as both plots stayed within the critical bounds.

6. Conclusion and Suggestions

The main objective of the study is to analyze the relationship between human capital and economic growth for Pakistan by using recent advances in dynamic modeling. This study investigates causality between economic growth and human capital in Pakistan using annual time series data for the period 1974-2009.

The results of this study are found consistent with the theory as well as with the past empirical research conducted on subject matter in the context of Pakistan economy. It supports significant positive impact of human capital on economic growth by confirming direct positive relationship between economic growth and measures of human capital. The existence of stable long-run relationship between economic growth and both measures of human capital is confirmed through Johansen cointegration test. Toda-Yamamoto causality test confirms the existence of three uni-directional causalities, *i.e.* economic growth to education index, economic growth to health index and education to health. The diagnostic outcomes are found quite satisfactory and stability of the model is confirmed through CUSUM and CUSUMSQ test. The results of the study have important implications particularly for policy makers that for achieving rapid economic growth, it is indispensable to give much emphasis to human capital.

Keeping in view the significant long-run relationship between human capital and economic growth, the study suggests that for achieving considerable and sustained economic growth there is a need to increase investment in education and health sectors. More funds as percentage of GDP may be allocated to education and health sector in line with other sectors. Furthermore, rising inflation over time calls for the need of the provision of subsidized education and health facilities to the citizens. The Ministries of Education and Health must cooperate in promoting importance of health and spreading health care information to the people on priority basis. The major limitation of the study is that it does not include any other determinant of economic growth as a regressor in the model. It is left on the interested readers to analyze the causal relationship between human capital and economic growth by including the determinants of economic growth along with human capital index.

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Table 1. Selected Human Capital Indicators (1980-2009) of Pakistan

Indicators	Years					
	1980	1990	2000	2005	2008	2009
Human Development Index (HDI)	0.31	0.35	0.41	0.46	0.48	0.49
Education Expenditure as % of GDP	2.12	1.91	1.83	2.25	2.47	2.10
Adult Literacy Rate (%) 15 Years and Above	25.72	33.80	47.10	49.87	53.69	55.20
Infant Mortality Rate (per 1,000 live births)	116.90	100.70	84.80	76.40	71.90	70.50
Life Expectancy Total (Years)	57.80	60.56	63.92	65.56	66.52	66.70

Source: Human Development Reports, UNDP (various issues), World Development Indicators.

Table 2. ADF and PP Test Statistic Results 1974-2009

Variables	Levels/ First Difference	ADF test statistic		PP test statistic	
		Without trend	With trend	Without trend	With trend
LPCY	Level	−1.05	−2.36	−1.70	−2.80
EI	Level	4.11	0.43	4.97	0.36
HI	Level	−1.34	−5.73*	−1.42	−4.69*
Δ LPCY	First Diff	−3.60**	−3.52***	−4.43*	−4.39*
Δ EI	First Diff	−2.13	−3.71**	−4.74*	−7.25*
Δ HI	First Diff	−.74*	−7.62*	−6.44*	−6.42*
Mac-Kinnon Critical Values					
1 %		−3.64	−4.26	−3.63	−4.25
5 %		−2.95	−3.55	−2.95	−3.54
10 %		−2.61	−3.20	−2.61	−3.20

Note: * shows significance at 1 percent level. ** show significant at 5 percent level and *** show significant at 10% level whereas Δ is used as difference operator.

Table 3. Ng-Perron Test Results 1974-2009

Vari-able	MZ$_α$		MZ$_t$		MSB		MPT	
	Deterministic terms		Deterministic terms		Deterministic terms		Deterministic terms	
	c	c, t	c	c, t	c	c, t	c	c, t
Ng-Perron in Levels								
LPCY	2.07	−3.08	1.91	−1.21	0.92	0.39	72.74	28.89
EI	−3.11	−6.87	−0.85	−1.64	0.27	0.23	7.30	13.43
HI	−2.44	1.65	−0.91	0.47	0.37	0.28	9.03	33.21
Ng-Perron in First Differences								
ΔLPCY	−11.2**	−13.94	−2.27**	−2.63^	0.20**	0.18	2.54**	6.57^
ΔEI	−5.53	−15.8^	−1.63^	−2.8^	0.29	0.17^	4.51	5.79^
ΔHI	−9358*	1.53	−684.03*	0.55	.0007*	0.35	.00007*	43.26
Critical values[a]								
1%	−13.8	−23.8	−2.58	−3.42	0.17	0.14	1.78	4.03
5%	−8.10	−17.3	−1.98	−2.91	0.23	0.17	3.17	5.48
10%	−5.70	−14.2	−1.62	−2.62	0.27	0.18	4.45	6.67

Note: * denotes significance at 1%, ** denotes at 5% and ^ denotes at 10% significance level. a → Asymptotic critical values taken from Ng-Perron (2001, Table 1). c → denotes constant and c, t → denotes constant and trend. MZ$_α$ → Modified Philips-Peron test. MZ$_t$ → Modified PP t-test. MSB → Modified Sargan-Bhargava test. MPT → Modified Point Optimal test.

Table 4. Johansen's and Juselius Cointegration Test Results 1974-2009

Part 1:	Trace Statistic			
Null Hypothesis	Alternative Hypothesis	Test statistic	Critical Value (5%)	Probability**
H_0: r $\leq$ 0	H_A: r >0	44.15*	29.79	0.00
H_0: r $\leq$ 1	H_A: r >1	15.80*	15.49	0.04
H_0: r $\leq$ 2	H_A: r >2	0.03	3.84	0.86
Part 2:	Maximal Eigen Value Statistic			
Null Hypothesis	Alternative Hypothesis	Test statistic	Critical Value (5%)	Probability**
H_0: r = 0	H_A: r =1	28.35*	21.13	0.00
H_0: r = 1	H_A: r =2	15.77*	14.26	0.02
H_0: r = 2	H_A: r =3	0.03	3.84	0.86
Part 3:	Normalized Co-integrating Vector			
	LPCY	Constant	EI	HI
LPCY	1.00	20.51	–4.01	–6.35
t-statistic			[2.29] *	[1.86] *

Note: ** P-values are taken from MacKinnon-Haug-Michelis (1999). In part 3, * denotes significance of the variable.

Table 5. VECM Estimates 1974-2009

Variables	Eq.1 D(LPCY)	Eq.2 D(EI)	Eq.3 D(HI)
Constant	0.03	0.01	0.00
	[1.76]*	[6.57]*	[2.49]*
$D(LPCY_{t-1})$	–0.02	–0.04	–0.04
	[–0.15]	[–2.18]*	[–1.74]*
$D(EI_{t-1})$	0.57	–0.47	0.04
	[–0.44]	[–2.60]*	[0.20]
$D(HI_{t-1})$	1.92	–0.08	–0.37
	[1.48]	[–0.44]	[–1.75]*
$(EC_{t-1})_{1t}$	–0.21	–0.02	–0.01
	[–3.49]*	[–3.13]*	[–0.66]

Note: * denotes significance of the variable and t-statistic values are reported in brackets.

Table 6. VECM Based Granger Causality Estimates 1974-2009

Dependent Variables	Independent Variables			$(EC_{t-1})_{1t}$	$\Sigma \chi^2$
	$DLPCY_t$	DEI_t	DHI_t		
	$\chi^2 (\alpha_i = 0)$			$t(\lambda = 0)$	
$DLPCY_t$	—	0.19	2.21	[–3.49]*	2.59
DEI_t	4.78*	—	0.19	[–3.13]*	4.91***
DHI_t	3.03***	0.04	—	[–0.66]	3.20
Critical Values of χ^2					
χ^2 (1) at 1 % =6.64, χ^2 (1) at 5 % = 3.84, χ^2 (1) at 10 %= 2.70					
χ^2 (2) at 1 % = 9.21, χ^2 (2) at 5 % = 5.99, χ^2 (2) at 10 % = 4.60					

Note: * indicates significance of the variables.

Table 7. Toda-Yamamoto Causality Estimates 1974-2009

Dependent Variables	Sources of Causation		
	LPCY	EI	HI
	Mwald test (χ^2)	Mwald test (χ^2)	Mwald test (χ^2)
LPCY	–	2.27 (0.13)	0.71 (0.39)
EI	9.14* (0.00)	–	0.30 (0.58)
HI	3.05*** (0.08)	6.43** (0.01)	–
Critical values of χ^2			
χ^2 (1) at 1 % = 6.643, χ^2 (1) at 5 % = 3.841 and χ^2 (1) at 10 % = 2.705			

Note: * denotes significance at 1%, **denotes significance at 5%, *** denotes significance at 10%.   Mwald – modified wald statistic. Probability values are given in parenthesis.

Table 8. Diagnostic Test Estimates 1974-2009

Test	Test statistic	Prob.	Conclusion
LM-stat	11.73	0.22	Residuals are free from serial correlation.
Jarque-Bera	7.96	0.24	Residuals are normally distributed.
Chi-square	53.43	0.71	There is no heteroskedasticity.
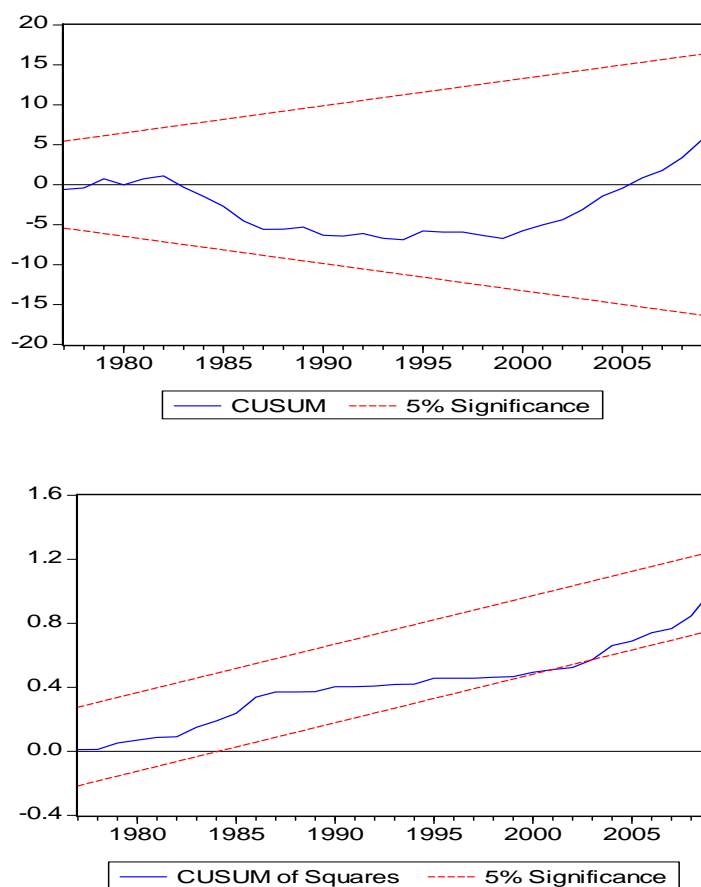
Figure 1. CUSUM and CUSUMSQ Plots

Appendix I

Education index reflects composite measure of knowledge and it has been taken as an important ingredient of human capital along with health index. Both self-constructed indices are based on UNDP methodology given in 1999-2000. The following formula has been used for constructing both education and health indices:

$$\text{Education Index} = \left[\frac{2}{3} * ALI\right] + \left[\frac{1}{3} * GEI\right]$$

$$\text{Where} \quad ALI = \frac{ALR - 0}{100 - 0} \quad \text{and} \quad GEI = \frac{CGER - 0}{100 - 0}$$

ALI = Adult literacy index, ALR = Adult literacy rate, GEI = Gross enrollment index, CGER = Combined gross enrolment rates.

Education index is constructed by adding together adult literacy index (ALI) with two-third weightage and combined primary, secondary and tertiary gross enrollment index (GEI) with one-third weightage.

$$\text{Health Index} = \left[\frac{LE - 25}{85 - 25}\right] \qquad \text{where LE = Life expectancy.}$$

Since values of these indices lie between 0 and 1 and they are unit free, we are unable to take log of these indices. So we have used semi-log model in our study.

An Analysis of the Recent Financial Performance of the Laotian Banking Sector during 2005-2010

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Abstract

Following the adoption of the New Economic Mechanism, banking sector reform was initiated as one of key components of economic reform policy in Laos. Since the process of reform began in Laos, banking sector has undergone significant changes and the performance of banks has improved significantly, especially in recent years. The banking sector reform, which was initiated by the Bank of the Lao PDR in the late 1980s, has brought a competitive environment for banking industry and banks are now offering a wide range of financial services and products to the public. In light of this development, this paper provides an overview of evolution and current structure and developments of the banking sector in the context of reform measures taken over the past two decades. The paper also analyses the financial performance of the banking sector by firstly examining the key financial development indicators and then uses a widely-used CAMEL framework surrounding capital adequacy, asset quality, management efficiency, earnings and profitability and liquidity to evaluate the financial performance. The results of this study is useful for assisting central bankers to know the strengths and weaknesses for formulating strategies and polices that will promote an effective and sound banking system.

Keywords: Laotian Banking sector, Financial performance, Financial analysis, CAMEL framework

1. Introduction

During the last two decades of economic development, financial sector reforms have been implemented in many countries. The motivation for these reforms varies from one country to another and the essence of reform has differed from time to time depending on the development strategy and ideology of the time. In many developing countries, important reasons for financial reforms, have been the need to establish a modern and sound financial sector of acting as the "backbone of the economy" and allocating the economy' savings in the most productive manner among different potential investments.

Recognizing the important role of financial sector, many developing countries implemented financial reforms as a part of broader market –based economic reforms since the late 1980s. The key parts of financial reforms entailed financial deregulation and institutional reforms to systems of prudential regulations and supervision. The central objectives of the reforms are to build more efficient, robust and deeper financial systems, which can foster the economic development and encourage private sector enterprises.

This is also similar situation in Laos. Laos, being a country in transition, has taken a gradual step to reform her financial sector, especially the banking sector. It is widely viewed that banks in a market-oriented economy plays a key role in the monetary payment mechanism, mobilization, intermediation and allocation of capital. Therefore, sound and efficient banking system would promote the socio-economic development by channeling funds from those who have saved surplus funds to those who needs these funds to engage in productive investment opportunities. The financial sector reform in Laos took place following the waves of economic and financial reforms in many countries, particularly in developing countries and transition economies during the late1980s.

For a long period of reform, the process of reform in Laos was carried out like trial and error. The results are mixed. During the process of transition, the performance of banking sector has gradually improved. The assets of commercial banks have risen from 139.2 billion Kip in 1992 to 3,829 billion Kip in 2000. In the meantime, the ratios of deposits have also increased from 6.4 percent in 1992 to almost 20 percent in 2000. Financial intermediation, as measured by M2 to GDP, was also increased from 9 percent in 1992 to almost 20 percent during

the same period. However, it was considered less successful outcome taking into account of the efficiency, financial viability, increased competitive banking environment and the financial demands for promoting financial development. Furthermore, the state-owned commercial banks (SOCBs), which serve as the driving force in the financial sector of Laos, had suffered large losses arised from high level of non-performing loans (NPLs) associated with directed-lending to SOEs. The NPL ratios of SOCBs ranged from more than 20 percent to about 50 percent during 1990s, and accounted for 3 percent of GDP in 2003(Unteroberdoerster, 2004). Until the early 2000s the Lao authorities decided to re-strengthen Laotian banking sector by another round of merging SOCBs and carried out internal restructuring of SOCBs. Following many attempts, banking sector, until recently, has managed to demonstrate significant improvements. Commercial banks in Laos controlled their lending growth, boosted their capitalization levels and implemented several measures to support their soundness, stability and safety. Besides, the commercial banks in Laos recorded high growth rates in recent years. For instance, the average growth rate of assets was 28 percent, the average growth rate of deposits was 21.4 percent, and the average growth rate of loans was 15.3 percent. In addition, The quality of assets of commercial banks has improved as NPLs were brought under control as represented by the average ratio of non-performing loan of banking sector was 4.24 percent in 2008, 3.28 percent in 2009 and 3.88 percent in 2010 consecutively(annual report, 2008, 2009, 2010). The operations of SOCBs were allowed to operate based on commercial-oriented basis and the number of banks and financial institutions has risen. Overall, banking sector as a whole has shown a constant pace of development and soundness.

To better understand the nature of financial sector development in Laos, this study focuses on key features of banking sector development since it is the core part of financial system of any economy, including Laos following the launch of market-based reforms in the late 1980s. In spite of financial performance of commercial banks has been widely reported in a number of studies, there is unfortunate that a small literature dealing with financial performance of banks in Laos is reported. Therefore, this study attempts to fill in the literature gap. This study brings an evaluation first time to make an empirical analysis on the most recent financial performance of banks in Laos. The banks under study are classified as follows: state-owned commercial banks, joint-stock banks, private banks and branches of foreign banks, in order to evaluate the financial performance of the commercial banks more accurately. More specifically, the objective of this paper is to analyze the financial performance of Lao banking sector in the recent times after economic and financial reforms. In order to evaluate the overall progress of financial and banking sector development in Laos, financial development indicators are firstly examined and CAMEL framework is then used to assess the financial performance of banks using data from the commercial banks' financial statements. The remainder of this paper proceeds as follows. Section 1 provides a literature review. The next section gives a brief overview of evolution and current structure and developments of banking sector in Laos. Section 4 assesses the most recent financial performance of Laotian banking sector during 2005-2010 and conclusion is drawn in section 5.

2. Literature Review

In assessing the financial performance of commercial banks, several empirical works usually use standard quantitative indicators for a number of countries such as the bank assets to GDP, bank deposit to GDP, broad money (M2)/GDP, total number of banks, branches and outlets, which allow us to compare and analyze the development of banking sector across the countries and over time. Beyond the key financial indicators, many previous studies employ micro-prudential ratios or CAMEL framework to analyze the financial soundness of banking sector such as capital adequacy, asset quality, management efficiency, earning and liquidity. To measure the financial soundness of banks based on CAMEL framework, there are financial indicators that we can obtain information from monetary statistics. Mohieldin, M., & Nasr, S (2007) assess the performance of the state-owned banks versus private banks over the period 1995–2005 in Egypt by using micro-prudential indicators, such as capital adequacy, asset quality, earnings, and profitability. Their findings reveal that state-owned banks lag behind in terms of efficiency and performance, compared to their private counterparts. Results also suggest that retaining government ownership can adversely affect banks performance. Other international agencies, bank regulators and researchers tend to use a CAMEL framework to assess the financial performance of banks. The International Monetary Fund (IMF, 2002) also develops a hand book on financial sector assessment to assist member countries to evaluate their financial sector performance, especially banks, which encompasses quantitative indicators of financial structure, development, and soundness. Particularly speaking about quantitative indicators of financial soundness which specifically measure the financial health and soundness of the financial institutions and cover major areas such as capital adequacy, asset quality, earning and profitability, liquidity and exposure to foreign exchange risk. In order to measure these five areas, similar financial ratios as indicated in the following section of this study are suggested. In recent time, several studies have been carried out by a number of researchers (Mohi-ud-Din and Tabassum, 2010). They also analyze financial performance of commercial banks in India using a CAMEL Model. Using this model, their results indicate

that the position of banks under study is sound and satisfactory so far as their capital adequacy, asset quality, management efficiency and liquidity is concerned. A similar framework is also used to analyze the banking sector in the Northern Cyprus. Atikoğulları M(2009) uses a CAMEL framework to assess the financial performance of five major banks in the post period of 2001, the results suggest that the profitability of banks and management quality have improved whereas capital adequacy and liquidity level, have deteriorated which requires a special attention for the future of the banking sector in the country. By exploring a number of empirical studies, this is strongly confirmed that a CAMEL framework is widely used to evaluate financial performance of banks.

3. The Evolution and Current Structure & Developments of the Laotian Banking Sector

3.1 Evolution of the Laotian Banking System

The Laotian banking system has been transformed through various stages during the last decades. Going back to October 1968, when the PatheLao Bank was established in the revolutionary zone. Since 1968-1975 the PatheLao Bank had mainly served as the national treasury for the government in the liberated zone in Houaphane province. After declaration of independence in 1975, the PatheLao Bank came to take over Vientiane front-led Bank in Vientiane Capital and renamed as the National Bank in March 1976. In 1981, the National Bank was further renamed as the State Bank of Laos (SBL) following the enactment of the Law on the state-monopolistic banking activity of the People's Supreme Council. During the period of 1975-1985, the role of National Bank or State Bank of Laos acted as mono-banking system, performing both central and commercial banking functions. In order to perform both functions, SBL expanded its 19 regional branches nationwide from Vientiane capital to cover different regions of the country (see figure 1). Serving as a central bank, SBL issued banknotes, regulated currency in circulation, handled payment system and remained as a national treasury. As a function of commercial bank, SBL accepted some deposits from society and lent money to state-owned enterprises according to central planner's instruction. Through a long period of performing the afore-mentioned role, however, the banking sector was unable to effectively perform its tasks, resulting in liquidity shortage, lack of efficiency and weak governance.

The late 1980s marked the beginning of a new era of financial sector reform in Laos. This attempt was made as a part of an open-door policy-known as New Economic Mechanism (NEM). In March 1988, Ministerial Council's Decree No.11 on the banking sector transformation was passed, setting a stage for officially transforming the Lao banking sector from a mono-bank system into a two-tier banking system. This legal framework also sets a milestone for comprehensive transformation of the banking sector in Laos and it was allowed for the first time to have a separate function between central bank and commercial banks. To implement the law effectively, former 19 branches of the State Bank of Laos were transformed into autonomous seven state-owned commercial banks in 1989, namely Banque pour le Commerce Exterieur Laos or BCEL, Sethathirath Bank, Lane Xang Bank, Lao May Bank, AlounMay Bank and Paktai Bank. The new setting was grouped based on geographical feature. These banks were permitted to perform a full commercial banking businesses such as accepting saving deposits from enterprises, public sector, individuals and granting credit to state entities, joint venture companies and individuals for capital investment and business start-ups or expansion. In June 1990, Central Bank Law No. 4 was enacted, establishing the Bank of the Lao PDR as the Central Bank. Under this Law, the central Bank assumes responsibility for supervising macro tasks such as formulation of monetary and exchange rate policies, regulation and supervision of commercial banks, managing foreign exchange reserves, issuance and supervision of money supply, granting bank license, management of the monetary and credit system.

During the period of transition, the banking reform in Laos was carried out like a trial and error. The banking sector was heavily regulated with respect to entry and interest rates before the mid-1990s. By using the interventionist approach, the outcome was mixed and considered less successful in promoting financial development. SOCBs lent to state-owned enterprises and priority projects at below-market interest rates. Large amount of directed lending to SOEs were not repaid, making some were financially vulnerable and this is clearly affecting the health of financial sector. As a result, the operations of the SOCBs were once faced with weak balance sheets (Unteroberdoerster, 2004), reflecting largely the problem of non-performing loans (NPLs) associated with directed lending to state-owned enterprises (SOE). This is called triangular debts (Note 2) Approximately, two-third of the NPLs belonged to SOEs, which is related to directed loans and policy- oriented purpose. The NPL ratios ranged from more than 20 percent to average 50 percent across the SOCBs during 1990s, of which around 50 percent of all NPLs is state-related lending (loans to SOEs and policy purpose). During 1994-1997, following unsatisfactory performance of SOCBs due to means of funding public priority projects, as well as budget deficits, the banking system was characterized with lack of competition, limited financial innovation, low level of financial intermediation, weak governance structure, and lack of managerial autonomy. Therefore, in order to address these problems, the Lao authorities decided to remodel their financial systems to ensure that resources were allocated efficiently, supporting their financial development strategies. They undertook a series of steps to deregulate the financial system. Among

the key steps were removal of interest rate restrictions, reduction of government direct lending, greater autonomy, increased capital requirements, promoted bank mergers and restructuring. During 1997-98, in particular, the consolidation and restructuring of SOCBs was carried out as a part of financial reforms under financial and technical support of the Asian Development Bank. The seven SOCBs were merged into four banks namely Lao May Bank, Lane Xang Bank, while BCEL and APB remained and were subject to internal restruturing. The Lao May Bank was the outcome of merging Lao May Bank, PakTai Bank and Nakhonluang Bank, while Lane Xang Bank is a result of merging Sethathirath, AlounMay Bank and Lane Xang Bank. Nervertheless, attempt to reform SOCBs further continued. In March 2003 Lao May Bank and Lane Xang Bank were merged and named as Lao Development Bank for for the second round. Therefore, the number of SOCBs declined as the result of consolidation during the late 1990s and early 2000s.

3.2 Overview of Current Banking System and Developments

Laotian financial industry consists of the central bank (Bank of the Lao PDR), state-owned commercial banks, private banks, joint stock banks, and branches of foreign banks and non-bank financial institutions. Since we concentrate on the performance of commercial banks, the central bank, as well as non-bank financial institutions are excluded from this study.

Commercial banks refer to those enterprise legal persons that are established to provide financial services such as accept deposits, issue loans, arrange settlements of accounts, and engage in other businesses in accordance with the Law on Commercial Banks enacted in December 2006 (No 03/LNA). According to Laos' commercial banks' structure, commercial banks can be further divided into state-owned commercial banks, private commercial banks, joint venture banks, foreign commercial banks' branches, etc.

It could be seen that, the current structure of Lao banking system is a product of several transformations that took place during the last two decades. As like financial system in developing countries or transition economies, banking sector plays a major role in the Laotian financial sector. The banking sector, which accounts for more than 80 percent of the financial system's assets and liabilities, is dominated by public ownership in terms of assets, deposits, loans and numbers of branches and service outlets. By the end of 2010, there were 25 commercial banks operating in Laos with their head offices based in Vientiane Capital (see Table2). Among 25 commercial banks, there were 4 state-owned commercial banks, which one of them is called a policy-based bank and the rest were 2 joint venture banks, 8 private banks, 11 foreign bank's branches and 1 representative office respectively. These banks carry out their operations through a network of 83 branches, 203 service units and 246 ATMs throughout the country as of December 2010.

In light of Lao banking financial developments, total assets of banking sector is amounted to 27.896,81 billion Kip or almost 50 percent of GDP as of December 2010. Total bank deposits and loans amounted 17.287,77 billion Kip and 12.768,66 billion Kip and represent 30.5 percent of GDP and 22.5 percent of GDP in 2010. Collectively, state-owned commercial banks account for almost 60 percent of total assets, 67.7 percent of deposits, 60.5 percent of loans and 85 percent of branch network and ATM service in 2010 (see table 1 & 2). The large share of SOCBs was the result of a deliberate government policy of developing the domestic financial sector, under which foreign banks had been restricted to open new branches during the initial stage of financial reforms. The three largest banks namely BCEL and Lao Development Bank and Agricultural Promotion Bank are owned by the government. Among these banks, BCEL maintains a leading position accounting for around half of total deposits and almost 40 percent of total loans in the banking system as of December, 2010. However, the share of assets, deposits and loans of state-owned commercial banks slightly declined in recent times as they are now facing intense competition with more banks coming into marketplace. The declining trend was replaced by private banks which are increasingly playing an important role as they are putting more active promotions to attract more clients. Although their market share of assets, deposits and loans, which is 17.95 percent, 19.67 percent and 20.23 percent respectively, was still relatively small. They have maintained a high growth momentum in recent years, with the annual growth of their assets, deposits and loans all exceeding 25 percent. Meanwhile the growth of joint venture banks and foreign banks' branches accounted for less than 15 percent in assets, deposits and loans. Although, the ratio of total asset of the banking sector to GDP has gradually increased from 30.7 percent in 2008, 40 percent in 2009 and 49.3 percent in 2010 respectively. However, banking sector is considered a relatively small size when compared with the size of the Lao economy, especially a country with a non-diversified financial system. Since the country is still at the early stage of capital market development, the banking sector is the main source of funding for industrial and commercial businesses. In addition, there have been also several important technological developments in the banking industry in recent years. Commercial banks have started to modernize all their operations and have introduced Automatic Teller Machines (ATMs), online system of communication and mobile banking. They have also changed their product mix to enhance their financial performance.

Apart from commercial banks playing the major role in financial sector, there are now other non bank financial institutions. These institutions include 9 deposit-taking microfinance institutions (MFIs), 15 non-deposit taking MFIs, 16 credit and saving unions, 25 pawnshops and 5 leasing companies under jurisdiction of the Bank of the Lao PDR. These institutions are widely spread and account for less than 5 percent of total assets of the banking industry. In addition, there are non-banking financial institutions, such as insurance companies and securities companies.

It is truly said that Laos has a relatively short experience of modern banking development. The commercial banks were not emerged until the late 1980s, and many of them have been in banking operations less than 10 years. As a result, banking sector is comparatively unsophisticated and most of commercial banks in Laos can only provide such basic financial service such as deposit taking, lending, payment, foreign exchange and clearing. Other sophisticated and value added services such as credit cards, gold trading, and etc; are beginning to be offered by some banks, but the volume of transactions remains extremely low. Overall, the lack of expertise, capacity and industry infrastructure, such as modern payment system, has impeded the rapid growth of new products and services.

4. An Analysis of the Financial Performance of Laotian Banking Sector

4.1 Source of Data and Study Methodology

In order to achieve the main objectives of this study, the data for this study was obtained from secondary sources-the banking statistics as published in the quarterly Monetary Statistics (2000-2010) and the annual report of the Bank of the Lao PDR via the Bank of Lao PDR's website. These data were used to compute key financial indicators of Laotian commercial banks for aforementioned period, as well as to assess the financial performance of the banking sector. According to official classification of the commercial banks in Laos (Annual report 2010), there are 25 banks which is composed of state-owned commercial banks, joint venture banks, private banks and foreign bank branches with different levels of market share. This study uses descriptive financial analysis to explain the financial situation of the Laotian commercial banks by examining the key financial development indicators. In addition, micro-prudential ratios or CAMEL framework, which can provide a rough indication of areas of vulnerabilities and weaknesses in the banking system, are further assessed. In this section, I undertake an analysis of financial performance of commercial banks in Laos. The following financial ratios are used in this study to measure financial performance.

Capital Adequacy = (i) (Total capital/ Total assets) X 100

(ii) (Total loans/ Total capital) X 100

Asset Quality = (i) (Total loans/ Total assets) X 100

Management Quality = (i) (Operating expenses/Total assets) X 100

(ii) (Interest expenses/Total deposits) X 100

Earnings Ability = (i) (Net income/Total assets) X 100

(ii) (Interest income/Total assets) X 100

Liquidity = (i) (Liquid assets/ Total assets) X 100

(ii) (Liquid assets/Total deposits) X 100

(iii) (Deposits/Total loans) X 100

4.2 Results and Discussions

Since the launch of financial sector reforms in second half of the 1980s, banking sector has gone through drastic changes. The banking sector has completely transformed from a mono-banking system into a complete form of a two tier banking system. The number of banks has increased from mainly seven state-owned commercial banks at the period of transformation to current number of 25 banks with more private banks , joint venture banks and foreign banks' branches attempted to penetrate in the Lao banking business. Commercial banks have improved their efficiency, financial services and expanded their network nationwide. Financial system has gradually shown a diversified financial structure. Presently, the banking business environment in Laos is very competitive with many banks entered in the marketplace to provide a variety of financial services and this seems to be the most suitable for studying the effect of financial deregulation policy. Originally, banks were concentrated only in Vientiane Capital, reluctant to expand their banking service to other provinces. Banks do not only open their branches but they also open their service units, introduced a ATM network widely to facilitate their banking operations. Banking sector, which used to be largely subject to public intervention, lack of innovation, low efficiency and high levels of NPLs is now progressing well. In particular, in recent years, the levels of NPLs have been under control with the ratio of less than 5 percent of total net lending. In sum, it could be said that banking sector in Laos is at the important juncture

for constant development and growth. Beyond the descriptive explanation of banking development in Laos, the improvements can be shown up based on some important financial development indicators. Now, let's look at the first four conventional financial indicators available, i.e., assets to GDP, the ratio of deposits to GDP, the ratio of loans to GDP, and the broad money (M2) to GDP. It is observed that the scale of assets in banking sector of Laos grew rapidly over the last decade. As observed from table 3, the assets-to-GDP ratio rose from 20.3 percent in 1992 to almost 50 percent in 2010 and meanwhile the deposit-to GDP ratio also rose from 8.6 percent to about 30 percent during the same period, while loans-to-GDP ratio remained more or less constant in between 10-12 percent in some years but rose to 22.8 percent in 2010. Furthermore, to better understand the evolution process of financial development in Laos, another important financial indicator, i.e., broad money (M2) as share of GDP, which measures the level of financial development or financial deepening, increased from around 10 percent in 1992 to almost 40 percent in 2010(table 3). These important figures illustrate that there are some financial improvements in Laos as a result of financial sector reforms initiated in the late 1980s. However, on average, the degree of financial development in Laos remains underdeveloped and narrow scope of activities.

For comparative perspective, it is useful to compare Laos with its close neighboring countries namely Cambodia, and Vietnam, China and Thailand, especially countries like Cambodia and Vietnam implemented financial sector reforms at similar period as Laos, while China and Thailand proceeded much earlier. By looking at one of the most indicators of the financial sector developments in these countries indicate surely a pace of progress and developments. Financial deepening as measured by the ratio of M2-to-GDP apparently rose from 5 percent in 1992 to 22 percent in Cambodia and around 23 percent in 1992 to 133 percent in Vietnam in 2010 (figure 2). Among late reformers like Laos and Cambodia, Vietnam is perhaps viewed as a country with faster progress in financial sector developments. However, when compared to its neighboring countries like Vietnam, Thailand and China, it suggests that Laos and Cambodia's financial sector development still far lag behind in terms of financial deepening. Therefore, it is clearly evidenced that financial sector in Laos and Cambodia is still in early stage of development. This ratio when compared with a ratio of 117 percent in Thailand, 182 percent in China and 133 percent where the financial system is well developed and diversified.

Financial Performance of Lao Commercial Banks Using CAMEL Framework

Besides the examination of key financial ratios of the banking development discussed above, CAMEL framework is also used to measure the financial performance of banking sector in Laos during 2006-2010. This framework is widely used to analyze the financial performance of financial institutions, especially banks, to determine their overall financial strength in many countries (Mohieldin and Nasr, 2007). The framework usually encompasses five key areas such as capital adequacy, asset quality, management quality, earning ability and liquidity

A. Capital Adequacy (C)

Capital adequacy is a measure of the overall financial strength of a bank. It is vital for maintaining soundness of the banking system since it acts as a cushion against panic or bank run or uncertainties. There are two financial ratios commonly used to measure the capital adequacy of banks. The first ratio is total capital as a share of total assets (capital/assets) which reflects the ability of a bank to absorb the unanticipated risks or losses and continue honoring claims. This ratio is positively related to the financial soundness of the bank, thus, it is negatively related with a possible failure. In other words, as this ratio becomes higher, it means that there is more capital to absorb unanticipated losses such as immediate deposit withdrawal caused by a bank-run or systematic shocks. The second ratio of the capital adequacy is total loans as a share of total capital (loans/capital). This ratio indicates the resistance of a bank to loan losses. Loan losses more than expected may cause a serious deterioration of the equity capital. Unlike the first ratio, this one has a positive relation with the risk of failure.

Figure 3 depicts two financial ratios, namely capital-to-total assets ratio and loans-to-capital ratio of commercial banks for 2005-2010, which provides a deep insight into the financial position of bank, and reveals their resistance against unexpected losses during 2005-2010. The figure indicates that commercial banks in Laos have continued to improve in terms of the level of capital using both financial ratios, especially in recent times. The Capital/Assets ratio shows a rising trend from a below 5 percent level in 2005 to about 15 percent in 2010, implying that commercial banks in Laos are less prone to possible unexpected losses than before. However, by examining the Loans/Capital ratio, which is another ratio used to assess the capital adequacy, the results show that the banking sector, in general, was deteriorating from the period 2007 to 2010 in terms of capital adequacy, especially from the standpoint of defending against loan losses. According to the result, the bank's capital strength against loan losses decreases significantly from 2007 to 2010 with an increased size of total loans from 7 to 34 times of the capital in 2010.

Apart from financial ratios used to measure the level of capital adequacy, it is also very important to examine the minimum capital adequacy ratio (CAR). Based on the international banking regulators (Basel Committee for Banking supervision), the minimum capital adequacy ratio(CAR) is 8 percent. In Laos, this minimum CAR at 8 percent of risky-weighted assets is also applied as stipulated in the Bank of the Lao PDR's regulation on capital adequacy(No 135/BOL, March 2007). Based on the recent data of the Bank of the Lao PDR, the capital adequacy ratio(CAR) of the commercial banks in Laos stood at 9.45 percent in 2008, 13.82% in 2009 and 23.47% in 2010 respectively. These figures, on aggregate level, appears to suggest that commercial banks have fulfilled capital adequacy standards and have a sufficient level of capital of bank to encounter with any potential shocks. However, the level of capital of some commercial banks may be remained low due to the recent regulatory changes which require commercial banks and branches of foreign banks to increase the minimum registered capital for from 100 billion Kip to 300 billion Kip or equivalent to US$ 38 million until 2014. The existing branches of foreign banks are required to increase a minimum registered capital from 50 billion Kip to 100 billion Kip until 2013(Decision No. 141/PM, 2009).

B. Asset quality (A)

In order to measure the asset quality of commercial banks, the ratio of total loans to total assets (Loans/Assets) was commonly used. This ratio also shows how much the banks dedicate of available funds to lending. Loans are the riskiest assets and usually account for the majority of a bank's assets. A high share of loans to total assets ratio indicates a more sensitive structure to total loan losses and may be a result of underestimating the possible loan losses. The higher the value of non-performing loans means a lower asset quality, which poses a risk to the bank's profitability and financial viability.

Table 4 below shows the ratios of the loans to total assets of commercial banks in Laos in order to asset the banks' asset quality. As can be seen from the table, the loans-to-assets ratios of commercial banks in Laos remain moderate with the average ratio of 37 percent during 2005-2010. This figure implies that commercial banks in Laos are generally managed to absorb possible loan losses that may be occurred. On aggregate level, the ratio of loans to total assets decreases from 2005 to 2007 in 2010 from 36.8 percent to 26.5 percent, indicating an increase in asset quality. Nevertheless, the ratio has continuously increases after that, reaching more than 40 percent in 2009 and 2010. In addition to examining the loans to total assets ratio, the volume of NPLs of banks also indicates how efficient the banks manage the asset quality. According to the recent publication of the Bank of the Lao PDR (annual report 2009-2010) the commercial banks were able to bring the quality of assets under control as shown by the declining level of NPLs, which were reduced from 10.52 percent in 2006 to 6.20 percent in 2007, 4.42 percent in 2008, 3.28 percent in 2009 and 3.88 percent in 2010 consecutively (annual report, 2008, 2009&2010) and provisions for loan losses were made almost 100 percent by all commercial banks. This figure is considered comparatively low by the international standard of commercial banks. For example, leading Chinese banks, namely ICBC's NPL ratios was 2.74 percent , 3.1 percent for BOC, 2.6 percent for CCB and 2.1 percent for BOCOM at the end of 2007(Hwa, E.C(2008).

C. Management quality/efficiency ratio (M)

In fact, it is not an easy task to measure the management quality since it is not solely dependent on the current financial performance. This component includes a wide range of issues such as the education level and expertise of the management.   From financial data available, the most appropriate measures to evaluate the management quality are operating efficiency and the cost of management over deposits. In this regard, there are two types of indicators usually used for evaluating the management quality. These include the operating expenses as a share of total assets (Operating Expenses/ assets), the deposit interest expenses as a share of total deposits (interest expenses/deposits).

In terms of management indicators, operating expenses/ assets; interest expenses/deposits as shown in figure 4 on aggregate level, the banking system is sufficient to maintain a stable position in terms of operational efficiency. By examining both ratios, banks maintain a slightly decreasing trend during 2005 to 2010. The Operating Expenses/Assets ratio is on average kept under control of 1 percent during six years, indicating that the management quality of the banks with respect to operating efficiency is maintaining quite reasonable level in spite of the large investment in innovations and the introduction of new financial service of state-owned commercial banks during the last 4-5 years. Another ratio to evaluate the management quality is concerned with the cost management of the bank over deposits. Overall picture of the trends indicates that the cost management over deposits has improved and declined since 2005. Banks can maintain the interest expenses as a share of total deposits below 3 percent over the last five years.

In addition, it is also observed that the interest rate spread between deposit and lending rates was once very high, indicating that the banks lack of efficiency due to higher operating costs. For example, saving account interest rate

for one year was 14-16 percent in early 1990s and short-term lending rate was 24-30 percent per annum, making the spread even wider. However, the deposit and lending rates have substantially dropped to about 9 and 14 percent recently(table 3.4). This generally implies that there is an improvement in operational efficiency of banks. Nevertheless, the interest rate spread of commercial banks is considered relatively large, implying that commercial banks in Laos need to improve and manage the operating costs further. In a country with modern and efficient banking sector, the interest rate spread could be narrow, not more than 2-3 percent. Expense ratio is probably higher for state-owned banks compared to private banks due to overstaffing in these banks, lack of performance assessment system and performance incentives.

D. Earnings and profitability (E)

The future viability of a bank depends on its ability to generate a sufficient level of return on its assets. Earning ability provides the means to a bank to expand its funding, maintain its competitive position and increase its capital. It is the most important factor determining the performance. To measure the earning ability of a bank, two ratios are used to evaluate the earning ability of banks. The first one is the net income as a share of total assets (Net income/Assets) which is also known as "return on assets" or ROE. The second ratio is the net interest income as a share of total assets (net interest income/Assets). So both ratios are positively related with the financial performance of the bank and negatively related to failure of possibility.

The Net income/Assets ratios and net interest income/Assets ratios are shown in the figure5. According to the figure, banks experience a downward trend for both ratios, indicating that the earning ability of the banks declines. Trends of the banks' Interest Income/Assets ratio particularly shows lots of ups and downs during2005-2010 but banks are still able to manage to generate profit on aggregate basis between 3 to 2 percent. However, profitability ratio of commercial banks may be low compared with international standard. For example, some international banks can record the highest ratio of ROE more than 10 percent.

E. Liquidity (L)

Liquidity management is very important task for the banks always care about it. Lack of liquidity of a bank can seriously damage the profitability and confidence, hence increase the likelihood of a bank failure. Liquidity reflects the ability of a bank to meet its financial obligations as they come due without incurring unacceptable losses, especially deposit withdrawal and daily payment of a bank. Managing liquidity is a daily process requiring bank managers to monitor and project cash flows to ensure adequate liquidity is maintained. Therefore, maintaining a balance between short-term assets and short-term liabilities is critical.

There are three indicators often used to assess the liquidity of commercial banks. This includes total liquid assets as a share of total assets, total liquid assets as a share of total deposits and total deposits as a share of total loans. First, the total liquid assets to total assets (Liquid Assets/Assets) reflects the ability to pay off its liabilities. Second, total liquid assets as a share of total deposits is to measure the capacity of the bank to meet unexpected deposit withdrawal. Third, the total deposits as a share of total loans(Deposits/Loans) that measure the deposit withdrawal was the last ratio to assess the liquidity.

According to the figure 6, the Liquid Assets/ Assets ratios and Liquid Assets/deposits ratios show that banks have maintained a more liquid position and shown a generally more stable position during the same period. During 2005-2010, the Liquid Assets/ Assets ratio for banks account for more than 50 percent, revealing that the banks are still in a better shape of liquidity and this may be considered that the operation of banks will be stable in the future. For the Liquid Assets/Deposits ratios, which enable banks to cover unexpected deposit withdrawals, almost indicates the same trend and shows the high and stable position. The trend shows that the bank has kept a relatively stable liquidity position throughout the sample period, maintaining ratios between 60 to 70 percent. Thus, this can be concluded that the bank has maintained its ability to cover any possible unexpected deposit withdrawal. Another important ratio used to assess the liquidity of the banks is the Deposits/Loans ratio. As can be observed in the figure, banks have showed a higher capitalization rate. This situation is shown by deposit-to loan ratio- a proxy for liquidity- shows that the banking sector average at more than 100 percent during 2005-2010. Nevertheless, the Deposits/Loans ratio have generally followed a decreasing trend, the ratio of deposits to loans increased from 180 percent to more than 200 percent between 2005 to 2007, then decreased sharply to about 130 percent in 2009 and has remained stable for the rest of the sample period.

Overall, comparing the banking performance during pre and post periods of the banking sector reform, it is clearly evidenced that financial reforms initiated by the Bank of the Lao PDR bring positive impact on the entire banking performance. Prior to financial reform, banking sector in Laos was characterized with poor performance, lack of efficiency, weak governance, lack of autonomy, low capital adequacy ratio, high level of non-performing loans associated with state-owned commercial banks' policy lending, wide spread of interest rate, lack of competition and

limited financial products and services. As a result of the reform measures as taken by the Bank of the Lao PDR over a decade, there has been significant changes in the landscape and financial performance. Some of the positive results achieved during the post period of reform are as follows:

The overall size of financial sector as measured by the total assets of banking sector to gross domestic product(GDP), has significantly increased from 20.3 percent in 1992 to almost 50 percent in 2010. The ratio of broad money to GDP (M2 to GDP), which measures financial deepening, has also increased from 11.2 percent to almost 40 percent in 2010. The ratio of bank deposits to GDP also rose from 8.6 percent to lamost 31 percent during the same period. In addition, number of banks has increased from less than 15 banks in the 2000s to more than 25 banks presently operating in the Lao PDR, with a variety of financial products and services and nationwide networks of branches, service units and ATMs. Financial sector has improved its diversification in terms of structure and products. Currently, besides the banks, there are also non bank financial institutions, namely deposit-taking MFIs, non deposit taking MFIs, credit and saving unions, pawnshops and leasing companies and securities companies under jurisdiction of the Bank of Lao PDR. Banks have now started to modernize all their operations and have introduced a nationwide network of ATMs, and mobile banking. They have also changed their product mix to help improve financial performance. By using financial soundness indicators, their financial performance has noticeably improved. The growth of assets and deposits has significantly increased. The quality of asset of commercial banks has also improved as indicated by a small size of non-performing loans (NPLs). The most recent figures suggest that commercial banks in Laos are managed to bring NPLs under control of less than 5 percent, which is consistent with international banks' practices.

Overall financial strength of banks has gradually improved. Examining the level of capital adequacy of banks based on the international prudential norms, the minimum capital adequacy ratio is set at 8 percent. During the period of 2008-2010, the ratio of banks in Laos stood at 9.45 percent in 2008, 13.82 percent in 2009 and 23.47 percent in 2010. These figures demonstrate that commercial banks in Laos have fulfilled capital adequacy standard and have a sufficient level of capital to encounter with any potential risks. Although, earning and profitability of banks appears to be low by international standard, but banks continue to make profit continuously. Banks manage to bring the expenses under control and the levels of interest rates and the level of interest rates and spread between deposits and lending have declined. These positive results reflect some effective outcomes achieved by the Lao authorities after financial reform implemented over a decade.

