Chaire de recherche Industrielle Alliance
sur les enjeux économiques
des changements démographiques
CEDIA.ca

16-07

SELF-EMPLOYMENT, WEALTH AND START-UP COSTS: EVIDENCE FROM A FINANCIAL CRISIS

CAHIER DE RECHERCHE
WORKING PAPER

Koffi Elitcha and Raquel Fonseca

Septembre / September 2016

UNIVERSITÉ LAVAL
Faculté des sciences sociales
HEC MONTRÉAL
ESG UQÀM

La Chaire de recherche Industrielle Alliance sur les enjeux économiques des changements démographiques est une chaire multi-institutionnelle qui s'appuie sur un partenariat avec les organisations suivantes :

- Centre interuniversitaire de recherche en analyse des organisations (CIRANO)
- iA Groupe financier
- Retraite Québec

Dépôt légal : Bibliothèque et Archives nationales du Québec et Bibliothèque et Archives Canada, 2016.
ISSN 2368-7207

Self-Employment, Wealth and Start-up Costs: Evidence from a Financial Crisis

Koffi Elitcha * Raquel Fonseca †

This version: August 2016

Abstract

Financial constraints affect in important ways the decision of individuals to become entrepreneur (self-employed). This implicitly suggests a positive relation between the propensity of individuals to become entrepreneur and their personal wealth. Recent theoretical work and empirical evidence confirm this hypothesis. More interestingly, it has been shown that the slope of the entrepreneurship-wealth relationship increases with the extent of liquidity constraints and flattens with the magnitude of start-up costs. Using individual level data from 3 surveys (SHARE, ELSA and HRS) in Europe and United States, as well as the World Bank's Doing Business data, this paper empirically zeroes in on the impact of start-up costs on the self-employment-wealth relationship. The dynamic nature of the data enables us to investigate potential effects of the last global financial crisis. Results confirm the strong positive relationship between the entrepreneurial choice and wealth, as well as the negative effect stemming from the increase in start-up costs. Interestingly, although there is no strong evidence that wealth in itself played a bigger role during the crisis, we find that the negative impact of start-up costs on wealth proved to be significantly pronounced during the last crisis.

Keywords: Self-Employment, Occupational Choice, Wealth, Liquidity Constraints, Start-up Costs, Financial Crisis

JEL Classification: E02, E21, J21, J24

*ESG UQAM. Email: elitcha.koffi_aseye@courrier.uqam.ca

†Corresponding author: ESG UQAM, CIRANO and RAND. Email: fonseca.raquel@uqam.ca. Department of Economics, UQAM: 320 Ste-Catherine Street East, Montreal (Quebec), Canada, H2X 1L7. We thank Alain Delacroix, Pavel Sevick, and Markus Poschke for their helpful comments. This research was supported by CRSH Insight Grant. This research is also part of the program of the Industrial Alliance Research Chair on the Economics of Demographic Change. Errors are our own.

1 Introduction

While it seems that we live in an era of the cult of the entrepreneur, it is important to remember that institutional regulations such as the ease of getting credit, or the extent of start-up costs, might prevent some individuals from embarking on a new business venture. The decision to become an entrepreneur rather than a wage worker, is of course an individual choice and is made on the basis of many considerations. In this paper, we however focus on how start-ups costs could impinge on this occupational choice when individuals are already faced with important liquidity constraints. Start-up costs here, should not be confused with the financial amount required to start a particular business project – which varies depending on the type of project. Instead, we refer to the fixed cost (in terms of administrative burdens) of meeting the regulatory requirements for setting up a limited liability company, in a given country for instance. In that sense, these entry costs [1] could be viewed as a disutility stemming from meeting these mandatory entry regulations.

The question on whether or not financial constraints in itself, influence the individual decision to turn entrepreneur, has received much attention in the rapidly increasing literature on entrepreneurship. If these constraints constitute a determinant factor, one should observe, other things being equal, that wealthier people are more likely to start new businesses. Evans and Jovanovic (1989) formalize this idea and show that there exists a minimum level of wealth above which individuals choose to become entrepreneur, in a financial constrained environment. Their seminal paper develops and successfully tests the prediction that personal wealth increases the probability of becoming an entrepreneur. Although the validity of this hypothesis has further been questioned by Hurst and Lusardi (2004) who find that the positive relationship between wealth and entry into entrepreneurship holds only at the top of the wealth distribution, thus cannot be regarded as an implication of borrowing constraints, Cagetti and De Nardi (2006) clearly show through their dynamic occupational choice model, that Hurst and Lusardi's result is in fact, not inconsistent with the view that

entrepreneurs are borrowing constrained. Now, if liquidity constraints make it more likely for wealthier people to become entrepreneurs, how possibly could start- up costs affect this wealth-entrepreneurship relationship? Do the wealth and start-up costs effects vary with the business cycle? For instance, assuming that liquidity constraints are more severe during financial crises or economic downturns, should we expect the wealth and start-up costs effects on the individual decision to start a new venture, to be more pronounced at these times? These are the questions we address in this paper.