5. Concluding Remarks

Lao banking sector has undergone significant developments and has now grown impressively. The banking sector reform initiated in the late 1980s has brought a competitive environment and many banks are now attempting to offer a wide range of financial service and products to their clients. By analyzing the financial performance of banks using CAMEL framework, this suggests that commercial banks in Laos have financially improved, including sufficient level of capital adequacy, good quality assets as indicated by low level of NPLs, improved efficiency of management, improved profitability and sufficient liquidity. However, there are some areas of deficiencies in the banking sector, especially the state-owned commercial banks, including a relatively low capital adequacy ratio, modest earning and profitability. On aggregate level, the financial sector is characterized by high degree of public ownership, relatively low level of financial intermediation, limited financial market depth and breadth, large interest rate spread very few formal financial institutions (FIs) have shown capacity to provide financial service to the small-scale entrepreneurs and rural operators. Formal FIs in Laos generally focus on support of trade and service-related activities. Furthermore, the range of financial institutions and products is narrow and the operation of the banks is constrained by the lack of relevant management skills.

In light of some deficiencies mentioned above, the agenda for strengthening the Laotian banking sector shall include policies and measures designed to improve the efficiency and competitiveness of the financial sector and intermediation process, especially improve the performance of state-owned commercial banks; improve the legal, regulatory and supervisory framework; implement policies and measures to improve the institutional and human capacity of the financial sector; mobilize managerial and technical skills of personnel; expand the structure of the sector and its financial instruments; improve payment systems; promote the efficiency and development of money, banking and capital markets; provide the legal, regulatory framework for the development of capital markets and encourage technological modernization of the sector. These are some of the major elements of a comprehensive financial sector reform agenda in Laos in the near future for enhancing a sound and effective financial sector.

This study would contribute to the design of policy to generate a sound and efficient financial sector development, help construct a set of performance measures to evaluate the policy, and serve as useful indicator of progress over times. The results of this study should help to provide bank managers with understanding of activities that would

require to enhance their financial performance as well as to design an appropriate financial strategy for attaining the desired financial outcome.

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Notes

Note 1. The views expressed in this paper are those of the author and do not necessarily reflect the official views or positions of the Bank of the Lao PDR. The first draft of the paper was prepared in 2008 when the author was joining ASEAN financial sector development conference at Nanyang Technical University of (NTU), Singapore. Enquiries may be contacted at keophetsa@bol.gov.la.

Note 2. Triangular debts refer to the debts involved with three parties: government, borrowers (SOEs) and SOCBs. First, SOEs borrowed money from SOCBs in advance to finance priority public projects, hoping to reimburse from the state budget. Unfortunately, when the project is completed, the budget is not ready to pay for the construction companies, the fiscal agent owes the construction companies, borrowers owe the banks, and the banks also faced the bad debts. In sum, the debts incurred with three parties.

Table 1. Financial statistics for commercial banks in Laos (end of 2010)

Type of Bank	Total Assets (Kip billion)	Market share(%)	Total deposits (Kip billion)	Market share(%)	Total loans (Kip billion)	Market share(%)
SOCBs (4)	16548.56	59.3	11,654	67.4	7719.47	60.5
Private Banks(9)	5007.92	18.0	3,401	19.7	2583.62	20.2
Joint venture banks(2)	3363.38	12.1	1,248	7.2	946.09	7.4
Branches of foreign banks(11)	2976.95	10.7	985	5.7	1519.48	11.9
Total	**27896.81**	**100**	**17,288**	**100**	**12768.66**	**100**

Source: Quarterly Statistics Review of Bank of Lao PDR(Various issues)

Table 2. Number of commercial banks in Laos as of December 2010

Name of Banks	Established	Branches	Service units	Money Changer	ATM
State-owned commercial banks					
1. Banque pour le Commerce Extrieur Lao	1-Nov-89	18	21	11	140
2. Lao Development Bank	18-Dec-02	18	43	19	63
3. Agricultural Promotion Bank	19-Jun-93	17	58	1	0
1. Nayoby Bank	15-Sep-06	6	46	6	0
Joint venture Banks					
1. Lao - Viet Bank	31-Mar-00	4	1	0	10
2. Banque Franco - Lao Ltd	16-Jul-10	0	0	0	0
Private Banks					
1. Joint Development Bank	17-Jul-89	0	2	0	27
2. Phongsavanh Bank	2-Feb-07	4	11	0	45
3. ST Bank	22-May-09	2	9	0	19
4. Indochina Bank	28-Nov-08	0	1	0	12
5. Booyong Lao Bank	14-Sep-09	0	0	0	0
6. ANZV Bank	2-Aug-08	2	0	0	13
7. ACleda Bank	8-Jul-08	4	10	0	14
8. International Commercial Bank	2-Oct-08	1	0	0	0
Foreign Bank Branches					
1. Siam Commercial Bank	30-Nov-92	0	0	0	0
2. Thai military Bank	1-Feb-92	0	0	0	0
3. Bangkok Bank	7-Sep-92	0	0	0	0
4. Krungthai Bank	25-Feb-93	0	1	1	0
5. Ayudhya Bank	26-Feb-93	1	0	0	0
6. Ayudhya Bank Savanakhet Branch	24-Jun-09	1	0	0	0
7. Public Bank	10-Apr-95	1	0	0	1
8. Public Bank Sikhai Branch	25-Feb-08	1	0	0	1
9. Public Bank Savanakhet Branch	25-Feb-08	1	0	0	1
10. Sacom Bank	9-Dec-08	1	0	0	0
11. Military Commercial Joint Stock Bank Lao Branch	22-Dec-10	1	0	0	0
Representative Office					
1. Standard chartered bank	2-Jul-97	0	0	0	0
Total		**83**	**203**	**38**	**346**

Source: Monetary Statistics Review of the Bank of Lao PDR, 2010.

Table 3. Key financial indicators of banking sector in Laos,1992-2010

Year	Deposits/GDP	Loans/GDP	Assets/GDP	M2/GDP
1992	8.6	8.3	20.3	11.2
1993	14.3	11.5	31.9	17.4
1994	17.9	15.5	35.6	21.3
1995	11.7	11.4	25.1	13.5
1996	13.5	10.4	26.3	14.2
1997	18.1	14.0	32.4	18.4
1998	21.2	13.5	35.4	20.4
1999	14.2	9.2	29.5	15.0
2000	14.6	9.6	29.6	17.4
2001	15.2	11.7	26.6	18.2
2002	16.4	9.9	26.1	19.4
2003	19.0	8.7	26.7	20.1
2004	18.1	7.8	24.8	19.9
2005	16.3	8.7	23.7	18.7
2006	16.5	6.6	23.0	19.6
2007	21.9	7.5	28.3	24.4
2008	20.7	11.3	30.7	25.4
2009	26.1	19.1	39.7	32.4
2010	30.6	22.8	49.7	37.4
Average	17.6	11.4	29.8	20.2

Source: Bank of Lao PDR's website

Table 4. Loans to total assets of commercial banks in Laos, 2005-2010

Year	Loans	Assets	Loans/Assets
2005	2525.3	6858.7	36.8
2006	2370.4	8281.0	28.6
2007	3005.7	11362.3	26.5
2008	5161.6	13995.0	36.9
2009	8936.1	18560.1	48.1
2010	12903.2	28096.3	45.9
Average	1648.5	4484.8	37.1

Source: Quarterly Statistics Review of Bank of Lao PDR(Various issues)

Table 5. Commercial Bank Interest Rate Spread, 2003-2010(In Kip)

Year	Deposit Rate(%)	Lending Rate(%)	Spread(%)
2003	15.37	18.83	3.47
2004	13.05	20.82	7.77
2005	11.17	19.48	8.31
2006	10.79	19.04	8.25
2007	10.67	18.79	8.12
2008	10.28	17.55	7.26
2009	9.56	15.29	5.73
2010	9.15	14.42	5.27

Source: Annual report of the Bank of the Lao PDR(various issues)
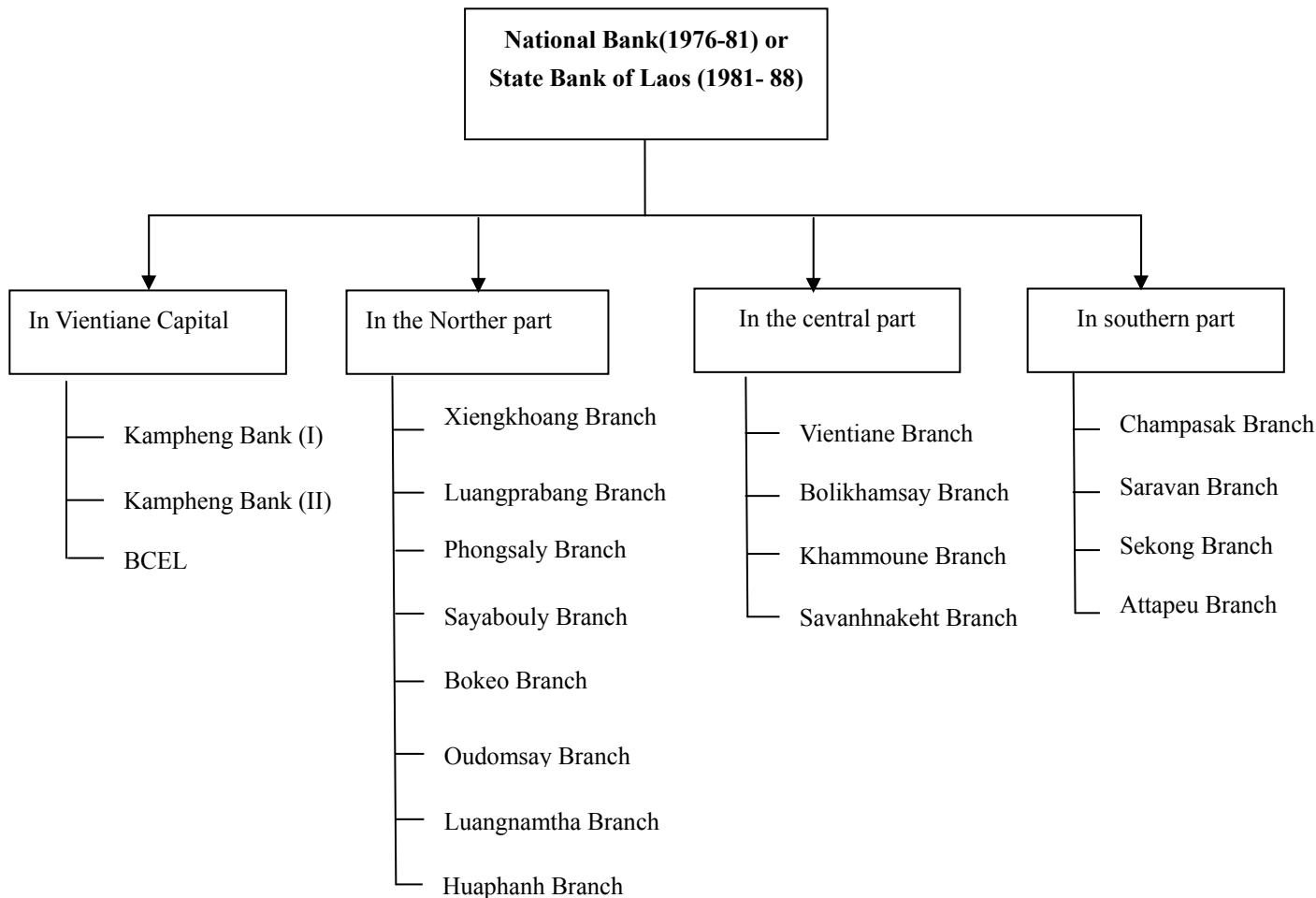
Figure 1. Banking structure prior to economic reform ,1976-1988 (monobank system)
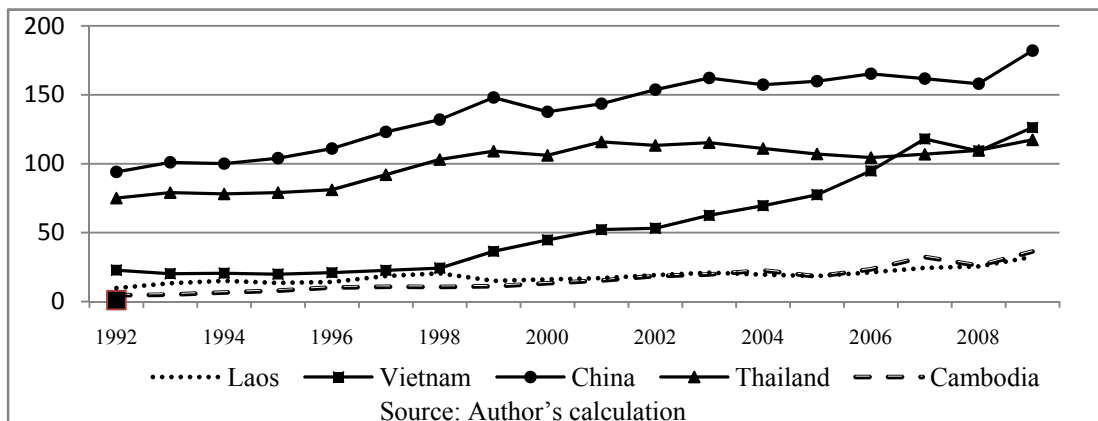
Figure 2. Financial Depth of Laos and its Neighboring countries, 1992-2010
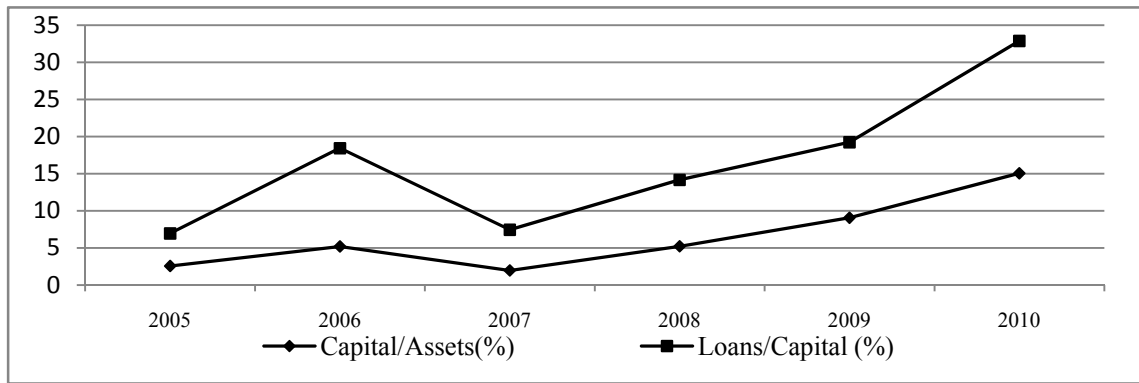
Source: Author's calculation is based on a Quarterly monetary statistics, Bank of Lao PDR
Figure 3. Capital Adequacy ratio as measured by capital/assets and loans/capital (%)
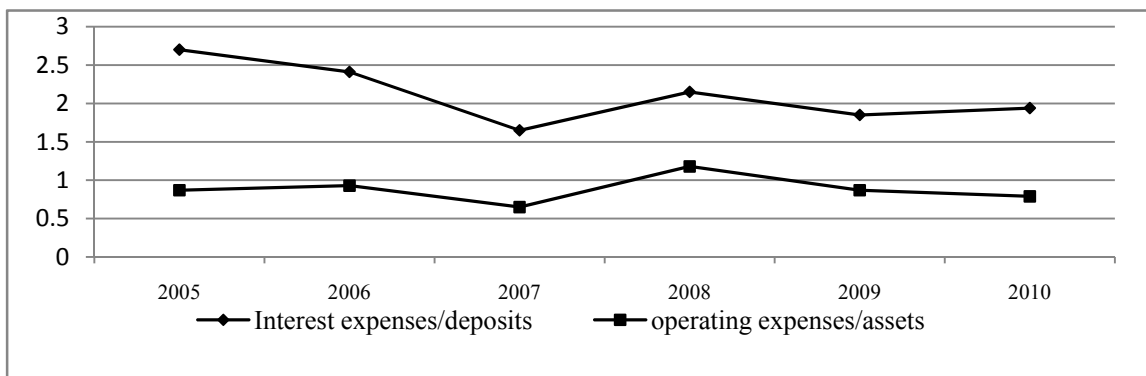
Source: Author's calculation is based on a Quarterly monetary statistics, Bank of Lao PDR
Figure 4. Management quality ratio as measured by operating expenses as a share of total assets and interest expenses as a share of total deposits,2005-2010
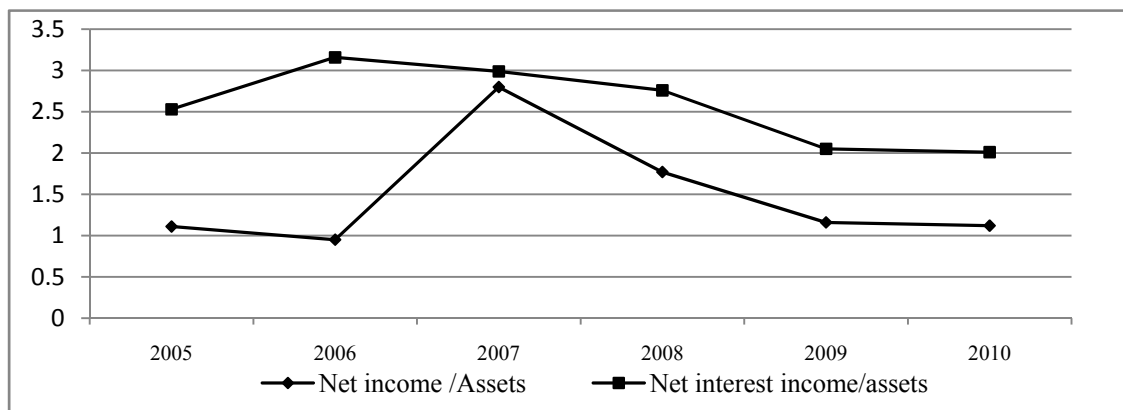
Source: Author's calculation is based on a Quarterly monetary statistics, Bank of Lao PDR
Figure 5. Earnings ratios of commercial banks in Laos, as measured by net income/assets and net interest income/assets, 2005-2010
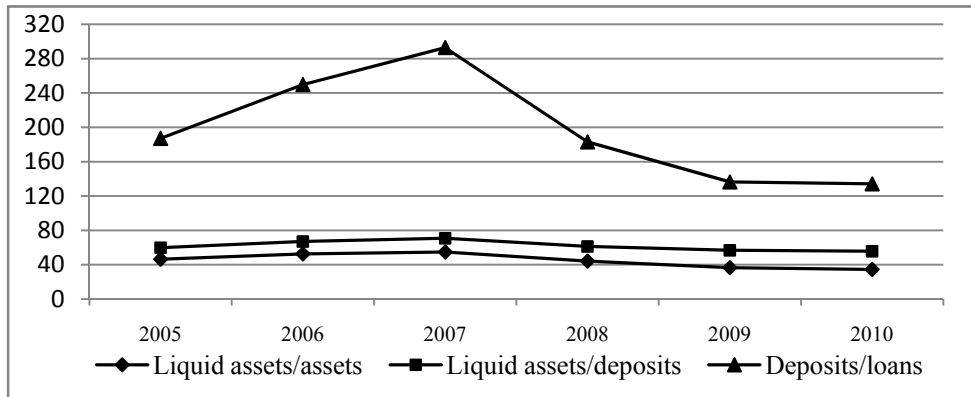
Source: Author's calculation is based on a Quarterly monetary statistics, Bank of Lao PDR

Figure 6. Liquidity ratios of commercial banks in Laos, as measured by liquid assets to total assets, liquid assets to total deposits and deposits to loans ,2005-2010

The Impact of Factors Related to the Audit of Financial Statements on Stock Returns: The Case of the Tunisian Market

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Abstract

This paper focuses on the analysis of the reactions of stock prices following the announcement of financial statements. Our contribution is to study the importance of variables related to the audit in explaining the reactions of stock returns. On the theoretical level, we have based our study on the theory of market information efficiency, the agency theory, signaling theory and corporate governance. Empirically, we used the event study method to test for abnormal reactions in stock prices following the announcement of financial statements, on a sample of 48 Tunisian listed companies. Our results show that the audit quality, the auditor's opinion and the co-commissioning have a joint impact on the evolution of stock prices. However, the recurrence of audit engagement has no effect.

Keywords: Stock returns, Audit, Event study

1. Introduction

Research in accounting and stock market reaction has developed in the early 1970 in the United States and in the early1990 in Europe. In fact, the empirical research dates back at least to the study of Ball and Brown and Beaver1968 on the market reactions to the publication of accounting results. Thus, what is most important in these studies was the investigation whether the announcement of earnings has high or low information contents. However, the announcement of quantitative information about accounting and finance is not enough to properly assess the stock market reaction.

Hence, there is a need for qualitative additional information. In fact, investors do not react as accounting numbers; they also react to less quantitative data such as ads on the strategies, restructuring, change management team and the deadline for publication of financial statements and auditors' reports.

In this sense, the current research may show the importance of information related to the audit as used by investors in their market valuation process. Hence, our problem is based on two main issues: Does the publication of audited financial statements influence stock returns? To what extent are factors related to the audit explaining such reactions important?

The paper is organized as follows: In section 1, we set the body of the theory. Section 2 presents our research hypotheses. Section 3 explains the methodological framework. In section 4, results are discussed. Section 5 concludes.

2. Body of Theory

With regard to the theoretical basis of this paper, the theory of informational efficiency is of paramount importance. Indeed, when considering the information content of disclosure (published accounting information), we need to know if we are part of an efficient financial market or not. In fact, an efficient market reflects all relevant information available for stock prices (Fama, 1970). Moreover, the theory of informational efficiency is that knowledge of information affecting the stock price which cannot allow its holder to make a profit on the market as other participants have the same information simultaneously. At this level, it is considered useful to present the theoretical basis of the audit and its relationship with stock returns of the securities, through the agency theory and the theory of signals.

2.1 Role of Audit in the Agency Theory

The audit is a type of control that helps to increase the firm's value by reducing the tendency of managers to manipulate the results (Jensen & Meckling, 1976). Moreover, according to these authors, the external audit is a

support alignment behaviour of the leader of the interests of shareholders, as well as formal control systems and budgetary restrictions. The external audit is, on the one hand, a monitoring mechanism providing an assessment of the conduct of management to shareholders and, on the other hand, a system to respond to a need for justification or obligation. To the extent that shareholders and creditors stare financial information of the company as a management control system, they can redeem themselves by providing this information, as well as having them certified by an independent external auditor.

2.2 Role of Audit in the Context of the Theory of Signals

Moore and Ronen (1990) maintain that managers hold internal information on the quality of their conduct while investors do not have this information. The difficulty of distinguishing the good from the terrible agents may lead to failure of the market for new securities because investors are conditional on the quality of managers. In this context, the demand for audit services is generated by the need to reduce the information asymmetry between managers and potential investors to assist in the acquisition of new capital. The purpose of external audit is currently inspecting the ability of the administration by verifying past financial reports. The demand for external audit can be interpreted as a system used by successful managers to make a good signal against investors.

3. Research Hypotheses

In what follows, we propose to present the research hypotheses that will be tested empirically.

3.1 Hypothesis on the Quality Audit

The impact of the external audit of stock prices is explained mainly by the risk of adverse selection that can cope with a market maker in a context of asymmetric information. Indeed, a high quality audit ensures the reliability of accounting data and allow users (including investors) to broadcast, trust accounts data communicated (Carassus & Cormier, 2003, Fan and Wong, 2005). Moreover, the higher the quality of information, the less information asymmetry between investors and also the fewer opportunities are available to take advantage of informed private information they have to depend on the uninformed. To this end, various indicators and attributes were used in the accounting literature to assess the quality of audit. Among these attributes, we find the size of the firm corollary of its reputation and membership in a large international network "BIG4" or sectoral specialization of audit firms. Thus, a first hypothesis on the influence of audit quality on stock returns can be deduced:

Hypothesis 1: the reaction of investors in the financial market has more scope for companies audited by an international network (BIG4) than for companies not audited by a BIG.

3.2 Hypothesis on the Co-Statutory Audit

Co-statutory audit can be defined as the control by at least two competent and independent professionals both with reference to the controlled company to express an opinion on regularity, sincerity and fair presentation of financial statements. It should be noted that each of the co-designated auditors is individually responsible for the planning, implementation of the audit work they carry out and the views it expresses. This will have a direct impact as the procurement of the relationship of trust between the company and the various financial market players. Hence, a second hypothesis concerning the influence of the joint statutory auditors on the stock market can be deduced:

Hypothesis 2: An audit report on a company audited by two auditors affects stock prices over a report on a company audited by one auditor.

3.3 Hypothesis Concerning the Auditor's Opinion

The views expressed by the auditor have information content because they allow, on the one hand, reducing the conflict of interest between business owners and managers, and on the other hand, informing user's published opinion to make a quality decision. Thus, the timeliness of announcements of opinion enables the auditors to determine the quality of financial and accounting information. To this end, empirical tests on the relationship between the content of audit reports (with or without conditions) and the notion of timeliness of reporting (in early and late) are generally significant. Hence, we can deduce a third hypothesis concerning the influence of an audit opinion with reservations about the stock market:

Hypothesis 3: The magnitude of the response of stock prices of a company is related to the auditor's opinion (with or without conditions).

3.4 Hypothesis Related to the Recurrence of the Mandates of the Auditor

Suddaby et al. (2007) argue that the duration of the audit relationship influences the investors' perception of audit quality. Indeed, regulators and standard setters assume too long an association between auditor and client that may impair the independence of the auditor. Moreover, the work of Lu (2006) has shown a relationship between the

recurrence of the mandates of the auditor and the behaviour of the investor. He concluded that when changing the audit there is a negative impact on the behaviour of the investor and on the propensity to manage the result. Thus, we can deduce a fourth hypothesis concerning the influence of the recurrence of the auditor's mandates on the stock market:

Hypothesis 4: An audit published report, prepared by an auditor whose mandate was renewed by the company concerned, affects stock prices more than a report by an auditor whose mandate was not renewed.

4. Methodological Framework

The main objective of our empirical study is to test the reaction of stock prices associated with the publication of audited financial statements. To conduct this study, we used the technique of event study analysis - also called abnormal returns or residuals - that allows studying the impact of a particular event in the stock market. This technique was created mainly with the work of Ball and Brown (1968) and Fama, Fisher, Jensen and Roll (1969). Following this early work, many events – announced by the company or not - such as the announcement of earnings (Ball and Brown, 1968), a distribution of dividends, Brickley (1983), a change in capital structure (Masulis, 1980), a takeover (Husson, 1988), the adoption of a new statutory instrument (Schipper and Thompson, 1983) and the development of an industrial crisis (safety and Pauchant, 1992), have applied the abnormal returns technique. However, despite the diversity of events studied, the methodological approach, which remains the same, generally consists of the following four main steps:

4.1 Step 1: Identification of the Parameters of the Study

In the literature, this step can often be only a brief and imprecise description. Yet it is the origin of the success of the study to the extent that misspecification of the parameters may affect the results. Therefore, it is convenient to define precisely the event, the announcement date and the periods of estimation and event.

4.1.1 The Event

As part of this research, the event studied is the publication of reports of business activity.

4.1.2 The Announcement Date

For some events, it is sometimes difficult to identify the exact date of the announcement. To avoid this problem, the solution is to study the market reaction, not the exact date of the first public announcement of the event but over an interval of time, called the event window, which revolves around the presumed date of announcement. Our sample consists of 48 Tunisian companies (belonging to the financial sector and non-financial one) as part of the permanent dimension of the Stock Exchange of Tunis (Tunis Stock Exchange). This sample is mainly composed of banks (11 banks) to the extent that they are the firms most frequently listed on the Tunisian stock market. Regarding the study period, the accounting data were taken during the period 2003-2007. Therefore, the number of observations amounts to 165 announcements external auditors' reports on the financial statements.

4.1.3 The Estimation Periods and Event

In our case, the study of events focuses on different dates of announcement relative to the annual publication of activity reports.

The estimation period allows evaluating the model parameters to calculate expected returns in the absence of event. The estimation period may be before, during or after the event. The choice generally depends on the model used to calculate the normal returns.

In the current study, the event window begins 15 days before the daily announcement date. This time interval is chosen so as to situate the event period between the beginning of the fiscal year and the publication of reports on the first half of the year. The estimation period is fixed at 30 days preceding the window.

4.2 Step 2: Evaluation of Bond Yields Expected by Investors

The event studies are designed to observe the stock market reaction to the announcement of an event. The impact on prices is measured by a yield difference, called residual or abnormal return. But, the profitability of an asset cannot be considered abnormal only in relation to a standard. This profitability, which corresponds to returns expected by investors in the absence of event, is called, in contrast, normal profitability.

The analysis of abnormal returns consists of three main parts. After defining models for establishing a standard, we first calculate the abnormal returns by the difference in returns actually recorded on the day of the event and the normal returns for each security. Then, the securities are grouped into several samples according to the weight of the explanatory variables (co-statutory audit, auditor's opinion, the auditor's reputation, etc). The average abnormal

returns for each sample and each of the intervals of the study period are calculated to allow the calculation of the cumulative returns on part of the period. This will allow monitoring the impact of the event over time.

The last step is to check the validity of the results obtained by applying appropriate statistical tests that assess the extent to which results are significant.

4.3 Step 3: Calculation of Residual Returns

Once the second stage of the methodology of selecting a model for forecasting returns is completed (market model in our case), it becomes possible to determine the stock market reaction associated with the announcement of the event under study .These are measured by a yield spread between the rates observed during the event window and the rate normally expected by investors in the absence of event. This difference is called the residual or abnormal return. It is equal to:

$$RA_{it} = r_{it} - E\ (r_{it})$$

RA_{it} = abnormal return of security i in period t

r_{it} = profitability of security i during period t

$E\ (r_{it})$ = normal return, or expected, asset i in period t.

4.4 Step 4: Statistical tests of Abnormal Return

In the present study, we adopt the Student test, as usually used to test statistically calculated abnormal returns. This choice is justified, on the one hand, by the Central Limit Theorem and, on the other hand, by the results of the simulation study conducted by Brown and Warner (1980). Indeed, it seems that the non normality of abnormal returns does not alter the effectiveness of the Student test to the extent that the Central Limit Theorem guarantees that the average abnormal returns converge rapidly to a normal distribution when the number of sample shares is large enough. In addition, the simulation results carried out by Brown and Warner indicate that non-parametric tests (sign test and Wilcoxon test) are less efficient than the Student test. Besides, analyzing the stock market reaction associated with the announcement of financial statements, the study allows the calculation of event, during a time interval surrounding the date of publication and rates of abnormal returns. These different levels of abnormal performance reflect how investors perceive the information in the financial statements. Be they positive or negative, they reflect the appreciation in the market for good or bad news.

5. Results

5.1 The Influence of Publication of Financial Statements under Audit Quality

In our methodological approach, we chose to distinguish the announcements of financial statements under audit quality (audited by Big 4 or not). (Appendix, Table 1). For both sub-samples, we note the absence of significant abnormal returns for the days preceding the date of the event. In addition, Figure 1 shows the distribution of audit reports according to their memberships Big 4 and No Big 4 of the study period 2003-2007.

From the date of the event, we note a highly significant investor reaction, embodied by the sudden increase in abnormal returns in the negative direction. The cumulative average abnormal returns diminish. But, from date 3, we see a return of the variation in cumulative average abnormal returns continuing until date 5. This reversal is still low compared to overreact generated by dates 0 and 1. Between dates 0 and 2, we see a strong response from investors who weaken proportionally after the date of the event. There are two significant impacts in the same direction, similar to those obtained on the entire sample, but significantly lower magnitude in the sub-sample audited by non Big. Indeed, this result can be explained by the fact that large firms are more conservative in their view than small competitor's reputation. This propensity for caution does allow users to ensure investors and others in the financial market against possible misuse of accounts. Otherwise, investors in the Tunisian market have confidence in the financial statements published by Big.

In conclusion, investors in financial markets attach great importance to the financial statements audited by a BIG compared to the financial statements audited by a no BIG. Where partial confirmation of H1.

5.2 The Influence of Publication of Financial Statements in the Auditor's Opinion

This hypothesis aims to assess the quality of the content of auditors' reports. It fits into the context of the problems with the difference of opinion regarding the role and usefulness of the audit function. We examine the behaviour of stock prices around the date at which the auditors have reservations on the financial statements with the behaviour of the shares of companies with an unqualified audit report. Our empirical study contains 48 Tunisian companies which have published their financial statements together with the external auditors' reports to the Board of the

Tunisian financial market over a period of five years. The number of audit reports is the order of 187, of which 64 are "subject" and the remaining 101 are "unqualified". (Appendix, Table 2).

The Figure 4 shows the results for the reserves reported by the auditors in the annual and consolidated reports of the two subsamples (compared with reserves and report without reserves). The results show a negative performance around the event date. The average abnormal return is negative and insignificant one day before the event date for the two subsamples. After the date zero, the abnormal return is negative and significant. The magnitude of the negative returns in the following days is becoming increasingly important in the category of companies (dealing with reserves).

Indeed, the average abnormal returns are negative and especially in the interval 1, + 3 (one day and three days after the event). This shows that the market reacts to bad news (compared with reserves). In general, the reserves expressed by the auditors have a negative impact on stock prices. Otherwise, investors in the Tunisian stock market attach importance to the opinions of the auditor and above all the bad news (reports with reserves).

In conclusion the auditor's opinion is an important determinant of stock prices following the announcement of financial statements, where confirmation of H2.

5.3 The Influence of Publication of Financial Statements under the Co-Statutory Audit

In the present section, we try to check whether the effect of the joint commission can be a determinant of stock price reaction to the stock market in Tunisia. In this case, we need a significant change at the level of abnormal returns generated by companies to co-statutory audit with respect to those without co-statutory auditor. To classify companies according to this criterion, we use the annual reports signed only by one or two auditors. In addition, the table 3 in the appendix shows the distribution of audit reports by the co-statutory auditor factor.

The figure 5 shows different results between the two subsamples. For instance, for companies in the subsample with no co-statutory audit, the reaction of investors starts at time 0 and continues for the dates 1 and 2. Besides, In terms of variation in the level of abnormal returns, the date 0 has the highest level of variation. This variation in the level of cumulative average abnormal returns does not continue for dates 1 and 2. From the 5th day, we note the stability of the reaction of these returns. For dates 0 and 1, they are statistically significant. Then, for companies in the subsample with co-statutory audit, the reaction of the average cumulative abnormal returns starts from the date - 1 and continues to date 2. The variation of the reaction reaches its maximum value at time 0. From date 5, we remark the stability of the returns reactions. As for dates 0, 1 and 2, they are statistically significant. We note that the superiority of the abnormal returns of companies with no co- statutory audit, reaches a value equal to 4 times for the date 0 compared to companies with co- statutory audit. However, we record a more rapid decline in abnormal returns of companies audited by co- statutory audit with respect to those companies audited by one auditor. This leads us to conclude that investors in the Tunisian stock market give importance to the phenomenon of co- statutory audit of the financial statements and allocate a lot of confidence to the financial statements audited by two auditors more those audited by a single auditor.

In conclusion, the co-statutory audit is a factor in the reaction of investors following the announcement of financial statements, which confirms H3.

5.4 The Influence of the Publication of Financial Statements in the Number of Terms of Auditors

In this section, we try to check whether the effect of recurrence of the audit engagement is a determinant of the response of stock prices. In this case, we need a significant change in the level of abnormal returns generated by the companies" mission-shot "compared to those with recurrence of mission. To do this, we subdivide our sample into two groups. The first group represents companies with "no recurrence of mission "and the second those with "recurrence of mission."

The table 4 and the Figure 7 in appendices present similar results for both subsamples, that is to say, for companies with a recurring audit engagement and companies with no recurrence of mission of audit. For the group of companies "recurring mandate", we note that the reaction of investors starts from the date of the event. This reaction is represented by a strong variation of abnormal returns, from the date -1. It continues for a date. From the date 2, we find stability of the variation in abnormal returns. Cumulative average abnormal returns of the corporate group are statistically significant for time 0 and 1. For the group of companies "no recurring mandate ", we note that the reaction of investors starts from the date of the event but it continues for a date. After that, we note the disruption of this reaction and return to the abnormal returns 0. The cumulative abnormal average returns of "no recurrence of mission" companies are statistically significant for time 0 and 1. This allows us to conclude that the same trend of response in the two subsamples. The two subsamples do not mark a difference in the reaction of investors. For company's recurring mission, we see two phases of reaction. The first phase covers the period preceding the date of

the event. This reaction generated the increase in the level of abnormal returns in the positive direction. From the date of the event, the reaction is reversed to lower abnormal returns and closer to 0. Statistically, the abnormal returns are significant for time 0 and 1. For company's recurring mission, we virtually consider responses from investors. As a result, investors on the Tunisian stock market are indifferent to the recurrence of the audit of financial statements. This reverses the effect of "recurring audit engagement" and may be a determinant factor of the reaction of stock market prices.

In conclusion, the recurrence of audit engagement has no effect on the reaction of stock market prices, hence the rejection of H4.

6. Conclusion

This research paper fits into the context of the problems with the role and utility of the accounting and financial audit in explaining stock returns. This paper aimed to assess the quality of the content of the reports of the auditors in the Tunisian financial market through empirical tests with four assumptions. The main results reveal that the variables related to audit quality (reputation, auditor's opinion and the co-statutory audit) have a general impact on the evolution of stock prices. Thus, our results lead us to reconsider the role of the auditor in corporate governance. Finally, despite the progress made in the publication of financial and accounting information, much remains to be done to meet the demands of investors and other interested parties in the matter. However, these improvements can be achieved only through close cooperation between the oversight body for listed companies, accountants and academics.

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Table 1. The influence of publication of financial statements under audit quality

Event	Day	Controled by a Big		Controled by a no Big	
		N= 55		N= 110	
		RAM	TRASM	RAM	TRASM
	-15	-0,0108	0,0214	0,4622	0,4622
	-14	-0,0110	0,2814	0,8515	0,8515
	-13	-0,0113	0,8254	0,9932	0,9932
	-12	-0,0115	2,5477	1,8128	1,8128
	-11	-0,0117	1,4369	0,2663	0,2663
	-10	-0,0120	1,6896	0,9335	0,9335
	-9	-0,0122	0,3126	3,0690	3,0690
	-8	-0,0125	1,1134	2,7757	2,7757
	-7	-0,0127	0,2982	1,5152	1,5152
	-6	-0,0130	1,1551	0,9422	0,9422
	-5	-0,0133	1,9064	-0,0134	0,8938
	-4	-0,0040	0,7870	-0,0300	1,0957
	-3	0,0015	0,7842	-0,0288	0,1240
	-2	0,0129	1,6849	-0,0365	0,6663
	-1	0,0155	0,4515	-0,0183	2,6005
	0	-0,0161	4,1968	-0,0614	3,9523
	1	-0,0317	2,8419	-0,1046	3,4188
	2	-0,0422	1,4547	-0,0999	0,3635
	3	-0,0395	0,4184	-0,1053	0,4525
	4	-0,0279	1,4858	-0,1031	0,2187
	5	-0,0196	1,3047	-0,1137	1,3052
	6	-0,0192	2,0456	-0,1114	0,5115
	7	-0,0188	1,3468	-0,1091	1,2143
	8	-0,0184	0,2741	-0,1070	1,2085
	9	-0,0180	0,5495	-0,1048	0,4069
	10	-0,0177	0,9132	-0,1027	1,6870
	11	-0,0173	1,0421	-0,1007	0,8682
	12	-0,0170	0,7267	-0,0987	0,9506
	13	-0,0166	1,2869	-0,0967	1,3996
	14	-0,0163	0,2267	-0,0947	1,9669
	15	-0,0160	0,3723	-0,0929	1,3425

N: number of announcements of audit reports for the period 2003-2007.

RAM: outputs abnormal means.

TRASM: abnormal output test after standardization.

Table 2. The influence of publication of financial statements in the auditor's opinion

| Event | Day | Report with reserves | | Report without reserves | |
| | | N= 64 | | N=101 | |
		RAM	TRASM	RAM	TRASM
	-15	-0,0143	0,7371	-0,0176	1,1238
	-14	-0,0146	0,7403	-0,0180	0,9796
	-13	-0,0149	0,1590	-0,0183	0,4556
	-12	-0,0152	0,1666	-0,0187	1,4515
	-11	-0,0155	0,3103	-0,0191	0,8714
	-10	-0,0159	1,0324	-0,0195	0,3859
	-9	-0,0162	0,3053	-0,0199	1,3597
	-8	-0,0165	0,9663	-0,0203	1,0320
	-7	-0,0169	1,7713	-0,0207	0,8626
	-6	-0,0172	0,5068	-0,0211	0,7497
	-5	-0,0176	1,5379	-0,0216	2,8624
	-4	-0,0425	1,7373	-0,0223	0,1099
	-3	-0,0456	0,2367	-0,0345	1,2536
	-2	-0,0529	0,6530	-0,0296	0,6998
	-1	-0,0529	0,0016	-0,0260	0,6167
	0	-0,0470	0,5122	-0,0160	2,3663
	1	-0,0321	2,3908	-0,0118	0,6065
	2	-0,0306	2,1333	-0,0157	0,6397
	3	-0,0228	0,4649	-0,0007	2,4074
	4	-0,0274	0,4428	0,0090	1,4084
	5	-0,0455	1,5662	0,0142	0,9337
	6	-0,0445	0,2406	0,0139	0,2814
	7	-0,0436	1,3109	0,0136	0,8254
	8	-0,0428	1,4627	0,0133	2,5477
	9	-0,0419	1,8494	0,0130	1,4369
	10	-0,0411	0,3144	0,0128	1,6896
	11	-0,0403	0,5117	0,0125	0,3126
	12	-0,0394	0,8205	0,0123	1,1134
	13	-0,0387	0,5655	0,0120	0,2982
	14	-0,0379	0,3115	0,0118	1,1551
	15	-0,0371	0,0214	0,0116	0,4622

N: number of announcements of audit reports for the period 2003-2007.

RAM: outputs abnormal means.

TRASM: abnormal output test after standardization.

Table 3. The influence of the publication of financial statements in the number of auditors

Event	Day	Report with co – statutory audit		Report without co – statutory audit	
		N=81		N= 84	
		RAM	TRASM	RAM	TRASM
	-15	0,0168	0,0261	0,0168	0,3075
	-14	0,0172	2,8383	0,0172	0,2987
	-13	0,0175	1,0885	0,0175	0,4122
	-12	0,0179	0,4017	0,0179	0,4597
	-11	0,0182	0,3393	0,0182	0,1559
	-10	0,0186	0,5840	0,0186	0,0066
	-9	0,0190	0,6967	0,0190	0,5970
	-8	0,0194	1,5318	0,0194	0,1831
	-7	0,0198	0,5343	0,0198	0,0595
	-6	0,0202	0,2399	0,0202	1,0852
	-5	0,0206	0,2151	0,0206	0,1752
	-4	0,1449	1,1959	0,1654	1,1729
	-3	0,1293	0,1260	0,2948	0,0786
	-2	0,0500	0,7578	0,3448	0,7108
	-1	0,2151	1,9551	0,5599	1,5106
	0	0,2223	2,0691	0,7821	2,0077
	1	0,0133	2,5515	0,7954	1,9691
	2	-0,1673	2,0486	0,6282	1,6697
	3	-0,2974	1,8741	0,3307	1,0341
	4	-0,4005	0,6718	-0,0698	0,7932
	5	-0,3938	0,0474	-0,4636	0,1423
	6	-0,3859	1,0395	-0,4543	0,7664
	7	-0,3782	0,7293	-0,4452	1,6850
	8	-0,3706	1,1978	-0,4363	0,5877
	9	-0,3632	0,4038	-0,4276	0,2639
	10	-0,3560	1,3885	-0,4191	0,9214
	11	-0,3488	0,0287	-0,4107	1,7122
	12	-0,3419	1,1973	-0,4025	0,2741
	13	-0,3350	0,4418	-0,3944	0,0822
	14	-0,3283	0,3732	-0,3865	0,4219
	15	-0,3218	0,6424	-0,3788	1,1461

N: number of announcements of audit reports for the period 2003-2007.

RAM: outputs abnormal means.

TRASM: abnormal output test after standardization.

Table 4. The influence of the publication of financial statements in the number of terms of auditors

| Event | Day | Report with only one mandate | | Report with several mandates | |
| | | N=102 | | N= 63 | |
		RAM	TRASM	RAM	TRASM
	-15	-0,0113	1,3163	-0,0105	1,3163
	-14	-0,0115	1,2359	-0,0107	1,2359
	-13	-0,0117	0,5593	-0,0109	0,5593
	-12	-0,0120	1,0462	-0,0111	1,0462
	-11	-0,0122	0,1197	-0,0113	0,1197
	-10	-0,0125	1,3642	-0,0116	1,3642
	-9	-0,0127	1,3380	-0,0118	1,3380
	-8	-0,0130	1,8481	-0,0120	1,8481
	-7	-0,0133	0,1148	-0,0123	0,1148
	-6	-0,0135	0,1872	-0,0125	0,1872
	-5	-0,0138	1,4440	-0,0128	1,1283
	-4	-0,0183	0,2976	-0,0116	0,1123
	-3	-0,0180	0,0288	-0,0045	1,1468
	-2	-0,0071	1,1520	-0,0083	0,4669
	-1	-0,0065	0,0694	0,0090	2,1682
	0	-0,0367	3,3257	-0,0334	4,8190
	1	-0,0575	1,9940	-0,0667	3,4226
	2	-0,0656	0,8214	-0,0671	0,0386
	3	-0,0666	0,1241	-0,0674	0,0363
	4	-0,0782	1,1773	-0,0412	3,7749
	5	-0,0834	0,6571	-0,0350	0,9865
	6	-0,0817	1,2253	-0,0343	1,1937
	7	-0,0801	0,3383	-0,0336	1,2798
	8	-0,0785	0,3285	-0,0329	1,4957
	9	-0,0769	0,4534	-0,0323	1,1352
	10	-0,0754	0,5056	-0,0316	0,9489
	11	-0,0739	0,1714	-0,0310	0,8248
	12	-0,0724	0,0073	-0,0304	0,2647
	13	-0,0710	0,6567	-0,0298	1,4420
	14	-0,0695	0,2014	-0,0292	1,6090
	15	-0,0681	0,0654	-0,0286	0,3459

N: number of announcements of audit reports for the period 2003-2007.

RAM: outputs abnormal means.

TRASM: abnormal output test after standardization.
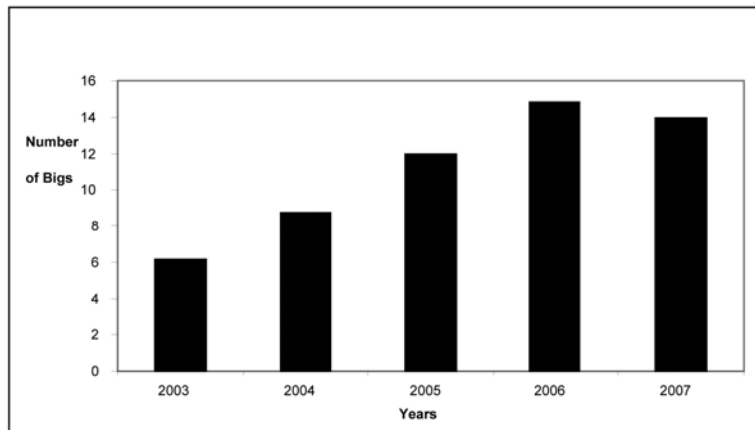
Figure 1. Changes in the number of reports audited by Bigs
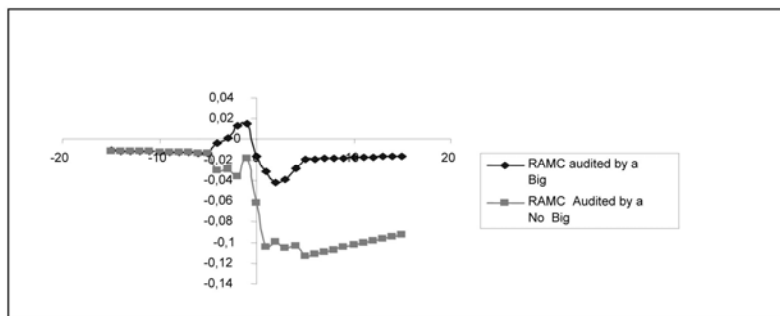
Figure 2. The influence of publication of financial statements under audit quality

Figure 3. Evolution of number of reports with reserves
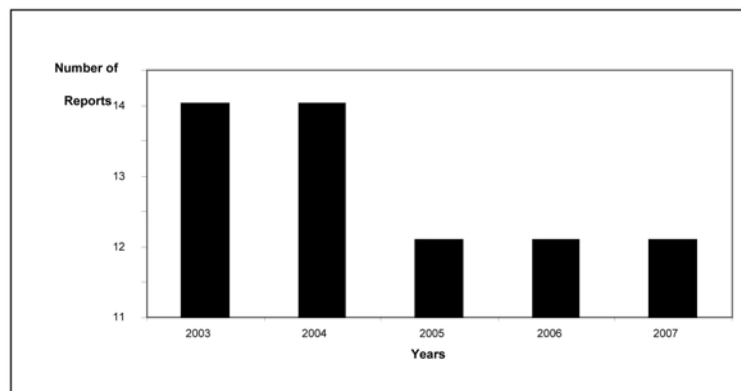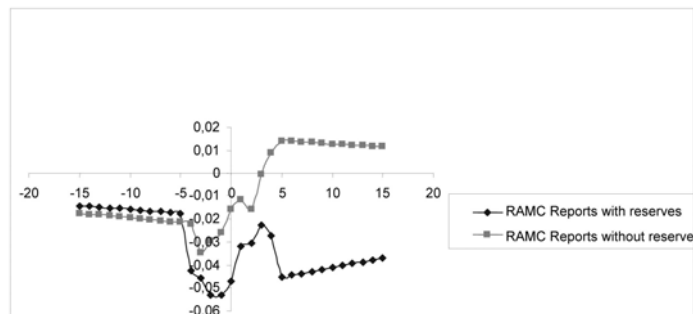

Figure 4. The influence of publication of financial statements in the auditor's opinion
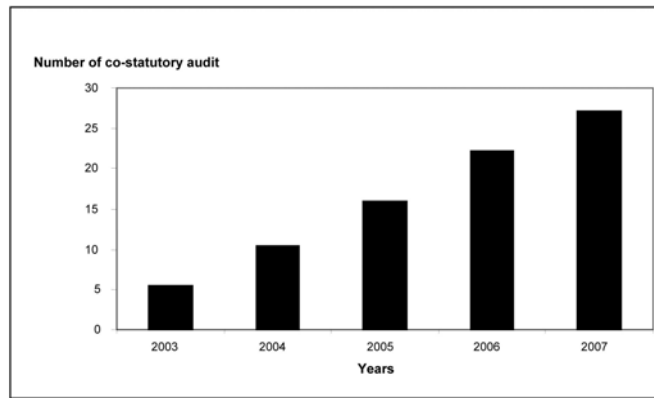
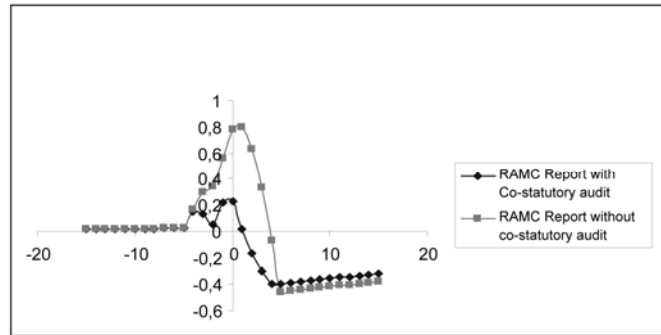Figure 5. Evolution of number of missions of co-statutory audit

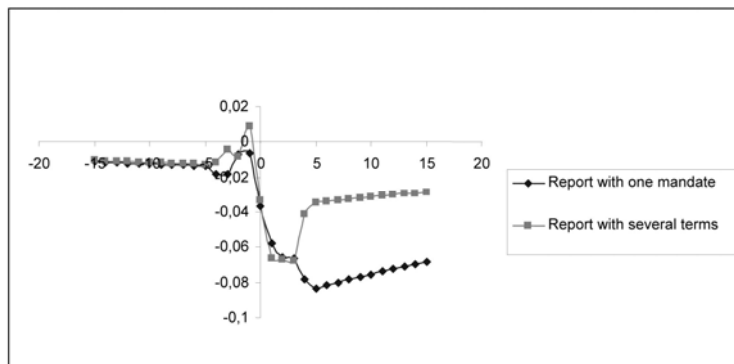Figure 6. The influence of the publication of financial statements in the number of auditors

Figure 7. The influence of the publication of financial statements in the number of terms of auditors

Financial Policy and Corporate Performance: An Empirical Analysis of Nigerian Listed Companies

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Abstract

This study investigates the effects of financial policy and firm specific characteristics on corporate performance. Panel data covering a period from 1990 to 2006 for 70 firms were analyzed. Pooled OLS, Fixed Effect Model and Generalized Method of Moment panel model were employed in the estimation and data were sourced from the annual report and financial statement of the sampled firms. The estimation of the dynamic panel-data results show that long-term debts, tangibility, corporate tax rate, dividend policy, financial and stock market development were all positively related with firms' performance. Furthermore, the positive relationship between stock market development and ROA suggest that as stock market develops, various investment opportunities are opened to firms. Therefore, there is need to monitor the performance of these variables in order to stabilize and enhance performance of listed firms in Nigeria. In addition, the result shows that growth, size and foreign direct investment are negatively related with firms' performance (ROA). In addition, the result indicates that higher income variability increases the risk that a firm may not be able to cover its interest payment, leading to higher expected costs of financial distress. This may leads to reduce their profitability. The results of the study generally support existing literature on the impact of financial policy on corporate performance.

Keywords: Firms' performance, GMM, Financial policy

I. Introduction

The Federal Military Government of Nigeria in 1987 deregulated the interest rates as part of the Structural Adjustment Programme (SAP) policy package. The official position then was that the interest rate liberalization would among other things enhance the provision of sufficient funds for investors, especially manufacturers, who were considered to be the prime agents, and by implication promoters of economic growth. Moreover, the institutional set-up within which firms were operated had undergone substantial transformation since the mid 1980s and early 1990s.

Since 1987, the financial liberalization in Nigeria has changed the operating environment of firms by giving more flexibility to the financial managers in choosing the capital structure of the firm. As such, firms will be able to adjust their capital accumulation behaviour depending upon business risk and investment opportunities observed by capital market. The financial deregulation reinstates market mechanism and enforces evolutionary argument that most efficient firms are able to stay in market because they have access to the capital market while the less efficient ones exit from industry.

The performance of publicly listed companies in Nigeria has been unsatisfactory despite several policy reforms introduced over the years. There is an argument that corporate firms carrying heavy short-term debt burdens (risk)

can pose a threat to firms' performance and the economy. This has implication on the capital choice and performance of listed companies in Nigeria. Yet, there is paucity of studies in this area which necessitates this study. Therefore, the objective of this study is to investigate the effect of capital structure and firms' specific characteristics on the performance of listed companies. The rest of this paper is organized as follows: Section two briefly examines the literature review. Section three presents method of analysis. Section fours centre on the discussion of the results, while section five is devoted to conclusion and recommendations.

2. Literature Review

Bevan and Danbolt (2001). using the fixed effects panel estimation, find that profitability appears to be negatively correlated with the level of gearing. Devic and Krstic (2001). in their study of Poland firms, find profitability to be a significant determinant of corporate financing patterns when book values of equity are used in the computation of leverage. According to them, the inverse relationship between profitability and leverage supports the Pecking order theory of capital structure. Hovakimian, Opler and Titman (2001) report in their study that even though high profitability is associated with low leverage, it is also associated with a higher probability of issuing debt vi-a-vis issuing equity, which is consistent with dynamic tradeoff models.

Fama and French (2002) agree that the negative effects of profitability on leverage is consistent with the pecking order model, but also find that there is an offsetting response of leverage to changes in earnings, implying that the profitability effects are in part due to transitory changes in the target. Mira (2002). using the ordinary OLS finds that profitability has a negative coefficient which corroborates the pecking order theory. Panno (2003). Mesquita and Lara (2003) using the ordinary least square examine the influence of the capital structure of 70 Brazillian companies regarding profitability. They discovered that profitability presents a positive correlation with short-term debt and equity, and an inverse correlation with long-term debt. Strebulaev (2003) uses a calibrated dynamic trade-off model with adjustment costs to simulate firms' capital structure paths. He argues that the simulated cross-sectional samples leverage is inversely related to profitability. Graud et al (2003) in their study of 106 Swiss companies using both static and dynamic tests find that lagged profitability has a positive impact on leverage, which confirms the prediction of a short term pecking order behaviour towards the target ratio

Pandey (2004) finds a saucer-shaped relation between capital structure and profitability, due to the interplay of agency costs, costs of external financing and debt tax shield. According to Haas and Peeters (2004). in their study of central and eastern European firms, profitability and age of firms are the most robust determinants of their capital structure targets, whereas profitability decreases firms' leverage targets. Salawu (2007). reports in his study that profitability has positive impact on leverage of large firms in Nigeria, confirming that the tax advantage of debt financing has nonetheless its relevance in Nigerian large firms. Akhigbe and Madura (2008) measure the long-term valuation effects following dividend initiations and omissions. They find that firms initiating dividends experience favorable long-term share price performance. Conversely, firms omitting dividends experience unfavorable long-term share price performance. The long-term valuation effects resulting from dividend initiations are more favorable for firms that are smaller, that over invest, and that had relatively poor performance prior to the initiations. The long-term effects resulting from dividend omissions are more unfavorable for large firms and for firms experiencing relatively large dividend omissions.

Bokpin and Abor (2009) analyze the effects of financial policy on corporate performance of emerging market firms. Their study employs fixed effects panel model estimation technique. The results indicate that capital structure has negative effects on return on assets and return on equity but is positively related with market-to-book value ratio. Dividend payout is also positively related with return on assets and return on equity.

Early and recent empirical studies focused on the relationship between profitability and capital structure. However, the causal relationship between profitability and capital structure has not been empirically resolved. The prior researches generally did not take into account the possibility of reverse causation from performance to capital structure. If a firm's performance affects the choice of capital structure, then failures to take this reverse causality into account may result in simultaneous equations bias. That is, regressions of firm performance on a measure of leverage may confound the effects of capital structure on performance with the effects of performance on capital structure.

3. Data and Methodology

The study employed secondary annual panel data for the period 1990 to 2006. Seventy (70) out of the one hundred (100) non-financial firms listed on the Nigerian Stock Exchange (NSE) were purposively selected for analysis. The sample of companies cut across fourteen (15) sectors according to the Nigerian Stock Exchange classification. Firm specific characteristics data were sourced from Annual Report and Accounts of the sample firms and annual publications of the Nigerian Stock Exchange such as fact books. The macroeconomics variables (inflation, foreign

direct investment, trade openness) were sourced from various editions of the Central Bank of Nigeria's statistical bulletin, Annual Report and Statement of Account and Economic and Financial Review as well as the Abstract of the Federal Bureau of Statistics. Descriptive statistic and econometric techniques of analysis were employed.

3.1 Model Specification

To achieve a complete dynamic specification allowing for possible AR-process and to examine adjustment cost effect, the lagged dependent variable is incorporated into equation (1).

$$Y_{it} = \alpha - \beta Y_{i(t-1)} + \Sigma X_{it} + \Sigma K_{it} + \eta_i + \lambda_{it} + U_{it} \tag{1}$$

with   i = 1 …., N and t = 1, …, T_i

where :

Y_{it} – the performance of firm i in year t

X_{it} – is a vector of firm specific characteristics variables

K_{it} - is a vector of macroeconomics variables

η_i – individual effects i.e. firm-specific effect

λ_t – time specific effects (e.g. interest rates, demand shocks). which are

  common to all firms and can change overtime.

U_{it} – the time-varying disturbance term is serially uncorrelated with

mean zero and variance.

The chosen performance measure is Return on Assets (ROA). Thus, specifying the models explicitly we have:

$$ROA_{it} = \omega_0 + \omega_1 LEV1 + \omega_2 LEV2 + \omega_3 TANG_{it} + \omega_4 GROW_{it} + \omega_5 SIZ_{it} + \omega_6 CTR_{it} + \omega_7$$
$$EPOW_{it} + \omega_8 VOLT_{it} + \omega_9 INV + \omega_{11} DIV_{it} + \omega_{12} TOP_{it} + \omega_{13} INF_{it} + \omega_{14} FDI_{it} + \omega_{15}$$
$$BMKTS_{it} + \omega_{16} STKA_{it} + \eta_i + \lambda_{it} + U_{it} \tag{2}$$

Where:

ROA = Return on Assets = EBIT/Total Assets

LEV1 = Total debt/Total Assets

LEV2 = Long-term debt/Total Assets

TANG = Tangibility = Fixed Asset/Total Assets

GROW = Growth Opportunity = TA in Year (t)/ TA in Year (t-1)

SIZ = Size of the firm = the natural logarithm of total sales

CRT = Corporate tax rate = Tax paid/Operating income

VOLT = Volatility = standard deviation of EBIT/ EBIT

DIV = Dividend = Dividend paid/Book value of equity

EPOW = Earning Power = log of EBIT

TOP = Trade Openness = Export + Import/GDP

INF = Inflation = the percentage change in consumer price index

FDI = Foreign direct investment = real investment/GDP

BMKTS = Bank market size = total domestic credit divided/GDP.

STKA = Stock market activity = total value traded/GDP

η_i – individual effects i.e. firm-specific effect

λ_t – time specific effects (e.g. interest rates, demand shocks). which are

common to all firms and can change overtime.

U_{it} – the time-varying disturbance term is serially uncorrelated with

mean zero and variance.

4. Results and Discussion

An examination of descriptive statistics for dependent and explanatory variables reveals the following observations. Firm performance (ROA) has experienced a low growth rate with the average growth rate standing at 13.26%. The disparity in profitability ranged from 0.0000 minimum values for some firms to a maximum value of 2.90. This presents a great disparity between firms in performance. The mean value of 0.1326 reveals that companies under review will prefer more debts and less equity. This is justified by the mean value of total debt/total assets (LEV1) of 68.99%, which mean that equity account for the remaining 31.01%. As far as the long-term debt/total asset is concerned, the means value is very low (0.13356).

Considering the standard deviation (S.D) which measures the level of variation or degree of dispersion of the variables from their mean reveals that firm performance (ROA) is relatively stable an S.D of 15.17% compared with other variables. The least volatile/most stable variable is trade openness (TOP) 5.33% and followed by foreign direct investment (FDI) 19%.

In order to determine the effect of the selected variables on the firms' performance, three functional forms of estimation techniques were used; the pooled ordinary least squares (OLS). the fixed effect model (FEM) and generalized moment method (GMM) estimation. Table 2 presents the results of the pooled OLS, fixed effects and GMM estimation for firm performance (ROA). The analysis of the firm performance under pooled OLS reveals a series of coefficients that are significant at one percent (1%) level and ten percent (10%) level. The results of the fixed effects in Table 2 for the firms' performance element suggest that the explanatory power of the regressions is higher. The adjusted R^2 is satisfactory in all the cases. The adjusted R^2 is 0.3433 under pooled OLS, while it is 0.4416 under fixed effect model. The F-values are also significant in all the models. Both fixed and random effects specifications of the model were estimated and subsequently, the Hausman specification test was conducted to determine the appropriate specification. The report of the Hausman test is presented in Table 2. The test statistics is significant at 1%, suggesting that the fixed effects model is preferred over the random effects. Thus, the null hypothesis was rejected and the alternative hypothesis is accepted.

The results indicate statistically significant (at 1%) positive relationship between return on asset (ROA) and capital structure (LEV1) under the three estimation techniques, with marginal contribution of 0.0931, 0.0892 and 0.0427 respectively. It implies that, a one-percentage increase in firms' capital structure (total debt/total assets-LEV1) will lead to 4.27% (GMM estimation) increases in firms' performance i.e. profitability. Also, under fixed effect model and GMM estimation, firms' performance is positively related to long-term debt ratio, with 0.0186 and 0.2316 coefficients respectively. This positive relationship could also represent growth option to the firm and may require external financing. As firms diversify, their productive assets ought to be financed and one of the options opened to them is the use of debt, hence this positive relationship. This result justified the mean value of total debts (68.99%) and the relationship between LEV1 and profitability (PROF) which is consistent with trade-off theory.

A positive relationship exist between the previous firm performance {ROA(-1)} and the current firms' performance (ROA). The value of coefficient is 2.4615 and is significant at 1% level. This indicates that with a change by one percent in the previous firms' performance; there will be a corresponding change of about 246.15% in the level of current firms' performance.

Growth opportunities (GROW) and sizes of the firm (SIZ) have negative relationship with firms' performance; however, the coefficients are significant at 1% level. This indicates that growth and size have no significant positive impact on firm performance. This suggests that firms in Nigeria will prefer external financing to internal financing. There is a positive but not significant relationship between dividend policy (DIV) and firm performance under fixed effect model and GMM estimation. This positive relationship implies that dividend policy is taken with the view of increasing firm performance. This confirms the views of Black (1976) and Easterbrook (1984) that dividend policy could help save companies from the problem of overinvestment. This is because; they reduce the amount of free cash flow available to the firm. Payment of dividend may push management to the capital market to raise finance.

In Table 2, GMM estimation reveals that tangibility, corporate tax shield and earning power are positively related to return on assets, however, only tangibility is not significant. An increase in any of these variables will improve firms' performance.

The estimated coefficients of trade openness (TOP) in the Table 2 are negative under the three models and only significant at 1% level for fixed effect model and GMM estimation. Trade openness has not impacted positively on the firms' performance in Nigeria. An important policy implication is that the benefit of trade openness may vary from industry/sector to industry. If the quoted companies in Nigeria are to benefit from the globalization programme

(trade openness). the trade openness policy is an indispensable tool. Trade policies that ensure increased globalization would stimulate firms' performance. Foreign direct investment (FDI) has negative relationship with corporate performance and significant at 1% level. Policies designed to increase FDI should not only be tailored to increasing the positive effects of FDI on firms' performance but also to ensuring that all the sectors have equal access to the benefits of trade openness.

Inflation (INF) exhibited positive relationship with corporate performance and significant at 5% level under GMM estimation. The result suggests that firms experiencing high inflation tend to exhibit high return on assets. The coefficients under the models 0.0003, 0.0003 and 0.0002 respectively which indicate that with a change in the level of inflation by one percent, there will be a corresponding change of about 0.02% or 0.03% in the level of firms' performance. The impact of inflation on firms' performance is less than 1%.

Furthermore, financial market development (BMKTS) is positively related to firms' performance and significant at 1% under GMM estimation. It indicates that one percent increase in financial market development will lead to 0.14% increase in return on assets. The impact is very low. Moreover, the coefficients of stock market development (STKA) under fixed effect model and GMM estimation are significant at 1% level. The implication of this is that an increase in stock development by 1% indicates a growth in corporate performance to about an approximately 3% to 6%. Also, the results indicate that as stock market develops, various investment opportunities and financing choices are opened to firms and this will increase corporate performance. Fama (1981) and Barro (1989) have argued that there is a link between stock market activity and investment and as well forms an important component of changes in market value of capital.

5. Conclusion

Foreign direct investment (FDI) has negative relationship with corporate performance and significant at 1% level. Policies designed to increase FDI should not only be tailored toward increasing the positive effects of FDI on firms' performance but also to ensuring   that all the sectors have equal access to the benefits of trade openness. Trade openness (TOP) has not impacted positively on the firms' performance in Nigeria.

The results show significant positive relationships between stock market developments (STKA) and the corporate performance. The results indicate that as stock market develops, various investment opportunities and financing choices are opened to firms and this will increase corporate performance. However, the impact of stock development and financial market development are at slow rate.

The estimation of the dynamic panel-data regression also suggest that long-term debts, tangibility, corporate tax rate, dividend policy, financial and stock market development were all positively related with firms' performance. Therefore, there is need to monitor the performance of these variables in order to stabilize and enhance performance of listed firms in Nigeria. On the other hands, growth, size and foreign direct investment are negatively related with firms' performance.

The following recommendations are made. There is the need for policy measures capable of increasing the fixed asset base of Nigerian companies. Companies in Nigeria should not only absorb the depreciation allowances but also, the net addition to the stock of fixed assets should be provided for. If the quoted companies in Nigeria are to benefit from the globalization programme, the trade openness policy is an indispensable tool. Trade policies that ensure increased globalization would stimulate firms' performance. The Nigerian government should encourage stock market development through appropriate regulatory policies to remove barriers to stock market operation and thus enhance its efficiency. Also, financial managers should endeavour to reinvest the profit generated for growth and expansion rather than consuming it.

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Table 1. Descriptive Statistics of Firms' Performance and other variables

	Mean	Median	Maximum	Minimum	Std-Deviation	No. Of Observation	Cross Section
Return on Assets ROA	0.1326	0.1020	2.9035	0.0000	0.1517	1044	70
Total Liabilities/Total Asset	0.6899	0.6607	6.2731	-0.7094	0.4576	1044	70
Long-term Liabilities/Total Asset	0.1335	0.0599	4.6576	-0.2711	0.3029	1044	70
Volatility (VOLT)	6.5046	1.0259	403.27	0.0121	27.4389	1044	70
Tangibility (TANG)	0.3262	0.2974	0.9999	0.0006	0.1885	1044	70
Growth Opportunity (GROW)	1.3908	1.1952	21.0650	0.0011	1.1403	1044	70
Size of the Firm (SIZ)	6.0959	6.0603	8.4696	2.9269	0.8593	1044	70
Corporate Tax Rate (CTR)	0.7209	0.2039	222.099	-10.5921	7.4131	1044	70
Earning Power (EPOW)	5.0388	5.0164	8.2576	2.1959	0.9016	1044	70
Income Variability (INV)	7.0656	11.6355	1.4367	2.8051	4.1420	1044	70
Dividend Paid (DIV)	56.2343	0.4298	15833.34	0.000267	711.0737	1044	70
Trade Openness (TOP)	0.5857	0.5978	0.6664	0.5046	0.0533	1044	70
Inflation (INF)	25.1608	14.0470	72.8120	4.7637	20.7694	1044	70
Foreign Direct Investment (FDI)	0.3397	0.3059	0.5422	0.1605	0.1129	1044	70
Financial Market Development	19.6057	19.6820	35.4950	9.0059	7.5043	1044	70
Stock Market Development	0.3399	0.0794	1.9617	0.0017	0.5161	1044	70

Table 2. Regression Model Estimate: Firm's Performance (ROA)

	POOLED OLS RESULT	FIXED EFFECT RESULT	GMM RESULTS
C	0.1345	0.0545	
	(1.2881)	(0.5444)	
ROA (-1)			0.3243
			(2.4615)*
LEV1	0.0931	0.0892	0.0427
	(7.4749)*	(6.7205)*	(5.2068)*
LEV2	-0.0045	0.0186	0.2316
	(-0.2308)	(0.8655)	(6.5734)*
VOLT	0.0002	-0.0002	0.0002
	(1.0820)	(-1.3251)	(0.9355)
TANG	-0.055	0.0547	0.0455
	(-2.5845)*	(1.8346)***	(1.5067)
GROW	-0.0062	-0.0048	-0.0116
	(-1.8143)***	(-1.4630)	(-6.1383)*
SIZ	-0.1118	-0.0693	-0.0559
	(-10.9418)*	(-5.439)*	(-8.7623)*
CTR	0.0025	0.0014	0.0035
	(4.7172)*	(2.6916)*	(6.8109)*
EPOW	0.1581	0.1551	0.1524
	(8.3094)*	(14.1729)*	(5.2790)*
INV	-7.71E-10	4.09E-10	-2.56E-05
	(-2.6389)*	(0.6317)	(0.8811)
DIV	-2.85E-06	3.15E-06	2.17E-05
	(-0.5251)	(0.5032)	(0.8811)
TOP	-0.2791	-0.5968	-0.3728
	(-1.5846)	(-3.3622)*	(-5.5348)*
INF	0.0003	0.0003	0.0002
	(1.2822)	(1.0814)	(2.0296)**
FDI	-0.0877	-0.1579	-0.1240
	(-1.2183)	(-2.3082)*	(-5.4419)*
BMKTS	0.0008	0.0009	0.0014
	(0.7196)	(0.8737)	(4.7715)*
STKA	0.0537	0.0600	0.0292
	(3.5323)	(4.1982)*	(5.1441)*
Adjusted R^2	0.3433	0.4416	
F-Statistic	37.349	10.8206	
	(0.0000)	(0.0000)	
D-Watson Stat.	0.41	0.49	
Hausman Test		3.6237	
		(0.0000)	
J-Statistic			58.416
Instrument Rank			70.0000
No. of Observation	1044	1044	909
Cross Section Included	70	70	70

*NOTE: LEV 1 refers to total liabilities/total assets, LEV 2 refers to long-term liabilities/total assets, Volatility (VOLT) is defined as standard deviation of EBIT/Earning before interest and tax. Income variability (INV) is standard deviation of turnover, tangibility (TANG) is defined as fixed assets/total assets. Firms' performance (ROA) refers to earning before interest and tax/total assets. Growth prospect (GROW) refers to the ratio of total assets in year t to total assets in year t-1. Size of the firm (SIZ) is the natural logarithm of sales. Corporate tax rate (CTR) is tax paid to Operating income. Non-debt tax shield (NDTS) is defined as the ratio of depreciation to total assets, while divided policy (DIV) is measured as dividend paid/book value of equity. Earning Power (EPOW) is natural log of EBIT. Trade Openness (TOP) is Export plus import/Gross Domestic Product, Inflation is measured by the percentage change in consumer price index. Foreign Direct Investment is defined as real investment/GDP, while financial market development (BMKTS) is total domestic credit divided by GDP. Stock market development (STKA) is defined as total value traded divided GDP. Numbers in parentheses appearing below coefficients are t-values. *, ** and *** indicates coefficients is significant at the 1,5 and 10 percent levels respectively.*

Testing the Contemporaneous and Causal Relationship between Trading Volume and Return in the Palestine Exchange

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Abstract

This study examines the causal relationship between return and trading volume in the Palestine Exchange. Using weekly trading volume and returns over the period from October 2000 to August 2010, the study employs GARCH (1,1) model to test the existence of the positive contemporaneous relationship. The study found that the relationship preserves after taking heteroskedasticity into account. Moreover, the results of Granger causality test show that there is bidirectional Granger causality between returns and trading volume, regardless of the measures of trading volume used.

Keywords: Palestine Exchange, Return, Trading volume, Granger causality, GARCH(1,1)

JEL Classifications: G15

1. Introduction

The Palestine Exchange was established in 1996 as a private share holding company. It held its first session in February 1997 as an initial fully automated and electronic stock market. It has become a public shareholding company in February 2010 responding to principles of transparency and good governance, and operating under the supervision of the Palestinian Capital Market Authority, providing a market for trading securities and financial instruments. It is characterized by equity, transparency and competence, thereby serving and maintaining the interest of investors, in accordance with the securities laws and modern regulations, and forming a strong basis that ensure a fair-trading environment and attracting foreign investment free of any restrictions.

The Palestine exchange maintained sustained growth in terms of the number of listed companies, market value, and trading volumes. By the end of 2010 the number of listed companies, the number of shares traded, and the market value have raisin to (41 230 million, 451.2 millions) receptively, but the market Index had a relatively large amounted diversity, raising from 207.6 to 1128.6 at the end of 2005, then fell down to 489.6 by the end of 2010. (www.pex.ps)

Empirical studies based on the trading data of the Palestine exchange are very rare or non-existent in Palestine. So after more than one decade of trading in Palestine Exchange, there is a potential to put into practice an empirical examination regarding the behaviors and dynamics of stock prices and trading volume. However, the purpose of this study is to investigate the contemporaneous and causal relationship between returns and trading volume, by applying Granger causality tests in the small emerging stock market of Palestine. In other words, the main purpose of this study is to test the hypothesis whether return-volume relation exists in the Palestine Exchange. Furthermore, this study addresses the issue of whether information about trading is useful in making the movement of the market. Such study has not been done in Palestine so far.

Testing for Causality is important; since it can help to better understand the microstructure of stock markets and its implications on other markets. While the empirical tests of return volume behavior are plentiful for developed stock markets, there is relatively less empirical research on emerging markets, but none relating to the Palestine Exchange. Moreover, this study will enable to uncover whether the return-volume relation in the Palestine Exchange exhibits different characteristics from those in developed markets. Understanding this relation has significant implications for regulators and other market participants.

Many studies reported a contemporaneous correlation between stock returns and trading volume (Karpoff, 1987), but the empirical evidence on the causal relationship between the two variables is thus mixed, and in some cases , contradictory. Therefore, the relationship still remains a very interesting field for investigation in several stock markets.

The remainder of this study proceeds as follows. Section 2 provides a literature review of theoretical aspects and previous empirical research. Section 3 describes the data and the variables measurements. Section 4 presents the methodology and the empirical results, and section 5 provides some concluding comments.

2. Literature Review

2.1 Theoretical Framework

The relationship between stock return and trading volume has received considerable attention from financial economists over the past three decades. The importance of price volume relationship has been pointed out by Karpoff (1987), where he provides four important reasons to study the price volume relation:

First, this relationship provides insight into the structure of financial markets. It helps discriminate between competing theories on how information is disseminated in financial markets. Second, it is important for event studies that use a combination of price and trading volume data to draw inferences. Third, it is critical to debate over the empirical distribution of speculative prices. Fourth, price-volume relations have significant implications for research in the future markets. The research on the issue of price-volume relationship stresses a common belief that there is a positive relationship between price changes and trading volume in the financial markets. The rational for postulating this positive relation can be found in the basic supply and demand model, i.e. a change in demand induces a price change.

Some researchers found another theoretical explanation for the causal price-volume relation. One explanation states that price changes and trading volume relations are due to a mixture distribution, i.e. the mixture of distribution hypothesis (MDH) for Clark (1973), Epps and Epps (1976) and Harris (1986). This hypothesis shows that stock prices and trading volume are positively correlated because the variance of the price change on a single transaction is conditional upon the volume of that transaction. Therefore, the relation between price variability and trading volume is due to the joint dependence of price and volume on underlying common mixing variable, called the rate of information flow to the market. This implies that price and volume change simultaneously in response to new information.

The other explanation according to the sequential arrival information hypothesis proposed by Copeland (1976), and later extended by Jennings et.al. (1981), is that exists a positive bidirectional causal relationship between absolute values of price changes and trading volume. Sequential arrival of information hypothesizes that new information that reaches the market is not disseminated to all market participants simultaneously, but to one participant at a time. The final information equilibrium is established only after a sequence of intermediate or transitional equilibriums have occurred. Therefore, due to the sequence of information flow, lagged absolute returns may have the ability to predict current trading volume, and vice versa. Hiemstra and Jones (1994) argued that a sequential information flow results in lagged trading volume having predictive power for current absolute price changes, and lagged absolute price changes having predictive power for current volume.

The price-volume relationship can also be explained in terms of the noise- trader model of De Long et.al. (1990). This model postulates that the noise traders' activities are not based on economic fundamentals, but rather to cause a temporary miss pricing of stock prices in the short run. The price, however, moves toward its mean value in the long run in the absence of transitory component. In this model, the positive causal relationship running from stock returns to trading volume is consistent with the positive feedback trading strategy of noise traders who based their decisions on past price movements. A positive causal relationship from volume to price changes is consistent with the hypothesis that price changes are caused by the action of noise traders.

Furthermore, Lakonishok and Smidth (1989) showed that current volume can be related to past stock price changes due to tax-and non-tax-related trading motives. Therefore the dynamic (causal) relation for tax-related trading motives is negative, whereas certain non-tax-related trading motives are positive.

2.2 Empirical Studies

The empirical research on price-volume relationship is vast and mixed. Since the older literature was surveyed by Karpoff (1987), this study will concentrate on recent studies, particularly on studies in emerging markets. These studies also provide mixed evidence. While most of them produced evidence for bidirectional causality, which support for the sequential information arrival hypothesis, some evidence has been found for the mixture of distribution hypothesis. The following is a brief description of some of the recent studies.

The evidence presented by Smirlock and Starks (1988), and Jain and Joh (1988) support an unidirectional Granger causality from returns to trading volume in the U.S. markets. Hiemstra and Jones (1994) applied linear and nonlinear causality testing to the U.S. stock market and found evidence of unidirectional Granger causality from Dow Jones stock returns to percentage changes in New York Exchange trading volume, but more importantly, they found significant bidirectional nonlinear causality between returns and volume. They also found evidence of nonlinear causality from volume to returns after controlling for volatility persistence in returns.

More recently, Chen et.al. (2001) examined the price – volume relation in nine developed equity markets. They found evidence that returns Granger cause volume for the U.S, Japan, U. K, Italy, Hong Kong, the Netherlands, France and Switzerland. Moreover, they reported significant bidirectional Granger causality for the markets of Switzerland, the Netherlands, Canada and Hong Kong, indicating that trading volume contributes some information to returns process. Lee and Rui (2002) also found that returns Granger cause trading volume in the U.S. and Japanese markets, but not for the U.K. market. Also they demonstrated that trading volume does not Granger cause stock market returns in the U.S., Japan and U.K. markets. They attributed this to the market efficiency.

Gunduz and Hatemi-J (2005) examined the dynamic relation between weekly stock prices and volume for Czech Republic, Hungary, Poland, Russia and Turkey stock markets. They found a bidirectional causality between returns and volume in Hungary and Poland, but an unidirectional causality running from market turnover to stock price in Poland, and the stock price unidirectional cause both volume and market turnover without any feedback in Russia and Turkey, but there is no causal relationship between the variables in the Czech Republic regarding market inefficiency, in addition the effects of different market characteristics on the stock price/volume relation.

Ajayi et. al. (2006) confirmed the unidirectional causality between price changes and trading volumes for six out of ten European stock markets, and bidirectional causality in Denmark, Portugal and Turkey, when they used nonlinear causality, but no causality in Switzerland. The same results for the case of Turkey, Kamath (2007) found evidence of a positive contemporaneous relation and a feedback bidirectional causality between volume and returns, when he used daily price changes and trading volume changes.

For the Asian emerging markets, Moosa and Al Loughani (1995) tested the price-volume relation in four Asian stock markets using monthly data. They found strong evidence for causality running from volume to absolute price changes, and from price changes to volume in Malaysia, Singapore and Thailand, but no causality for the Philippines due to the small size of this market. In another research, Silvapulle and Choi (1999) used linear and nonlinear causality tests to examine the dynamic relation between daily Korean stock returns and volume. They found a bidirectional linear and nonlinear Granger causality between stock returns and volume changes.

More recent studies, Henry and McKenzie (2006) found the same results for Hong Kong stock market; their evidence supports a nonlinear bidirectional relationship between volume and volatility. Pisedtasalasai and Gunasekarage (2007) found statistically significant causality running from stock return to trading volume for Indonesia, Malaysia, Singapore, and Thailand, and a significant causality running from trading volume to stock returns was detected only for Singapore. They didn't find any causal effect for the Philippines.

Also, Kamath and Wang (2006) found bidirectional causality in four out of six Asian stock markets, but in the case of Korean market they found evidence of causality running from returns to volume, and a diametrically opposite directional causality in the Taiwanese market. hese results were generally confirmed by Deo et.al. (2008), using daily data from seven Asia-pacific stock markets to examine the relationship between stock returns, volatility and trading volume. They found a bidirectional causality between returns and volume for Hong Kong, Indonesia, Malaysia and Taiwan stock markets.

In another Asian stock market Khan and Rizwan (2008) investigated the empirical relation between daily stock returns and trading volume in Pakistan's stock market. They found a positive contemporaneous relation between trading volume and return preserves after taking heteroskedasticity into account. Moreover, they found feedback bidirectional causality between the two variables. Mahajan and Singh(2009) examined the empirical relationship between return, volume and volatility dynamics using daily data from the Indian stock market. They found evidence of positive and significant correlation between volume and return volatility, and significant relationship of causality flowing from volatility to trading volume. Their study also detected one-way causality from return to volume, which is an indicative of a noise trading model of return- volume interaction in this market.

On the other hand, some studies focus on Latin American emerging markets. For example, Saatcioglu and Starks (1998) investigated price- volume relation for six Latin American stock markets and found evidence of unidirectional causality running from volume returns in all six markets. In another study, De Medeiros and Van Doornik (2006) examined the empirical relationship between stock returns, volatility and trading volume, using data from Brazilian stock market. They cannot find evidence of causal relationship between stock returns and trading

volume in either direction. That means that short-run forecasts of current or future stock returns cannot be improved by knowledge of recent trading volume data and vice versa. In addition, they found a mutual Granger causality between returns volatility and trading volume, although more intensely from volume to volatility. Kamath (2008) examined price-volume relation in the Chilean stock market. His causality test results provide a clear evidence of daily returns Granger causing daily trading volume changes in the Chilean stock market.

Finally, in one of the African cases, Leon (2007) investigated the relation between daily stock return volatility and trading volume in the stock exchange in the West African Economic and Monetary Union (BRVM). The results of Granger Causality show that volume has predictive power to stock return volatility, regardless of the measure of volatility used. This is due to the maximum ceiling imposed price changes and non-synchronous trading, which hinder the transmission mechanism.

The literature search found some papers on a variety issues involving the Palestine Exchange. For example, Darwish (2009), and Awad and Daraghma (2009), tested the weak - form efficient market hypothesis for the Palestine Exchange, utilizing daily prices on the market and the five sectors indices. They found that the Palestine exchange is inefficient at the weak - form level. Darwish et. al. (2010) tested the relationship between risk and return, by applying GARCH (1,1) model. They found that there is no significant positive relationship between risk and return in the Palestine Exchange. However, the price-volume relationship was not investigated in any published paper.

In summary, the majority of the previous studies have confirmed the existence of positive relationship between trading volume and returns . They also highlight that volume is a powerful indicator to predict the market .

Although emerging markets have shown progress in recent years , they have given mixed results about the return-volume relationship. However the literature is still lacking studies that inspect the relationship between these variables, especially in Palestine.

Moreover, the review of prior empirical evidences addressed some research questions: Is there contemporaneous correlation or causality relationships between returns and trading volume in the Palestine Exchange? If yes, then what is the direction and extent of relationship between those variables?

For this reason, this study comes to answer these questions taking variety of econometric techniques into consideration, and I believe that the present study contributes to the literature by enabling international investors to have a deeper insight about the characteristics of, and the relationship between return and volumes in the Palestinian emerging market.

3. Data Description and Variable Measurements

The data sample used in this study consists of weekly stock price index and trading volume of the Palestine Exchange (PE), covering the period from October 2000 to August 2010, for total of 486 pairs of relevant data. Weekly data were used because of the small market size, thin trading, and to avoid the day- of- the week effect, and the data were obtained from the Palestine Exchange database. The period after September 2000 was chosen because of the political and economic instability in the Palestinian territory before that date.

From the raw data of the closing Index values, the weekly rate of return (R_t) was computed using the following equation:

$$R_t = \text{Ln}(P_t/P_{t-1}) \tag{1}$$

Where P_t is the closing index price on week (t).

For the trading volume, different definitions and measures can be found in the previous studies, Jain and Joh (1988), Hiemstra and Jones (1994), Jiang and Kryzanowski (1997), Silvapulle and Choi (1999), and Lee and Rui (2002) have used raw value of trading volume, i.e. the number of shares traded. Chen and Zhou (2001) utilized logarithm of raw volume, Saatcioglu and Starks (1998) utilized market turnover, Gunduz and Hatemi-J (2005) utilized raw volume and market turnover. They have found the same results from utilizing different measures, Jiang and Kryzanowski (1997) noted that raw volume is a better proxy for information flow; therefore, this study utilizes raw volume, i.e. weekly number of shares traded, as a measure of trading.

The raw volume (V_t) assumes only positive values. Therefore, in addition to raw volume, the study empirical tests also employ Kamath and Wang (2006) procedure by utilizing changes in raw volume, to take on account positive as well as negative values.

The changes in trading value (ΔV_t) were computed using the following equation:

$$\Delta V_t = \text{Ln}(V_t/V_{t-1}) \tag{2}$$

Where V_t is the raw trading volume.

Table 1 presents the descriptive and basic statistics relating to the weekly returns and trading volumes. The statistics show that the sample means of return, trading volume and the changes in trading volume are positive. The measures of skewness and excess kurtosis indicate that the distribution of returns and trading volume are positively skewed and leptokurtic relative to a normal distribution, which is consistent with the presence of GARCH effects. The Jarque-Bera normality test rejects normality of all series at 1% level. The autocorrelation coefficient (LB) up to 36 lags is statistically significant which indicates that all series suffer from serial correlation.

4. Methodology and Empirical Results

4.1 Unit Root Test

Before applying any model to the data, the study adopts a test for a unit root to ensure that every variable is stationary, and to avoid spurious regression. The testing for a unit root is based on Augmented Dickey- Fuller (1979) (ADF) test, and Phillips-Perron (1988) (PP) test. ADF and PP tests are used with trend and without trend.

Table 2 reports the results of ADF and the PP tests for unit root. The results show that the null hypothesis that return and trading volume series are nonstationary (i.e. has a unit root) is rejected for all series. This confirms that all series tested are stationary and, therefore, useful for further statistical analysis. The implication of these findings is that testing for causality between return and volume should be based on unrestricted VAR approach.

4.2 Contemporaneous Relationships

The study examines the contemporaneous relation between return and trading volume before testing Granger causality. With contemporaneous test, the study examine the notion that rising market indexes are accompanied by rising volume, whereas declining market is accompanied by falling volume. For this purpose the following regression equations were estimated:

Panel A:

$$R_t = \alpha_1 + \beta_1 R_{t-1} + b_1 V_t + \varepsilon_{t1} \tag{3a}$$

Panel B:

$$R_t = \alpha_2 + \beta_2 R_{t-1} + b_2 \Delta V_t + \varepsilon_{t2} \tag{3b}$$

Where R_t is return at time t, and V_t, ΔV_t are the raw trading volume and the changes in trading volume at time t respectively, R_{t-1} is included in the equations to account for serial correlation in returns series.

The results reported in Table 3. indicate a positive contemporaneous relation between returns and trading volume, and between returns and the changes in trading volume. These results are consistent with most of the previous studies, for example: Lee and Rui (2000), De Medeiros and Van Doornik (2006), Khan and Rizwan (2008). The results provide a support for notion that rising markets are accompanied by rising volume and declining markets are accompanied by falling volume, and that is consistent with the theoretical model that implies that information content of volume affects future stock return. This evidence on the Palestine Exchange is consistent with the evidence reported for many of the developed, as well as, emerging markets.

The Ljung-Box (LB(Q)) statistics up to 36 lags are statistically insignificant, which indicate that the models do not suffer from the problem of serial correlation. While ARCH-LM test indicates the presence of ARCH effect.

For further investigation about the relationship between trading volume and returns, and to test whether the positive contemporaneous relation still exists after controlling for non-normality of error distribution, the study used a Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model. Following Lee and Rui (2000), and Khan and Rizwan (2008), and according to Darwish et.al. (2010), the following GARCH(1,1) models are appropriated for the Palestine exchange:

Panel A:

$$R_t = \alpha_1 + \beta_1 R_{t-1} + b_1 V_t + \varepsilon_t \tag{4a}$$

$$\varepsilon_t^2 \left| \left(\varepsilon_{t-1}^2, \varepsilon_{t-2}^2, ... \right) \right. \approx N\left(0, h_t\right) \tag{5a}$$

$$h_t = \omega_0 + \omega_1 \varepsilon_{t-1}^2 + \omega_2 h_{t-1} \tag{6a}$$

Panel B:

$$R_t = \alpha_2 + \beta_2 R_{t-1} + b_2 \Delta V_t + \upsilon_t \tag{4b}$$

$$\upsilon_t^2 \left| \left(\upsilon_{t-1}^2, \upsilon_{t-2}^2, \ldots \right) \approx N(0, h_t) \right. \tag{5b}$$

$$h_t = \gamma_0 + \gamma_1 \upsilon_{t-1}^2 + \gamma_2 h_{t-1} \tag{6b}$$

Where h_t is the variance of the error term, $\varepsilon_t(\upsilon_t)$, at time t. ω_0, γ_0 are constant and ω_1, γ_1 are coefficient that relate the past values of squared residuals, ε_{t-1}^2, and υ_{t-1}^2 relate to current volatility, and ω_2, γ_2 are coefficient that relate current volatility to the volatility of the previous period.

The results reported in Table 4, indicate that GARCH model is an attractive representation of weekly stock behavior, and successfully capturing the temporal dependence of return volatility. GARCH parameters are statistically significant, and the coefficients in the conditional variance equation (i.e., ω_1 and γ_1) are smaller than the ω_2 and γ_2, respectively. This implies that small market surprises induce relatively large revisions in future volatility. Moreover, the coefficients of regressing returns on trading volume and changes in trading volume are positive and statistically significant by using GARH (1,1) model. The Ljung-Box (LB(Q)) statistics up to 36 lags are statistically insignificant, which indicate that there is no serial correlation in the models. While Wald chi-square statistics are significant, indicating that the parameters associated with the explanatory variables are statically different from zero. So the positive contemporaneous relationship between trading volume and return preserves after taking heteroskedasticity into account. These findings are consistent with the finding of Lee and Rui (2000) in the Chinese stock market and with Khan and Rizwan (2008) in the Pakistan market.

4.3 Test for Granger Causality

Our investigation covers not only contemporaneous but also causal relationship, with causality test the study examine if the changes in volume cause return to change even when controlled for the past changes in the returns, and vice versa. The unit root test shows that we can test for Granger causality between returns and trading volume without making error correction models, so the study investigates causality between the two variables in both directions following bivariate Vector Autoregressive (VAR) models:

$$R_t = \alpha_R + \sum_{i=1}^{n} \alpha_i R_{t-i} + \sum_{i=1}^{n} \beta_i V_{t-i} + \varepsilon_{R,t} \tag{7a}$$

$$V_t = \alpha_v + \sum_{i=1}^{n} \alpha_i V_{t-i} + \sum_{i=1}^{n} \beta_i R_{t-i} + \varepsilon_{V,t} \tag{8a}$$

And for the changes in the trading volume:

$$R_t = \alpha_R + \sum_{i=1}^{n} \alpha_i R_{t-i} + \sum_{i=1}^{n} \beta_i \Delta V_{t-i} + \varepsilon_{R,t} \tag{7b}$$

$$\Delta V_t = \alpha_v + \sum_{i=1}^{n} \alpha_i \Delta V_{t-i} + \sum_{i=1}^{n} \beta_i R_{t-i} + \varepsilon_{\Delta V,t} \tag{8b}$$

The null hypothesis in Granger causality test is that R_t (V_t) does not Granger cause V_t (R_t) for the equation 7a and 8a, and R_t (ΔV_t) does not granger cause ΔV_t (R_t) for the equations 7b and 8b. The null hypothesis in the above-mentioned equation is mathematically represented by H_o: $\beta_i = 0$ for all (i), and the test statistic is a standard F-test.

To ensure that the models are not including unnecessary lags, the researcher used Akaike information criterion (AIC), Schwarz information criterion (SC), F- Statistic and adjusted R^2 statistic. After trying many combinations for number of lags between 1 and 20, the optimal VAR(10) was used. Thus the right side of equations 7a,b and 8a,b require estimating 21 coefficients. Instead of providing the entire 21 coefficient. Table 5. presents the intercept, the first lag, and the tenth lag of the returns and trading volume, along with F-Statistic and the adjusted R^2 statistic.

Panel A, Table 5, shows that the influence of lagged trading volume on returns is weak but significant at 1% level on at least one lag, and the influence of lagged returns on trading volume is negative and significant at 5% level, at least on one lag.

Panel B, Table 5, shows that the influence of lagged changes in trading volume on returns is significant at 1% level, at least on one lag, and the influence of lagged returns on lagged changes in trading volume is positive and significant at 10% level, at least on one lag.

To take a better decision about the bidirectional causality between trading volume and returns Table 6 presents the results of Granger causality based on VAR (10) results shown in Table 5.

The results in Table 6 indicate a clear evidence of bidirectional Granger causality in the Palestine Exchange, which mean that returns Granger cause trading volume and trading volume Granger cause returns, regardless of how trading volume is defined or measured.

These results are consistent with those of Moosa and A-Loughani (1995), Silvapulle and Choi (1999), Khan and Rizwan (2008), which reported bidirectional causal relationship to some Asian stock markets, and some emerging European markets such as Hungary, Poland, and Russia, (Gunduz and Hatemi-J 2005), and to small developed markets such as Switzerland, Netherlands, Turkey, and Hong Kong (Chen et. al. (2001), Ajayi et.al. (2003) and Kamath (2003). But the results are not consistent with the previous evidence from developed markets, such as Hiemstra and Jones (1994) and Lee and Rui (2002). They have documented that volume does not Granger cause stock market returns in developed markets. Because the microstructure and institutional factors regarding small stock market of Palestine are different from the developed stock markets. Silvapulle and Choi (1999) argue that institutional, organizational and structural factors have effect on the behavior of price-volume relation. However, trading in the Palestine exchange is much lower than in most developed countries.

The findings of bidirectional causality can be explained theoretically: Volume, which implies information, leads to price changes, and large positive price changes that imply higher capital gain, encourage transactions by traders leading to increase in volume. Moreover, the majority of stock market Participants in Palestine are short-term investors, who frequently engage in speculative activities, thus their behavior can be characterized by over-reaction to new information, and lacking fundamental analysis.

The economic interpretation of the results concerning the findings of bidirectional causality seems to be consistent with the noise trading model of De Long et. al. (1990); a positive causal relationship running from price to volume, consistent with a positive feedback trading strategy of noise traders who base their decisions on past price movements, and also positive causal relationship from volume to price, consistent with the hypothesis that price changes are caused by the action of noise traders. A greater influence of noise traders is possibly due to the delaying frequent and thin trading.

5. Conclusion

This study investigated the relationship between trading volume and returns using weekly data from the Palestine exchange over the period from October 2000 to August 2010. We found evidence of a significant contemporary relationship between trading volume and return, and indicating that information content of volume affects future stock return. This evidence is consistent with the evidence reported by studies on many developed and emerging markets.

We also found evidence of bidirectional Granger causality between trading volumes and returns regardless of the measures of trading volume used. The theoretical explanation of this finding is that volume which implies information leads to price changes, and large positive price changes that imply higher capital gain, encourage transactions by traders to increase in volume. Moreover these findings of bidirectional causality are consistent with the noise trading model of De Long et.al.(1990).

Our findings provide evidence of positive contemporaneous relationship between volume and returns. Granger causality tests also confirmed that volume added a predictive power for future returns in presence of current and past returns, and vice versa.

It is concluded that the past information of trading volume is useful for prediction of stock price, and vice versa. The study suggests that regulators and market participants can use past information for monitoring the stock price movement in the market.

Some of the limitations of this study is that we have employed the linear Granger causality test, and normal volume and returns. Non-normality hypothesized to have different effects, so there is a need for further study considering nonlinear mechanism and empirical regularities.

However, the finding of this study is subject to the period and data selected, and the results may therefore change if the study period and data change.

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Table 1. Descriptive statistics

Variable	Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	LB (Q):36
R_t	.0013	0.0409	0.2596	4.9933	85.9156*	54.76*
V_t	846125.1	1210033	5.9078	65.1643	81075.55*	354.84*
ΔV_t	-0.0003	1.0526	-0.1855	4.5468	51.2354*	124.54*

* Note: Significant at 1% level

Table 2. Unit root test in the level

Variable	ADF			PP		
	None	**Intercept**	**Trend and intercept**	**None**	**Intercept**	**Trend and intercept**
R_t	-18.748	-18.745	-18.7244	-19.7562	-19.7413	-19.7246
V_t	-3.5429	-8.6519	-9.8777	-16.3538	-19.2669	-19.2649
ΔV_t	-16.691	-16.679	-16.6559	-87.9158	-88.145	-88.0135

Note: The 1% critical values of the ADF and PP tests are -3.4436 (without trend) and -3.9771 (with trend). A significant test statistic indicates the rejection of the null hypothesis, which is nonstationary in both tests.

Table 3. Regression of weekly trading volume on returns

Panel A: $R_t = \alpha_1 + \beta_1 R_{t-1} + b_1 V_t + \varepsilon_{t1}$			**Panel B:** $R_t = \alpha_2 + \beta_2 R_{t-1} + b_2 \Delta V_t + \varepsilon_{t2}$		
Variable	**Coefficient**	**Z-Statistic**	**Variable**	**Coefficient**	**Z-Statistic**
α_1	-0.00322	-1.4506	α_2	0.00108	0.5974 *
β_1	0.1257	2.8111*	β_2	0.1535	3.4600 *
b_1	5.13×10^{-9}	3.3912*	b_2	0.0068	3.9434 *
LB (Q):36	37.458		LB (Q):36	35.98	
ARCH- LM test	18.6751*		ARCH- LM test	17.436*	

*Note: significant at 1% level

Table 4. GARCH Results

Panel A: $R_t = \alpha_1 + \beta_1 R_{t-1} + b_1 V_t + \varepsilon_t$ $h_t = \omega_0 + \omega_1 \varepsilon_{t-1}^2 + \omega_2 h_{t-1}$			**Panel B:** $R_t = \alpha_2 + \beta_2 R_{t-1} + b_2 \Delta V_t + \upsilon_t$ $h_t = \gamma_0 + \gamma_1 \varepsilon_{t-1}^2 + \gamma_2 h_{t-1}$		
Variable	**Coefficient**	**Z-Statistic**	**Variable**	**Coefficient**	**Z-Statistic**
α_1	-0.00144	-1.1189	α_2	0.0009	0.7164
β_1	0.13519	6.6899*	β_2	0.1627	6.9754*
b_1	2.83×10^{-9}	4.7982*	b_2	0.00393	2.8275*
ω_0	0.00014	5.1216*	γ_0	0.00014	5.4846*
ω_1	0.3651	5.2528*	γ_1	0.3403	5.1032*
ω_2	0.6020	12.5398*	γ_2	0.613	12.7725*
LB (Q):36	31.259		LB (Q):36	31.736	
Log likelihood	942.1092		Log likelihood	942.7206	
Wald $\chi^2(1)$	23.023*		Wald $\chi^2(1)$	7.9945*	

*Note: significant at 1% level

Table 5. Vector Autoregressive Estimates

Panel A:				Panel B:			
Dependent Variable				Dependent Variable			
R_t		V_t		R_t		ΔV_t	
Coeff.	Value	Coeff.	Value	Coeff.	Value	Coeff.	Value
α_R	-.0039***	α_v	207516.4	α_R	.0006	α_{DV}	-.0035
α_1	0.0975**	α_1	0.168*	α_1	0.1363*	α_1	-0.621*
α_{10}	0.0423	α_{10}	.098**	α_{10}	.0523	α_{10}	-.0575
β_1	1.57×10^{-9}	β_1	1890218***	β_1	-0.0055*	β_1	1.384***
β_{10}	$-3.96 \times 10^{-9*}$	β_{10}	2654723	β_{10}	0.0038**	β_{10}	.3064
F-Stat.	3.94*	F-Stat.	5.26*	F-Stat.	3.51*	F-Stat.	11.10*
adjR^2	0.076	adjR^2	0.152	adjR^2	.06	adjR^2	0.30

*, **, *** Note: significant at 1%, 5% and 10% level respectively

Table 6. Granger Causality

Panel	Null Hypothesis	Obs.	F-Statistic	Prob.
Panel A.	V doesn't Granger cause R	476	2.595	00046
	R doesn't Granger cause V		1.79	0.075
Panel B.	ΔV doesn't Granger cause R	476	1.81	0.057
	R doesn't Granger cause ΔV		1.79	0.042

Capital Movements and Economic Growth Fluctuations: The Threshold Effect of Financial Development

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Abstract

We examine the relationship between capital account openness and growth volatility according to the level of financial development condition. We demonstrate that economies with high level of financial sector development benefit more from capital flows than those with a lower one. In what follows, we extend previous studies by employing updated data, and also exploring more questions related to the links between capital movements and growth volatility. More specifically, we will investigate the issues relevant to threshold effect of financial development on which capital flows changes of sign. We investigate the role of financial development in the relationship between capital flows and growth volatility for different groups of countries. Estimations are conducted with a panel data of 70 countries over the period 1970-2009 using GMM-System estimator for dynamic panel data. Empirical results support that capital movements aggravate macroeconomic volatility according to the level of domestic financial development. This implies that countries which are at an intermediate phase of financial development are the most vulnerable to instability. This threshold is estimated at a rate of credits to the private sector to GDP around 50 %.

Keywords: Financial development, Financial integration, Capital movements, Macroeconomic volatility

1. Introduction

Given their low level of capital and their biggest volatility, developing countries, particularly seem to have most interest to benefit from the process of financial integration. Since the decision-makers estimate the risks and the advantages of capital flows including its implications for growth, the volatility took a big importance. Therefore, there was a debate on the impact of capital flows on economic growth. In spite of the crises which shook emerging countries, certain works have shown that the advantages of the capital flows are acquired on the long run. Several other studies have examined the causal relation between financial integration and economic growth. Although many of these studies concluded that capital flows really produces advantages for growth. Hence, this relation is not yet found to be strong. In this context, we address the question to whether really financial development threshold enables capital flows reduce macroeconomic volatility.

The remainder of this paper is organized as follows. The next section provides a brief theoretical and empirical review on the relationship between financial development, capital flows and macroeconomic volatility. Section 3 highlights an econometric analysis where descriptive statistics, model and estimated methodology are described. Empirical results and discussions are presented in Section 4. Finally, this piece of research concludes with Section 5.

2. The Review of the Literature

The international capital flows has considerably increased since the end of 1980s and it has been a source of important potential advantages. At first, opening to international capital markets supplies additional resources to finance investment. It also can lead to a bigger capital accumulation. This is particularly in the countries where the capacity of savings is forced by a low level of income. Besides, financial integration can lead to a more efficient allocation of capital by improving the discipline of market and by strengthening banking system. The greater allocation of capital and efficiency has the objective to decrease the investment costs and to spur economic growth. Another major source of advantages is to facilitate the sharing of international risk by supplying more opportunities for the diversification of portfolios. This channel supplies additional means of insurance for companies by allowing

them to invest in projects with high return and more risks. However, if these potential advantages are theoretically well established, the empirical evidence still mitigate and rather weak.

Most of the theoretical studies on the capital flows have been concentrated on the evaluation of the impact of capital account opening on growth rate, (Edison and al., 2002). The attention has been shifted the relation between financial openness and macroeconomic volatility. After financial crises of the 1980s and 1990 which followed reforms of liberalization of the major account, some studies supported that capital flows could be a source of bigger macroeconomic volatility. This is going to expose the countries to be vulnerable in the sudden reversals of capital flows, (Kaminsky and Reinhart, 1999). According to this line of explanation, some countries are going to run a higher macroeconomic volatility by what they miss in terms of political instruments to smooth the cycles. Particularly, they miss adequate financial institutions to avoid sudden reversals of capital flows. Even, without considering external episodes of macroeconomic volatility (as the financial crisis), financial integration associated with weakness of domestic financial institutions could strengthen existing changes due to imperfections of credit market. This can also bring report of volatility of the cycles of the economic activity. In the presence of information asymmetries, opening of capital account supplies additional liquidity to domestic banking system and leverage more raised for the loans of firms. In this context, capital flows can amplify the mechanism of financial accelerator identified in the study of Bernanke and al. (2000). International financial integration can have two major potential advantages: the improvement of global allocation of capital and the assistance of countries to better share risk by reducing consumption volatility, (Mr. Ayhan Kose, Eswar Prasad and Marco Terrones; 2003). The understanding of the dynamics of macroeconomic volatility is recently moved for certain reasons. At first, suggestions of Ramey and Ramey; (1995) showed the existence of a negative relation between growth and its volatility. As quoted previously, the literature handled only the theoretical links and the channels of influence between financial development and economic growth. This interconnection always appreciated the positive impact of development of the financial sector on growth. The potential connections between financial development and growth volatility were not completely studied. However, the increase of growth volatility of that many developing countries have experienced in the last decades, brought an important and recurrent question: at which level can production fluctuations be moved closer to financial development sector?

The previous studies of Easterly and al. (2000), Denizer and al. (2002), Haussmann and Gavin (1996); and Raddatz (2006) showed that financial development reduces macroeconomic volatility. The conclusion from these suggestions is that none tried to identify channels by which financial development affects potentially growth volatility. In an attempt to examine if financial intermediaries serve either as shock absorbers by easing the effect of the real or monetary volatility on that of the economic growth, or as an amplificator. On the one hand, this ensues from works of Bernanke and Gertler (1989) which showed that if the net value of borrowers is affected by a shock, this is going to amplify volatility of economy through the effect of investment accelerator. In this direction, Acemoglu and Zilibotti (1997) suggested that the interaction between indivisibility of investment and incapacity of risk diversification increases economic volatility. On the other hand, and in the same current of the literature, the studies of Bernanke and Blider (1992) and Bernanke and Gertler (1995) proposed that monetary policy can affect real economy through its effect on credit market. By reference to the model of Bacchetta and Caminal (2000), some studies showed that the entrepreneurs, by difference in their levels of wealth, have access to financial markets. The emergence of financial intermediaries is due to information asymmetries between lenders and borrowers, (Thorsten Beck, Mattias Lundberg and Giovanni; (2006)). Unlike Bacchetta and Caminal, these works explicitly modelled financial intermediation making use of the channel of monetary policy. They studied two types of shocks: the real shocks which affect only the non financial institutions and the monetary shocks which affect only the banking balance sheets. Because entrepreneurs produce at different levels of productivity by depending on the internal resources level, real and monetary shocks will have distributional effects resulting from its impact on the output. Although depends on the nature of shock that is cooled or amplified. We can note that theoretical studies examining financial integration effects on business cycles volatility failed to bring conclusive results.

Empirically, by using a dynamic stochastic model, Mendoza (1994) discovered that there are low production and consumption volatilities simultaneously with a greater financial integration. In front of bigger and more persistent shocks, there is a proof which production volatility increases with degree of financial integration. Unlike, Baxter and Grucini (1995) showed that there is a negative relation between capital flows and both relative and absolute consumption volatility. For them, production volatility is found to increase with a bigger financial integration. The changes observed by production and consumption volatility are largely awarded to wealth effects and their interaction with risk sharing. This depends on the various structures of market assets. The analysis of capital flows impact on macroeconomic volatility can be complicated by other factors.

Another branch of studies showed that the degree of influence on output and consumption volatility depends on the nature of shocks affecting economy. In case of monetary and fiscal shocks, volatilities of production and consumption move simultaneously with increase of financial integration, (Sutherland; (1996), Senay; (1998) and Buch, Doepke and Pierdzioch; (2005)). Rodrik (1998) supported that with financial integration, opened economies have a wider exhibition shocks in the world market and their structures. This underlies the degree of exports and the diversification of imports which determine their capacity to absorb terms of trade and foreign demand shocks. These shocks explain a significant fraction of the volatility in developing countries. Aghion and al. (1999) and Aghion and al. (2000) argued that countries with a low level of financial development can expose more volatile growth rates. However, Beck and al. (2001) concluded that it's not the case that financial development effect on volatility depends on the nature of shocks which affect economy whether real or monetary. By using a panel of 63 countries over the period 1960-1997, no strong relation was found between financial development and growth volatility. Other recent works focused on interdependence between domestic and foreign financial markets. Chang and Valesco (1999) have examined the influence of banks and foreign investors on domestic banking systems. Caballero and Krishnamurthy (2001) have investigated the role of domestic financial system in the access to international financial markets. Razin and Rose (1994) have investigated the impact of trade openness on the volatilities of production, consumption and investment for a sample of 138 countries over the period 1950-1988. They found an insignificant relation between openness and macroeconomic volatility. Estearly, Islam and Stiglitz (2001) have looked for sources of volatility by using a sample of 74 countries over the period 1960-1997. Therefore, they found that countries having a more developed domestic financial sector are associated to a lower volatility. In spite of the richness empirical literature which studied the impact of financial openness on economic growth, the studies of links between openness and macroeconomic volatility are limited.

3. An Econometric Analysis of Financial Integration, Growth Volatility and Financial Development

3.1 Data and Sample

The used sample consists of 70 developed and developing countries. The period of study extends over 1970-2009 where the observations for each country is averaged on 5 years periods (Note 1). Data are used from WDI database (2009), IFS database (2009) and database built by Levine (2009). The indicator of financial development is measured by ratio of credits to the private sector to GDP. The net private capital flows to the GDP is a de facto measure of financial integration. Here we use that in Lane and Milesi-Ferretti (2006). For growth volatility we shall use the standard deviation of GDP in Log for every five years period. The same procedure is adopted for other variables of control: the inflation rate volatility which is measured by standard deviation of Log (1+inflation), the standard deviation of trade openness ((X+M)/GDP); exchange rate stability used in Aizenman (2008) and standard deviation of government spending (G/GDP).

3.2 The Descriptive Statistics

According to the results presented in table 1 we notice that growth volatility marked the most raised value during the decades of 80s and 90s for emerging countries (MFI). This period was qualified by adoption of certain policies such as financial liberalization and integration. Consequently, these countries witnessed economic recessions due to crises arisen from this period. Unlike developing countries, volatility was almost stable in developed countries during the four decades. However, in less financially integrated countries, volatility is showed in decline throughout studied period.

Table 2 shows that financial development indicator reaches the maximum values in developed countries and is gradually growing through decades. The more developed financial systems are the most active and efficient ones in allocation of resources. In other cases, we notice that financial development indicator whose tendency seems to be stable for the most opened countries. (Note 2)

3.3 The GMM-System in Dynamic Panel Data

The methodology of Generalized Method of Moments (GMM) for panel data analyses, proposed by Arellano and Bond (1991) and then further developed by Blundell and Bond (1998), is employed here to control for endogeneity in our estimations. The data will be calculated every 5 year period from 1970 to 2009. It gives a balanced panel of 70 countries and 8 periods. The empirical results suggest, however, that the past volatility is suited in the explanation of the current volatility for the economic growth. The following presentation of the structure of the model of regression is based on a dynamic specification. We are going to consider the model of following regression:

$$y_{i,t} = \alpha y_{t-1} + \beta x_{i,t} + \mu_i + \epsilon_{i,t}$$

With μ_i and $\epsilon_{i,t}$ are independently distributed, $E[\mu_i] = E[\epsilon_{i,t}] = E[\mu_i\epsilon_{i,t}] = 0$ for i = 1, ..., N and t = 2, ..., T and $E[\epsilon_{i,t}\epsilon_{i,s}] = 0 \quad \forall\, t \neq s$. With this specification and our structure of panel (raised N and short T), the OLS estimator is biased. Arellano and Bond (1991) and Arellano and Bover (1995) proposed the linear GMM-IV estimator which consists in taking for each equation the first difference of the equation to be estimated in order to eliminate the specific effects of countries; and then use the values in a lagged level with one period at most from the explanatory variables as instruments of these variables at the level of the equation in first difference. The System-GMM estimator developed by Arellano and Bover (1995) consists in estimating a system of equations (one for each time period) specified in level and in first difference. The consistency of the GMM estimator depends on the validity of the assumption that the error terms do not exhibit serial correlation and on the validity of the instruments. To address these issues, we use two specification tests suggested by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). The first is a Sargan test of over-identifying restrictions, which tests the overall validity of the instruments by analyzing the sample analog of the moment conditions used in the estimation process. The second test examines the hypothesis that the error term $\epsilon_{i,t}$ is not serially correlated. We test whether the differenced error term is second-order serially correlated (by construction, the differenced error term is probably first-order serially correlated even if the original error term is not). Failure to reject the null hypotheses of both tests gives support to our model.

3.4 Model and Estimation Strategy

Referring to previous modeling, we consider following both dynamic equations where we introduce the financial development and financial integration:

$$y_{i,t} = \alpha y_{i,t-1} + \beta_1 x_{i,t} + \beta_2 DF_{i,t} + \beta_3 FI_{i,t} + \mu_i + \epsilon_{i,t} \tag{1}$$

$$y_{i,t} = \alpha y_{i,t-1} + \beta_1 x_{i,t} + \beta_2 DF_{i,t} + \beta_3 FI_{i,t} + \beta_4 (DF_{i,t} \cdot FI_{i,t}) + \mu_i + \epsilon_{i,t} \tag{2}$$

Where, y_{it} is the growth volatility for country i in year t. More specifically, y_{it} is either output volatility measured as the five-year standard deviations of GDP per capita; (DF) is the private credit as a ratio to GDP as a measure of financial development; (FI) is a de facto measure of financial integration. Here we use those in Lane and Milessi-Ferretti (2006) and $(DF_{i,t} \cdot FI_{i,t})$ which is an interaction term between the capital flows and the level of financial development. We are particularly interested in interaction term effect because we suspect that international capital flows may complement or substitute other conditions. X_{it} is a vector of macroeconomic control variables that include the most used variables in the literature, namely, inflation volatility as the five-year standard deviations of inflation rate ; trade openness volatility defined as the five-year standard deviation of $((X+M)/GDP)$; government spending volatility; and exchange rate stability index used in Asieman (2008) as five-year averaged.

The parameters of interest are β_2, β_3 and β_4 which get potential interaction effect between capital flows and financial development indicators. This formulation allows the impact of the one of both variables to depend on the level of the other one. β_2 and β_3 of the equation (1) represent marginal impacts respectively of financial development and financial integration. In contrast, β_3 in (2) represents marginal impact of capital flows conditional on the level of financial development being zero and the interpretation which is similar for β_2 is also held. Finally, to obtain the level of threshold of financial development, we have to calculate from (2) the function: $\frac{\partial y}{\partial FI} = \beta_3 + \beta_4 DF^*$ being equal to zero.

4. Results and Discussions

Our estimation has supplied the following results. First of all, we have to consider the mixed full sample, and then we shall proceed to separate groups of countries according to the degree of financial integration, adopted by Mr. Ayhan Kose, Eswar Prasad and Marco Terrones; (2003). The first estimation consists in considering the full sample mixed which contains 70 countries where 20 are industrialized economies. Second, we split developing countries (50) into two groups: 18 More Financially Integrated Economies (MFIE) and 32 Less Financially Integrated Economies (LFIE). The instrumental variables employed in our study are lagged values of indicators and time dummies to check time effect and which are not posted in the following tables.

Table 3 indicates two results. Firstly, second-order serial correlation test justifies the acceptation of the null hypothesis. Secondly and at the same time, Sargan test of over identification suggests that we cannot reject the validity of instruments hypothesis (prob $X^2 > 0.05$). It's noted that we have instrumented financial development indicator by its lagged values and time dummies variables to check the time effect. Column (1) shows results of the model without introduction of variables of interest (financial development and financial integration), obtained from GMM-System. The results show that coefficients associated with explanatory variables answer favorably the expected signs. The standard deviation of trade openness indicator exercises a negative effect on the severity of growth volatility. This result doesn't confirm the Rodrik's argument: more opened economies are more specialized

and so running the biggest shocks of income, combined with imperfect financial markets, lead to a bigger macroeconomic volatility. On the one hand, instability of inflation, exchange rate volatility and government spending have positive impact on growth rate instability which showed strongly significant at 1 %. On the other hand, the coefficient of lagged dependent variable has a significant and positive sign with a scale less than one. Given that we have considered 5 year periods, it suggests that this volatility is relatively persistent. Furthermore, it also supports the dynamic specification adopted here. In column (3), we have introduced the financial development indicator measured by ratio of credits for the private sector divided by GDP and capital flows indicator measured by the ratio of net private capital flows to GDP. Financial development reduces favorably macroeconomic volatility by the fact that an increase in the indicator of credits of 1 point percentage weakens the volatility of 0.1 point percent. Capital flows aggravates significantly economic growth volatility of 0.02 point. This means that a developed financial system, by the exercise of functions as mentioned in Levine papers, minimizes the economic danger of skidding. Other control variables have the same signs as in (1) and (2). In model (4), it is interesting to point out that the addition of interactive term between capital flows and financial development indicators is to determine financial development threshold from which capital flows can change sign towards its effect on economic growth rate volatility. The estimation supplies a significant negative impact of the interactive term at a risk of 5 %. The capital flows reduces volatility as soon as certain threshold of financial development is reached by studied countries. This means that there is a threshold of financial development from which coefficient of capital flows changes sign. This threshold is determined by calculation of marginal impact of capital flows as table shows. This means that from a certain financial development level, capital flows has just brought its initial enthusiasm while reducing macroeconomic volatility. This threshold is approximate at a level of 58 % of private credit ratio. A financial system, which is in phase of maturity, can run instabilities which may engender an escalation of volatility due to financial openness.

As reminder, this rate is taken by high levels of developed countries appearing in the sample. It is possible that separation procedure of samples will give more precise results which take into account heterogeneous specificities of studied groups. We shall divide sample into three groups according to the degree of capital flows as adopted by the economists, Kose, Mr A. E. Prasad, K. Rogoff, and S.J. Wei. This will give us 20 developed countries and 50 developing countries where 18 represent the Most Financially Integrated and 32 Least Financially Integrated Economies.

The estimation for developed countries sample shows that capital flows has no significant effect on growth volatility both in (3) and (4), (see table 4). Financial development indicator persists with a significantly negative effect which strengthens the idea that a developed financial system favors economic growth while minimizing economic instability. However, financial openness has no significant impact on macroeconomic volatility; this confirms the works of Kose and al. (2003) and of Easterly and al. (2004). The introduction of interactive term returns has no significant effect.

Other explanatory variables in table 5 resist by having the same signs as in regressions (1) and (2). In regression (4), addition of interaction term between capital flows and financial development has a significant negative impact which validates hypothesis that capital flows can change sign towards its effect on growth volatility. Capital flows appear reducing volatility at a determined financial development threshold which is reached by studied developing countries. This means that there is a threshold from which the coefficient of capital movements changes sign. This latter is determined from the marginal impact of capital flows as the table shows. This justifies that from a certain financial development level, the capital flows has just brought its initial enthusiasm while reducing the macroeconomic volatility. This threshold is approximate at a level of 50 % of the private credit ratio. A financial system which is in phase of maturity can run instabilities which can engender an escalation of the volatility along with the financial opening.

For less financially integrated countries estimation, as shown in table 6 column (3), the increase in growth volatility during studied period is significantly better explained by evolution of lagged volatility, inflation rate volatility, exchange rate volatility, government spending volatility and the financial integration. The financial development has a significant effect on decline of macroeconomic volatility in LFIEs. This underscores that countries which have under developed financial systems can undergo instabilities further to the opening to international financial markets. However, evaluation of regression (4) suggests that coefficient of capital movements changes sign of impact on growth volatility. Therefore, this change depends on the level of financial development due to significance of interactive term indicator which is shown statistically significant. This evidence confirms the ideas of Beck and al. (2001). Then, we conclude that the financial development threshold in LFI countries, from which the capital flows changes sign towards growth volatility, is approximated at one level of 58 %. Generally, this result confirms and

agrees with the most previous empirical and theoretical studies which plan and accord an ambiguous impact of capital flows on growth volatility to the nature of shocks striking the economy.

The estimated coefficients for the 18 more financially integrated economies (see table 7) have the expected sign (Note 3). The coefficient of lagged dependent variable has a significant and positive sign with a scale less than one. The impact of exchange volatility is positive on growth volatility. Then, trade openness volatility appear leading to more growth volatility which confirms the Rodrik's study (1998). Thus, more opened economies are more specialized and so throw the biggest shocks of income, combined with imperfect financial markets, lead to a bigger macroeconomic volatility. Similarly, this result agrees with work papers of Kose and al. (2003), and Easterly and al. (2004). However, the interaction term has no significant impact. This is due to advanced market financial development stages of these more financially integrated countries which allocates financial flows efficiently and enhances macroeconomic stability.

5. Conclusion

The contribution of this paper aims to show the relation between capital flows and macroeconomic volatility conditional to the development level of domestic financial systems. The interaction between domestic financial development and capital flows is a determinant which does not miss importance of the scale of the volatility brought by financial openness. However, capital flows is associated with the highest growth rate volatility if level of domestic financial development is below determined threshold. Our empirical results suggested that the level of financial development threshold, measured by the ratio of private credit to GDP, is estimated to be around 50%. Departing from this level, we expect advantages and benefits of financial openness. It seems, however, that countries, which are at an intermediate phase of financial sector development, can be the most unstable. In terms of policy conclusion, it suggests that the financial domestic system has to be a prerequisite for financial integration decision. The basic implication is that economies which run an intermediate stage of financial development system are more unstable than those which are more or less developed economies. This is true in the sense that temporary shocks have big and persistent effects, as long as these countries can expose economic cycles. Thus, countries which are in a phase of development of their financial systems can be more unstable on the short-run. Similarly, full liberalization of capital account can destabilize these economies. This is explained by phases of growth with capital inflows. Conversely, when this process is followed by capital outflows a sudden fall certainly happen.

Financial integration can catalyze financial development, improve governance, and impose discipline on macroeconomic policies. But, in the absence of a basic pre-existing level of these supporting conditions, capital movements can aggravate instability. Broader range of financial markets, greater financial depth can help deal with shocks; make transmission of macroeconomic policies more efficient. Financial integration can support and catalyze other reforms, especially financial development. Unlike, other developing economies are still below threshold levels of financial and institutional development. Still, de facto fixed or tightly-managed exchange rates and inflation targeting create problems whenever surges in inflows. In addition, real exchange rate appreciations can affect poor and undeveloped economies. Overall, developing countries can manage risks during transition to thresholds, but cannot eliminate them. However, a selective approach to liberalization based on prioritization on collateral benefits must be adopted before.

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Notes

Note 1. Periods are: 70-74, 75-79, 80-84, 85-89, 90-94, 95-99, 2000-2004 and 2005-2009.

Note 2. For simultaneous evolution of private credit and growth volatility looks at graphs in annexes.

Note 3. The results in table1 show that (i) test of second-order serial correlation justify the acceptance of the null hypothesis, and (ii) the Sargan test of over identification suggests that we cannot reject the hypothesis of the validity of instruments (prob $X^2 > 0.05$). It noted that we have instrumented the indicator of the financial development by its values lagged and time dummies variables to check the time effect.

Correlation matrix

	FI	FD	E XCHANGE	GROWTHVOL	INFVOL	TRADEVOL	GOVVOL	FI*FD
FI	1.0000							
FD	-0.0545	1.0000						
EXCHANGE	0.0425	-0.2000	1.0000					
GROWTHVOL	0.0669	-0.1412	0.0981	1.0000				
INFVOL	-0.0586	-0.0767	-0.0817	0.0777	1.0000			
TRADEVOL	0.1141	-0.0224	0.0854	0.0784	0.1120	1.0000		
GOVVOL	-0.2466	-0.3334	0.1684	0.1334	0.0376	0.0605	1.0000	
FI*FD	0.5746	-0.5496	0.2200	0.0828	0.0085	0.1330	0.1186	1.0000

Table 1. The volatility of the growth rate by decade: a comparative analysis between the various groups of countries

Groups	Standard deviation of growth rate by group of countries in %			
	1970-1979	1980-1989	1990-1999	2000-2009
Developped countries	2.88	2.04	2.265	2.45
Developing MFI (Note 4)	3.7	4.88	4.54	3.65
Developing LFI (Note 5)	7.02	5.13	3.90	2.93

*. MFI: More Financially integrated.

**. LFI: Less Financially Integrated.

Table 2. The evolution of financial development indicator from various groups

Groups	Mean of private credit ratio to GDP in %			
	1970-1979	1980-1989	1990-1999	2000-2009
All countries	33	43	54	65
Developped countries	54	67	89	119
Developing MFI	28	40	51	54
Developing LFI	19	24	22	26

Table 3. GMM-System Estimation of Growth volatility: full sample of 69 countries

Variables	GMM-System			
	(1)	(2)	(3)	(4)
Lagged dependant variable	0.420***	0.303***	0.341***	0.331***
	(49.42)	(50.36)	(26.02)	(21.79)
Inflation volatility	0.00193***	0.00169***	0.00159***	0.00139***
	(55.97)	(54.60)	(21.52)	(25.50)
Exchange rate volatility	0.0230***	0.0390***	0.0312***	0.0371***
	(14.85)	(18.53)	(16.11)	(10.51)
Trade volatility	-0.166***	-0.117***	-0.105***	-0.0677***
	(-20.04)	(-14.62)	(-9.413)	(-2.914)
Government spending volatility	1.499***	1.198***	1.387***	1.579***
	(59.66)	(76.80)	(70.10)	(29.82)
Private credit		-0.0936***	-0.0774***	-0.105***
		(-20.14)	(-19.10)	(-17.87)
Net private capital flows			0.0200***	0.0353***
			(34.76)	(21.36)
Credit*Capital flows				-0.0609***
				(-9.324)
	(-37.24)	(-58.15)	(-36.77)	(-25.31)
Constant	0.0370***	0.0850***	0.0817***	0.0841***
	(77.65)	(104.5)	(58.21)	(26.84)
Observations	483	483	483	483
Countries	69	69	69	69
Serial correlation test[a] (p-value)	0.2343	0.2673	0.2646	0.3166
Sargan test[b] (p-value)	0.7709	0.9189	0.9995	0.9996
Threshold of Financial Development(%GDP) (Note 6)				58

Note: $\frac{\partial y}{\partial FI} = \beta_3 + \beta_4 DF^*$ from regression (4).

T-stat in parentheses.

The regressions also includes dummy variables for the different time periods that are not reported.

* p<0.1; ** p<0.05; *** p<0.01 indicate significance at the 10%, 5% and 1% level in the first-stage regression respectively.

a. The null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation.

b. The null hypothesis is that the instruments used are not correlated with the residuals.

Table 4. GMM-System Estimation of Growth volatility : 20 developed countries

Variables	GMM-System			
	(1)	(2)	(3)	(4)
Lagged dependant variable	0.371***	0.285***	0.292***	0.321***
	(5.265)	(4.781)	(4.726)	(3.533)
Inflation volatility	0.622	0.391	0.450	0.300
	(1.631)	(1.039)	(1.236)	(0.638)
Trade volatility	-0.321***	-0.289**	-0.215*	-0.175
	(-3.558)	(-2.024)	(-1.716)	(-1.154)
Government spending volatility	3.250***	1.167	0.741	1.519
	(3.997)	(1.134)	(0.634)	(1.128)
Exchange rate volatility	0.0001	0.0331***	0.0507***	0.0505**
	(0.0256)	(2.938)	(2.658)	(2.129)
Private credit		-0.0590***	-0.0642***	-0.0688***
		(-11.81)	(-9.364)	(-6.841)
Net private capital flows			-0.00890	0.00343
			(-0.904)	(0.127)
Credit*net capital flows				-0.00551
				(-0.285)
Constant	0.0338***	0.0859***	0.0739***	0.0752***
	(4.906)	(6.733)	(4.719)	(3.602)
Observations	133	133	133	133
Countries	19	19	19	19
Serial correlation test[a] (p-value)	0.0821	0.0228	0.0187	0.0247
Sargan test[b] (p-value)	0.8507	0.8630	0.8876	0.8950

Table 5. System Estimation of Growth volatility: 50 developing countries

Variables	Two Step GMM-System			
	(1)	(2)	(3)	(4)
Lagged dependant variable	0.298***	0.255***	0.309***	0.293***
	(12.72)	(8.659)	(6.830)	(7.556)
Exchange rate volatility	0.0802***	0.0729***	0.0509***	0.0621***
	(18.25)	(10.18)	(6.310)	(5.985)
Inflation volatility	0.00285***	0.00256***	0.00246***	0.00235***
	(8.134)	(6.175)	(6.321)	(6.196)
Trade volatility	-0.151***	-0.120***	-0.0637*	-0.0282
	(-3.706)	(-3.281)	(-1.689)	(-0.726)
Government spending volatility	1.433***	1.299***	1.490***	1.510***
	(7.242)	(5.083)	(4.340)	(4.965)
Private credit		-0.0677***	-0.0659***	-0.0980***
		(-11.32)	(-10.09)	(-6.541)
Net private capital flows			0.0228***	0.0361***
			(11.12)	(9.683)
Credit*net capital flows				-0.0725***
				(-5.420)
Constant	0.0144***	0.0459***	0.0551***	0.0540***
	(4.530)	(9.266)	(10.05)	(6.096)
Observations	350	350	350	350
Countries	50	50	50	50
Serial correlation test[a] (p-value)	0.3435	0.3272	0.2959	0.4147
Sargan test[b] (p-value)	0.7537	0.7674	0.9994	0.9996
Threshold level of Financial Development (private credit in %GDP) (Note 7)				50

Note: $\frac{\partial y}{\partial FI} = \beta_3 + \beta_4 DF^*$ from regression (4).

Table 6. GMM-System Estimation of Growth volatility: 32 LFIE countries.

Variables	Two Step GMM-System			
	(1)	(2)	(3)	(4)
Lagged dependant variable	0.327***	0.291***	0.317***	0.304***
	(8.391)	(7.675)	(7.766)	(6.315)
Inflation volatility	0.00231***	0.00183***	0.00207***	0.00175***
	(4.571)	(3.250)	(4.804)	(2.820)
Trade volatility	-0.0854***	-0.0830**	-0.0550	-0.0184
	(-3.184)	(-2.237)	(-1.322)	(-0.334)
Exchange rate volatility	0.0688***	0.0771***	0.0657***	0.0672***
	(8.250)	(7.238)	(6.267)	(5.718)
Government spending volatility	1.266***	1.078***	1.569***	1.531***
	(8.982)	(6.141)	(9.712)	(6.777)
Private credit		-0.0914***	-0.0887***	-0.121***
		(-6.461)	(-6.357)	(-4.442)
Net private capital flows			0.0327***	0.0419***
			(12.79)	(9.581)
Credit*net capital flows				-0.0728***
				(-2.834)
Constant	-0.0102*	0.00906	0.0181**	0.0222**
	(-1.814)	(1.329)	(1.986)	(2.135)
Observations	224	224	224	224
Countries	32	32	32	32
Serial correlation test[a] (p-value)	0.2964	0.2753	0.4328	0.4794
Sargan test[b] (p-value)	0.2546	0.3302	0.2975	0.3050
Threshold level of Financial Development (private credit in %GDP) (Note 8)				58

Note : $\frac{\partial y}{\partial FI} = \beta_3 + \beta_4 DF^*$ from equation (4).

Table 7. GMM-System Estimation of Growth volatility: 18 MFIE.

Variables	Two Step GMM-System			
	(1)	(2)	(3)	(4)
Lagged dependant variable	0.569***	0.491***	0.405***	0.349***
	(4.212)	(5.858)	(5.413)	(3.791)
Inflation volatility	0.000412	0.000551	0.000580	0.000705
	(0.824)	(1.138)	(0.958)	(1.152)
Trade volatility	0.106	-0.00177	0.160**	0.184**
	(1.097)	(-0.0204)	(2.052)	(2.293)
Exchange rate volatility	0.0426**	0.0237*	0.0381*	0.0468**
	(2.406)	(1.863)	(1.692)	(2.019)
Government spending volatility	3.541	2.061***	1.768***	1.308*
	(1.393)	(2.986)	(2.705)	(1.725)
Private credit		-0.0603***	-0.0695***	-0.0947***
		(-4.498)	(-5.255)	(-4.927)
Net private capital flows			0.0402**	0.0496**
			(2.225)	(1.976)
Credit*net capital flows				-0.0309
				(-1.012)
Constant	-0.00140	0.0578***	0.0601***	0.0729***
	(-0.0802)	(3.721)	(3.382)	(3.643)
Observations	126	126	126	126
Countries	18	18	18	18
Serial correlation test[a] (p-value)	0.9668	0.5159	0.8469	0.7017
Sargan test[b] (p-value)	0.9953	0.9805	0.9805	0.9907

Countries list

Countries
Developed countries:
Austria, Belgium, France, Germany, Italy, Netherlands, the United Kingdom, Ireland, Spain, Finland, Denmark, Greece, Portugal, Sweden, Norway, the USA, Canada, Australia, New-Zélande, Japan.
Developing countries: MFIEs:
South Africa, Mexico, Argentina, Brazil, Chile, Colombia, Venezuela, Peru, Singapore, Thailand, Philippine, Indonesia, Malaysia, R. Korea, Egypt, Pakistan, Turkey, Morocco.
Developing countries: LFIEs:
Algeria, Bangladesh, Benin, Bolivia, Botswana, Burkina Faso, Burundi, Cameroon, Costa Rica, Côte d'Ivoire, Ecuador, El Salvador, Gabon, Ghana, Guatemala, Haiti, Honduras, Jamaica, Kenya, Maurice, Nicaragua, Niger, Nigeria, Panama, Papouasie-New-Guinia, Paraguay, Syria, Senegal, Sri Lanka, Togo, Tunisia, Uruguay.

Variables list

| Variables	Description	Source
Growth Volatility	Standard deviation of GDP per capita in log per 5 years unit.	WDI
Inflation Volatility	Standard deviation of inflation rate in per 5 years unit.	WDI
Trade Volatility	Standard deviation of trade (X+M/GDP) per 5 years unit.	WDI
Government spending Volatility	Standard deviation of government consumption share of GDP per 5 years unit.	WDI
Exchange rate stability	To measure exchange rate stability, Aizenman used annual standard deviations of the monthly exchange rate between the home country and the base country are calculated and included in the following formula to normalize the index between 0 and 1: $$ERS = \frac{0.01}{0.01 + sdev(\Delta(\log(exch\_rate)))}$$	Aizenman, J., M.D. Chinn, and H. Ito. 2008.
Private credit to GDP	Private Credit by Deposit Money Banks and other Financial Institutions to GDP.	WDI Financial Structure Database, Levine (2009).
Net private capital flows	NPCF=Total assets – Total liabilities where: Total assets= FDI assets+portfolio equity assets+debt assets+derivatives assets+FX reserves Total liabilities= FDI liabilities+portfolio equity liabilities+debt liabilities+derivatives liabilities	Lane, Philip R., and Gian Maria Milesi-Ferretti (2007).
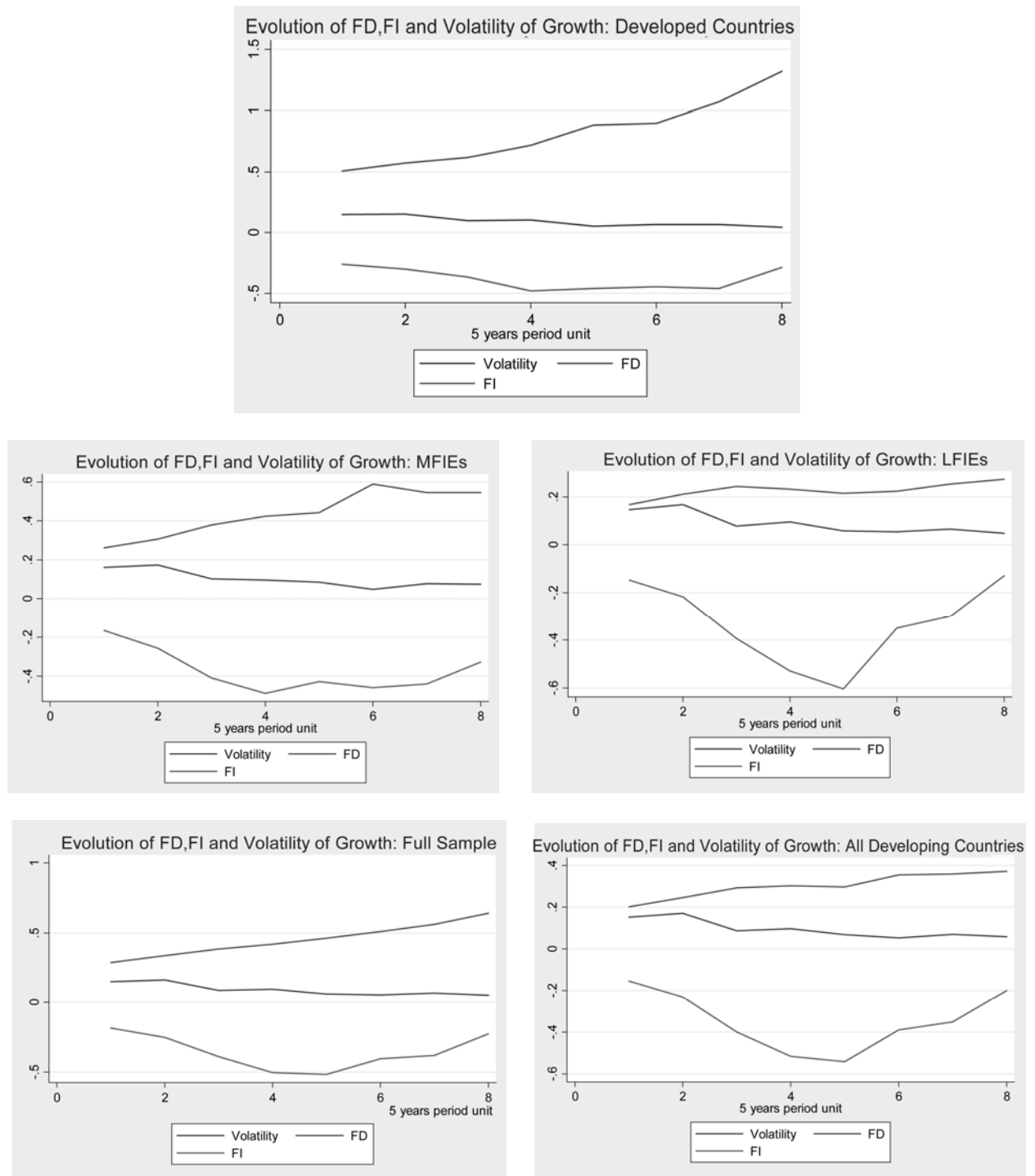
Figure 1.

The Value Relevance of goodwill impairments: UK Evidence

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Abstract

Using a sample of 528 firm-year observations, drawn from the top 500 UK listed firms for 2005 and 2006, this study employs a multivariate ordinary least squares regression to assess the value relevance of goodwill impairment losses following the adoption of IFRS No. 3 "*Business Combinations*". Empirical results reveal a significant negative association between reported goodwill impairment losses and market value, suggesting that these impairments are perceived by investors to reliably measure a decline in the value of goodwill and incorporated in their firm valuation assessments. The study provides evidence consistent with IASB's objectives in developing the impairment-only standard and reinforces the argument that, through IFRS 3, managers are more likely to use their accounting discretion to convey privately held information about the underlying performance of the firms.

Keywords: Goodwill accounting, Impairment, International Financial Reporting Standards, Value relevance, EU.

1. Introduction

On 31 March 2004, the International Accounting Standards Board (IASB), seeking international convergence and global harmonisation, followed the US Financial Accounting Standards Board (FASB), and issued IFRS 3, *Business Combinations*, (IASB, 2004a).IFRS 3 eliminates the use of the pooling of interests method and prohibits the amortisation of goodwill. Instead, it requires the testing for impairment to be performed annually or more frequently if events or changes in circumstances indicate that the asset might be impaired. With the transition to international reporting standards, UK firms listed on the main market had to discontinue amortising goodwill and account for it using IFRS 3 since 2005.

Prior studies provide empirical evidence that straight-line amortisation of goodwill over an arbitrary period fails to provide useful information to the users of the financial statements and instead adds noise, making it harder for investors to use the earnings measure to predict future profitability (e.g., Jennings et al., 2001; Moehrle et al., 2001). The impairment approach to goodwill was introduced with the intention of improving the information content of reported acquired goodwill and providing users of the financial statements with value-relevant information that more closely reflects the underlying economic value of goodwill (Note 1). However, this approach has been criticised by

practitioners, academics and dissenting IASB members based on the managerial discretion inherent in the impairment test. The impairment criteria provided by the standard are drafted in such a way that leave significant room for managerial discretion, interpretation, judgement and bias (Massoud and Raiborn, 2003). For example, Watts (2003, p. 217) criticised the impairment approach and argued that "*assessing impairment requires valuation of future cash flows. Because those future cash flows are unlikely to be verifiable and contractible, they, and valuation based on them, are likely to be manipulated*".

Standard setters suggest managers will use the accounting discretion permitted by the impairment approach to provide their private information about future cash flows, resulting in impairments that better reflect the underlying performance of the firm. Alternatively, managers may choose opportunistically to exploit their accounting discretion, resulting in impairments that do not adequately reflect the firm's underlying economics, and hence the purported benefit of the impairment-only approach is merely an illusion shared among standard setters.

Based on the above debate, the primary objective of this study is to examine the value relevance of goodwill impairments reported in the UK context following the adoption of IFRS 3. The hypothesis investigated is that these impairments are more likely to reflect the provision of managers' private information about future cash flows if they are perceived by investors as sufficiently reliable measures of goodwill declination and used by them in their market valuation of the firm values. Alternatively, goodwill impairments may not provide useful information to the market in view of the concerns raised by analysts and investors regarding the standard's implementation.

Using a sample of 528 firm-year observations drawn from the top 500 UK listed firms for financial years 2005 and 2006; this study examines the relationship between equity market value and goodwill impairment losses. Empirical results reveal a significant negative association between reported goodwill impairment losses and market value, suggesting that these impairments are perceived by investors to be value relevant and incorporated in their firm valuation assessments. This perceived reliability and value relevance of goodwill impairment losses may be interpreted as early evidence that managers do in fact choose to exercise their impairment discretion to reliably convey private information on future cash flows. As such, the study further supports IASB's objectives in developing the impairment-only standard and reinforces the argument that, through IFRS 3, managers are more likely to use their accounting discretion granted under this standard to convey privately held information about the underlying performance of the firms, thereby improving the accounting for goodwill practices in particular, and financial reporting among firms in general.

The UK context provides an early yet interesting experimental setting to examine the value relevance of goodwill impairments for the following reasons. Firstly, while most prior studies focused on either the cumulative effect method or the retroactive method used to account for transitional goodwill impairments in USA and Canada respectively, this study provides empirical evidence in relation to goodwill impairments recorded on transition to IFRS 3 in the UK which requires impairments to be recorded in income from continuing operations (Note 2). The absence of special transitional accounting treatments in the UK suggests that goodwill impairments are less likely to be affected by managerial incentives specific to the transition period, and hence increases the generalisability of the results. Secondly, in contrast to the US and Canadian GAAP, whereby a two-steps impairment test on goodwill is to be carried out, goodwill is tested for impairment at a lower level using a one-step test under IFRS 3, thereby providing less room for managers to manipulate the amount of goodwill and resulting in better information provided to investors. Thirdly, this study includes both impairers and non-impairers as its sample for the empirical tests in order to better examine the "net benefits" of the impairment-only approach under IFRS 3. Through such an approach, the limitations in prior studies as identified by Ramanna (2008) can be mitigated. Finally, this study may be one of the first to provide early UK empirical evidence that goodwill impairments reported following the adoption of IFRS 3 are in fact value relevant, in the sense that they are perceived by investors to be reliable measures of the reduction in the value of goodwill and are incorporated into the valuation assessment of the firms.

The remainder of this paper is organised as follows. Section 2 discusses the background. Section 3 presents the main findings of prior research. Section 4 explains the research design employed. Section 5 reviews descriptive statistics and empirical results. Finally, Section 6 concludes.

2. Background

Accounting for goodwill has been a controversial issue in the UK. The first attempt by the UK standard setter, SSAP 22 in 1984 (ASC, 1984), required goodwill to be either written off against reserves (retained earnings) or capitalised and amortised over an "appropriate" period. This attempt received enormous criticisms as it permitted two different accounting treatments that were "conceptually inconsistent" (Hussey and Ong, 2000). The debate in the late 1990s in the UK led to the establishment of FRS 10 *Goodwill and Intangible Assets* (ASB, 1997), whereby goodwill must be capitalised and amortised (with trigger-based impairment tests) under a rebuttable presumption that its useful

economic life does not exceed 20 years from the date of acquisition instead of the immediate write-off to reserves (Note 3).

With the transition to international reporting standards in the UK in 2005, all firms listed on the main market discontinued amortising goodwill and accounted for it using the guidelines specified by IFRS 3 "*Business Combinations*" and IAS 36 "*Impairment of Assets*" (IASB, 2004b). According to IAS 36, goodwill acquired in a business combination should, from the date of acquisition, be allocated to each of the acquirer's cash-generating-units, or groups of cash-generating-units that are expected to benefit from the synergies of the business combination, irrespective of whether other assets or liabilities of the acquisition are assigned to those units or groups of units. Each unit or groups of units to which goodwill is allocated should represent the lowest level within the entity at which goodwill is monitored for internal management purposes, and not be larger than a segment based on either the entity's primary or secondary reporting format, according to IAS 14 "*Segment Reporting*" (Note 4) (superseded by IFRS 8 "*Operating Segments*" effective for annual periods beginning 1 January 2009). A cash-generating-unit to which goodwill has been allocated shall be tested for impairment both annually and whenever there is an indication that the unit may be impaired. If the recoverable amount of the unit exceeds the carrying amount of the unit, the unit and the goodwill allocated to that unit is not impaired. If instead the carrying amount of the unit exceeds its recoverable amount, the entity must recognise an impairment loss (Note 5). The recoverable amount of an asset or a cash-generating-unit is whichever is the higher of its fair value less costs to sell and its value in use.

The impairment loss is first allocated to the goodwill of the cash-generating-unit (groups of units) before it is allocated to other assets within the unit (groups of units) on a pro-rata basis, as long as it does not reduce any asset below the highest of its fair value less costs to sell, its value in use, and zero. The impairment loss is recognized immediately above the line in the section of income from continuing operations (Note 6). Once recognised, IAS 36 prohibits the recognition of reversals of impairment losses for goodwill in subsequent periods.

While IFRS 3 forces managers to perform annual goodwill impairment tests and, at a lower level, using a one-step test of impairment, it also provides the opportunity for accounting discretion by requiring managers to make a number of accounting choices. The most important of these are the determination of the cash-generating units, the subsequent allocation of goodwill to these units, and the recoverable amount estimates of the units. According to standard setters, such accounting treatment is expected to improve the representational faithfulness of the goodwill figures rather than that reported via straight-line amortisation over an arbitrary period. They further argue that, through the impairment-only approach, more useful information can be provided to users of an entity's financial statements (IASB, 2004a, BC140, p.142). However, practitioners and financial report users remain sceptical over the motivations for managers' reporting choices. By exercising discretion inherent in IFRS 3, managers may, depending on their reporting incentives, overstate, understate, or simply not recognise an existing economic impairment loss by being selective with respect to the underlying choices they make when testing goodwill for impairment. This discretion may be used to convey managers' private information about future cash flows. Alternatively, it may be used opportunistically to extract rents from other contracting parties resulting in impairments that are less reflective of the firm's underlying economics.

3. Related Research

The majority of prior empirical studies examining the impact of the amortisation expense on share prices provide little evidence that it is of significant value to users. For example, Jennings et al. (2001) examine whether total earnings with goodwill amortisation is more informative than total earnings before amortisation. They find that earnings before goodwill amortisation explain significantly more of the observed distribution of share prices than earnings after goodwill amortisation, and that goodwill amortisation adds "noise", making it harder for investors to use the earnings measure to predict future profitability. Similarly, Moehrle et al. (2001) find little evidence that goodwill amortisation contains value-relevant information, and suggest that the amortisation disclosures were not decision-useful, thereby supporting the FASB's choice of impairment tests for goodwill instead of amortisation (Note 7). In contrast, Ojala (2007) finds that the goodwill amortisation practice does provide relevant information for investors, provided that amortisation periods are sufficiently short in order to better reflect the economic life of the underlying asset.

Studies that examine the market effects of write-offs can be divided into two primary strands. The first strand uses the information content approach to examine the relation between the announcement of a write-off and equity market reactions measured over a relatively short period surrounding the announcement date (Alciatore et al., 1998). The second strand is the association studies which examine the association between the write-off amount and returns calculated over a longer interval, such as a financial year (Alciatore et al., 1998). The majority of prior studies use

the information content approach, and examine the market reactions at the time of the announcement of the write-off. The assumption underlying these studies is that if share prices change around the time of write-off announcements, then these write-offs are value-relevant and useful for investment decision making (Note 8).

Strong and Meyer (1987), Elliot and Shaw (1998), Francis et al., (1996), and Bartov et al., (1998), are prior studies that, using the information content approach, report negative stock market reactions at the announcement of asset write-offs. Among the studies that focus specifically on goodwill write-offs, Hirschey and Richardson (2003) find that the stock market reaction to 80 goodwill write-offs reported prior to the adoption of SFAS 142 is negative and material. Bens and Heltzer (2004) examine the information content of goodwill write-offs recorded before, during, and after the adoption of SFAS 142, and report a significant negative stock market reaction to the announcements of goodwill write-offs before and after the adoption of SFAS 142. However, they also conclude that the market reaction to goodwill impairments recorded in the transition period is significantly less negative than the reaction to impairments recorded in later periods, clearly suggesting that the market believes managers have acted strategically in the transition year by writing off goodwill that was not yet impaired in order to take advantage of the one-time below-the-line treatment, and to present a more conservative balance sheet. Li et al., (2011) and Zang (2008) are two more recent empirical studies on the information content of transitional goodwill impairments following the adoption of SFAS 142. Using a sample of US firms, these two studies are able to conclude that negative abnormal returns are reported following the announcement of goodwill write-offs. Furthermore, they find that financial analysts revise their short-term and long-term earnings forecasts downwards following the announcements of goodwill impairment losses.

Using the association approach, Chen et al. (2008) examine the value relevance of goodwill impairments reported during and subsequent to the first year of SFAS 142 adoption. They find that both the adoption and first year impairments provided new information to the market. They therefore conclude that SFAS 142 is "net beneficial", consistent with the objectives laid out by FASB when developing the standard. With a sample of Canadian firms, Lapointe-Antunes et al. (2009) examine the value relevance and timeliness of transitional SFAS 142 goodwill impairments recorded by these firms and find a negative relationship between reported impairment losses and share price. They then interpret their results as evidence that fair value measurements can be relevant, even when the financial statement elements are inherently bound to measurement error and subject to significant managerial discretion.

Studies from both strands produced evidence to suggest that goodwill write-offs convey economically meaningful information to the investors about the firm's future profitability. One important implication to be drawn from these studies is that the impairment-only approach has improved the quality of reported information on goodwill (as predicted by the standard setters) by providing managers with a framework to convey their private future-cash-flow information to markets (Note 9) (Note 10)

However, it has to be noted that results of studies using US and Canadian data from the transition period have to be interpreted with caution and may lack generalisability since managers, in recording transitional write-offs, may have had incentives to act strategically by increasing the amount of write-offs that are treated as merely an accounting change or charged to retained earnings, thereby decreasing the probability and amount of future impairments that would be, if recorded, included in income from continuing operations (Beatty and Weber, 2006). For example, Bens and Heltzer (2004) report that the market's reaction to transitional SFAS 142 goodwill impairments is significantly less negative than its reaction to impairments recorded in later periods, suggesting that US managers acted strategically in the adoption year by writing off goodwill that was not yet impaired in order to take advantage of the one-time below-the-line treatment and present a more conservative balance sheet. Similarly, Jordan et al. (2007) find that U.S managers have "cherry picked" the adoption year to aggressively recognise goodwill impairment losses so that operating income in future years would not be burdened with these charges.

Furthermore, Ramanna (2008) argues that these studies focus primarily on explaining *recorded* impairments but have not considered firms that have *avoided* impairments (p.255). Using a sample that includes both impairers and non-impairers may therefore be a much better approach to arrive at conclusions on the "net benefits" of the impairment-only standards.

This study relates to prior literature in strand two, which adopts the association approach when examining the value relevance of goodwill impairment losses. However, having been made aware of the limitations of past research, this study differs from prior studies in two key aspects. Firstly, unlike previous research, this study focuses on IFRS 3 goodwill impairment losses reported in the UK context which requires impairments to be recorded in the section of income from continuing operations, and hence are less susceptible to managerial incentives specific to the transition period. Secondly, this study includes both impairers and non-impairers as its sample for the empirical tests in order

to better examine the "net benefits" of the impairment-only approach under IFRS 3. Through such an approach, the limitations in prior studies as identified by Ramanna (2008) can be mitigated. These two key differences clearly demonstrate the further need and advantage for carrying out this study examining the value relevance of goodwill impairments in the UK context, which, according to the authors' best knowledge, has not been examined before.

3. Methodology

3.1 Sample Firms

Table 1 presents the sample construction process. The top 500 UK listed firms by total market capitalization as listed by the *Financial Times* at 30 March 2007 are selected for the 2005 and 2006 financial years. This results in 1000 firm-year observations. 254 observations belonging to the *Financials* industry are then excluded, since their financial reporting processes as regulated industries tend not to match with other industries. The distinction between financials and non-financials is based on the *Industry Classification Benchmark* system as given by the *London Stock Exchange* (LSE). The exclusion of the financial institutions results in 746 firm-year observations. 80 observations listed on the LSE's *Alternative Investment Market* (AIM) are further excluded, since they are required to adopt IFRS-based reporting for the first time after the 1st of January 2007 and were still amortising goodwill according to the provisions of the previous UK GAAP, FRS 10. This process results in 666 firm-year observations. Finally 87 observations with no positive goodwill balances and 51 observations that do not have the necessary data to run the tests are excluded. These procedures result in a final sample that consists of 528 firm-year observations, comprised of 109 write-off (20.6% of sample) and 419 non-write-off observations (79.4% of sample). Financial data for sample firms is obtained from the Hemscott Premium Database, supplemented by the firms' annual reports when necessary. Finally, financial statements prepared in a currency different from pounds sterling are translated into pounds using the exchange rate at the balance sheet date.

Insert Table 1 Here

3.2 Model and Variables

To evaluate the value relevance of goodwill impairment losses, this study adopts the model applied by Lapointe-Antunes et al. (2009), known as an accounting-based valuation model that is originally proposed by Ohlson (1995). This model views the firm's market value as a function of the book value of its equity and its earnings. The valuation model is then altered to separate goodwill and goodwill impairment losses from book value of equity and earnings. The following ordinary least squares regression model is used to assess the value relevance of goodwill impairment losses:

$$MVAL_i = \alpha + \beta_1 BVAL_i + \beta_2 PTP_i + \beta_3 ECVGW_i + \beta_4 GILA_i + e_i$$

Where:

MVAL	Firm *i*'s market value of equity at the end of the year in which the goodwill impairment test is performed.
BVAL	Firm *i*'s book value of equity at the end of the year in which the goodwill impairment test is performed minus the carrying value of goodwill at the end of that same period.
PTP	Firm *i*'s pre-tax profit at the end of the year in which the goodwill impairment loss is recognized plus the reported goodwill impairment loss.
ECVGW	Firm *i*'s carrying value of goodwill at the end of the year in which the goodwill impairment test is performed plus the reported goodwill impairment loss.
GILA	Firm *i*'s reported goodwill impairment loss reflected as a positive number. *GILA* is 0 for firms the do not report goodwill impairments.

Following Lapointe-Antunes et al. (2009), all variables included in this study are deflated by year-end total ordinary shares outstanding. Furthermore, the model above is corrected for heteroscedasticity using White's heteroscedasticity-corrected variances and standard errors.

Prior value relevance research suggests that the book of value of equity is a value-relevant factor that proxies for expected future normal earnings (Ohlson, 1995). Similarly, it has been argued that earnings reflect information about expected future cash flows (Note 11) (Kothari and Zimmerman, 1995; Ohlson, 1995). Consequently, the study expects the book value of equity (*BVAL*) and earnings (*PTP*) to be positively related to price. Prior research on the value relevance of firms' reported goodwill in USA and Australia provides evidence of a positive association

between firm value and goodwill (e.g., Jennings et al., 1996; Godfrey and Koh, 2001; Henning et al., 2000; Dahmash et al., 2009), suggesting that investors perceive that goodwill reflects an underpinning economic value which generates future economic benefits to the firm (Note 12). Consequently, the study expects a positive association between the carrying value of goodwill (*ECVGW*) and price. Finally, prior research reports negative correlations between SFAS 142 write-offs and share prices (e.g., Chen et al., 2008; Lapointe-Antunes et al., 2009). To the extent that investors perceive IFRS 3 goodwill impairments to be reliable estimates of a reduction in the value of goodwill and to incorporate these estimates in their valuation of firm values, the current study expects a negative association between goodwill impairments (*GILA*) and price.

4. Empirical Results

4.1 Descriptive Statistics

Table 2 provides descriptive statistics for the variables used in the multivariate OLS regression examining the value relevance of goodwill impairment losses. The table shows an average share price of £5.21 and an average book value per share before goodwill of £0.79. Sample firms have average earnings per share before goodwill impairment of £0.46. The average goodwill per share before goodwill impairment and the average goodwill impairment per share are £0.82 and £0.01, respectively. The book value per share exceeds the market value for only 11 observations. Out of these firms, 6 report goodwill impairment losses.

Insert Table 2 Here

Table 3 provides Pearson correlations for the variables used in the multivariate OLS regression examining the value relevance of goodwill impairments. As predicted, *BVAL*, *PTP* and *ECVGW* have significant positive correlations with *MVAL*. *GILA* has a negative and insignificant correlation with *MVAL*. While bivariate correlations exist, the multivariate analysis offers advantages over bivariate correlations on the grounds of its ability to control for the effects and interrelationships between other independent variables. Finally, Table 3 reveals that the independent variables are not highly correlated with one another. The highest pair-wise correlation coefficient is 0.5398, suggesting that multicolinearity does not appear to be a problem in this study.

Insert Table 3 Here

4.2 Multivariate Results

Table 4 reports the results of the OLS regression examining the value relevance of goodwill impairment losses. The model is significant (P-value < 0.001) with an adjusted R^2 of 76.57%. The Durbin-Watson *d* statistic is not less than 1, indicating that autocorrelation is not a serious problem (Note 13).

Consistent with the predictions of the study, the book value per share (*BVAL*), and earnings per share (*PTP*) are positively associated with share price and the association is significant (p=0.0452 and p<0.001). In addition, goodwill per share (*ECVGW*) is positive and significant (p<0.001), providing evidence consistent with prior research (e.g., Jennings et al., 1996; Henning et al., 2000; Godfrey and Koh, 2001; Dahmash et al., 2009) and suggesting that goodwill reported by UK firms is value-relevant and perceived by investors to provide firms with future economic benefits. Finally, Table 4 reveals that the goodwill impairment loss per share (*GILA*) is negative and significant (p<0.001), suggesting that the information relating to these impairments is integrated by investors in their valuation assessments of the firm. This result may be interpreted as evidence that IFRS 3 has improved the quality of reported information on goodwill by allowing managers to reliably convey their privately-held future-cash-flow information to markets, consistent with the IASB's objectives in developing the impairment standard. Thus, the study provides evidence consistent with prior US and Canadian value relevance studies (e.g., Chen et al., 2008; Lapointe-Antunes et al., 2009) but in a different experimental setting.

Insert Table 4 Here

5. Conclusion

Using a sample of 528 firm-year observations, drawn from the top 500 UK listed firms for 2005 and 2006, this study employs a multivariate ordinary least squares regression to assess the value relevance of goodwill impairment losses reported by UK firms following the adoption of IFRS 3 "*Business Combinations*". While IFRS 3 was issued to improve the accounting treatment for goodwill and provide users with more useful and value-relevant information regarding the underlying economic value of goodwill, practitioners and financial report users remain sceptical over the motivations for managers' reporting choices. The hypothesis investigated is that these impairments are more likely to reflect the provision of managers' private information about future cash flows if they are perceived by investors as sufficiently reliable measures of goodwill declination and used by them in their market valuation of the

firm values. Alternatively, goodwill impairments may not provide useful information to the market in view of the concerns raised by analysts and investors regarding the standard's implementation.

Empirical results reveal a significant negative association between reported goodwill impairment losses and market value, suggesting that these impairments are perceived by investors to reliably measure a decline in the value of goodwill and are incorporated in their firm valuation assessments. Contrary to criticisms that surrounded the application of the impairment-only approach, which centred on whether the managerial discretion afforded by such standards may be used by managers opportunistically to distort the underlying economics of the firm, the perceived reliability and value relevance of goodwill impairment losses documented in this study may be interpreted as early evidence that managers do in fact choose to exercise their impairment discretion to reliably convey their private information on future cash flows. As such, the results should be of interest to standard setters and academics, as they provide further support to IASB's objectives in developing the impairment standard and reinforce the argument that, through principles-based standards (e.g., IFRS 3), managers are more likely to use their accounting discretion to convey privately-held information about the underlying performance of the firms. Finally, the empirical findings of this study provide greater confidence to the findings of prior accounting research (e.g. Jennings et al., 1996; Henning et al., 2000; Godfrey and Koh, 2001; Dahmash et al., 2009) that the information content of reported goodwill figures is value relevant. This study is subject to the standard econometric problems faced by most positivistic accounting researchers (e.g., errors in variables, omitted variables, sample selection bias). The limited number of years studied is also another limitation of the current research. Given more years of financial statement data, it may be possible to examine the long-term effects of IFRS 3 on goodwill accounting and determine whether the conclusions of this study hold over time.

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Notes

Note 1. In explaining how IFRS 3 improves financial reporting, the IASB (2004a, BC 140, 142) argues that "straight-line amortisation of goodwill over an arbitrary period fails to provide useful information. The Board noted that both anecdotal and research evidence supports this view…The Board reaffirmed the view it reached in developing ED 3 that if a rigorous and operational impairment test could be devised, more useful information would be provided to users of an entity's financial statements under an approach in which goodwill is not amortised, but tested for impairment annually or more frequently if events or changes in circumstances indicate that the goodwill might be impaired".

Note 2. The US SFAS 142 gave firms a reporting benefit by allowing them to report transitional goodwill impairments below-the-line as the effects of changes in accounting principles, while the Canadian GAAP (Section 3062) allowed firms to use the retroactive method and charge transitional goodwill impairments to opening retained earnings rather than net income

Note 3. FRS 10 allowed goodwill to have a useful economic life of greater than 20 years, or even an indefinite one, but only when it is expected to be capable of continued measurement. Where goodwill is regarded as having an indefinite useful economic life, it should not be amortised. If goodwill is not amortised, or if it is amortised over a period of more than 20 years, then an impairment review must be performed each year to ensure that the carrying value of the goodwill does not exceed its recoverable amount in accordance with FRS 11 *Impairment of Fixed Assets and Goodwill* (ASB, 1998). However, the way that UK firms applied the requirements of FRS 10 and FRS 11 was regarded as "slightly surprising, given their long-standing hostility to amortizing goodwill: most of them chose the amortisation route in order to avoid the complexities of the full-blown impairment testing regime" (Paterson, 2002, p 102). Andrews (2006) also reports that the majority of large UK firms in the 2004 financial year have selected 20 years as the finite useful economic life for goodwill and have amortised the asset over its finite life.

Note 4. In deciding not to converge with SFAS 142 on the level of the goodwill impairment test, the Board noted that several North American round-table participants expressed a high level of dissatisfaction at being prevented by SFAS 142 from recognising goodwill impairments that they knew existed at levels lower than reporting units (as defined by SFAS 142), but which disappeared once the lower level units were aggregated with other units containing sufficient cushions to offset the impairment loss (IASB, 2004b, BC 149).

Note 5. In developing IAS 36, the Board considered converging fully with SFAS 142. However, the Board was concerned that the two-step approach required by SFAS 142 would not provide better information than an approach under which goodwill is tested for impairment at a lower level using a one-step test (thereby removing many of the cushions protecting the goodwill from impairment) and concluded that the complexity and costs of applying a two-step approach would outweigh any benefits of that approach. For example, if the carrying amount of a cash-generating unit that contains goodwill exceeds its fair value, firms are required to report an impairment loss under IAS 36. However, under SFAS 142, US firms that fail the first step can still avoid recording an impairment loss if the implied fair value of goodwill exceeds its carrying value.

Note 6. In developing IAS 36, the Board considered whether IAS 36 should include a transitional goodwill impairment test similar to that included in SFAS 142. The Board argued that the only possible situation in which a transitional impairment test might give rise to the recognition of an impairment loss would be when goodwill being amortised over a period not exceeding 20 years was impaired in the absence of any indicator of impairment that would require an impairment test. Given the rare circumstances in which this issue would arise, the Board concluded that the benefit of applying a transitional goodwill impairment test would be outweighed by the added costs of the test, and decided that the revised version of IAS 36 should not require a transitional goodwill impairment test (IASB, 2004b, BC 220-222).

Note 7. Moehrle et al. (2001) find that accounting earnings with or without amortisation are equally informative and provide similar value relevance when related to market returns.

Note 8. Capital market research in accounting assumes that equity markets are semi-strong form efficient, in which all publicly available information, including that available in firms' financial statements and other financial disclosures, is rapidly and fully reflected into share prices as it is released (Deegan and Unerman, 2006).

Note 9. Ramanna (2008, p. 255) casts doubts on the "net benefit" conclusions of these studies and provides alternative explanations for the perceived negative stock market reaction. Impairments are either utilised as a "big bath" strategy, or by management's incompetence to avoid losses despite SFAS 142's discretion potential. In both cases, the impairments are providing new information to markets, but not because the impairment approach has provided a framework for managers to reliably report their private information.

Note 10. Another stream of literature examines managers' use of discretion in determining goodwill impairment losses following the mandatory adoption of the impairment-only approach in USA, Canada and the UK (Lapointe-Antunes et al., 2008; Godfrey and Koh, 2009; Jarva, 2009; AbuGhazaleh et al., 2011). These studies fail to find evidence that managers are opportunistically using their accounting discretion to distort the underlying economics of the firms and conclude that the introduction of the impairment approach has enabled managers to convey their private information about future cash flows consistent with the standard setters' objectives in developing the impairment standards. These studies provide further support to the hypothesis investigated in this study.

Note 11. Since the market's expectation of future cash flows are unobservable, empirical specifications of the price-earnings relation often use current earnings as a proxy for the market's expectation (Kothari and Zimmerman, 1995, p. 156).

Note 12. However, Henning et al. (2000) decompose goodwill into going concern, synergy, and residual components (overpayments). The residual component is measured as the difference between reported goodwill and the going concern and synergy components. Regressing the market value of equity on the three components reveals that the residual component is negatively related to market value, suggesting that the market treats overpayments as an expense at the time of the acquisition.

Note 13. Correcting the results for first order autocorrelation improves the Durbin-Watson d statistic and does not change the inferences on any of the variables (untabulated).

Table 1. Sample Construction*

Firm- Year Observations	
Top 500 UK listed firms by market capitalization (as listed by the *Financial Times* at 30 March 2007) for the 2005 and 2006 financial years.	1000
(-) observations related to the *Financials* industry	(254)
(-) observations listed on the *Alternative Investment Market*	(80)
(-) observations with no positive goodwill balances	(87)
(-) observations with insufficient/ missing data	(51)
Final Sample	**528**
Goodwill impairers	109 (20.6 %)
Non goodwill impairers	419 (79.4 %)

*This table presents the construction process for the final sample used to examine the value relevance of goodwill impairments.

Table 2. Descriptive statistics *

Variable **	N	Mean	Median	Minimum	Maximum
MVAL	528	5.2093	3.8265	0.1550	44.3713
BVAL	528	0.7896	0.3869	-4.2519	8.9349
PTP	528	0.4558	0.2693	-0.5693	5.4491
ECVGW	528	0.8162	0.4134	0.0004	10.5041
GILA	528	0.0105	0.0000	0.0000	0.7460

*This table provides descriptive statistics for the variables used in the multivariate OLS regression examining the value relevance of goodwill impairments.

**Variable definitions (all variables are deflated by year-end total ordinary shares outstanding)

    MVAL   The marketvalue of equity at the endof the year in which the goodwill impairment test is performed.

    BVAL   The book value of equity at the end of the year in which the goodwill impairment test is performed minus the carrying value of goodwill at the end of that same period.

PTP	The pre-tax profit at the end of the year in which the goodwill impairment loss is recognized plus the reported goodwill impairment loss.
ECVGW	The carrying value of goodwill at the end of the year in which the goodwill impairment test is performed plus the reported goodwill impairment loss.
GILA	The reported goodwill impairment loss reflected as a positive number. GILA is 0 for firms the do not report goodwill impairments.

Table 3. Pearson correlations*

Variable**	MVAL	BVAL	PTP	ECVGW	GILA
MVAL	1.0000				
BVAL	0.4494 P< 0.001	1.0000			
PTP	0.8636 P< 0.001	0.5398 P< 0.001	1.0000		
ECVGW	0.3149 P< 0.001	-0.2345 P< 0.001	0.2052 P< 0.001	1.0000	
GILA	-0.0194 P=0.1207	0.1309 P=0.003	0.0832 P=0.056	0.1989 P< 0.001	1.0000

*This table provides Pearson correlations for the variables used in the multivariate OLS regression examining the value relevance of goodwill impairments.

** The variable definitions are reported in Table 2.

Table 4. Value relevance of goodwill impairment losses*

Variable**	Prediction	Coefficient	T-Statistic	P-Value***
Intercept	?	1.5818	9.549	**< 0.001**
BVAL	+	0.2259	2.893	**0.0452**
PTP	+	6.1722	9.713	**< 0.001**
ECVGW	+	0.8592	5.097	**< 0.001**
GILA	-	-6.2557	-12.187	**< 0.001**
Adjusted R²	76.57%			
Model F Test	431.70 P-Value < 0.001			
Durbin-Watson statistic	1.3525			

*This table presents the results of the OLS regressions examining the value relevance of goodwill impairment losses. The above results are corrected for heteroscedasticity using White's heteroscedasticity-corrected variances and standard errors provided by LIMDEP. The model uses a sample of 528 firm-year observations over the period 2005-2006 (109 write-off observations and 419 non-write-off observations). The parameter estimates are based on the following model: $MVAL_i = \alpha + \beta_1 BVAL_i + \beta_2 PTP_i + \beta_3 ECVGW_i + \beta_4 GILA_i + e_i$

** The variable definitions are reported in Table 2

***One-tailed.

Profitability and Working Capital Management

The Jordanian Case

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Abstract

This paper aims to assess the effect of working capital management (WCM) on the performance. Utilizing unbalanced data for a sample of 49 Jordanian Industrial corporations listed at Amman Stock Exchange - 2005 to 2009. Using two alternative measures of profitability as proxy for the performance and five proxies for the Working Capital Management, estimation of twenty models panel data cross-sectional time series have been tested employing two regression models; the Fixed-Effects Model and the Ordinary Least Squares Model. The findings of our study found to be significantly consistent with the view of the traditional working capital theory. The results suggest that working capital management and performance are positively correlated. The regression results also concluded that the Jordanian industrial firms follow a conservative investing policy and less aggressive financing policy in the working capital, and a well-efficient managing of the working capital can add value to the shareholders wealth.

Keywords: Profitability, Working Capital, Efficient management, Jordan

1. Introduction

When we talk about implication of Working capital management –WCM we mean profit and liquidity. Hence, working capital proposes a familiar front for profitability and liquidity management. (Amalendu Bhunia, 2010) (Raheman and Nasr, 2007), a poor and inefficient WCM will lock-up in funds in fertile form of assets, thus reducing company`s liquidity and profit (Reddy and Kameswari 2004). Companies are facing growing pressure on costs and funding requirements as a result of fierce competition in the international markets. Such as, firms are looking for ways to make themselves more efficient in achieving profits, as an easy option firms may focus on trying to increase income or reduce expenses without the need to take the balance sheet items into consideration. But improving the existing capital structure can increase the ability of the firm to achieve more profit through providing financial resources which can be invested. Hence the importance and the purpose of this study is to analyze and investigate the effect of WCM on the performance of the Jordanian industrial firms, and to shed lights on the financing and investing policy of working capital for Jordanian industrial firms.

Using unbalanced panel data of 49 Jordanian industrial firms, which represents about 67% of the Jordanian industrial sector, from period of 2005 to 2009. Two alternative measures of the profitability where used as a proxy of the firm performance; return on total assets and net operating profitability, as for the working capital management measure, the study utilized the average collection period (ACP), average age of inventory (AAI), average payment period (APP), cash conversion cycle(CCC) and the net trade cycle(NTC). The models of the study were estimated using the regression Fixed-Effect Model (FEM) and Ordinary Least Square Method (OLS).

The practical implication of the study is to encourage managers of Jordanian industrial firms to implement policies and strategies that will lead to efficient and effective management of the components of working capital, due to its significant role in maximizing the market value of the firm, and therefore the owners of the company's wealth.

2. Related Literature

In August of 2010, CFO Research Services conducted an electronic survey on WCM to document how the global recession may have affected the working capital needs of U.S. companies. Survey results make it clear that U.S. finance executives are taking a much conservative approach both to managing working capital and to running the business in the aftermath of the global recession. When asked how the economic downturn had changed the ways their companies manage working capital, the largest number of respondents (about a third overall) echoed, in some fashion, the comments of two finance executives: "We became more cautious" and "[We are] more careful in our spending" (CFO Research, 2010).

(Md. Sayaduzzaman , 2006) defined Working capital as "*amount of funds which company needs to finance its day by day operations*". Working capital is an investment needed for daily business operations that should not exceed one year (Kesseven Padachi, 2006) (T. Afza et al., 2011). Literally speaking one of the most important corporate finance decisions is WCM due to its direct impact on company`s profitability and liquidity.

Working capital may be referred to as net working capital generally means: current assets (C.A.) less current liabilities (C.L.), where the concept of C.A. which appears in the statement of financial position / Balance Sheet is characterized by its fast turnover and its ease to convert it into liquid cash and current liabilities that matures and due for payment within a year or less. Corporations are required to maintain a daily balance between liquidity and profitability while conducting its operations. From another point of view (Azhagaiah R. et al. 2009) WCM is concerned with the problem that arises during C.A. and C.L. management. (M. Y. khan et al. 1999) both the terms working capital and net working capital normally refers to the difference between current assets and current liabilities, as the two terms are used interchangeably (McGuigan, et al. 2006).

(Kesseven Padachi, 2006) The importance of cash as an indicator of continuing financial health should not be surprising in view of its crucial role within the business, which should be invested efficiently to a void insolvency in the long run.

(Umara Noreen et al., 2009) the purpose of WCM is to manage the firm's C.A. to obtain the required equilibrium between risk and profit. (R. Autukaite et al. 2011) WCM is important to corporations of all sizes and can reduce their dependence on external and will grant corporations more flexibility. A growing number of organizations are treating WCM as one of the three pillars of cash management and as an integral component of enterprise risk management program (APQC, 2011).

(Veena Gundavelli, 2006) working capital tied up in cash, is being seen as a *"hidden reservoir"* of efficiencies that can be tied to fund growth strategies. Cash flow locked in credit, receivables and payables can be realized by using a recipe of business process improvements, technology application and effective management.

(L. J. Citman, 2000) C.A. and C.L. management is one of the financial manager`s most time-consuming activities as both constitute a large portion of total assets and total financing respectively. (McGuigan, et al. 2006) and (R. Autukaite et al., 2011) marked that in manufacturing sector, C.A. comprise about 40% of the total assets , (Horne and Wachowitz, 2000) states that among the wholesaling and retailing sector, the percentage is even higher between 50% - 60% percent range (McGuigan, et al. 2006).

Extensive and wide range of research working capital management has been conducted in public, private and Multinational companies. A study by (Mohammad Alipour, 2011) analyzing the relationship between WCM and profitability, concluded that profitability associated significantly with WCM, advising company`s managers to reduce the amount of receivable and inventory in order to create value for shareholders.

(Eljely, A., 2004) investigated the type of relationship between liquidity and profitability by measuring current ratio and cash gap on a sample of 29 joint stock companies in Saudi Arabia and the result of the study is there is significant negative relation between both the variables amount, another study by (T. Afza et al., 2011), on a sample of 208 listed companies in Karachi Stock Exchange- KSE, the result of the study indicated a negative relationship between working capital policies and profitability and no significant relationship between the level of current assets and liabilities and risk of the firms.

(Abdul Raheman et al., 2007), (Olufemi I. Falope et al. 2009)   studied the effect WCM different variables including the Average collection period - ACP, Inventory turnover in days, Average payment period - APP, CCC and Current ratio on Net operating profitability of Pakistani firms, the results is a strong negative relationship between the WCM variables and firm`s profitability and same negative relation between liquidity and profitability, indicating that, as cash conversion cycle or liquidity increase corporation`s profitability will decrease.

Other researchers like (Ghassan AL Taleb et al., 2010), studied the determinant of effective WCM, concluded that, a statistical significant relationship between the working capital and operating cash flow deflated by total assets, Sales

Growth, Return on assets, and results show a statistical significant relationship between all independent variables and working capital at every year and all period years of the study. (André Luiz de Souza & Valcemiro Nossa, 2010), analyzed the adequacy of a WCM normative model, in terms of profitability, liquidity and solvency, they found that certain point of time – where financial C.A. exceed onerous C.L. – is accompanied with higher levels of profitability, liquidity and solvency, reiterating the importance of efficient WCM to the performance and survival of healthcare insurance companies.

(Md. Sayaduzzaman,2006), pointed out that effective WCM will achieve a high level of profit and positive cash inflow and the company will enjoy good facility of cash credit and working capital loans from various commercial banks due to its satisfactory level of liquidity. (R. Autukaite et al., 2011) pointed out that shareholders undervalue cash holdings and net working capital, and alert management not to undervalue the importance of cash holdings and WCM, where (Kesseven Padachi, 2006) research on WCM trend and its impact on firms' performance, show that high investment in inventories and receivables is associated with low level of profitability. (Sai D. & John K. 2010), analyzed the relationship between investment in fixed capital, working capital and financing constraints, they concluded that firms with high working capital, displayed excessive sensitivity between investment in working capital and cash flows (WKS) and low sensitivity between investments in fixed capital and cash flows (FKS), And that firms with high WKS and low FKS showed high rates of fixed investment, despite of the restrictions on the sources of external funding.

3. Data

Table 1 list the variables used in this study, notation, measure, and the expected effect based on the literature. The study employed time-series and econometric analyses using an unbalanced panel data of 49 Jordanian industrial firms during the period 2005-2009. The data for the firms in the sample are derived from the Amman Stock Exchange databases *(ASE)* during the study period, resulting in 229 firms year observations.   For the econometric analysis, the study adopted the Average Collection period *(ACP)*, Average Age of Inventory *(AAI)*, Average Payment Period *(APP)*, Cash Conversion Cycle *(CCC)* and Net Trading Cycle *(NTC)* as measures of Working Capital Management; and Return on Total Assets *(ROTA)* and Net Operating Profitability *(NOP)* as measures of Profitability. Other variables were included in the model as control variables namely: Gross Working Capital Turnover *(GWC_T)* defined as the ratio of net sales to total current assets, the ratio of the current assets to total assets as a proxy of the Investing Policy of the Working Capital *(INVP)*, the ratio of the current liabilities to total assets as a proxy of the Financing Policy of the Working Capital *(FINP)*, Size of the firm *(lnS)* , Investment Growth Opportunities *(INGO)* and Liquidity *(LIQU)*.

4. Methodology

The effect of the WCM on performance of Jordanian Industrial Firms is tested by panel data regression. The panel data regression used has some benefits relative to period average cross-sectional data like increasing in the degrees of freedom, more precise estimates due to the efficiency gain brought by the availability of large number of observations, and reducing the problem of co- linearity among explanatory variables. These advantages lead to extra efficient estimation.

To assess the possible effect of WCM on firm's performance, the general model used for our analysis has the form:

$$Profitability_{it} = f(WCM_{it}, Firm's\ Chracteristics_{it}) \qquad (1)$$

Where the subscripts *i, t*   are the firm *i* at the time *t*; Profitability is the proxy for the firm's performance and has two alternative measures: return on total assets and net operating profitability, *WCM* the vector of working capital management variables, Firm's characteristics are the vectors of control variables incorporates*; GWC_T, INVP, FINP, lnS, INGO* and *LIQU.*

Equation *1* suggests that the profitability of the firm *i* at time *t* is a function of its *WCM* and its specific characteristics. So, the linear regression model can be estimated by converting equation 1 as follows:

$$Prof_{it} = \alpha\ + \beta_1(WCM_{it}) + \gamma_1(GWC\_T_{it}) + \gamma_2(INVP_{it}) + \gamma_3(FINP_{it}) + \gamma_4(lnS_{it}) + \gamma_5(INGO_{it}) + \gamma_6(LIQU_{it}) + \varepsilon_{it} \qquad (2)$$

Where; *Prof* is the two alternative performance measures for *i*[th] cross-sectional firm for the *t*[th] time period, with *i = 1,2,3,...,49, t = 1,2,3,4,5, α* is constant, *β1* unknown parameters of the *WCM* variables to be estimated, *WCM*   is the independent variable used as a vector of *ACP, AAI, APP, CCC* and *NTC*, *INGO* is the investment growth opportunities, *LIQU* is the liquidity, *GWC_T* is the gross working capital Turnover, *INVP* is the investing policy of working capital,   *FINP* is the financing policy of working capital, *lnS* is the size of firm. *γ's* unknown parameters of the firm's specific characteristics included in the model to be estimated, and ε is the error term. It is expected that *ACP*, *AAI*, *CCC* and *NTC* to associated inversely with the performance.

The Econometric model used for the regressions analysis is displayed in the basic form in equation 2 and the *WCM* will be changed with its components *ACP, AAI, APP, CCC* and *NTC* in turn resulting in five basic models as follows:

$$Prof_{it} = \alpha + \beta_1(ACP_{it}) + \gamma_1(GWC_{T_{it}}) + \gamma_2(INVP_{it}) + \gamma_3(FINP_{it}) + \gamma_4(lnS_{it}) + \gamma_5(INGO_{it}) + \gamma_6(LIQU_{it}) + \varepsilon_{it}$$

(3)

$$Prof_{it} = \alpha + \beta_1(AAI_{it}) + \gamma_1(GWC\_T_{it}) + \gamma_2(INVP_{it}) + \gamma_3(FINP_{it}) + \gamma_4(lnS_{it}) + \gamma_5(INGO_{it}) + \gamma_6(LIQU_{it}) + \varepsilon_{it}$$

(4)

$$Prof_{it} = \alpha + \beta_1(APP_{it}) + \gamma_1(GWC\_T_{it}) + \gamma_2(INVP_{it}) + \gamma_3(FINP_{it}) + \gamma_4(lnS_{it}) + \gamma_5(INGO_{it}) + \gamma_6(LIQU_{it}) + \varepsilon_{it}$$

(5)

$$Prof_{it} = \alpha + \beta_1(CCC_{it}) + \gamma_1(GWC_{T_{it}}) + \gamma_2(INVP_{it}) + \gamma_3(FINP_{it}) + \gamma_4(lnS_{it}) + \gamma_5(INGO_{it}) + \gamma_6(LIQU_{it}) + \varepsilon_{it}$$

(6)

$$Prof_{it} = \alpha + \beta_1(NTC_{it}) + \gamma_1(GWC\_T_{it}) + \gamma_2(INVP_{it}) + \gamma_3(FINP_{it}) + \gamma_4(lnS_{it}) + \gamma_5(INGO_{it}) + \gamma_6(LIQU_{it}) + \varepsilon_{it}$$

(7)

Following (Deloof, 2003), the models are estimated using the regression-based framework Fixed-Effect Model *(FEM)* and Pooled Ordinary Least Square Method *(OLS)*, and with the two alternatives of the performance proxy, five variables of the WCM, twenty models will be tested as shown in Table 4 and 5 to achieve the objectives of the study.

5. Empirical Results

The result of analyzing the effect of the *WCM* on the firm's performance using different measures of *WCM* and the two alternative measures of the profitability are presented in the following section.

5.1 Descriptive Analysis

The mean, median, standard deviation, maximum and minimum of the variables are presented in Table 2. Table 2 shows that Jordanian industrial firms have on average about 100 days of *ACP*, 82 days of *AAI*, 119 days of APP, 63 days of *CCC* and 72 days of *NTC*, the sample firms have on average about 12% annually sales growth, almost 54% current assets, and the current assets on average covers the current liabilities 3 times. The profitability measures used in the analysis are *NOP* and *ROTA* as proxies for the performance, *ROTA* (*NOP*) are on average 6.65% (10.39%) with a standard deviation of .0841 (.0964) .

5.2 Correlation Analysis

Table 3 presents Pearson correlation coefficients matrix. The results show that the *ROTA* and *NOP* are negatively significantly associated with *ACP, AAI, CCC, and NTC*. Also table 3 shows that the *ROTA* and *NOP* are significantly positively associated with *APP* indicating that more profit firms have on average relatively longer payment period compared to less profitable firms due to its credit reputation.

These result are consistent with the view that quickly turning over the inventory without resulting in stock-outs, collecting accounts receivable as quickly as possible without losing sales and slowly paying the suppliers without affecting the credit rating of the firm are associated with increase in profitability.

Table 3 also shows that *ROTA* and *NOP* are significantly negatively correlated with financing policy of working capital indicating that increasing reliance on debt by firms will lead to reduction of profitability. The Gross working capital turnover, firm's size, Investment Growth Opportunities, investing policy of working capital and Liquidity are significantly positively correlated with *ROTA* and *NOP*, indicating that increasing the firm's size, the sales annual growth and the ability of the firm's to meet its short terms obligations are associated with increase in profitability.

5.3 Regression Analysis

Table *4* (Table *5*) show the result of the *FEM* estimations models *1* to *5* (models *11* to *15*) and the *OLS* method estimations models *6* to *10* (models *16* to *20*) with *ROTA* (*NOP*) as the dependent variable. By comparing the adjusted R-squared values for the *FEM* and *OLS* at table *4* and *5*, it can be concluded immediately that the use of the

FEM improves the explanatory power of the models, where the value of the adjusted R-squared ranged between 0.653 - 0.844 in the *FEM*, it ranged between 0.328 - 0.408 in the *OLS* method, therefore, the focus will be on *FEM* in the regression analysis. Results being not significantly different from zero will not be reported.

In models *1* to *5* and *11* to *15* all coefficients of the working capital management have the expected signs, and are significantly different from zero, except for the *AAI* and *APP* in model *2* and *3* that were not significantly different from zero, indicating that the firm's profitability measured by *ROTA* (*NOP*) affected by the *ACP*, *CCC* and *NTC* (*ACP*, *AAI*, *APP*, *CCC* and *NTC*). These results are consistent with the traditional theory of working capital management, where conservative policy expects to reduce profitability in order to maintain high liquidity. The result of the regression models *1* to *5* indicate that firms can increase its *ROTA* by increasing its *GWC_T* and/or its *INVP*, while regression models *11* to *15* indicate that firm can increase its *NOP* by increasing its *GWC_T, INVP, FINP* and/or its *LIQU*.

In model *1* (*11*) results concluded that there is a statistically significant relation between *ROTA* (*NOP*) and *ACP* where P-value = *0.041 (0.093)*, which means that an increase in the average collection period by 1 day will result in decreasing the profitability by *0.067% (0.072%)*.

Model *2* (*12*) shows that the coefficient for *AAI* is negative and insignificant (significant) with P-value equals to *0.103 (0.047),* which implies that shorting the average days of inventory by 1 day will result in increasing the *NOP* significantly by *0.097%.*

Model *3* (*13*) shows a positive coefficient of *APP*, which indicates that lengthening the *APP* is associated with profitability in the form of increasing the *NOP* by 0.038% for each day increasing in the *APP*. Even thou the relation between *ROTA* and *APP* is not significant in model 3 it is consistent with the view that longer a firm takes to pay its suppliers, higher working capital can be used to improve its ability to generate profit.

In model *4 (14)* a negative significant relation is found between the *CCC* and firm's performance, where the P-value = *0.013 (0.032)*. This result is consistent with the view that shortening the *CCC* can maximize the shareholders wealth by generating more profit for the firm.

In model *5 (15)* following Shin and Soenen (1998) another comprehensive measure of the working capital management is used. The result of this model confirmed the result of the *CCC* model, as evident from the statistically significant inverse relation between the *NTC* and the profitability, implying that firms with relatively shorter *NTC* can create additional value for their shareholder by been more profitable.

In models 6 to 10 and 16 to 20 the determinants of the firm's profitability are estimated using Pooled *OLS* rather than *FEN*, where the *OLS* ignores the firms' differences in profitability due to specific characteristics. In general the results confirm the statistical significance influence of the working *WCM* on firm's performance.

6. Conclusion

This study aimed to shed light on the effect of working capital management on the profitability of Jordanian Industrial firms, using two alternative measures of profitability as a proxy of the performance and two regression models, the panel data cross-sectional time series has been used.

The result shows that for the Jordanian industrial firms, working capital has a significant effect on the firm's performance, and has a basic role in maximizing the wealth of the shareholders by making the firm more profitable through shorting the cash conversion cycle and net trading cycle.

The negative relationship of average collection period, average age of inventory and the positive relationship of average payment period with the profitability imply that keeping lesser inventory and shortening the collection period along with extending the payment period will increase profitability for the Jordanian industrial firms.

The significant positive effect of the current assets to total assets ratio on profitability implies that the Jordanian industrial firms have in general a conservative investment policy in working capital, such as, the significant negative impact of the current liabilities to total assets ratio on profitability indicates less aggressive financing policy in the working capital for the Jordanian industrial firms.

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Table 1. Definition, notation and expected effect of the explanatory variables

		Variable	Measure	Notation	Expected Effect
Dependent variable		Return on total assets	Net profit before tax / Total assets	ROTA	
		Net operating profitability	(EBIT + Depreciation)/ Total assets	NOP	
Explanatory Variables	Working Capital Management	Average collection period	(Accounts Receivable/ Net Sales) * 365	ACP	-
		Average Age of Inventory	(Inventory / Cost of goods sold) *365	AAI	-
		Average Payment Period	(Account Payable / Purchases) *365	APP	+
		Cash Conversion Cycle	AAI + ACP - APP	CCC	-
		Net Trading Cycle	(Inventory / Net sales)*365 +ACP - APP	NTC	-
	Control Variables	Gross Working Capital Turnover	Net Sales / Current assets	GWC_T	+
		Investing Policy of Working Capital	Current assets / Total assets	INVP	?
		Financing Policy of Working Capital	Current Liabilities / Total assets	FINP	?
		Size of firm	Natural Logarithm of Sales	lnS	+
		Investment Growth Opportunities	(sales $_t$ – Sales $_{t-1}$) / Sales $_{t-1}$	INGO	+
		Liquidity	Current Asset / Current Liabilities	LIQU	?

Table 2. Descriptive Statistics of variables

Variable	N	Mean	Std. Dev	Median	Minimum	Maximum
ROTA	229	0.0665	0.0841	.0564	-.23	.44
NOP	229	0.1039	0.0964	.0838	-.15	.52
ACP	229	99.924	75.593	84.0998	2.25	387.02
AAI	229	81.677	75.708	59.8250	2.42	608.23
APP	229	118.56	87.359	103.8236	3.43	396.41
CCC	229	63.039	39.888	129.2814	-115.35	474.42
NTC	229	71.72	34.547	117.0233	-105.92	516.77
GWC_T	229	1.423	0.81233	1.2321	.04	4.83
INVP	229	0.537	0.21533	.4858	.10	.92
FINP	229	0.266	0.14800	.2536	.01	.86
lnS	229	16.719	1.73349	16.3534	12.18	21.6
INGO	229	0.121	0.2742	.0812	-.0312	1.392
LIQU	229	3.044	1.29426	1.8223	.35	17.66

Variables definitions are given at Table 1

Table 3. Person Correlation coefficients between Variables

	ROTA	NOP	ACP	AAI	APP	CCC	NTC	GWC_T	INVP	FINP	lnS	INGO
ROTA	1											
NOP	.865**	1										
	.000											
ACP	-.214**	-.317**	1									
	.001	.000										
AAI	-.180**	-.105*	.278**	1								
	.006	.014	.000									
APP	.108**	.156*	.265**	.011*	1							
	.006	.018	.000	.478								
CCC	-.017*	-.152*	.571**	.768**	-.391**	1						
	.043	.021	.000	.000	.000							
NTC	-.169*	-.303**	.564**	.528**	-.402**	.852**	1					
	.011	.000	.000	.000	.000	.000						
GWC_T	.146*	.188**	-.360**	-.248**	-.338**	-.272**	-.352**	1				
	.027	.004	.000	.000	.000	.000	.000					
INVP	.215**	.130	.083	.052	.189**	.135*	.097	-.187**	1			
	.001	.050	.211	.435	.004	.041	.144	.005				
FINP	-.258**	-.261**	.022	.240**	-.165*	-.221**	-.238**	.254**	.226**	1		
	.000	.000	.741	.000	.012	.001	.000	.000	.001			
lnS	.305**	.331**	-.222**	.031	-.228**	-.280**	-.335**	.602**	.145*	.426**	1	
	.000	.000	.001	.638	.001	.000	.000	.000	.028	.000		
INGO	.011*	.046**	-.052	-.012	.036	.001	.010	-.036	.005	-.030	.027	1
	.087	.049	.435	.854	.592	.990	.877	.592	.938	.650	.687	
LIQU	.239**	.191**	-.024	-.23**	.186**	.229**	.250**	-.240**	.161*	-.626**	-.363**	.033
	.000	.004	.717	.000	.005	.000	.000	.000	.015	.000	.000	.618

Variables definitions are given at Table 1; *, **; correlation is significant at 0.05, 0.01 respectively.

Second line Sig. (2-taild)

Table 4. Impact of Working Capital Management on Corporate Profitability
Dependant Variable: ROTA

Regression Model	Fixed Effect Model					Ordinary Least Square Method				
Model	1	2	3	4	5	6	7	8	9	10
	ACP	AAI	APP	CCC	NTC	ACP	AAI	APP	CCC	NTC
Constant	.157	.155	.160	.111	.064	-.285***	-.311***	-.311***	-.305***	-.270***
	.490	.481	.468	.611	.777	.000	.000	.000	.000	.000
ACP	-.00067**	-	-	-	-	-.00078**	-	-	-	-
	.041					.027				
AAI	-	-.0073	-	-	-	-	-.0024*	-	-	-
		.103					.063			
APP	-	-	0.0035	-	-	-	-	-.00075**	-	-
			.171					.041		
CCC	-	-	-	-.00083**	-	-	-	-	-.00029*	-
				.013					.062	
NTC	-	-	-	-	-.00061*	-	-	-	-	-.00072**
					.053					.039
GWC_T	.30*	.026	.30*	.030*	.026	000	.005	.001	.004	.001
	.056	.103	.050	.061	.116	.965	.550	.902	.558	.888
INVP	.317***	.319***	.327***	.317***	.306***	.098***	.097***	.094***	.098***	.104***
	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
FINP	-.075	-.079	-.065	-.076	-.085	-.264***	-.270***	-.260***	-.272***	-.280***
	.179	.156	.247	.180	.135	.000	.000	.000	.000	.000
lnS	-.017	-.016	-.019	-.016	-.011	.023***	.023***	.024***	.023***	.022***
	.265	.285	.227	.305	.499	.000	.000	.000	.000	.000
INGO	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	.431	.399	.476	.417	.344	.385	.462	.440	.460	.456
LIQU	.002	.002	.002	.002	.002	.002	.002	.002	.002	.003
	.392	.446	.460	.380	.331	.315	.257	.313	.254	.189
R-Square	.737	.738	.738	.736	.738	.361	.349	.354	.349	.377
Adjusted R-Square	.653	.655	.655	.653	.654	.341	.328	.333	.329	.357
df Regression	55	55	55	55	55	7	7	7	7	7
Residual	173	173	173	173	173	221	221	221	221	221
Total	228	228	228	228	228	228	228	228	228	228
F.	8.816	8.875	8.883	8.786	8.837	17.831	16.910	17.273	16.954	19.070
Sig.	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Variables definitions are given at Table 1;   *, **, ***; significant at 0.1, 0.05, 0.01 respectively; Second line Sig. (2-taild)

Table 5. Impact of Working Capital Management on Corporate Profitability
Dependant Variable: NOP

Regression Model	Fixed Effect Model					Ordinary Least Square Method				
Model	11 ACP	12 AAI	13 APP	14 CCC	15 NTC	16 ACP	17 AAI	18 APP	19 CCC	20 NTC
Constant	-.144*	-.132*	-.134*	-.072**	-.056*	-.273***	-.304***	-.327***	-.285***	-.245***
	.077	.097	.094	.012	.079	.000	.000	.000	.000	.000
ACP	-.00072*	-	-	-	-	-.00078**	-	-	-	-
	.093					.027				
AAI	-	-.00097**	-	-	-	-	-.0024*	-	-	-
		.047					.063			
APP	-	-	.00038*	-	-	-	-	-.00075*	-	-
			.073					.051		
CCC	-	-	-	-.00051**	-	-	-	-	-.00044*	-
				.032					.062	
NTC	-	-	-	-	-.00049**	-	-	-	-	-.00072**
					.039					.036
GWC_T	.031*	.025*	.032**	.030**	.030**	-.002	.004	.004	.005	.000
	.024	.069	.020	.030	.040	.784	.684	.647	.559	.955
INVP	.240***	.244***	.254***	.239***	.237***	.080***	.086***	.076**	.090***	.091***
	.000	.000	.000	.000	.000	.006	.004	.012	.003	.001
FINP	-.082*	-.088*	-.069	-.085*	-.086*	-.313***	-.333***	-.318***	-.340***	-.345***
	.099	.076	.166	.093	.089	.000	.000	.000	.000	.000
lnS	-.012	-.010	-.013	-.009	-.008	.027***	.027***	.028***	.026***	.023***
	.386	.447	.329	.497	.578	.000	.000	.000	.000	.000
INGO	.000	.000	.001	.000	.000	.000	.000	.000	.000	.000
	.159	.447	.130	.181	.197	.932	.716	.770	.760	.729
LIQU	.003*	.003	.003	.003*	.004*	.001	.001	.001	.001	.002
	.081	.187	.113	.074	.071	.727	.552	.609	.521	.364
R-Square	.843	.844	.844	.841	.841	.379	.349	.340	.361	.422
Adjusted R-Square	.793	.795	.795	.791	.791	.360	.329	.319	.341	.403
df. Regression	55	55	55	55	55	7	7	7	7	7
Residual	173	173	173	173	173	221	221	221	221	221
Total	228	228	228	228	228	228	228	228	228	228
F.	16.851	17.074	17.041	16.680	16.687	19.304	16.941	16.269	17.868	23.013
Sig.	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Variables definitions are given at Table 1; *, **, ***; significant at 0.1, 0.05, 0.01 respectively; Second line Sig. (2-taild)

Financial Structure and Economic Growth in Nigeria: Theory and Evidence

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Abstract

Purpose: The purpose of this study is to examine specifically the impact of competing financial structure theories on economic growth in Nigeria.

Design/methodology/approach: The study used time series data for a 17 year period: 1992-2008, to fill this important research gap. The study used the Ordinary Least Square regression approach to estimate the formulated models in line with financial structure theories. The growth rate of the gross domestic product per capita was adopted as the dependent variable, while the independent variables include; conglomerate index of bank-based financial structure; conglomerate index of market-based financial structure, conglomerate index of financial service-based financial structure; and the conglomerate index of the legal-based financial structure.

Findings: The regression results showed that the coefficients of bank-based theory and legal-based theory were positive in promoting economic growth, while the regression coefficients of market-based theory and the financial service theory were negative in promoting economic growth.

Research Limitations/Implications: Paucity of substantial local literature on financial structure and economic growth constitute the major limitation of this study. Although, this study is meant to close this gap, the implication is that foreign theoretical and empirical literature standpoint constitutes the bulk of the review, which may not explain reasons for any identifiable local trends in the Nigerian financial structure.

Practical Implication: The study recommends that policy makers should focus their attention on legal, regulatory and policy reforms that encourage the proper functioning of banks, rather than concern themselves with banks and market reforms.

Originality/Value: This study contributes to financial structure literature for developing economies by using data from Nigeria. Specifically, the findings reveal that for developing economies, bank-based financial structure is better in promoting growth.

Keywords: Economic growth, Financial structure

1. Introduction

The decision of developed and developing economies to move conveniently away from free market fundamentals to a regulated economic regime, with the government taking up major stakes in the financial markets through the injection of funds into the institutions as a measure of curbing the global financial crisis, has raised important issues in policy formulation. While some countries injected liquidity in the form of preference shares, others injected liquidity in the form of tier-two capital. Analysts believe that these decisions were informed by the countries' preference for a particular financial structure based on studies undertaken in those countries. According to Levine and Zervos (1998), in developed economies, policy makers show strong preference to a particular financial structure that exerts more influence on economic growth.

The Nigerian government via the Central Bank of Nigeria (CBN) injected N620b in the form of tier-two capital. This important bail-out decision has the capacity of promoting the bank-based financial structure over the market-based financial structure. However, the government did not in any way attempt a bail-out of the capital market, especially when one considers the fact that the stock market was not spared by the global financial crisis. For example, the Nigerian Stock Exchange that witnessed unprecedented growth in total market capitalization and value of share traded from 2004 to early 2008, experienced a serious downturn in its activities during the global credit crunch. According to Udeme and Onuba (2009), the market capitalization of the 303 listed equities.., which had opened on January 1st, 2008, at N10.18tn and appreciated to N12.395tn as at March 2008, suffered its highest fall in the 48-year history of the Nigerian Stock Exchange, depreciating by N3.223tn or 32 per cent to N6.957tn by the year end. Similarly, the NSE All Share Index depreciated by the same margin from 63,016.60 at which it opened in January, to 31,450.78 on the last trading day of 2008.

The government decision to bail-out only banks in the form of tier-two capital raises important questions such as; what is the structure of the Nigerian financial system? Which of these structures exerts more influence on economic growth? Research that clarifies our understanding of the financial structure that promotes economic growth in Nigeria is scant. This study strives to fill this important research gap. The findings from this study will have good policy implication and shape future policy oriented research. Also, information from such study will influence the importance policy makers and advisers attach to reforming the financial system. A very good understanding of the country's financial structure will in no small measure be invaluable for such an important decision, since relying on existing studies of financial structure in other jurisdiction might be misleading. The rest of the paper is structured as follows;

2. Review of Related Literature

The taxonomy established by Gerschenken (1962), which divided the financial system into two categories; 'bank-based and market-based' financial structure has generated serious controversy among scholars. The argument has been polarized along the following lines; (1) the standard parameters or measurement for classifying a country's financial system either as bank-based or market-based; (2) which of these classifications exert more influence on economic growth; and (3) the determinants of a country's financial structure.   Financial structure has to do with the institutions, financial technology, and rules of the game that specify how financial activity is organized at a point in time (Stulz, 2001), and provides a payment system, i.e. a mechanism for pooling funds, ways of transmitting resources across space and time, ways to manage uncertainty and control risk, price information to allow the economy to implement a decentralized allocation, and ways to deal with the asymmetric information problems that arise when one party to a financial transaction has information that the others do not have (Merton, 1995).

The link between financial structure and long-run growth can be examined on the basis of competing theories of financial structure. These are: the bank-based view, the market-based view, the financial services view and the legal based view (Levine, 2002; Beck and Levine, 2002 and La Porta et al; 1997). The bank-based theory lays emphasis on the positive role of banks in development and growth, and also, stresses the shortcomings of market-based financial systems. It argues that banks can finance development more effectively than markets in developing economies, and, in the case of state-owned banks, market failures can be overcome and allocation of savings can be undertaken strategically (Gerschenkron, 1962). Those banks that are unhampered by regulatory restrictions, can exploit economies of scale and scope in information gathering and processing (for more details on these aspects of bank-based systems, see Levine, 2002, and Beck and Levine, 2002). The bank-based view emphasises the importance of banks in identifying good projects, mobilising resources, monitoring managers and managing risk,

while stressing the deficiency of market-based economies. For example, it has been argued that banks are effective at financing projects that are characterised by substantial asymmetric information (e.g, adverse selection and moral hazard), because banks have developed expertise in distinguishing between "bad and good" borrowers. According to the bank-based view, bank-based financial systems, especially in countries at an early stage of economic development, are more effective at fostering growth than market-based financial systems.

Indeed, bank-based financial systems are in a much better position than market-based systems to address agency problems and short-termism (Stiglitz, 1985). The latter reveal information publicly, thereby reducing incentives for investors to seek and acquire information. Information asymmetries are thus accentuated, more so in market-based rather than in bank-based financial systems (Boyd and Prescott, 1986). Banks can ease distortions emanating from asymmetric information through forming long-run relationships with firms, and hence through monitoring, contain moral hazard. As a result, bank-based arrangements can produce better improvement in resource allocation and corporate governance than market-based institutions (Stiglitz, 1985; Bhide, 1993).

In particular, advocates of the bank-based view argue that well functioning markets instantly reveal information in public markets, which provides individual investors with less incentive to acquire information. This argument is primarily based on the well known free-rider problem. If information is going to be revealed by the market, no one is motivated to collect it. As a result, competitive financial markets may be characterised by underinvestment in information. Consequently, well developed financial markets have a negative impact on the identification of innovative projects, and thereby impede efficient resource allocation (Stiglitz, 1985 and Booth, Greenbaum, and Thakor, 1993). Banks may have better incentives to gather information and monitor firms, and can efficiently internalize the fixed cost of doing so (Diamond, 1991).

The market-based theory highlights the advantages of well-functioning markets, and stresses the problems of bank-based financial systems. The market based theory argues that big, liquid and well-functioning markets foster growth and profit incentives, enhance corporate governance and facilitate risk management (Levine, 2002, and Beck and Levine, 2002). The inherent inefficiencies of powerful banks are also stressed, for they "can stymie innovation by extracting informational rents and protecting firms with close bank-firm ties from competition … may collude with firm managers against other creditors and impede efficient corporate governance" (Levine, 2002). Market-based financial systems reduce the inherent inefficiencies associated with banks and are, thus, better at enhancing economic development and growth.

A related argument is developed by Boyd and Smith (1998), who demonstrate through a model that allows for financial structure changes as countries go through different stages of development that countries become more market-based as development proceeds. An issue of concern, identified by a recent World Bank (2001) study in the case of market-based financial systems in developing countries, is that of asymmetric information. Scholars have argued that the complexity of modern economic and business activity has greatly increased the variety of ways in which insiders can try to conceal firm performance. Although progress in technology, accounting, and legal practice has also improved the tools of detection, on a balance scale, the asymmetry of information between users and providers of funds has not been reduced as much in developing countries as in advanced economies – indeed, it may have deteriorated.

The market-based view essentially counter-attacks the bank-based view by concentrating on problems generated by powerful banks. First, in the process of financing firms, banks get access to information that is not available to other lenders. Banks can use such inside information to extract rents from firms. More concretely, at the time of new investments or debt renegotiations, banks can have bargaining power over a firm's expected future profits. Powerful banks can obtain disproportionately large share of the profits, so that firms will have fewer incentives to undertake high risk and profitable projects (Rajan, 1992). Secondly, powerful banks can collude with managers against outsiders, which in turn impedes competition, corporate controls, the creation of new firms, and long-run economic growth (Hellwig, 1998). Wenger and Kaserer (1998) provide evidence from Germany where banks misrepresent balance sheet of firms to the public and encourage firm managers to misbehave.

The financial services view (Merton and Bodie, 1995; Levine, 1997), is actually consistent with both the bank-based and the market-based views. It embraces both, but minimizes their importance in the sense that the distinction between bank-based and market-based financial systems matters less than was previously thought; it is the financial services provided that are by far more important, than the form of their delivery (World Bank, 2001). According to the financial services view, the issue is not the source of finance. Rather it is the creation of an environment where financial services are soundly and efficiently provided. The emphasis is therefore on the creation of better functioning banks and markets rather than on the specific type of financial structure in place.

Simply put, this theory suggests that it is neither banks nor markets that matter; rather it is both banks and markets. They are different components of the financial system, and, as such do not compete with each other, but, ameliorate different costs like transaction and information cost, in the system (Boyd and Smith, 1998; Levine, 1997; Demirguc-Kunt and Levine, 2001). Under these circumstances, financial arrangements emerge to ameliorate market imperfections and provide financial services that are well placed to facilitate savings mobilisation and risk management, assess potential investment opportunities, exert corporate control, and enhance liquidity. Levine (2002) argues, that "the financial services view places the analytical spotlight on how to create better functioning banks and markets, and relegates the bank-based versus market-based debate to the shadows".

The legal-based view of financial structure –espoused by Laporta, Lopez-de-Silanes, Shleifer, and Vishny (1997, 1998, 1999a,1999b) – extends the financial services view and unconditionally rejects the bank-based versus market-based debate. The legal-based view argues that finance comprises a set of contracts. These contracts are defined – and made more or less effective – by legal rights and enforcement mechanisms. From this perspective, a well functioning legal system facilitates the operation of both markets and intermediaries. It is the overall level and quality of financial services – as determined by the legal system – that improves the efficient allocation of resources and economic growth. According to the legal-based view, the century long debate concerning bank-based versus market-based financial systems is analytically vacuous.

Empirically, a number of studies have concentrated on comparisons that view Germany and Japan as bank-based systems, while the US and UK are described as market-based systems. These studies have employed rigorous country-specific measures of financial structure. Existing studies on Germany and Japan use measures of whether banks own shares or whether a company has a 'main bank' respectively (Hoshi et al., 1991; Mork and Nakamura, 1999; Weinstein and Yafeh, 1998). The studies provide evidence that confirm the distinction between bank-based and market-based financial systems in the case of the countries considered. However, a reassessment of the evidence on the benefits of the Japanese financial system in view of the economy's poor performance in the 1990s has concluded against the beneficial effects of the bank-based nature of this system. Bank dependence can lead to a higher cost of funds for firms, since banks extract rent from their corporate customers (Weinstein and Yafeh, 1998).

Studies on the US and the UK concentrate on the role of market takeovers as corporate control devices (Wenger and Kaserer, 1998; Levine, 1997), and conclude in favour of market-based financial systems. Goldsmith (1969: 407), however, argues that such comparison in the case of Germany and the UK for the period 1864-1914 does not contribute to the debate since "[o]ne cannot well claim that a superiority in the German financial structure was responsible for, or even contributed to, a more rapid growth of the German economy as a whole compared to the British economy in the half-century before World War I, since there was no significant difference in the rate of growth of the two economies".

Levine (2002) in reinforcing Goldsmith's (1969) argument concludes that "financial structure did not matter much since the four countries have very similar long-run growth rates". Levine (2002) addresses this problem by using a broad cross-country approach that allows treatment of financial system structure across many countries with different growth rates. The findings of this study support neither the bank-based nor the market-based views; they are, instead, supportive of the financial services view, that a better-developed financial system is what matters for economic growth.

An earlier study by Demirguc-Kunt and Levine (1996), using data for forty-four industrial and developing countries for the period 1986 to 1993, concludes that countries with well-developed market-based institutions also have well-developed bank-based institutions; and countries with weak market-based institutions also have weak bank-based institutions, thereby supporting the view that the distinction between bank-based and market-based financial systems is of no consequence. Also, Levine and Zevros (1998), employing cross-country regression for a number of countries covering the period 1976 to 1993, conclude that market-based systems provide different services from bank-based systems. In particular, market-based systems enhance growth through the provision of liquidity, thus enabling investment to be less risky, such that companies have access to capital through liquid equity issues (Atje and Jovanovic, 1993). The World Bank (2001) provides a comprehensive summary of the available evidence, which reached similar conclusions. It argues strongly that the evidence should be interpreted as clearly suggesting that "both the development of banking and market promote economic growth: each can complement the other".

To provide greater information on both the importance of the structure of a country's financial system, economists have broadened the debate to include a wider array of national experiences. However empirical studies yield to controversies, which are also based on conceptual and statistical descriptions. The arguments are still on, with improved statistical and econometric tools of analysis. Country-specific studies have also been undertaken, yielding

to more controversies and revelations on the subject matter. At individual country level, empirical study on the structure of the Nigerian financial system based on the researcher's knowledge is scant, yet the structure of the Nigerian financial system is expanding both in size and complexity. Therefore, it is this knowledge gap that this study fills.

3. Data

This study uses indicators of financial development along the four competing theories of financial structure. Insights and justification for the inclusion of these variables are stated below.

3.1 Bank-Based Indicators (Bank-Based View)

The bank-based view emphasises the importance of banks in identifying good projects, mobilising resources, monitoring managers and managing risk, especially in countries at the early stage of economic development. The indicators of bank-based financial structure are as follows;

3.1.1 Bank Activity (BA)

To measure the activity of bank, the study adopts bank credit ratio, which equals the value of deposit money bank credits to the private sector as a share of gross domestic product. This indicator has been used by Levine and Zervos (1998), Levine, Loayza and Beck (2000), and Beck, Levine and Loayza (2000). This measure excludes credits to the public sector (Federal Government, State Government and Local Government). It is generally argued that this is the most robust measure for bank activity since the core function of banks is channeling of funds from savers surplus to savers deficit (Beck, Levine and Loayza, 2000). Also, this is a ratio of stock variables and does not pose any problem of wrong timing or deflation

$$\text{Bank Activity} = \textit{Bank Credit to the Private Sector/GDP} \qquad (1)$$

3.1.2 Bank Size (BS)

To measure the size of bank, the study adopts liquid liabilities as a share of gross domestic product. Liquid liabilities to GDP is a general indicator of the size of the financial intermediaries relative to the economy (King and Levine, 1993a,b). According to Beck, Demirguc-Kunt and Levine (2001), Liquid liabilities to GDP equals currency plus demand and interest-bearing liabilities of banks and other financial intermediaries divided by GDP. They posit that this is the broadest available indicator of financial intermediation size often referred to as M2.

$$\text{Bank Size} = \textit{M2/GDP} \qquad (2)$$

3.1.3 Bank Efficiency (BE)

One of the functions of financial intermediaries is to channel funds from savers to investors. Works along this line use net interest margin and overhead cost as proxies for bank efficiency (Claesens, Demirguc-Kunt and Huizinga, 1997; Demirguc-Kunt, Levine and Min, 1998). This study adopts the net interest margin, since it is the most used in extant literature (Claessens, Demirguc-Kunt and Huizinga, 1997; Demirguc-Kunt, Levine and Min, 1998). Net interest margin is the gap between the interest income the bank receives on loans and securities and interest cost of its borrowed funds (Rose and Hudgins, 2008). Net interest margin is a ratio of flow and stock variable and therefore measured at different points in time for several reasons, and do not need the deflation of numerator and denominator because there is no known deflator for individual bank's assets and income flows (Beck, Demirduc-Kunt and Levine, 2001).

$$\text{Net Interest Margin} = \textit{Net Interest Margin/Total Assets} \qquad (3)$$

The study adopts the simple average of the three bank indicators as proxy for the bank-based view.

3.2 Market-Based Indicators (Market-Based View)

The market-based theory highlights the advantages of big, liquid and well-functioning markets in fostering growth, profit incentives, good corporate governance and facilitating risk management. The indicators of market-based financial structure are as follows;

3.2.1 Market Activity (MA)

Value of shares traded ratio equals the total value of shares traded on the stock exchange divided by GDP. The total value traded ratio measures the organized trading from the exchange as a share of national output and therefore should positively reflect liquidity on an economy-wide basis. The total value traded ratio also complements the market capitalization ratio. Although a market may be large, there may be little trading. In line with the works of Levine and Zervos (1996), Mohtadi and Agarwal (2004), Xu (2000), Pagano (1993), and other numerous works on this topic, this was used to proxy stock market liquidity.

$$\text{Total value of shares traded ratio} = \textit{Value of Shares Traded/GDP} \qquad (4)$$

3.2.2 Market Size (MS)

Market capitalization ratio equals the total market value of listed shares divided by GDP. The assumption behind this measure is that the overall market size is positively correlated with the ability to mobilize capital and diversify risk on an economy wide basis. In line with the works of Levine and Zervos, (1996), Mohtadi and Agarwal, (2004), Xu, (2000), Pagano, (1993), this will be used as a measure of stock market size.

$$\text{Stock Market Capitalisation Ratio} = \textit{Total Market Capitalisation/GDP} \qquad (5)$$

3.2.3 Market Efficiency (ME)

This is also known as market turnover. Turn over equals the value of total shares traded divided by total market capitalization. Though it is not a direct measure of the theoretical definition of liquidity, high turnover is often used as an indicator of low transaction cost. The turnover ratio complements the market capitalization ratio. A large but inactive market will have a large capitalization ratio but a small turnover ratio. Turnover ratio also complements the total value traded ratio. While the total value traded ratio captures trading relative to the size of the economy, turnover ratio measures trading relative to the size of the stock market. A small liquid market may have a high turnover ratio but a small total value traded ratio. In line with the works of Palyi (1932), Arestis, Demetriades and Luintel (2001), Yartey and Adjasi, (2007), Levine and Zervos (1996), this is a robust indicator of stock market efficiency.

$$\text{Turnover ratio} = \textit{Value of shares traded/market capitalization} \qquad (6)$$

The market-based view is the simple average of the three market indicators.

3.3 Financial Services View

The financial services view argues that better developed financial systems positively influence economic growth, and that it is relatively unimportant to economic growth whether overall financial development stems from bank or market development. Thus, the financial-services view indicator equals the average of the bank-based and market-based indicators.

3.4 The Legal-Based View

The Nigerian legal system closely resembles the English law, a situation arising from Nigeria's colonial history. We adopt the measures of legal-based financial structure as constructed by LaPorta, Lopez-de-Silanes, Shleifer and Vishny (1997, 1998), Rajan and Zingales (1998) and Levine (1998) to examine the impact of the legal system on economic growth.

I. Creditor Rights. The ability of banks to persuade firms to pay their loans differs across national legal systems. Legal systems differ in terms of the rights of banks to repossess collateral or liquidate firms in the case of default. Legal systems differ in terms of the rights of banks to remove managers in corporate reorganization. Finally, legal systems differ in terms of the priority given to secured creditors relative to other claimants in corporate bankruptcy. More specifically, this study used four measures of the legal rights of banks:

AUTOSTAY equals one if Nigerian laws impose an automatic stay on the assets of the firm upon filing a reorganisation petition. *AUTOSTAY* equals 0 if this restriction does not appear in the legal code. The restriction would prevent banks from gaining possession of collateral or liquidating a firm to meet a loan obligation and thus promote market-based financial system.

MANAGES equals one if the firm continues to manage its property pending the resolution of the reorganisation process and equals zero if otherwise. In some countries, management stays in place until a final decision is made about the resolution of claims. In other countries, management is replaced by a team selected by the courts or the creditors. If management stays pending resolution, this reduces pressure on management to pay bank loans and promote market-based financial system.

SECURED equals one if secured creditors are ranked first in the distribution of the proceeds that result from the disposition of the assets of a bankrupt firm. *SECURED* equals zero if non-secured creditors, such as the government or workers, get paid before secured creditors. In cases where *SECURED equals* zero, this certainly reduces the attractiveness of lending secured credit.

CREDITOR is a conglomerate index of these three individual creditor rights indicators that is designed to be positively associated with creditor rights. Specifically,

$$\textit{CREDITOR} = \text{the average of AUTOSTAY + MANAGES + SECURED} \qquad (7)$$

and takes on values between 1 (best) and - 2 (worst). We expect a country with higher values of *CREDITOR* to have better-developed banks, all else being equal.

2. *Enforcement.* The laws governing secured creditors will affect secured creditors only to the extent that the laws are enforced. Consequently, measures of the efficiency of the legal system in enforcing contracts are included in line with the works of LaPorta, Lopez-de-Silanes, Shleifer and Vishny (1998).

RULELAW is an assessment of the law-and-order tradition of the country that ranges from 10, strong law-and-order tradition, to 1, weak law-and-order tradition. This measure was constructed by International Country Risk Guide (ICRG) and is an average over the period of this study. Given the contractual nature of banking, higher values of the *RULELAW* is likely to positively influence banking development.

CONRISK is an assessment of the risk that governments will—and therefore can—modify a contract after it has been signed. *CONRISK* ranges from 10, low risk of contract modification, to 1, high risk of contract modification. Specifically, "modification" means either repudiation, postponement, or reducing the government's financial obligation. This measure was constructed by Laporta, Lopez-de-Silanes and Shleifer and Vishny (1997) and is an average over the period under study. Legal systems that effectively enforce contracts will tend to support bank-based financial systems.

$$ENFORCE = \text{the average } of\ RULELAW \text{ and } CONRISK \tag{8}$$

The empirical analyses focused on this aggregate index of the efficiency of the legal system in enforcing contracts, *ENFORCE,* and the aggregate index of creditor rights, *CREDITOR*.

4. Econometric Methodology

This is a time series study that covers the period: 1992-2008, and adopted the time serial linear multiple regression, which is specified thus;

$$Y_i = B_0 + B_1 X_{1i} + B_2 X_{2i} + U_i \tag{9}$$

Where; The subscript i runs over observation, I = 1, ...,n; Y_i is the dependent variable or the regressand ; $X_{1i} + X_{2i}$ are the independent variables or the regressors, $B_0 + B_1 X + B_2 X$ are the population regression lines or population regression function; B_0 is the intercept of the regression line; $B_1 + B_2$ are the slope of the population regression line; and U_i is the error term (Stock and Watson, 2007)

To test the competing views on the role of the financial structure (bank-based view, market-based view, financial service view and the legal system service view) in promoting long-run growth in Nigeria, we modify the multiple linear regression in equation (9) into a standard growth regression in line with Beck, Demirguc-Kunt, Levine and Maksimovic (2001) which is specified thus;

$$G_i = B_0 + B_1 FS_{1i} + B_2 C_{2i} + U_i \tag{10}$$

Where; the subscript i runs over observation, I = 1, ...,n; G_i is the growth rate of GDP per capita, FS_{1i} is the respective financial structures, C_{2i} the control variable, B_0 is the intercept of the regression line, and U_i is the error term (Stock and Watson, 2007). To modify equation (10) in line with the objectives of the study, we have;

$$GROWTH = B_0 + B_1(BBV)_{1i} + B_1(MBV)_{1i} + B_1(FSV)_{1i} + B_1(LBV)_{1i} + U_i . \tag{11}$$

Where, GROWTH is economic growth; BBV is bank-based view; MBV is market-based view; FSV is financial service view; and LBV is legal-based view.

To ascertain the net effects of financial structure on long-run growth in Nigeria in our results, we control other variables that might impact on economic growth. The controlled variables are government expenditure as a ratio of GDP and gross capital formation as a ratio of GDP. Thus, equation (11) is rewritten as;

$$GROWTH = B_0 + B_1(BBV)_{1i} + B_1(MBV)_{1i} + B_1(FSV)_{1i} + B_1(LBV)_{1i} + B_2 GOVEXP_{(control)2i} + B_2 GCF_{(control)2i} + U_i \tag{12}$$

Where, GOVEXP is government expenditure as a ratio of GDP and GCF is Gross Capital Formation as a ratio of GDP. The Ordinary Least Square time serial multiple regression was used to estimate the growth model in equation (12). The OLS estimator has been criticized for not considering the degree in variability as it assigns equal weight to all the variables which introduces bias in regression results. Our decision to use stock and flow variables might compound this problem. Specifically, stock variables are measured at the end of the period, while flow variables are defined relative to a period. This presents a problem both in correct timing and deflating correctly. To address these problems and ensure that our result is unbiased, we weighted the proxies to eliminate problem of heteroskedasticity. This approach allows the researchers assign equal weight or importance to each observation and therefore is capable of producing estimators that are BLUE (Best Linear Unbiased Estimator).

5. Results

Insert Table 1 Here

Table 1 presents the descriptive results. Results based on the descriptive analysis show that the average value of bank-based indicator is 2.02, while market-based indicator is 1.44. The higher value of bank-based indicator could be traced to the history of Nigerian financial system or the proxies used. The average value of the financial services view is 1.7 which is higher than the market-based view, but lower than the bank-based view. The value is consistent with the methodology since it is the simple average of market-based and bank-based view.

The average value of government expenditure to real GDP is approximately 2 for the period under review, while gross capital formation as a ratio of GDP has a value of 1.2. The descriptive analysis shows that the standard of living of Nigeria (economic growth) maintained a constant growth rate of 2% for the period under study. This falls short of the globally accepted standard and the National Economic Empowerment and Development Strategy benchmark of 10%. This is more worrisome considering the fact that the Nigerian population grows at 5.8% (for details on the growth rate of Nigerian population, see the various Central Bank of Nigeria Annual Reports and Statement of Accounts). The average values of government expenditure and gross capital formation justifies their inclusion as control variables.

Insert Table 2 Here

To test for the likelihood of multicollinearity given the nature of the data, table 2 presents the Pair-wise correlation matrix. The results of inter-correlation recorded between the pairs of the explanatory variables shows that the correlations between the variables are positive but non-significant. Most of the coefficients, as observed, are weak. This indicates at first glance, that although likely cases of multicollinearity may exist, the degree of such may be too remote to affect the results of the regression estimates (Gujarati and Porter, 2009).

Insert Table 3 Here

Table 3 presents the Ordinary Least Square regression results corrected for heteroskedasticity. Based on the results obtained from the model, the following conclusions could be drawn. The coefficient of bank based financial structure was positive, but non-significant in predicting economic growth in Nigeria. This result is consistent with the bank-based financial structure theory which posits that the unique role of banks in identifying good projects, mobilising resources, monitoring managers and managing risks promotes economic growth.

The coefficients of market-based and financial service view financial structure indicators were negative and non-significant in promoting economic growth. This finding is consistent with theory which argues that well functioning markets instantly reveal information in public markets, which provides individual investors with less incentive to acquire information. This argument is primarily based on the well known free-rider problem. If information is going to be revealed by the market, no one has incentive to collect it. As a result, competitive financial markets may be characterised by underinvestment in information. Consequently, well developed financial markets have a negative impact on the identification of innovative projects and thereby impede efficient resource allocation (Stiglitz, 1985 and Booth, Greenbaum, and Thakor, 1993). Banks may have better incentives to gather information and monitor firms, and can efficiently internalize the fixed cost of doing so (Diamond, 1991). Another problem with the market based financial structure is the fact that liquid markets can create an environment in which individual investors behave as if they were myopic (Bhide, 1993). Specifically, because individual investors are able to readily sell their shares in liquid markets, they have fewer incentives to monitor managers thoroughly. This implies that greater market development may hinder corporate and economic performance (Levine, 1997, 2000). Similar results in some jurisdictions have propelled government to reduce the volatility of the capital market through legislation through the ban on short-term trading in the stock market.

The coefficient of legal based financial structure was positive but not significant in promoting economic growth. This implies that it is the overall level and quality of financial services as determined by the legal system that promotes the efficient allocation of resources and economic growth. Thus, any legal system that promotes investors rights, ensures compliance to enforcement of contracts promotes economic growth.

6. Conclusion

This study assesses the impact of financial structure on economic growth in Nigeria. In particular, the study examines competing views of financial structure and economic growth. The bank based view holds that bank-based systems, particularly at early stages of economic development foster economic growth to a greater degree than market-based financial system. In contrast, the market-based view emphasizes that markets provide key financial services that stimulate innovation and long-run growth. Alternatively, the financial services view stress the role of bank and markets in researching firms, exerting corporate control, creating risk management devices, and mobilising

society's savings for the most productive endeavors. This view minimises the bank-based versus market-based debate and emphasises the quality of financial services produced by the entire financial system. Finally, the legal-based view rejects the analytical validity of the financial structure debate. The legal-based view argues that the legal system shapes the quality of financial services. Put differently, the legal-based view stresses that the component of financial development explained by the legal system critically influences long-run growth. Thus, countries should focus on creating a sound legal environment, rather than on debating the merits of bank-based or market-based systems.

The regression result using Nigerian data for the period 1992-2008 shows strong support for the bank-based and legal-based theories of financial structure. The negative result of the market-based view and the financial service could be traced to the volatility of the economy, which suggests that the country lacks the infrastructure for an efficient market-based economy. Although the measures of financial structure are not optimal, the results do provide a clear picture with important policy implications.

7. Policy Implication

Most policy prescriptions are of the view that improving the functioning of markets and banks is critical to the boosting of long-run economic growth. Despite the truism in the above statement, a particular structure exerts more influence on economic growth than the other. High levels of malpractices in the Nigerian stock market has turned the market into a side show, where inefficiencies would merely redistribute wealth between smart investors and noise traders, and would not affect real economic activities. Keynes (1936) argues that [a]s the organisation of investment market improves, the risk of the predominance of speculation does…increase…speculator may do no harm as bubbles on a steady stream of enterprise…a serious situation can develop…when enterprise becomes the bubbles on a whirlpool of speculation. The government, can as well de-emphasis the importance attached to the capital market, or take the bold step of providing first-class capital market infrastructures in Nigeria.

The results provide a very strong evidence for bank-based and legal-based financial structure, and is consistent with the findings of Levine and Zervos (1996), Demirguc-Kunt and Zervos (1996), Demirguc-Kunt and Makismovic (1996) and King and Levine (1993a,b) The results of some of these studies showed that the bank-based financial structure is more beneficial for developing economies. The policy implication is that government should intensify efforts to promote banking stability. The need for adequate regulation and supervision of the financial intermediaries arises because financial intermediaries are subject to asymmetric information. A key objective for financial regulation and supervision is to increase the effective functioning of the financial system in order to enhance its ability to absorb shocks and maintain financial stability. Financial instability occurs when shocks to the financial system interfere with the payment system and impact on the ability for normal business and trade to occur. Financial regulation and supervision can help increase the effective functioning of the financial system and maintain financial stability.

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Table 1. Descriptive Results

Variables	Obsevations	Mean	Std. Dev	Minimum	Maximum
Bank-based view	17	2.024664	1.821269	0.259254	6.668768
Market-based view	17	1.436615	2.126086	0.044256	7.579519
Financial-services view	17	1.73064	1.940238	0.151755	6.537626
Legal-based view	17	1.294118	0.224918	0.8	1.6
GovExp	17	1.979375	1.173902	0.341965	4.803428
GCapform	17	1.225676	0.841965	0.262042	2.896475
EG	17	2.637075	5.010085	-2.50528	18.04227

Source: Computed from Collated Data (Using Stata-Computa Analytical Package)

Table 2. Correlation Matrix Results

Variables	BBV	MBV	FSV	LBV	GOVEXP	GCF	GROWTH
BBV	1.0000						
MBV	0.2324	1.0000					
FSV	0.3802	0.0855	1.000				
LBV	0.1638	0.0405	0.1094	1.0000			
GOVEXP	0.4462	0.1164	0.28914	0.0187	1.0000		
GCF	0.5462	0.0859	0.2332	0.0671	0.1103	1.0000	
GROWTH	0.2191	0.0641	0.1379	0.3464	0.2069	0.2236	1.0000

Source: Computed from Collated Data (Using Stata-Computa Analytical Package)

Table 3. Ordinary Least Square Regression Results (corrected for heteroskedasticity).

regress	GROWTH BBV MBV FSV LBV GOVEXP GCF					Number of obs = 17	
Source	SS	df	MS			$F(6, 10) = 0.98$	
Model	148.809815	6	24.8016359			Prob > F = 0.4855	
Residual	252.815794	10	25.2815794			R-squared = 0.3705	
Total	401.625609	16	25.1016006			Adj R-squared = -0.0072	
						Root MSE = 5.0281	
GROWTH	Coef.	Std.	Err.	t P>|t|		[95% Conf. Interval]	
BBV	10.26949	5.429234	1.89	0.088	-1.827596	22.36658	
MBV	-4.407898	2.094458	-2.10	0.062	-9.074641	.2588454	
FSV	-1.810718	1.745191	-1.04	0.324	-5.699246	2.077811	
LBV	1.18263	6.323808	0.19	0.855	-12.90769	15.27295	
GOVEXP	-7.800911	4.898697	-1.59	0.142	-18.71589	3.114066	
GCF	-3.127589	6.108579	-0.51	0.620	-16.73835	10.48317	
_cons	11.11017	13.32353	0.83	0.424	-18.5765	40.79684	

Health and Economic Implications of Waste Dumpsites in Cities:
The Case of Lagos, Nigeria

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Abstract

Refuse dumpsites are found both within and on the outskirts of cities in Nigeria and due to poor and ineffective management, the dumpsites turn to sources of health hazards to people living in the vicinity of such dumps. This study was designed to examine the health and economic implications of solid waste disposal among sampled residents of two major refuse disposal dumps in Lagos, Nigeria. The data used for the study were generated from primary source, while SPSS software was used in the data analyses. In addition to the descriptive analysis which forms the bedrock for the conclusion drawn in this paper, both linear probability and ordinary least squares regression models were also used in the analyses. The models examined the determinants of health status as well as the labour supply of the sampled respondents respectively. The results show that pollution variables are statistically significant in the determination of health status as well as the labour supply performance of respondents. Based on these findings, policy measures that would enhance the health status and improved labour market performance of residents were proposed.

Keywords: Waste management, Landfills, Dumpsites, Labour market, Environmental pollution

JEL Classification: I18, J24.

1. Introduction

The cities of third world countries are growing at very rapid rates compared to those in the developed nations. For instance, a UN-Habitat report observed that Africa is the fastest urbanizing continent having cities like Cairo, Lagos, Nairobi, Kinshasa among others growing at fast rates that would make them triple their current sizes by the year 2050 (UN-Habitat, 2010). Such high rate of growth of cities has implications for the provision of urban infrastructural services to prevent the proliferation of urban slum. The increasing growth of cities, therefore, has implications for municipal waste management among other social services required in the urban communities. Data from many of the cities shows inadequacy in urban social services like shelter, provision of safe drinking water and efficient management of solid wastes. The cities are therefore littered with 'mountains' of rubbish in landfills and open (in most cases illegal) waste dumps which are covered with flies and thus serve as breeding grounds for rodents and mosquitoes which are carriers of diseases.

In a bid to examine the link between environmental pollution arising from waste dumps and public health, the United Nations Environmental Programme (UNEP) conducted a pilot study of the Dandora Waste Dump in Kenya. The study, as tentative as it was, showed that a link exists between the two. The extensive tests carried out on the soil and water around the dump site in comparison with samples from other sites as well as medical tests carried out on humans living around the dumpsite shows evidence of infections from water, land and air pollution. The leachates generated in the landfills and open dumpsites are sources of pollution which is inimical to public health (UNEP, undated). The conclusion from this and other studies has led to an increasing interest of researchers in the studies relating to several aspects of municipal solid waste management in urban cities of many nations (Yongsi, et al, 2008; Boadi and Kuitunen, 2005; Aluko and Sridhar 2005; Nwanta 2010; Aatamila et. al. 2010, among others). Many of the researchers who have undertaken studies in the area of environmental pollution are mainly from the

natural sciences who are interested in studying the nature and the chemical properties of environmental pollution, as well as its effects on plants and animals (e.g. Yongsi et.al, 2008). Though some studies conducted by social scientists have examined the social consequences of the present urban waste management issues, yet, few of these studies examined the health implications of people living in close proximity of waste dumpsites (Sarkhel, 2006; Yongsi et. al 2008; Abul, 2010; Babatunde and Biala, 2010, Nabegu 2010, Nwanta et. al. 2010). The main objective of this study is therefore to examine the health effect of living around solid waste dumpsites in Lagos Nigeria, as well as the economic effects of living in such filthy environment. The rest of this paper is organized as follows: Following this introductory section, we discuss the Theoretical Framework and Literature Review in Section two. Section three discusses the Methodology of Study while Section four gives the interpretation of data. Section five concludes the study.

2. Theoretical Framework and Brief Survey of Literature

2.1 Theoretical Framework

Many studies on waste management and its implications for the city dwellers take their theoretical root in the conventional wisdom regarding the trade-off between industrial growth and income inequality among the citizenry. Given that high level of savings is a pre-requisite for investment and rapid growth, Kaldor (1978) believes that an income distribution skewed towards the entrepreneurial class, who are believed to be having high marginal propensity to save, is good for growth. On the other hand, Kuznets (1955) and Lewis (1954) are of the view that rapid industrial progress in the modern urban sector triggers labour transfer from the low productivity sector to the cities, giving rise to high initial aggregate increase in inequality which will later decrease (Kaldor, 1978; Kuznets, 1955). However, this conventional wisdom has not gone unchallenged in the literature given recent data from cross-country studies as clearly articulated by Birdsall, Ross and Sabot (1995), among others.

The Kuznets' hypothesis has been adapted by scholars in the environmental studies to explain the relationship between the growth in income per capita and various indicators of environmental degradation, and it is popularly referred to as Environmental Kuznets Curve (EKC). The main argument of EKC is that the level of environmental degradation (as a result of pollution from industrial and domestic activities) first rises, gets to a peak and later declines as income per head increases in the economy. The EKC proposition was brought into prominence by the World Bank in 1992 which argued that "as incomes rise, the demand for improvement in environmental quality will increase, as will the resources available for investment" (IBRD, 1992; p.39). Following the World Bank's study, Grossman and Krueger (1995) estimated an econometric model where the level of pollution per capita was made a quadratic function of real GDP using a panel regression approach. The pollution variables used are the quality of water and ambient air in cities worldwide. The resulting scatter plot of pollution-income relationships appear as an inverted U-shape, but with the peaks of predicted pollution-income paths varying across pollutants but in most cases they come before a country reaches per capita income of $8,000 in 1985 dollars (Grossman & Krueger, 1995, p. 353).

A number of intellectual debates centering on the critical survey of the EKC proposition in the literature have been published. As widely surveyed by Stern (2003), criticisms of EKC have been on both theoretical and methodological grounds as shown by the works of Arrows et al (1995), Stern et. al (1996) and Stern, 1998. Following these, recent modifications to the EKC model have introduced additional explanatory variables such as political freedom, output structure, and trade openness, among others. These modifications led to a revised EKC curve which did not significantly alter the inverted U-shaped curve but shifts its position downwards and to the left due to technological change (Stern, 2003, p.12). The identified weaknesses of EKC hypothesis notwithstanding, evidence abound in the literature that the level of solid waste generation and the resulting environmental pollution is high in developing countries of Africa, Asia and Latin America as compared to the developed nations. This can be linked to the rural-urban migration and urbanisation phenomena as well as externality effect of solid waste generation in production and consumption activities as the economy develops industrially.

Economic theory has posited a strong link between economic growth and the growth of cities. Thus, there is a positive relationship between urbanization and income per capita. For instance in 2009, a UN-Habitat's report put the proportion of African population living in cities at 40% (395 million), but by 2050, urban population projection would have increased to 60% rising to 1.23 billion persons (UN-Habitat, 2010). The report is of the view that rapid growth of cities is neither good nor bad in itself unless such rapid growth results in urban congestion, slum and increase in environmental pollution from increased solid domestic and industrial waste generation that is not adequately managed. Since, most developing nations in the wake of urbanization and industrialization are still grappling with the problem of adequate management of solid waste being generated, this study represents an attempt to determine the health and economic implications of waste dumps in the city of Lagos.

2.2 Survey of Empirical Literature

Waste dumps or landfills are generally safely constructed to minimise any form of negative externality, (e.g. pollution of ground water via leaching) to the surrounding areas. According to Environmental Research Foundation (2011); "*A secure landfill is a carefully engineered depression in the ground (or built on top of the ground, resembling a football stadium) into which wastes are put. The aim is to avoid any hydraulic [water-related] connection between the wastes and the surrounding environment, particularly groundwater. Basically, a landfill is a bathtub in the ground; a double-lined landfill is one bathtub inside another."* Three types of landfills are normally used for solid waste disposal and they are: secured or sanitary landfills, controlled landfills and open dumps. As defined above, secured or sanitary landfills are highly lined at the base to prevent infiltration by percolating liquids, controlled landfills are waste dumps where the refuse are merely covered with soil, and in open dumps there is no standard for refuse dumping (Gouveia and do Prado, 2010).

In developing nations, a great proportion of solid waste generated are dumped either in controlled landfills or open dumps which constitute sources of health risks to surrounding residents. The use of sanitary landfills is not feasible for many waste management authorities of most countries due to cost constraints. In their study of health risks of urban solid waste landfill sites in Sao Paulo, Gouveia & do Prado discovered that in Brazil; only 47% of all the garbage collected were disposed of in sanitary landfills, 23% in controlled landfills while the remaining 30% were in open dumps. For Manzini city in Swaziland, Abul (2010) confirmed that open dumpsites rather than secured landfills are more in number for waste disposal and this constitutes great health hazards to the residents. Such open dumps are found on the outskirts of urban areas which form breeding sites for disease-carrying vectors in the communities. The cost issue has prompted some municipal government authorities in some developing nations to adopt cost-reduction programme as well as conservation tenets of "reduce, reuse, and recycle" to reduce the level of waste generation and recycle others, whether bio-degradable or non-biodegradable items. This is being achieved through aggressive community education of consumers and producers on waste reduction methods, while institutions and businesses that could buy up discarded materials are facilitated to enhance recycling and reuse. These activities not only have positive environmental impact on the communities involved, but also have an important economic dimension (Goldman and Ogishi, 2001).

The preponderance of open dumps in many developing nations has spurred the need to examine the health implications of such dumps to the surrounding residents. For instance, Yongsi et. al. (2008) conducted a cross-sectional epidemiological study to examine the health risks of different waste disposal system in Cameroun. The study found a 14% diarrheic prevalence among the respondents and a strong statistical association was found between household refuse management methods and incidence of diarrhea among the respondents. Salam Abul (2010) examined the health impact of solid waste management among residents around the Mangwaneni Dumpsite in Swaziland. The study is unique in that the respondents were stratified by the distance of their homes to the dumpsite. The first group are those having their homes within 200 metres radius, while the second group live from 200 metres and beyond from the Manzini Dumpsite in Swaziland. The study, which was conducted among 78 households found a negative relationship between the distance of residential apartments from dumpsite and being affected by the dumpsite pollution. This study has adopted similar approach towards the determination of health, economic and labour supply implications of living around waste dump sites in Nigeria.

Studies relating to the health status and its labour market implications for residents around waste dump sites in Nigeria are few. The studies by Babatunde and Biala (2010) and Yahaya et. al. (2011) only examined the externality arising from production and consumption of sachet water in Kwara State while Yahaya et al (2011) made an attempt to determine the contamination level and the distribution of pathogenic substances in well water located near the municipal solid and liquid wastes in Zaria, Northern Nigeria. Since there appears to be a unanimity in literature that improper waste management and indiscriminate littering of the environment are linked to diseases arising from air, land, water and environmental pollution (IBRD, 1999), it is thus imperative to examine the magnitude of the impact of such health effects on those living in close proximity with pollution sources. This study is an attempt to fill this yawning gap.

3. Methodology

3.1 Research Design

This study covered two waste dumpsites in Lagos State of Nigeria. The study is aimed at measuring the socio-economic consequences of living around the waste dump sites and how such effects might impact the labour market performances of such individuals. To enable us do this, two dump sites were purposefully chosen: the Olususon dumpsite which is the largest transfer loading station managed by the Lagos State Waste Management Agency (LAWMA), and an open dumpsite along Oke-Afa carnal which started as an illegal open dump. Preliminary mapping activities were carried out to delineate the survey areas. Three areas were delineated: residential houses

within two hundred and fifty metres (<250 metres) radius; residential houses within 250 metres to less than 500 metres (250 to <500 metres) and areas within 500 metres but not more than 750 metres (500 to ≤ 750 meres) radius from the dumpsite. Each of the three areas is designated as LOC1, LOC2 and LOC3, beginning from the area closest to the dumpsite.

The data collection exercise employed a structured questionnaire which was administered by trained enumerators in each of the designated areas around the two dumpsites. The random sampling approach was used in the selection of the respondents from each of the LOC1, LOC2 and LOC3 around the two refuse dumps. A total number of 100 households was intended to be sampled with the proviso that only the household members who are fifteen years and above are qualified to be interviewed. The structured questionnaire was divided into five sections:

- The first section addresses the issue of pollution from the dumpsite

- The second addresses health issues

- The third addresses the economic impact of pollution using income as its indicator

- The fourth addresses the measures put in place either by the community or the Government to control pollution.

- The fifth addresses household characteristics of respondents, while

- The sixth is the bio-data of the respondent.

At the end of the survey exercise, a total number of 72 households, made of one hundred and ninety-eight individuals were interviewed giving a response rate of 72 per cent.

3.2 The Models, the Data and Analytical Technique

Two basic models are postulated and estimated.

Model 1: The main economic model in this study is the health production function from which we go ahead to determine, empirically, the factors responsible for the state of health of the ith individual in the survey area. The health status of the individual is therefore posited to be a function of various factors. Some of these include environmental factors around the dumpsite, education, income level, employment status, among others. The health production function is represented by the following equation, following Grossman (1972) and Pedrick (2001):

$$H = f(ENV, LOC, LMC, HHS, PC) \tag{1}$$

Where:

H = the self-reported health status of the respondent and this is measured in two ways, H_1 and H_2. H_1 is a binary variable which takes value 1 if the respondent rarely/never falls ill within the reference period prior to the survey and zero if he/she sometimes/always falls ill. On the other hand, H_2 measures the state of illness of the respondent measured with the value of zero through 3, where zero is equivalent to being in excellent health and three in bad health. ENV = Environmental factors affecting the health of the individual. Such factors include BRN=burning, ODR=Odour, distance as measured by LOC (=LOC1, LOC2 and LOC3 as previously defined). LMC = Labour market characteristics of the individual respondent which are: EMPS=Employment status, whether employed (EMP) or unemployed (UEMP); EMPN=Nature of employment whether wage (WG) or self-employed (SLF), EARN=Earnings per month, Labour market experience (EXP) and educational attainment of the respondent (EDUC). HHS = Household status of the respondent whether head (HD), or non-head (NHD); GHD = Gender of the household head whether female (GHF) of male, (GHM) and residential status whether tenant (TNT) or owner (OWN). PC=Personal characteristics of the respondent which include age (AGE), gender (GND), marital status (MRT), among others.

Therefore, re-writing equation (1) above we have:

$$H_i = \alpha_0 + \alpha_1 ODR + \alpha_2 BRN + \alpha_3 LOC + \alpha_4 EMP + \alpha_5 SLF + \alpha_6 EARN + \alpha_7 EXP + \alpha_8 EDU + \alpha_9 HD + \alpha_{10} GHM + \alpha_{11} OWN + \alpha_{12} EXP^2 + \alpha_{13} GND + \alpha_{14} MRT + \mu_k \tag{2}$$

Note that $H_i = H_1$ or H_2 as earlier defined above.

In the estimation of equation (2) when H_1 is used as the dependent variable, the method of estimation adopted is the linear probability model (Gujarati, 2009; Pindyck and Rubinfeld 1981) while the ordinary least squares method is used when H_2 is the dependent variable.

Model 2: The second model postulated in this study relates to the analysis of the factors affecting the income level of the respondents given the dumpsite environment in which they live and where some also work. This is based on the human capital model as specified by Garry Becker (1975) and Jacob Mincer (1974). Using the log of earnings as

the dependent variable, equation (3) below is specified to examine the impact of environmental pollution variable, in addition to other traditional variables, on the distribution of income of respondents. The equation is specified as:

$$LOG\ EARN = \beta_0 + \beta_1 ODR + \beta_2 BRN + \alpha_3 LOC + \beta_4 EMP + \beta_5 SLF + \beta_6 EXP + \beta_7 EDU + \beta_8 HD + \beta_9 GHM$$
$$+ \beta_{10} OWN + \beta_{11} EMP + \mu_k \qquad\qquad (3)$$

4. Data Analysis and Discussion of Results

4.1 Brief Description of the Sampled Dumpsites

Two dumpsites were selected for this study. The first dumpsite known as the Olusosun dumpsite is located at Ojota area of Lagos and it covers an area of about 42 hectares of land (Aderibigbe, 2010). The dumpsite, which is claimed to be the largest landfill in Lagos covers areas around Ikosi Ketu, Oregun industrial estates, the commercial area of Kudirat Abiola way, and Ojota residential area. The dumpsite is being managed by the Lagos State Waste Management Authority (LAWMA). The dumpsite is said to be the repository of more than 50% of about 9,000 metric tonnes of solid waste generated in the Lagos Metropolis on a daily basis.

The second dumpsite from where data was collected for this study is the Oke-Afa dumpsite which is located at the T-junction that leads to Ejigbo, in the Lagos Metropolis. The dumpsite is very close to the Isolo general hospital, the Isolo market, while there are residential areas around the dumpsite. The area, known as Oke-Afa is a community in the Oshodi-Isolo Local Government/Ejigbo Local Council Development Area, which came into the limelight on two occasions. The first was the time a military plane crashed into the canal in 1992, killing 45 military officers on board; and in January 2002 when there was an explosion from the Ikeja cantonment. The rush of panicking multitudes trying to escape from the bomb explosion area led to the death of many residents of Oke-Afa area in the canal located in the area (Apata, 2011) . Being a smaller and illegal dumpsite, Oke-Afa is not as active as Olusosun dump which is being managed by LAWMA, a government-owned Agency in Lagos State. The site is however, still being used (illegally), and the areas around the dump are surrounded by residential houses while scavengers eke out some existence on and around the dumpsite.

4.2 Socio Economic Characteristics of the Respondents

The result of data analysis shows that 48% of our respondents are female while the remaining 52% are male. In terms of age, none of the respondents was less than16 years of age and the highest percentage of respondents are between the age cohorts of 26-35 years. Other age groups in the survey are those in the 16-25 years category which represent 33%, the 36-45 years age group followed next at 23.2% while those above 46 years are 13.6%. In terms of marital status, many of the respondents are married (49%), those that are single constitute 45% while the rest are either divorced (5%) or separated (1%). In terms of formal educational attainment, only 1.5% of them never attended formal educational institutions. Those who have up to secondary education are about 34%, while those with post-secondary education are 64%.

Sixty-four percent of the respondents are employed and are thus engaged in various labour market activities in the urban labour market of Lagos. In terms of the type of employment engaged in, 33% of those employed are in self-employment while the remaining 67% are employees. With respect to income level, out of the one hundred and fifty nine that responded to the question on average monthly earnings, 21% earn less than ₦15,000, 34% earn between ₦15,000-N28,999; 35% earn between ₦30,000 and a little less than ₦45,000, the remaining 11% earn ₦45,000 and above. Note that US$1=₦150 at the time of the survey.

4.3 Waste Dumpsites, Environmental Pollution and Health Status of Respondents

4.3.1 Environmental Pollution and Health Status of Respondents

In many developing nations, dumpsites serve several purposes in addition to being a place to deposit domestic, medical and industrial wastes. For many urban poor, dump sites are places of work for waste pickers, waste collectors using push-cart to dump refuse on waste sites, waste buyers who sell them to recyclers and re-users, among others. Worst still, many of these informal workers who are too poor to afford a house for themselves live on the dumpsite or at best, in public institutions around the dumpsites. For instance, (Aderibigbe, 2010) reports that: *"miscreants and scrap scavengers who ply their trade at the 'TLS colony' (i.e. Olusosun Dumpsite Transfer Loading Station) thronged into the school. It has practically become for them, a home. These boys practically sleep in the school. They have turned the classrooms into their bedrooms and they do all manners of things in here. Our toilets have been taken over by these people and early in the morning between 5.00 am and 6.00 am, you see them leaving the premises and going back to the dumpsite to resume the day's job".* In addition to the homeless living on the dumpsites or public institutions around them, there are others who own or hire residential apartment around dumpsites. Thus, the waste dump, especially the big ones like the one in Olusosun, are usually busy with activities of waste picking,

waste dumping, waste sorting among others, in spite of the environmental filth that pervades the surroundings. The two dumpsites surveyed are not different from the general description detailed above.

Table 1 reveals some of the characteristics of respondents with respect to the relative distances of their residence to the dumpsites. Three classifications are adopted to identify residential locations: those living close to the dumpsite (0 to < 250 metres, henceforth referred to as LOC1), those living relatively far away from the dumpsite (500 to ≤ 750 metres), henceforth referred to as LOC3) and those living in between the two extremes (250 to < 500 metres), henceforth referred to as LOC2). Distributed by households, thirty-four households representing 47% of the total live in LOC1, 26 which is 36% of the total responding households live in LOC2 while the remaining households (17%) live LOC3. Analysis of individual respondents show that 99 respondent which represent 51% live close to the dumpsite in LOC1, 26% made of 51 respondents live in-between in LOC2, while the remaining 23% live farther from the site in LOC3. Among those living close to the dump, 47% are male while the remaining 56% are females.

Given the amount of environmental pollution generated by the dumpsite which is clearly obvious to every observer and passerby in terms of obnoxious odour oozing from the dumpsite, the regular discharge of effluents into the atmosphere as a result of incineration activities on the dumpsite, the very dirty and unkempt environments, among many other characteristics of the area, there is little doubt that living in the dumpsite has several health implications. Thus the respondents were asked to state the health effects of living around the dumpsite. Sixty-one percent of the respondents (61%) confirmed that the environmental pollution from the dumpsite has negative effects on their health status. The reported negative impact is heaviest among those in LOC1 (57%) while, as expected, it is least among those in LOC3 (11%). Many of the respondents reported that the dumpsite-generated pollution makes them suffer different types of ailments such as constant bouts of malaria as a result of infection from mosquitoes' bites; chest-related ailments resulting from inhalation of fumes from waste incineration; as well as all kinds of skin and body irritations. Malaria topped the list of sickness suffered (57%), followed by skin and other forms of irritations (19%) while the least is chest-related problems (10%).

The percentage of respondents reporting a particular kind of ailment varies inversely with the distance between the dumpsite and place of residence. Thus, residents of LOC1 are mostly affected compared to those in LOC2 and LOC3 respectively. For instance, while 49.5% of the respondents in LOC1 are affected by malaria, only 22% and 28% experience such ailments in LOC2 and LOC3 respectively. Similar pattern is observed for other types of ailments reported. The pattern of frequency of sicknesses is also similar to the pattern observed with respect to the incidence of ailments. Seventy-one percent of those living closest to the dump (LOC1) have experienced sickness always while only 12% of those living relatively very far (LOC3) have similar experience. The relative strength of association between the variables examined and the distances of residential houses to the dumpsite is shown in the last column of Table 3. These are found to be statistically significant at 5% level or better for all but variables TYP and EMP.

The foregoing analysis thus shows that the dumpsite is one of the major causes of pollution, which in turn can be linked to the state of health of respondents in this study. In addition to the dumpsite, there are other pollution sources in the area. Some of these are pollutions caused by auto vehicles, method of refuse disposal that litters the environment as well as well as the existence of the local/community markets in the area which are major sources of solid waste generation to the environment. The extent of air and water pollution is worse in the raining season as a result of offensive and disease-carrying odour, as well as ground water pollution. In the dry season, smoke from the incineration of the dumpsite is an important source of air pollution. Table 3 and Table 4 show the regression results from both the linear probability model and the ordinary Least Squares regression models respectively. The purpose of the regression exercise is to determine, in a statistical sense, those factors that determine the health status of respondents living around dumpsites.

In Table 4, we reported the results of the two regression estimates tagged Regression 1 and Regression 2. The regression estimates show that four variables (Burning, Self-employed, House location and Health Expenditures) are statistically significant in their influence on health status. For instance, the result in the table shows that air pollution variables (proxied by 'Burning' and 'Odor') vary positively with the probability of being ill. In relation to the distance of residential apartment to the dumpsite, the result shows a negative relationship between state of health (sickness) and home distance to the dumpsite. That is, those living close to the dumpsite suffer more health problems than those living farther from it. This results support the one described in Table 1. We are however surprised that the 'odor' variable is not statistically significant in its effect on health status. Table 3 gives similar result to the one reported in Table 2. For instance, the result shows that BRN and ODR are positive on their effect on being sick, but while BRN is statistically significant at the 5% level, ODR is not significantly different from zero. The distance variable (LOC) is negatively related to the level of ill-health which means that health situation worsens as distance from dump site to respondents' residence reduces and vice versa. The nature of employment variable

(EMPTN) is a binary variable measured as 1 if self-employed and zero otherwise. Thus, the negative statistically significant result means that the self-employed have worse state of health compared to the wage employed who are treated as the reference category. In other words, those that are in wage employment are less sickly in comparison to those in self-employment. This result appears plausible for several reasons. First, the wage employees earn more than the self-employed. For instance, while the self-employed has an average monthly income of ₦27,000 per month (₦150=US$1) those in the wage employment category earn an average of N31,000 per month. Second, those in wage employment are likely to be working outside their area of residence thereby limiting their exposure to environmental pollution to non-work periods. Third, the formal educational attainment of those in wage employment is slightly higher than those in self-employment. Therefore, the combination of improved formal education and higher earning in wage employment are expected to make the wage workers afford better nutrition and curative as well preventive health care for self and family members.

4.3.2 Environmental Pollution and Labour Market Implications for Respondents

The foregoing section has shown, in a statistically significant sense, the negative impact of environmental pollution on the state of health of persons living around dumpsites. The issue addressed in this section relates to the labour market implications of waste dump pollution on the environment. It examines the implications of environmental pollution arising from residing around the dumpsite in relation to the health status of residents and the effects it has on the labour market performance of such individuals. The Pearson correlation coefficient between pairs of some selected proxy variables of pollution and labour market outcomes show some interesting results. Using the two-tailed test, the result in Table 5, shows that the frequency of illness is positively correlated (in a statistically significant sense) with being affected by both odour from dumpsite and smoke arising from incineration activities of the dumpsite. Income from employment is significantly negatively correlated with pollution variables of odour and burning. As expected, monthly earnings is negatively related to frequency of illness and self-employment, but is positively related to owning a house as well as the distance of residential accommodation to the pollution source – the dumpsite. Being affected by pollution (via odour and burning) is negatively related to the distance of residential homes from the dumpsite. In other words the farther the residential house is from the dumpsite, the lower is the rate of being affected by smoke as well as offensive and disease-carrying odour from dumpsites.

An important labour market variable which is given further attention in this study is the level of earnings and the factors that affect its distribution among respondents. Given the result of the bivariate correlation analysis explained above, a linear regression analysis, shown in Table 4 was specified and estimated. In general, a linear regression gives the coefficient estimates of specified explanatory variables that best predict the value of the dependent variable. In this case, the dependent variable is the Log of earnings while the explanatory variables are the pollution variables (Burning, Odour, LOC1, LOC2, LOC3), labour market variables (Level of education, nature **of employment-whether wage- or self-employment, and labour market experience proxied by age), Size of the** household, status in the household (whether head or non-head), among others.

The regression analysis shows that in addition to the labour market variables, environmental pollution variables are also statistically significant determinants of earnings distribution among the survey respondents. In specific terms, being exposed to odour reduces earnings compared to the control group of those that are not. Though not statistically significant, frequency of illness is negatively related to monthly earnings while those that live close to the dumpsite earn less than those living from those relatively far from it. The latter appears plausible as those living closer to the dumpsite are prone to more frequent sicknesses which reduce the amount of time available for productive labour market activities. The sign of the 'Burning' variable does not conform to *apriori* expectation even though the coefficient is statistically significant at 10% level. Could it be that the majority of the respondents are engaged in activities that are involved with burning, say, waste iron or plastic smelting? Or, could it be that some of the respondents become familiar with the smoke from incineration over time and their immune system get adjusted to it so that it no longer affects their health and income? For the former, we have no information in the data base to make further comment. However, for the latter, a further analysis of data shows that the proportion of persons that are affected by smoke from burning decreases with their length of stay in the dumpsite area. Also, the Pearson correlation coefficient between length of stay in the dumpsite area and 'Burning' shows a result of -0.136 with a t-values of 0.057 (Table 5). Like the 'burning' variable, the education variable is statistically significant at 5% level but its sign is contrary to *apriori* expectation. This may not be unconnected with high level of unemployment among educated graduates who may have been compelled to seek residence around the waste dumpsites and probably be informally engaged in waste-related occupation. This aspect of the finding, among others, is a pointer to the need for further research in this area of study.

5. Summary of Findings and Concluding Remarks

This study examined the health status of households living around the Olusosun and Oke-Afa waste dumpsites in Lagos Nigeria. Results from the analysis of data reveals evidence of self-reported illnesses, which is linked with

pollution from the dumpsite around which they live. Distance between the dumpsite and residential apartment varies inversely with frequency and type of illness reported while the latter affects labour market performance of respondents as shown by the income distribution analysis. For improved health status of the populace and for better labour market performance, a resettlement programme for persons living within 250 metres radius programme is a must for the government. In the long term, efforts to provide low-cost houses situated in a clean environment is a priority that the government must pursue vigorously to enable the poor to live in affordable yet clean environment. To curtail the menace of high rate of rural-urban migration which is an important source of urban congestion and slum, a policy of integrated development whereby the rural sector is developed to provide jobs and social amenities should be made a priority.

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Table 1. Distribution of Some Variables by Location of Respondents' Homes from The Dumpsite and by Other Seclected Variables

Main Variable	Derived Variable	Very Close: (0-250m.)		In-Between: 250-500 m		Far Away: (> 500 m)		Total		Chi-Square Test
		No.	%	No.	%	No.	%	No.	%	
Affected by Odour?	Yes	67	*57*	38	*32*	13	*11*	118	*61*	Value: 22.91
	N	32	*43*	13	*17*	30	*40*	75	*39*	d.f.: 2
	Total	99	*51*	51	*26*	43	*22*	193	*100*	Sig.: 0.000
Affected by smoke from burning?	Yes	62	*57.9*	32	*39.9*	13	*12.1*	107	*55.4*	Value: 14.231
	No	37	*43*	19	*22.1*	30	*34.9*	86	*44.6*	d.f. 2
	Total	99	*51.3*	51	*26.4*	43	*22.3*	193	*100*	Sig. 0.001
Length of Residency	< 1 Year	15	*45*	14	*43*	4	*12*	33	*17*	Value: 25.43
	1 – 5 Years	49	*54*	24	*27*	17	*19*	90	*47*	d.f. 10
	6 Yrs& over	35	*50*	13	*19*	22	*31*	79	*36*	Sig. 0.005
Frequency of Falling ill	Always	17	*71*	2	*8*	5	*21*	24	*12*	
	Sometimes	46	*51*	30	*33*	14	*16*	90	*47*	
	Rarely	36	*46*	19	*24*	24	*30*	79	*41*	
Type of sickness suffered	Malaria	53	*49.5*	24	*22.4*	30	*28.1*	107	*56.9*	
	Chest-related	11	*57.9*	4	*21.1*	4	*19*	19	*10.1*	
	Stomach-related	14	*53.8*	11	*42.3*	1	*3.8*	26	*13.8*	Value: 9.786
	Irritation	16	*44.6*	12	*33.3*	8	*22.2*	36	*19.1*	d.f. 6
	Total	94	*50*	51	*27.1*	43	*22.9*	188	*100*	Sig. 0.134
Employment Status	Employed	72	*52.6*	37	*27*	28	*20.4*	137	*71.7*	Value: 1.321
	Unemployd	27	*50*	12	*22.2*	15	*27.8*	54	*28.3*	d.f. 2; Sig.=0.51
House Ownership	Yes	16	*47.1*	3	*8.8*	15	*44.1*	34	*18.3*	Value: 14.947
	No	21	*53.3*	46	*30.3*	25	*16.4*	152	*81.7*	d.f. =2;Sig.=.001

Source: Computed by authors from Survey Data

Table 2. Linear Probability Model Showing the Determinants of Health Status

Dependent Variable: State of Well-Being: (Always/Sometimes Ill=1; Rarely/Never Ill=0)

Variables	REGRESSION 1			REGRESSION 2		
	Coefficient Estimate	t-Statistic	Sig.	Coefficient Estimate	t-Statistic	Sig.
Burning	0.689*	2.922	0.007	0.675***	2.804	0.10
Odour	-0.204	-0.864	0.395	-0.191	-0.792	0.436
Home Distance	-0.001***	-2.005	0.055	-0.001***	-1.989	0.058
Self-Employed	-0.230	-2.088	0.047	-0.202	-1.624	0.117
Monthly Earnings	0.002	0.026	0.979	-0.002	-0.024	0.981
Monthly Health Exp.	-2.3E-005**	-2.304	0.029	-2.2E-005**	-2.163	0.040
Own House	-0.261***	-1.950	0.062	-0.281**	-1.989	0.058
Male HH Head	-0.123	-0.572	0.573	0.093	0.409	0.636
Married	0.080	0.488	0.630	0.096	0.565	0.577
No. of Children	0.046	0.974	0.339	0.056	1.071	0.294
No. in the Household	0.008	0.858	0.399	0.010	0.981	0.336
Education of HH head				0.038	0.513	0.612
CONSTANT	0.626	1.331	0.195	0.218	0.428	0.673
R^2	0.779			0.781		
Adj. R^2	0.685			0.676		
F-Statistic	8.312			7.425		
Sig. of F-Statistic	0.000			0.000		

*= Significant at 1%

**= Significant at 5%

*** = Significant at 10%

Source: Computed by the authors from survey data

Table 3. OLS Regression Result

Dependent Variable: State of Sickness: (Always=3. Sometimes=2 , Rarely=1; Never=0)

Variables	Coefficients	t-Statistic	Sig.
Burning (BRN)	1.319*	3.146	0.004
Odour (ODR)	-0.685	-1.629	0.115
Home Distance (LOC)	-0.002*	-2.978	0.006
Self-Employed (EMPN)	-0.406**	-2.076	0.048
Monthly Earnings (EARN)	0.221	1.494	0.147
Monthly Health Exp. (HEXP)	-4.1E-005**	-2.284	0.031
Own House (OWN)	-0.057	-0.239	0.813
Male HH Head	0.055	0.142	0.888
Married	-0.345	-1.178	0.249
No. of Children (NCHILD)	.0.024	0.270	0.791
No. in the Household (HHSIZE)	0.003	0.016	0.850
Educ. of HH head (HEDUC)	-	-	-
CONSTANT	1.670***	1.978	0.056
R^2	0.662		
Adj. R^2	0.519		
F-Statistic	4.626		
Sig. of F-Statistic	0.001		

*= Significant at 1% **= Significant at 5% *** = Significant at 10%

Source: Computed by the authors from survey data

Table 4. Ordinary Regression Analysis Showing the Determinants of Labour Income

Dependent Variable: Log of Monthly Income

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	4.696*	0.198		23.711	0.000
AGE	0.142*	0.042	0.591	3.362	0.002
burning=1	0.222***	0.132	0.462	1.687	0.098
odor=1	-0.320**	0.132	-0.632	-2.431	0.019
Freq. of illness (FRIL)	-0.045	0.049	-0.150	-0.917	0.364
selfemployed=1	-0.118***	0.069	-0.245	-1.710	0.094
Own house=1	-0.020	0.095	-0.034	-0.214	0.832
male hh head=1	-0.077	0.101	-0.104	-0.766	0.448
Married = 1	-0.099	0.065	-0.203	-1.539	0.131
No. in HH	-0.004	0.005	-0.128	-0.729	0.469
EDUCATION	-0.082**	0.038	-0.288	-2.142	0.038
LOC1	-0.153***	0.077	-0.340	-1.997	0.052
LOC3	0.110	0.109	0.167	1.001	0.322
R^2	0.372				
Adj. R^2	0.208				
F-Statistic	2271				
Sig. of F-Stat.	0.023				

*= Significant at 1% Level or better

** = Significant at 5% Level or better

*** = Significant at 10% Level or better

Source: Computed by the authors from survey data

Table 5. Pearson'S Correlations Coefficient among Pairs of Selected Variables

	House location distance to dump	Own home=1, zero otherwise	Self-employed=1, zero otherwise	Burning=1, zero otherwise	Odour=1, zero otherwise	Frequency of illness dummy	Average MonthlyIncome	Length of time in residence (years)
House location distance to dump	1	.188(*)	-.094	-.246(**)	-.283(**)	-.135	-.005	.160(*)
		.010	.261	.001	.000	.061	.947	.026
	193	186	144	193	193	193	156	193
Own home=1, zero otherwise	.188(*)	1	-.071	-.191(**)	-.189(**)	-.196(**)	.226(**)	.233(**)
	.010		.400	.008	.009	.007	.005	.001
	186	189	141	189	189	189	153	189
Self-employed=1, zero otherwise	-.094	-.071	1	.008	-.072	.097	-.121	.000
	.261	.400		.925	.389	.245	.144	1.000
	144	141	147	147	147	147	147	147
Burning=1, zero otherwise	-.246(**)	-.191(**)	.008	1	.850(**)	.552(**)	-.137	-.136
	.001	.008	.925		.000	.000	.084	.057
	193	189	147	198	198	198	159	197
Odour=1, zero otherwise	-.283(**)	-.189(**)	-.072	.850(**)	1	.502(**)	-.224(**)	-.105
	.000	.009	.389	.000		.000	.004	.143
	193	189	147	198	198	198	159	197
Frequency of illness dummy	-.135	-.196(**)	.097	.552(**)	.502(**)	1	-.181(*)	-.054
	.061	.007	.245	.000	.000		.023	.452
	193	189	147	198	198	198	159	197
Average Monthly Income	-.005	.226(**)	-.121	-.137	-.224(**)	-.181(*)	1	.117
	.947	.005	.144	.084	.004	.023		.143
	156	153	147	159	159	159	159	159
Length of time in residence (years)	.160(*)	.233(**)	.000	-.136	-.105	-.054	.117	1
	.026	.001	1.000	.057	.143	.452	.143	
	193	189	147	197	197	197	159	197

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Source: Computed by authors from survey data

Capital Structure and Financial Risks in Non-Conventional Banking System

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Abstract

We discuss issues of capital structure and enforcement in Islamic finance only to the extent that Islamic financial institutions differ from their conventional counterparts. Substantive differences do in fact exist. This paper presents the capital adequacy framework for Islamic banks compared to the setting up of the Basel II capital adequacy framework. We discusses of the risk profile of an Islamic banking and on the relationship between risk management and capital structure, it overviews specific risk categories for Islamic banks as an initial step in risk management, and highlight the differences and similarities in importance of these causes for Islamic banks. We present appropriate risk weights to unrestricted investments in order to defining their own capital requirements with regard to loss tolerance.

Keywords: Capital structure, Capital adequacy framework, Islamic banks

JEL classification: G01, G21, G32, G33.

1. Introduction

Banks operating under asymmetric information will tend to take more risk. Nevertheless, the risk-taking of banks is limited by regulatory capital requirements to prevent bank insolvency. Capital adequacy requirements is the most frequently cited form of prudential regulation. Maintaining a high level of capital impedes their ability to compete because equity is more costly than debt. Capital requirement for a banking institution is function of the portfolio composition, flow of liquidity, management and the environment in which it evolves. According to Kim and Santomero (1988), the use capital requirement is an ineffective means to bound the insolvency risk of banks. Authors claimed that banks may increase their risks in response to regulatory requirements for higher levels of capital, since such actions by regulators limits the return-risk frontier and therefore encourages banks to select riskier asset portfolios. Repullo (2004) used a dynamic model of imperfect competition in banking to show that in the absence of regulation, more competition (i.e., lower bank margins) leads to more risk. The taking risk will be lower if the bank has significant market power and an important capital.(Note 1) To analyze the role of preventive equity it is necessary to examine the relationship between the level of capitalization and the risk of insolvency, the relationship is it the same as the structure of the banking market. Capital Structure is a buffer against negative shocks to firm value (Froot, 2001). The capital structure of IIFS includes shareholders' equity(Note 2) and three broad categories of deposit accounts: current, unrestricted investment (PSIA^U),)(Note 3) and restricted investment (PSIA^R).(Note 4) The capital value and returns on investment deposits depend on banks' profits according to the PLS ratio stipulated in their contracts. Islamic banks pool depositors' funds in providing them with professional investment management with associated returns and risks. Neither the face value of investment deposits nor their return is guaranteed. In addition, investment deposits can be withdrawn only on maturity. Islamic banks provide only administrative services to the PSIA^R since the depositors are themselves actively involved in investment decision making. (Note 5) This demonstrates that Islamic banks perform fiduciary and agency roles at the same time.

However, the proportion of PSIA^{U}to total assets varies depending upon the preferences of the investors; the higher the proportion ofPSIA^U, the more significant the agency role undertaken. (Note 6) Capital Structure with due regard to the characteristics of Islamic banks, constitutes a key organ in an Islamic bank. Capital structure of Islamic banks imposes an important constraint on Islamic banks operations. This combination of requirements of *Sharia*-compliance and business performance raises specific challenges and agency problems, and underlines the need for distinctive capital structures.

We discuss issues of capital structure and enforcement in Islamic finance only to the extent that Islamic financial institutions differ from their conventional counterparts. Substantive differences do in fact exist.This section presents the capital adequacy framework for Islamic banks compared to the setting up of the Basel II capital adequacy framework. We discusses of the risk profile of an Islamic banking and on the relationship between risk management and capital structure, it overviews specific risk categories for Islamic banks as an initial step in risk management, and highlight the differences and similarities in importance of these causes for Islamic banks. We present appropriate risk weights to unrestricted investments in order to defining their own capital requirements with regard to loss tolerance. We try to answer the question, what links can be established between the financial structure and insolvency in conventional and Islamic banking system?

2. The Theory of Capital Structure Revisited for Islamic Banking

Modigliani and Miller (1958) argued that firm's capital structure is not always neutral to the firm's performance in the product market, but does influence it from the view point of asymmetric information and trade off theory. According to Modigliani and Miller (1958) in the absence of costs of bankruptcy, transaction costs, asymmetric information, or taxes, the value of a firm would be independent of its capital structure, and so the focus should be on capital level and not structure. (Note 7) Modigliani-Miller theory of capital structure is based on the assumption that funds can only be raised through debt and equity. This problem only imperfectly reflects the situation of a banking firm, which is not arbitrating between debt and equity, but between debt, equity, and deposits. The concept of financial risk, on which modern capital structure theories are built, is inadequate to tie down the capital structure of Islamic banks. The foundations of Modigliani-Miller as well as the predictions of the traditional school, which are based on debt financing, cannot be generalized to include Islamic banks. The cost of capital in conventional banks represents the cost of debt and equity deposit. Nevertheless, the cost of capital in Islamic banks is replaced by profit and loss sharing by depositors and equity holders. Conventional banks use both debt and equity to finance their investments, while Islamic banks are expected to finance their investments using mainly equity financing and customers" deposit account (Karim and Ali, 1989). Archer and Karim, 2006 argued that IIFSs used profit-sharing investment ''*deposits*'' as a form of leverage and expose IIFSs to displaced commercial risk. (Note 8) Thus, unrestricted investment accounts (UIA) are seen in a special situation in Islamic banks compared to depositors in interest-based banks. (Note 9) Essentially, it is the asymmetry between the extent of these depositors' participation in bearing investment risks and of their ability to influence the operations of the institution.

A model of the capital structure of an Islamic bank has been proposed, estimated and tested using annual accounts drawn from a panel of 12 Islamic banks for 1989-1993 as a panel by applying the random effects technique for panel data. Al-Deehani, Rifaat, Murinde (1999) argued that the concept of financial risk, on which modern capital structure theories are based, is not relevant to Islamic banks. Given the contractual obligation binding the Islamic bank's shareholders and investment account holders to share profits from investments, they propose a theoretical model in which, under certain assumptions, an increase in investment accounts financing enables the Islamic bank to increase both its market value and its shareholders' rates of return at no extra financial risk to the bank. Examining the impact of IIFS deposit mobilization on their performance, Shubber and Alzafiri (2008) explored four assumptions namely(Note 10) a) independence of the WACC from the level of deposits; b) a larger size of deposits does not entail higher financial risk; c) a larger deposit size entails higher earnings per share, and c) a large deposit size increases a bank's market value. The authors used 1993 to 1996-1998 data, for four institutions, and consider correlations between the costs of equity, deposits, and the WACC. (Note 11) The data appears to support the four assumptions. The correlation coefficient between market capitalization and size of deposits ranged between .72 for DIB and .88 for QIB with an average of .83. Accordingly, the authors concluded that a larger deposit base increases market value without affecting financial stability.

3. Anatomy of Risk Exposures in PLS Operations

Chapra and Khan (2000) argued that Islamic banks face some additional risks as a result of their PLS and sales-based debt-creating operations, the differences of opinion among the *fiqh,* (Note 12) and their inability to use credit derivatives and reschedule debts on the basis of a higher mark-up rate. Due to Islamic law forbidding the rescheduling of debts based on increased mark-up rates, encouragement is provided to improper customers to

intentionally default. This prohibition may represent an incentive to debtors to be lax in meeting debt service obligations, increasing financial institutions credit risk. However, the asset-based nature of Islamic finance transactions mitigates the risks by providing banks an ownership title to marketable collateral. (Note 13) Differences of opinion among *Sharia* scholars create another risk specific to IIFS. A document or structure may be accepted by one *Sharia* board but rejected by a different *Sharia* board. Some scholars consider the *murabaha* contract binding only for the seller, but not for the buyer. (Note 14) Others consider it binding on both parties, and most Islamic banks function on this basis. However, the OIC Fiqh Academy believes that the party, which defaults, has the overall responsibility for the compensation of any losses to the wronged party. In another example of differences of opinions, some scholars have challenged the compliance of *ijara* ending in ownership, a type of transaction implemented by most Islamic institutions. This difference of opinion raises the degree of risk in the *ijara* contract. Finally, no *Sharia*-compliance of most hedging instruments and notably credit derivatives limits IIFS access to effective methods of credit risk mitigation.Additional risks identified for Islamic banks include price, fiduciary and displaced commercial risks. Islamic banks are exposed to different risks than conventional banks that arise from the uses of funds. IFIs face five broad risk categories: transaction, business, treasury, governance, and systemic risks. Table 1 draws a comparative risk profile for conventional and Islamic banks. The balance sheet underlying the rules of the Basel Capital Accords belongs to a conventional bank whose structure completely differs from that of an Islamic bank, both in terms of assets and liabilities. Basel II standards do not account for the specific risks related to the nature of Islamic banks' activities.

The accounting and auditing organisation of Islamic financial institutions (AAOIFI, 1999) identifies this displacement risk as the risk resulting from the volatility of returns, rate of return risk, generated from assets financed by investment accounts. This risk arises when the actual rate of return is lower than returns expected by investment account holders, which follow current market expectations and generally equivalent to rate of returns offered on alternative investment. IFSB (2005) defined the displaced commercial risk as the risk of losses which an Islamic bank absorbs to make sure that investment account holders are paid in rate of return equivalent to a competitive rate of return, (Note 15) the statement designate market factors affecting rate of return on assets *vis a vis* rate of return for shareholders. This risks arises when an IFI pays investment depositors a return higher than what should be payable under the "actual" terms of the investment contract. An IFI engages in such practice to induce investment account holders not to withdraw their funds to invest them elsewhere. Thus, the bank may forgo up to all its shareholders' profits, adversely affecting its own capital. (Note 16) This asset risk is being transferred from PSIA to shareholders in a way that seems to be at odds with the nature of the *mudaraba* contract. Shareholders support the risk of a deterioration of an IFI returns to equity holders to maintain the IFI's attractiveness to investment account holders. Displaced commercial risk affects the capital of Islamic Banks and exposes them to losses which requires an additional capital charge (Archer and Rifaat, 2007; Grais and Kulathunga, 2006). In environments where displaced commercial risk is a significant factor, the volume of investment accounts has capital adequacy implication and supervisors should review whether added regulatory capital should be set aside (Archer and Rifaat, 2007).

Islamic financial instruments incorporate specific credit risk features. IFSB (2005) defined credit risk as potential that counterparty fails to meet its obligations in accordance with agreed terms. The *salam* contract may face a counter-party risk associated with a failure to supply on time, or at all, and failing to supply the agreed upon quality or quantity. When an Islamic bank participates in an *istisna* contract, it functions as supplier, manufacturer, constructor, and builder. As none of these roles is the bank's normal business, subcontractors must be used. Thus, the bank is exposed to two-way counter-party risk. The risk of default of the customer is one of these, but there is also the risk of the sub-contractors failing to carry out their duties effectively and on time. This combined credit risk and counter party risk may be compounded with a commodity risk related to the storage, in particular in the case of agricultural-based contracts (Khan and Ahmed, 2001). The *mudaraba* contract could expose an IFI to a larger counter party risk. When the IFI as *rabb-ul-mal* books an asset with a *mudaraba* contract, it bears all the losses in case of a negative outcome. In addition, the IFI cannot oblige users of the funds (*mudarib*) to take the appropriate action or exert the required level of effort needed to generate the expected level of returns (Lewis and Algaoud, 2001). In a *mudaraba*, the IFI does not have the right to monitor or participate in the management of the project and may lose its principal investment in addition to its potential profit share if the entrepreneur's books show a loss (Errico and Farrahbaksh, 1998).

Market risk is a risk that a bank may experience due to unfavorable movements in market price (Greuning and Iqbal, 2008) and it will arise from the changes in the prices of equity instruments, commodities, fixed income securities, and currencies. Market risk results from the risk of losses in on and off-balance sheet positions arising from movements in market prices (IFSB, 2005). (Note 17) It applies to the portfolio of financial instruments held by the

bank and is composed of four elements: interest rate risk, equity position risk, foreign exchange risk and commodity risk. Banks' exposure to market risk is reflected in their portfolio of securities and is therefore estimated based on its trading book. Much critical attention has been given to Market risk. It can have profound microeconomic and macroeconomic consequences and must be understood and managed with care. Quémard and Golitin (2005) argued that most conventional bank failures and banking problems historically have been attributable to poorly managed exposures to it. This risk result from a decrease in the value of an investment as a consequence of changes in market factors (equity risk, interest rate risk, currency risk, commodity risk, credit risk). One of the most important market risks faced by conventional bank is the interest rate risk. From a conventional viewpoint, a key role of money markets is price-discovery. Essentially, the formation of short-term interest rates and thereby, the short-end of the yield curves. Since money market trading is designed to be reflective of rate movements, conventional money market instruments are highly rate sensitive. Additionally, since central banks typically use the money market to execute monetary policy, the money market would usually be the first to react to rate or liquidity changes. Interest rate risk manifests itself in several ways. The three key forms being: i) Prepayment risk ii) Reinvestment risk and iii) Re-pricing risk. Given the short-term nature of money market instruments, prepayment risk is a nonissue. Though reinvestment risk is relevant, re pricing risk is by far the most important for money market instruments. Given the discounted form of their pricing, rate movements would have a highly significant and direct impact. The money market, as is the case with any financial market or instrument, has a number of associated risks. Where the conventional money market is concerned, most literature identifies four key risk categories: i) counterparty risk; ii) liquidity risk; iii) interest rate risk and iv) regulatory risk.

Given that Islamic banks operate under different principles, such as risk sharing and free-interest, (Note 18) and maneuver in accordance with *sharia* principles, it is wrong to think that they do not confront this risk. Islamic financing activities are generally backed by real assets, exposing them to substantial commodity price risk. Their financing and investing activities are thus exposed to a new market risk dimension that is applicable to their banking book (and not only to their trading book as is the case for conventional banks), leading to an overall higher market risk exposure. IIFS face indirectly *market risk*, through notably the mark-up price of deferred sale and lease-based transactions. (Note 19) *Market risk* may result in losses in on and off-balance sheet positions arising from movements in market prices. These would include volatility of market rates or prices such as profit rates, foreign exchange rates and equity prices. A typical loss would be a decrease in the value of an investment due to changes in market factors. (Note 20) The London Interbank Offering Rate (LIBOR) is generally used as a benchmark in pricing by Islamic banks. Thus, a change in the reference rate is likely to affect the rate of return that the bank expects to collect on its uses of funds and pay to its depositors. This is referred to as rate of return risk. Islamic banks can be affected by the collapse of other conventional banks. Furthermore, IIFS' balance sheets are exposed indirectly to variations of rates of return linked to LIBOR. An increase in the LIBOR systematically lead to an increase in the mark-up and consequently the payment of elevated profits to upcoming depositors, compared to those received by the banks from the customers of long-term funds. Islamic banks often benchmark the pricing of their instruments to LIBOR. Thus, a change in LIBOR affects an IIFS income statement in the same way it does with a conventional bank depending on the share of the balance sheet linked to the benchmark. The value of assets such as a deferred sale and lease transaction will vary with the wedge between the price at which they were issued and market changes in the benchmark. (Note 21) According to Chapra and Ahmed (2002), given that these IIFS use as a benchmark the London inter-bank offer rate (LIBOR) then it is quite normal that all assets are affected by the fluctuations of this rate.

The existence of profit sharing investment accounts (PSIA) (Note 22) raises some fundamental issues in calculating the capital adequacy ratio (CAR) for an Islamic bank. The basic issue surrounds the possibility of including PSIA as a component of capital because they have a risk-absorbing capability. Khan and Chapra (2000) suggested the adoption of separate capital adequacy standards $PSIA^U$. They argued that Islamic banks should not be required to meet the same capital requirements as conventional banks. A separation of capital requirements would enhance comparability, transparency, market discipline, depositor protection, and systemic stability. Furthermore, they mention the possibility of either keeping the demand deposits in a trading book, or pooling the investment deposits in a securities subsidiary. This suggestion, basically, expresses two important things. First, the need for a reliable accounting system that is able to prevent a potential dilution between fiduciary roles and agency roles and second, the need to promote a system that will be able to accommodate different types of customer preferences without jeopardizing systemic stability.

4. What Capital Regulation Do Islamic Banks Need?

Basel II set guidelines to reduce the amount of capital needed by a bank that effectively uses hedging techniques to mitigate the risk exposure of conventional banks. Islamic financial institutions can implement *Sharia*-compliant

hedging techniques, and it is recommended that future proposals consider the impact of such activities on the calculation of adequate regulatory capital. (Note 23) The capital structure stipulated by the Basel committee is segregated into three categories, as set out in table 2. Capital adequacy ratios (CAR) are a measure of the amount of capital that a bank must hold a minimum of 8 per cent (Tier 1 representing at least 4 per cent) expressed as a percentage of the bank's total risk-weighted assets. (Note 24) Requirements were set for the conventional financial services; a bank that is well capitalized has to hold a minimum total capital (tier 1 and tier 2) equal to 8% of risk-adjusted assets. For Islamic financial Institutions, IIFS, tier 1 capital is not the same as in CFS and IFS. Grais and Kulathunga (2006) argued that tier 1 capital would be same as in conventional and Islamic financial institutions; they argued that the reserves would include the shareholders' portion of the profit equalization reserve (PER), which is included in the disclosed reserves (tier 1). (Note 25) The tier 2 capital would not be any hybrid capital instruments, subordinated debts as CFS. (Note 26) The AAOIFI committee on capital adequacy proposed that it would not be appropriate to include the PSIA in tier 2 capital. (Note 27) The Islamic Financial Services Board (2005) has taken a similar position, profit-sharing investment accounts would be excluded from the calculation of the risk-weighted assets of the capital adequacy ratio (CAR) because it is deemed that 100% of the credit and market risks of such assets are borne by the investment account holders themselves. (Note 28) Reasons that explains why unrestricted investment accounts cannot be classified under equity or tier 1 capital is that such account bearers have no voting rights. (Note 29) To sum, unrestricted investment accounts lie "*in between' deposits and equity''*, and they should be properly acknowledged for capital adequacy purposes. (Note 30) While this statement accepted that, legally speaking, asset risk is not transferred from PSIA to shareholders of an Islamic bank, it identified two sources of risk to the bank's own capital resulting from the management of PSIA. The first of these sources lies in the nature of the *mudaraba* contract, which places liability for losses on the *mudarib* in case of malfeasance, negligence, or breach of contract on the part of the management of the *mudaraba*. In such a case, the capital invested by the PSIA becomes a liability of the bank. The term "fiduciary risk" was used in the statement to designate this type of risk. The second source of risk is of a more subtle nature, and raises some fundamental questions as to the financial economics of Islamic banking.

The AAOIFI (1999) and IFSB (2005) recognized the exposure of Islamic banks to displaced commercial risk and recommended establishing prudent reserves to mitigate the impact of returns smoothing to investment account holders on Islamic banks capital. The displacement risk is the situation where an Islamic bank is liable to find itself under commercial pressure to increase return rate to the profit sharing investment account holders, which is sufficient to induce those investors to maintain their funds with the bank rather than withdrawing them and invest them elsewhere. (Note 31) Thus, for market needs and for the prudential supervisory requirements, Islamic banks must bear a share of credit and market risks pertaining to the investment deposits as a measure of investor protection in order to avoid systemic risk resulting from massive withdrawals of funds by dissatisfied investment account holders. Like the AAOIFI, the IFSB capital adequacy framework serves to complement the Basel II standardized approach with a similar approach to risk weights in order to cater to the specificities of Islamic financial institutions. (Note 32) A requirement of meeting the same capital adequacy ratio for IIFS and conventional banks, may handicap the former vis a vis the latter.

4.1 AAOIFI Standard: Excluding of Restricted Investment Accounts in the Calculation of Capital Adequacy Requirement

The capital structure of IIFS includes shareholders' equity and three broad categories of deposit accounts: current, unrestricted investment ($PSIA^U$) and restricted investment ($PSIA^R$). According to the standard developed by the AAOIFI (AAOIFI, 1997), $PSIA^R$ deposits cannot be recognized as liabilities of Islamic banks and should not be reflected on the banks' statement of financial position. The AAOIFI recommends that restricted investment accounts be included as off-balance sheet items(Note 33) The implication is that such investment funds will not be included in the calculation of CAR. This is because the depositors are highly involved in investment decisions. Thus, it can be argued that $PSIA^R$ financed assets should be excluded from the risk-weighted assets in the denominator of the CAR. Yet in the CAR, no distinction is drawn between $PSIA^R$ and $PSIA^U$. AAOIFI recommends the inclusion of 50% risk-weighted assets of the UIA to cover "fiduciary risk" and "displaced commercial risk". The solution presented by AAOIFI is to include only 50 per cent of the risk-weighted assets financed by investment accounts (instead of 100 per cent) in the calculation of the required capital adequacy requirements. In the proposed risk-sharing scheme of AAOIFI, (Note 34) investment account holders share part of the risk with shareholders, and the CAR for an Islamic bank is:

$$CAR = \frac{OC}{(W_{OC+L}(OC+L)) + w_{PSIA}(0.5 \times PSIA)} \tag{1}$$

Where OC is the bank's own capital; (Note 35) L(Note 36) represents its non- PLS-based deposits; W_{OC+L} represents the average risk weight for assets financed by OC and L (bank's capital and depositors' current accounts); and w_{PSIA} represents the average risk weight for assets financed by $PSIA^U$ (unrestricted depositors' investment accounts). Like the Basel standards, the AAOIFI standard requires the CAR to be at least 8%. A major shortcoming of the AAOIFI proposal, however, is the lack of consideration to the asset side of the Islamic bank's balance sheet(Note 37) In practice, Islamic banks may have different proportions of $PSIA^U$ in their balance sheets. The ratio of OC to $PSIA^U$ as a function of the percentage of $PSIA^U$ to total assets (TA) indicates that Islamic banks, which have a higher proportion of $PSIA^U$ within their assets will have a lower proportion of OC to $PSIA^U$. The limitation of the approach developed by the AAOIFI is that it simply focuses on the sources of funds for Islamic banks, overlooking the importance of detailing the calculation of risk-weighted assets. The idea is to put less emphasis than the AAOIFI scheme on developing a framework that has basic similarities with Basel II. A requirement for a minimum level of net-worth (financial cushion) to enhance the capacity of a bank to maintain its solvency when facing temporary financial shocks has been adopted widely by Islamic banking regulators in many countries. However, the calculation of the CAR should only include the assets financed by debt-based liabilities and own capital, according to Dadang ; Dar, and Halla (2004), the capital adequacy ratio should be calculated as follows:

$$CAR = \frac{OC}{RWA_{OC+DBC}} \tag{2}$$

Where RWA_{OC+DBC} is the value of the risk-weighted assets financed by OC and DBC.

4.2 IFSB Standard: Proportion ''α'' of Risk-Weighted Asset

The IFSB (2005) framework proposes two alternative versions of capital adequacy ratio for Islamic banks. In the first version, profit sharing investment accounts are treated as typical *mudaraba* investment, so investment account holders fully absorb the risks (credit and market risks). The operational risk resulted from Investment Account management are borne by Islamic banks. Therefore, the formula excludes risk weighted assets (credit and market risks) funded by these Profit sharing investment accounts. In other words, there is no capital requirement in respect of risk arising from assets funded by such funds. IFSB (2005) include market risk not only in the trading book but also in the banking book of Islamic banks due to the nature of the banks' assets such as *murabaha, ijara, salam, musharaka,* and *mudaraba.* Capital adequacy requirement for IIFS in the IFSB is equal to 8% for total capital. (Note 38)

Given that the risks on assets financed by profit-sharing investment account holders do not represent risk to the capital of the institution, the IFSB (2005) proposes that profit sharing investment accounts are treated as similar to deposits and quasi deposits products. IFSB (2005) recommends to include a proportion "α %" of risk-weighted (credit and market risk) assets financed by profit sharing investment accounts that can be deducted from the total risk-weighted assets (RWA) for the calculation of capital adequacy. The ratio "α %" reflects the displaced commercial risk, which is the extent of risks displaced to shareholders from investment account holders. This share ''α'' represents the extent of total risk assumed by the investment account holders, with the remainder absorbed by the shareholders on account of displaced commercial risk (Sundararajan, (2005); Archer and Karim (2006)).

The extent of risk sharing actually borne by them determines the value of "α %". Higher would be the value of "α %", more the bank absorbs a higher proportion of risk weighted (credit and market) assets and investment account holders are treated more as conventional depositors than investors. If the value of "α %" of is equal to zero, investment funds are equivalent to shareholders capital and investment account holders bear the totality of losses. Therefore, risks on assets financed by Investment funds are not subject to minimum capital requirements. If value of "α" is equal to the unit, investment funds are similar to conventional deposits. The capital invested, and the associated returns are implicitly guaranteed and the Islamic bank bears consequently the totality of losses. In practice, the value of "α" is generally superior to zero (Sundararajan, 2008). A positive relationship exists between α and displaced commercial risk. The lower (higher) is this risk the lower (higher) the value of "α" (IFSB, 2005). The IFSB (2005) has left the determination of α% value at the discretion of national supervision authorities. The proportion of risk weighted assets financed by unrestricted investment accounts funds (PSIA) that needs to be included in the denominator of the CAR:

-    If ''α'' = 0, PSIA is in effect a pure investment carrying the full risk of loss, and DCR = 0

-    If ''α'' = 1, PSIA is considered akin to deposits, with both principal and return implicitly guaranteed, and hence DCR is at its maximum level

-    If 0<''α'' <, IIFS is managing the PSIA to avoid being in either extreme, and DCR>0

According Khan (2007) the assessment of an appropriate level of the capital adequacy ratio for Islamic banks should be primarily based on a thorough analysis of the composition of the underlying asset portfolio between PLS and non-PLS transactions. (Note 39)

The standard addresses the different risks faced by Islamic banks arising from the nature of their activities and assigns adequate risk weights to different Islamic financing modes. The new framework considers credit, market, and operational risks of the Islamic bank's assets and, most importantly, does not require regulatory capital for risk-weighted assets that are funded by profit-sharing investment accounts. While the AAOIFI focuses on the sources of funds of an Islamic bank, the IFSB consider the uses of funds and assigning appropriate risk weights to each asset item. The major contribution of the IFSB is to acknowledge that the uses of funds for Islamic banks, which are by nature *Sharia* compliant, differ from the typical asset side of the balance sheet for a conventional bank. The recent standard takes into consideration the specificity of investment account holders who share part of the risk with shareholders as follows:

$$CAR = \frac{Tier1 + Tier2}{\substack{RWA(Credit\ risk + Market\ Risk + Operational\ risk) \\ -RWA\ funded\ by\ PSIA(Credit\ risk + Market\ risk)}} \qquad (3)$$

RWA (Credit risk + Market risk + Operational risk) include those financed by both restricted and unrestricted Profit Sharing Investment Accounts (PSIA). IFSB suggests computing the Basel solvency requirement as the ratio of pure equity capital on risk weighted assets. These should include not only the assets financed with shareholders' capital and money deposits, but also a percentage of the portfolio pertaining to the investment deposits, which the national regulatory authorities can fix to no more than 70 per cent at their discretion.

Using a Granger causality test, Chong and Liu (2009) showed that Islamic deposit accounts in Malaysia are effectively pegged to the returns on conventional-banking deposits. Islamic banks, in practice, are not too different from conventional banks. They argued that Islamic banks should be subject to regulations similar to those of their western counterparts because the depositors' funds are mostly invested in non-PLS financing; they suggested that there should not be any capital relief for assets that are funded by *mudaraba* deposits.

5. Governance of Reserve: Provisioning Practice to Smooth the Returns

A fundamental difference between conventional and Islamic banks consists on their provisioning policy. (Note 40) AAOIFI has restricted its role in protecting investment account holders to maximizing transparency and uniformity of reporting standards. The only recourse for investment account holders, assuming that the Islamic bank does not engage in negligence or fraudulent activities, is to withdraw their funds from that bank. That threat of fund withdrawal drives Islamic banks to use their loan-loss reserve accounts to smooth rates of return paid to investment account holders, ensuring their competitiveness against rates paid by other Islamic and conventional banks. Each IIFS adopt clear provisions regulating contributions to these funds and their disclosure in financial statements to anticipate their credit risk and to take account for expected losses rather than actual losses and to absorb any future losses. (Note 41) This practice implies, from one hand, a natural smoothingof banks resulting through manipulating the expected loss estimates. (Note 42) On the other hand, dynamic provisions policy helping to anticipate and coverage credit losses in loans along the lending cycle, enable banks to have a safety funds that can be used during periods of economic distress. (Note 43) By strengthening the soundness of the bank, contributes to restrict pro cyclicality in lending and produces smoother loan loss provision ratios (Pérez; Salas, and Saurina, 2006). Anandarajan; Hasan, and Loranzo-Vivas (2003) showed that Spanish banks, despite regulatory requirements on provisioning leaving little discretion for managers, use reserves to manage their results.

IIFS generally have two standard practices of retaining reserves in the management to displaced commercial risk with the objective of providing a cushion of resources. (Note 44) Thus, Islamic banks try to assure to PSIA a rate of return almost in line with market interest rates applied by conventional banks on similar instruments; moreover, the probability for depositors to incur a capital loss is largely reduced by the fact that most banks, under the control of the national supervising authorities, have two different voluntary reserves: (i) the investment risk reserve (IRR) used to absorb potential losses and playing the same function of loan risk provisions in conventional banks; and (ii) the profit equalization reserve (PER) to level off the rate of return during the economic cycle, similar to the equalization reserve used by insurance companies for smoothing economic results. (Note 45) Table 3 shows anatomy of funding risk exposures for each source of funds having its own risk characteristics and reserves affecting. The only difference is the degrees of the exposure, and how the banks mitigate it.

The profit equalisation reserve (PER) is created from the total income before the profit allocation between shareholders and investment account holders and the calculation of *mudarib* share. (Note 46) The retention of profit equalisation reserve reduces returns actually distributed to both parties. Profit equalisation reserve is needed to smooth a low rate of return and reduce the volatility of investment account holders returns. Investment risk reserve

(IRR) (Note 47) is created by setting aside amounts out of the profit attributable to PSIA holders, which the bank as *Mudarib* is typically authorised to do in the *mudaraba* contract. The bank may include a clause in the *mudaraba* contract giving the *mudarib* the right to set aside a certain percentage of the profit attributable to PSIA. This may be used to mitigate the bank's exposure to displaced commercial risk. The lack of transparency in financial reporting has permitted Islamic banks to create undisclosed reserves, which can be used for income smoothing purposes.

Investment Risk Reserve is retained only from the profits attributed to investment account holders (After deduction of *mudarib* share). However, the investment risk reserve is needed to cover potential losses on assets invested with investment account holders funds (Archer and Rifaat, 2006; Grais and kulathunga, 2006). The way in which the bank creates reserves out of profits attributable to PSIA can also be used to smooth the returns to the latter without affecting the profit attributable to shareholders. If these reserves are adequate to avoid the transfer of income from shareholders to investment account holders, there is no exposure of the Islamic bank to displaced commercial risk. In the opposite case, If these reserves are insufficient and the transfer of some proportion of shareholders returns to depositors is necessary, then the displaced commercial risk is positive (Sundararajan, 2008).

A percentage of profit equalisation reserve and the totality of investment risk reserve belong to investment account holders but retained by the Islamic bank. (Note 48) The remainder part of accumulated profit equalisation reserve belongs thus to shareholders. In the contract, investment account holders agree in advance on the proportion of their income that may be allocated to both reserves, which is determined by the management of the bank at their own discretion. These reserves are generally invested by the Islamic bank to generate additional returns to investment account holders (Archer and Rifaat, 2006). The portion of the PER that is attributable to the PSIA, and all of the IRR, are invested in assets that produce returns for the PSIA; however, the bank as *Mudarib* will receive a percentage of these returns. What is not clear is whether this percentage is the same as that stated in the *mudaraba* contract with the PSIA holders. In both cases, reserves are created within the equity of PSIA holders that provide a means whereby the bank may smooth the reported returns attributable to its PSIA holders.

In a dual banking environment, the ability to maximize risk- adjusted return on investment and sustain stable and competitive returns is an important element for the development of a competitive Islamic banking system. Thus, profit equalisation reserve is a mechanism, which may to mitigate the fluctuation of rate of return arising from the flow of income, provisioning, and total deposits. This reserve is appropriated out of the total gross income and is shared by both the depositors and the banking institution (Central Bank of Malaysia, 2004). The central banks may discourage wide fluctuations in the rates that the banks are authorised to offer to the depositors in order to avoid destabilizing movements in the shares of deposits within the system (Zaher and Hassan 2001). (Note 49)

Using the Beidleman and Eckel coefficients, Boulila Taktak, Slama Zouari, Boudriga (2010) examined first income smoothing practices on a sample of 66 Islamic banks compared to conventional banks over the period 2001-2006 in 19 countries. (Note 50) Results confirm the income smoothing practices by Islamic banks by loss provision for loans and investment in *murabaha*, *musharaka*, and *mudaraba*. These findings reveal the Islamic specificity of income smoothing in banking sector and the importance of the dynamic provision policy, which requires special attention from supervisors and regulators as a tool to improve financial stability.

Islamic banks handle this uncertainty and to mitigate such a risk, by using a profit equalisation reserve and investment risk reserve. IIFS create reserve funds to smooth the returns to UIA holders or protect their principal in case of adverse developments in the performance of the investment portfolio. (Note 51) Returns to UIA holders are supposed to vary according to IIFS performance, poor returns may induce UIA holders to transfer their funds to a better performing institution and to complement the returns that would be due to UIA holders. IIFS consider these funds important to deal with competitive pressure from commercial and Islamic banks. Grais and Kulathunga (2006) argued that the profit equalisation reserve and investment risk reserve might be considered in terms of the perspective of dealing with expected and unexpected losses to the extent that funds in these reserves provide cushions equivalent to capital. (Note 52) Investment account holders (UIA) are liable to incur unexpected losses as shareholders because there is effectively no cushion, as provided by equity from the shareholders in conventional institutions.

According to Grais and Kulathunga (2006), the economic capital could be extended to Islamic contracts to address correlations between risks, providing a comprehensive risk management tool for IIFS and comfort to their stakeholders. (Note 53) This approach would be applicable to both types of financial intermediaries. Nevertheless, a major difference between IIFSs and conventional banks relates to investment account deposits. As for IIFSs and conventional banks, the expected losses would be borne by the income. Nevertheless, the risk-sharing feature of investment account deposits should reduce the overall risks for IIFSs, but the latter, would bear losses that are the

outcome of market conditions but not of a *Mudarib's* misconduct. (Note 54) Grais and Kulathunga (2006) identified economic capital to deal with unexpected losses that are due notably to misconduct of the IIFS.

6. Conclusion

In this paper, we have demonstrated that in theory and practice the banking portfolio management in Islamic banking and the behavior to the regard to the risk is identical to conventional banks. The Islamic bank has a behavior similar to the conventional bank in portfolio management.This chapter also discussed the implications of corporate governance in Islamic banking for agency problems using traditional theory of financial intermediation. Evidence suggests that corporate governance in Islamic banks might be not too different from conventional banks.We have also showed that features of balance sheet structures of IFIs and conventional banks, which have an important implication in risk management.Islamic banks urgently need *Sharia*-compliant products to meet a number of needs: i) Short-term placement of funds and liquidity and asset-liability mismatch management; ii) financial risk management and hedging; (Note 55) iii) resource mobilization at a competitive cost; and iii) balance sheet management through securitization. The proposed capital regulation for Islamic banks outlined seeks to enhance both repayment capacity and the quality of PLS contracts. We have identified clearly the risk categories an IIFS and CFS may face; then, we have presented capital requirement may help a financial intermediary to define the capital. (Note 56) Thus, the chapter showed risk management approaches and methodologies for IIFSs and CFS. Risk management and capital requirements in Islamic banking might permit them to use their resources efficiently. Nevertheless, in case of financial distress, we must considers mechanisms that may help contain it and those that may foster post crisis recovery to contain a crisis and foster recovery in the case of conventional and Islamic finance, in order to prevent or solve distressed financial institutions and their relevance to IIFS.

List of Abbreviations

AAOIFI: Accounting and Auditing Organization for Islamic Financial Institutions

BCBS: Basel Committee on Banking Supervision/ **BFR**: Base Financing Rate/ **BHD**: Bahrain Dinar

BIB: Bahrain Islamic Bank/ **BIS**: Bank for International Settlements/ **BNM**: Bank Negara Malaysia

CAH: Current Account Holders/ **CAR**: Capital Adequacy Ratios/ **CB**: Central Bank

CBB: Central Bank of Bahrain/ **CFS**: Conventional Financial Services

CIBAFI: General Council of Islamic Banks and Financial Institutions/ **DIB**: Dubai Islamic Bank

EPS: Earnings per Share/ **FAS**: Financial Accounting Standards/ **FSA**: Financial Services Authority

GAMC: Government Asset Management Corporation/ **GCC**: Gulf Cooperation Council

IFH: Ihlas Finance House/ **IIFS**: Institution Offering Islamic Financial Services

IFRS: International Financial Reporting and Accounting Standards

IFSB: Islamic Financial Services Board/ **IIFM**: International Islamic Financial Market

IIMM: Islamic Inter-Bank Money Market/ **IIRA**: International Islamic Rating Agency

IsDB: Islamic Development Bank/ **IOSCO**: The International Organization of Securities Commissions

LIBOR: London Inter-bank Offer Rate/ **LMC**: Liquidity Management Center

LOLR: Lender of Last-Resort/ **MII**: Mudaraba Inter-Bank Investment

PLS: Profit and Loss Sharing/ **PSIA**: Profit Sharing Investment Accounts

PSR: Profit-Sharing Ratio/ **QIB**: Qatar Islamic Bank/ **RIA**: Restricted Investment Account

SAMA: Saudi Arabia Monetary Authority/ **SFH**: Special Finans House/ **SSB**: Sharia Supervisory Board

TBRSA: Turkish Banking Regulation and Supervision Agency/ **UIA**: Unrestricted Investment Account

USD: US Dollar/ **WACC**: Weighted Average Cost of Capital

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Notes

Note 1. I.e. lower bank margins.

Note 2. No preference shares issued as it would violate the *Sharia* to pay fixed percentage dividends to holders of these shares. Equity funds include reserves accumulated over the years. Shareholders have sole control over the bank through the board of directors.

Note 3. Investment accounts are offered in different forms, often linked to a pre-agreed period of maturity, which may be from one month upwards, and the funds in the accounts can be withdrawn if advance notice of one month is given. Unlike shareholders, PSIA neither have control over management nor are they in a position to enforce monitoring measures on the management. In the last resort, they can withdraw their funds.

Note 4. A bank with only restricted investment accounts would be close to a mutual fund in terms of its risk profile, with almost all risk passed to investors. Even with unrestricted investment accounts, much of the risk is in principle borne by investors.

Note 5. In the case of restricted investment accounts ($PSIA^R$), the bank acts only as fund manager -- agent or non-participating Mudarib and is not authorized to mix its own funds with those of investors without their prior permission. The $PSIA^R$ depositors have the right to determine the investment types chosen; the banks merely provide them with information about feasible investments. Therefore, the $PSIA^R$ depositors take responsibility for investment risk.

Note 6. The $PSIA^U$ give full authorization to the bank to take all decisions relating to the investment process. Like shareholders, therefore, PSIA have no right to interfere in the management of their funds that is the sole prerogative of the Islamic bank.

Note 7. It should be noted that Modigliani-Miller ignore the effect of the following variables on capital structure: (a) bankruptcy costs; (b) signaling of information by managers; (c) option pricing (d) agency; and (e) personal taxes. Taking these factors into consideration, an increase in debt financing to a certain level would tend to result in an increase in the value of the thereby indicating that there is an optimum capital structure.

Note 8. See section III.2.

Note 9. Islamic banks use funds deposited in investment account as the main source of external finance.

Note 10. For Islamic banks, this model is composed of the following elements: dividend paid to shareholders; cost of "Zakat" paid on shareholders' funds; rate of growth in dividend to shareholders; and return provided to depositors, as well as the rate of increase thereon.

Note 11. Kuwait Finance House (KFH); Dubai Islamic Bank (DIB); Qatar Islamic Bank (QIB); Bahrain Islamic Bank (BIB).

Note 12. Islamic jurisprudence is also known as Fiqh. It covers all aspects of life: religious, political, social and economic. It is mainly based on interpretations of the Quran and Sunna (sayings and deeds of the prophet).

Note 13. Islamic banking may be compared to collateral-based mortgages, which have less risk in comparison to commercial loans and are, therefore, given a lower risk-weight of 50% whereas the latter are given 100%.

Note 14. Scholars include the OIC Fiqh Academy.

Note 15. Benchmark rate, rate of return paid by conventional bank, rate of return paid by the peer, etc.).

Note 16. An example is the International Islamic Bank for Investment and Development in Egypt, which distributed all of its profits to investment account holders while the shareholders received nothing from the mid to late 1980s.

Note 17. Fluctuations in values in tradable, marketable or leasable assets (including sukuk) and in off-balance sheet individual portfolios (for example restricted investment accounts).

Note 18. Basic Islamic modes of financing.

Note 19. In PLS modes, the rate of return on financial assets is unknown or pre-fixed to undertaking the transaction. In purchase-resale transactions, a mark-up is determined based on a benchmark rate of return, typically a return determined in international markets such as LIBOR.

Note 20. Equity price risk arises from fluctuations in equity indices and prices. The non-trading equity price risk exposure arises from the Bank's investment portfolio. Currency risk is the risk that the value of a financial instrument will fluctuate due to changes in foreign exchange rates. The bank takes an exposure to the effect of fluctuation in prevailing foreign currency exchange rates on its financial position. Commodity risk refers to the uncertainties of future market values and of the size of the future income, caused by the fluctuation in the prices of commodities. Quémard et Golitin (2005) argued that most conventional bank failures and banking problems historically have been attributable to poorly managed exposures to market risk.

Note 21. In PLS modes, the rate of return on financial assets is unknown or pre-fixed to undertaking the transaction. In purchase-resale transactions, a mark-up is determined based on a benchmark rate of return, typically LIBOR.

Note 22. $PSIA^U$ depositors engage in fixed term contracts; hence, they have less flexibility to withdraw their funds if the banks do not perform well financially.

Note 23. This risk-sharing feature has led some to argue that UIA are not liabilities for the IIFS and accordingly they should not be required to meet the same capital requirements as conventional banks. In particular, the credit and market risk would fall on depositors, while the bank would only be subject to operational risk.

Note 24. Under Basel II, bank activities are classified into either banking or trading books for the purpose of calculating the CAR. While the banking book consists of all banking activities such as the transformation of depositors' funds into loans or instruments provided to users of funds, the trading book clusters the activities that involve buying and selling of securities. The regulation requires the RAR to be equal to at least 8% of total assets, after applying risk-weighting coefficients to the assets, on- and off-balance-sheet. The CAR as stipulated in Pillar 1 of Basel II is expressed as:$CAR = \dfrac{Tier1Capital + Tier2Capital}{Risk\ Weighted\ Asset}$

Note 25. The IAH share of the PER and the whole of the IRR (none of which is attributable to shareholders) are excluded from capital. They are taken into account in measuring the amount of risk-weighted assets attributable to investment account holders.

Note 26. As these would bear interest and contravene Sharia principles.

Note 27. Karim (1996) proposed to equate the investment accounts to the hybrid capital instruments included in Tier 2. However, it is difficult to reconcile with the technical characteristics of the investment deposits, which are not negotiable in the financial markets and can have short maturity, even cut short with the bank's agreement

Note 28. Furthermore, the failure of Islamic banking deposits to share in the losses of the bank is best highlighted in the case of Bank Islam Malaysia Berhad in 2006 when the bank continued to pay out RM0.371 billion in "profit sharing" to its depositors despite incurring a reported loss of RM1.3 billion. As such, assets that are funded by profit-sharing investment accounts should not be excluded from the calculation of the risk-weighted assets of the CAR. Central Bank of Malaysia also considers profit sharing investment accounts as part of overall Islamic banking capital fund for the purpose of determining single customer limit.

Note 29. The rationale is that investment depositors can withdraw their funds upon maturity and reduce the sources of funds available to the bank, but the equity base remains unchanged when shareholders 'withdraw their funds' by selling their shares to other investors.

Note 30. IIFSs use profit-sharing investment '*'deposits''* as a form of leverage (Archer and Karim, 2006) and expose IIFSs to displaced commercial risk.

Note 31. Displaced commercial risk expresses the possibility that depositors will withdraw their funds if the return paid to them is lower than that paid by the other banks. As a result, some Islamic banks give minimum guaranteed returns to depositors, although it is prohibited by the Sharia principles (AAOIFI, 1999).

Note 32. The document identify six risk categories: credit risk, equity investment risk, market risk, liquidity risk, rate of return risk and operational risk in order to provide guidelines that account for some of these risk exposures, especially liquidity risk and operational risk.

Note 33. This is the position adopted by the Accounting and Auditing Organization for Islamic Financial Institutions the body established to promulgate accounting and auditing standards for Islamic financial institutions in its Financial Accounting Statement No. 2: Concepts of Financial Accounting for Islamic Banks and Financial Institutions (1993). Investment accounts would neither be listed under liabilities, as is currently the practice of almost all Islamic banks, nor would they be included with owner's equity funds. Hence, the formula of the statement of financial position of an Islamic bank should be: assets = liabilities + equity of investment account holders + owners' equity.

Note 34. AAOIFI's standards are mandatory for the following markets: Bahrain, Jordan, Sudan, Qatar, and Dubai International Financial Center. Syria is considering their adoption. The standards are used as guidelines in Saudi Arabia, Kuwait, Malaysia, Lebanon, and Indonesia. Most Islamic banks' Sharia supervisory committees use AAOIFI standards as guidelines.

Note 35. The Islamic bank's own capital is calculated according to the Basel methodology and comprises two tiers: Tier 1 and Tier 2. This basic calculation has been adopted by the AAOIFI's Financial Accounting Standard (No. 11: Provision and Reserves).

Note 36. The AAOIFI uses L to include all other (non-PLS-based) deposits (depositors' current accounts). SA is used to represent all other non-PLS-based deposits.

Note 37. TA is equal to the total of OC, SA and $PSIA^U$. Insolvency in an Islamic bank happens when TA < DBC (debt-based capital).

Note 38. Tier 1 and tier 2 equal to 8% of risk-adjusted assets.

Note 39. Most IIFS are exposed to unrated customers, 100% RW equivalent to 8% capital charge.

Note 40. Islamic Banks adopted the financial accounting rules established by the International Accounting Standards Board.

Note 41. Although the AAOIFI number 11 *"Provisions and Reserves"*, applicable from 1 January 2001, permit such reserves, it requires disclosure of their amounts and movements. One such reserve (referred to in as "Profit Equalization Reserve" (PER) is created by setting aside amounts out of the bank's profit before allocation and calculation of the Mudarib share; the amounts so set aside reduce the profit available to both shareholders (including the Mudarib share) and PSIA holders. AAOIFI requires IIFSs to disclose the shares of the actual profits and of the funds from the profit equalization reserve in the returns they receive. *"Provisions and Reserves": "Specific Provision which is the amount set aside to reflect devaluation of a certain asset i.e., write it down to its current cash equivalent value. General Provision, which is the amount, set aside to reflect a potential loss that may occur of current unidentifiable risks in relation to Total of Assets "Receivables and Investment and Financing".*

Note 42. Income smoothing practices is a common form of earnings management that uses accounting techniques to reduce the fluctuations in net income over time.

Note 43. Shrieves and Dahl (2003) demonstrated the use of this technique in times of financial distress.

Note 44. The objective of the use of profit equalization and risk investment funds is to maintaining a stable return to this category of UIA holders; managers automatically send the signal that the firm is healthy and profitable, while the reality may be otherwise. The practice of profit equalization and investment risk reserve may convey an inaccurate view on the actual performance of the financial institution, compounding the asymmetry of information available to UIA holders and management.

Note 45. Decisions pertaining to PER and IIR should ideally be left to the business. However, concerns over maintaining the UIA holder principal and the systemic consequences that losses may provoke have led some regulators to intervene. The banking law of Jordan as amended in 2003 establishes a minimum deduction of 10% on earnings to be invested in an investment risk fund in order to cover losses in mutual investment accounts. Such minimum deduction may be increased by the CB (Art. 55).

Note 46. Profit equalisation reserve (PER) is the amount appropriated by the IIFS out of the mudaraba income, before allocating the Mudarib's share, in order to maintain a certain level of return on investment (Unexpected Losses) for IAH and to increase owners' equity. Smoothing PSIA's profit payouts via transfers of profits into and out of a profit equalization reserve, giving a misleading impression of stable returns.

Note 47. Investment risk reserve (IRR) is the amount appropriated by the IIFS out of the income of IAH, after allocating the Mudarib's share, in order to cushion against future investment losses (Expected Losses) for IAH. Masking losses on investments of PSIA funds by use of an Investment Risk Reserve (IRR) formed out of prior period PSIA profits, which acts as an internal buffer to absorb losses on investments of PSIA funds.

Note 48. Conventional banks usually have the ability to pass on risks to their customers, through their ability to adjust deposit and loan rates. Islamic banks can protect investment account holders and shift risks to shareholders (displaced commercial risk), for competitive reasons, they can hold back profits in good years and pay out in bad years (Čihák and Hesse, 2008). Only after Islamic banks' layers of protection have been exhausted and after the bank has started to incur losses, does a shock have an impact on capital and reserves. These additional layers of protection are ultimately reflected in the banks' returns and capital, and thereby in their z-score (See chapter 3).

Note 49. When the banks constitute internal reserves in the form of profit equalisation reserve or investment risk reserve (the first, charged pro-quota to both the shareholders and the investment accounts; the second, charged wholly to the second), the risk-weighted assets financed by such reserves can be taken away from the denominator of the solvency coefficient up to a maximum of 30 per cent as established by the supervisory authorities (IFSB, 2005).

Note 50. Bahrain, UAE, Turkey, Iran, Sudan, Pakistan, Kuwait, Yemen, Brunei, Qatar, Malaysia, Bangladesh, Arabia Saudi, Egypt, Jordan, Russia, Indonesia Mauritania, Tunisia.

Note 51. These reserves are generally known as Profit Equalization Reserves (PER) and Investment Risk Reserves (IRR). We follow AAOIFI's definition in Financial Accounting Standard (FAS) 11.

Note 52. PER cannot be used to offset an overall loss during a period, as this would contravene the Sharia; IRR is used for this purpose. PER is employed to enhance the distributable profit if the profit earned is considered inadequate, and this may be due to the effects of asset write-downs or write-offs.

Note 53. Grais and Kulathunga (2006) illustrated an example with murabaha contracts in providing the probability distribution of losses associated with murabaha contracts that finance trade within a 12-month period. IIFS would be expected to conduct business in such a way as to deal with expected losses, pricing its products and accumulating provisions accordingly.

Note 54. In this case, pricing designed to cope with expected losses should limit the need for a PER to addressing errors in setting pricing and other such unexpected events. The IRR could address unexpected losses (excluding those due to misconduct), as pricing would be expected to generate resources to fund provisions for expected losses.

Note 55. Given that Islamic banks operate under risk sharing, Vogel and Hayes (1998) argued that there were not effective of Islamic debt contracts such as swaps, futures and options. With prohibition of gharar, Islamic finance could not accept the derivatives products, however, following the agreement Tahawwut (Hedging) Master agreement of March 1, 2010 of the International Swaps and Derivatives Association (ISDA) and the International Islamic Financial Market (IIFM), the authorization of certain derivatives product have been allowed under certain conditions. Given that Islamic banks operate under principles of risk sharing, the agreement does not remove the risk because it is not allowed to receive a profit without risk; however, it is possible to reduce risks such as currency risks, interest rate risk and counterparty risks. Islamic banks are allowed to use the wide range of derivative instruments such as swaps available to conventional banks for hedging purposes or transfer of risks.

Note 56. Nevertheless, Islamic financial intermediation needs to comply with Sharia principles, notably those of risk sharing. They do respond to a latent demand for financial services that do not breach Sharia principles. Accordingly, they have the potential to contribute to financial deepening, economic growth and social inclusion.

Table 1. Classification of Capital in Basel Accords

Classification	Contents
Tier 1 (core capital)	Ordinary paid-up share capital/common stock, disclosed reserves from post-tax retained earnings, non-cumulative perpetual preferred stock (goodwill to be deducted).
Tier 2 (supplementary capital)	Undisclosed reserves, asset revaluation reserves, general provisions/general loan-loss provisions, hybrid (debt/equity) capital instruments, and subordinated term debts.
Tier 3	Unsecured debt: subordinated and fully paid up, to have an original maturity of at least two years and not be repayable before the agreed repayment date unless the supervisory authority agrees.

Source: Grais and Kulathunga (2006).

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