The definition of an entrepreneur is a controversial issue and can differ in some extent, depending on the particular questions one wishes to address (see Quadrini (2009) for a discussion on that matter). However, in empirical studies and particularly in the occupational choice literature, an entrepreneur is commonly identified as a self-employed person as opposed to working for someone else. Given the nature of the questions addressed in this paper, we also follow this definition. Recent cross-country evidences report that self-employment expands during downturns (see Bosch and Maloney (2008) or Loayza and Rigolini (2011) for instance). Controlling for this effect through time specific effects, we empirically investigate the possibility that individuals could in fact, be less likely to start their own business during times of recessions or severe financial crises because of the financing constraints inherent to these periods. More interestingly, we examine the joint effects of liquidity constraints and start-up costs , under these circumstances, on the choice to become self-employed. Our focus is on the effects stemming from the recent global financial crisis. The latter was associated with a large and sudden decline in personal wealth and venture capital funding, on top of a severe tightening of credit to small businesses or start-ups. Although several policy sources report the detrimental effects the global crisis had on entrepreneurship as well as on small and medium businesses, we are not aware of any study that does a thorough empirical investigation on the issue, and in particular, on how the crisis might have influenced the joint effects of liquidity constraints and entry costs.

Our paper is related to the vast literature on the role of wealth for entrepreneurship

entry in presence of financing constraints (see Quadrini (2009) for a review of some of these studies). Start-up costs constitute another important element that could somehow affect the decision to start a new venture. Despite the evidence that they vary substantially across countries (see work by Nicoletti et al. (1999) for OECD countries), the issue has received relatively far less attention in the occupational choice literature. The idea that start-up costs might negatively impinge on the decision to become entrepreneur, has already been developed in Fonseca, Lopez-Garcia and Pissarides (2001). Introducing an occupational choice decision in a search and matching model, they show that start-up costs discourage entrepreneurship and decrease the level of employment in the economy. However, their focus is on the employment effects of start-up costs; so how the latter decrease the fraction of entrepreneurs in an economy without financial market imperfections is left unanswered. Rissman (2007) assesses the impact of start-up costs on employment transitions using a search framework of the labor market which allows for mobility between unemployment, self-employment and wage work. She finds a very small negative effect of business start-up costs on the steady state self-employment rate. In fact, as carefully pointed out in her paper, that result simply indicates that entry costs do not have a significant impact in an environment that completely abstracts from liquidity constraints. For a sample of European firms, Klapper et al. (2006) show that high start-up costs hamper the creation of new firms, especially in sectors that should naturally have high entry rates. Yet, their interest is not on the individual occupational choice and consequently they do not examine the role of wealth in the process. The closest work to our paper is the one by Fonseca et al. (2007) which provides interesting insights into the interplay between liquidity constraints and start-up costs and its implications for the occupational choice. Using a dynamic occupational choice model, they document a positive relationship between the fraction of entrepreneurs in the economy and the level of wealth at equilibrium, but more interestingly, find that this relationship flattens out with the introduction of start-up costs. The reason is that, entry costs–being a sort of disutility– decrease the marginal value of wealth under liquidity constraints, thus making

it even more important for the entrepreneurship decision. We refer to this negative impact of start-up costs, as the "start-up costs hypothesis". This prediction is supported by the empirical estimation conducted in their paper.

Our study differs from theirs in investigating the joint effects of wealth and start-up costs in a dynamic context, with a focus on the 2007-2010 financial crisis. To do so, we use several waves of individual level data as well as new institutional data on start-up costs. The individual level data come from three sibling surveys which focus on older people (aged 50 or more): The Survey of Health, Ageing and Retirement in Europe (SHARE), the English Longitudinal Study of Ageing (ELSA) in England and the Health and Retirement Study (HRS) in the United States. Our focus on older people can be justified by two main reasons: The first is the high incidence of self-employment among the senior population, which has been documented and explained in the literature (see for instance Quinn (1980); Hochguertel (2010) or Zissimopoulos and Karoly (2007) among others). The second reason is that, these surveys are unique in providing directly comparable key and timely variables across several European countries and the United States, which is crucial to address our empirical questions. The country level (institutional) data are mainly a product of the World Bank's Doing Business Project. The dynamic nature of the data enables us to take advantage of time variation in order to investigate effects of the 2008-2010 global financial crisis.

Estimation results validate the start-up costs hypothesis. That is, there is a strong positive relationship between the propensity to become self-employed and personal wealth; yet start-up costs tend to flatten out this relationship. What this suggests is that, the marginal value of wealth is attenuated under liquidity constraints, in countries with bigger start-up costs. To put it another way, entry costs constitute an additional burden that makes wealth even more important in presence of financing constraints. More interestingly, we find evidence that the negative impact of start-up costs is not a non-varying phenomenon, but rather presents an important dynamic component. In particular, while wealth in itself does not seem to play a bigger role during the crisis, we document that the negative impact of start-up costs on

wealth proves to be significantly pronounced during the crisis, that is, in 2010 compared to the periods 2004, 2006 and 2012.

The remainder of the paper is organized as follows. The next section presents the data and shows some descriptive statistics from them. Section 3 breaks down our econometric strategy. Section 4 discusses the results and Section 5 concludes.

2 Data and Descriptive Analysis

The analysis is based on cross-country data from various sources and at different periods of time. We distinguish between individual level data and country level institutional data.

2.1 Individual Data

These data come from three longitudinal surveys: The Survey of Health, Ageing and Retirement in Europe (SHARE), the English Longitudinal Study of Ageing (ELSA) in England, and the Health and Retirement Study (HRS) in the United States. They focus on individuals aged 50 and over, provide comparable information and can be used for various analyses. Detailed information on health, socio-economic status and family networks are contained therein. The SHARE is the last (of the three) to be established and its development closely follows its sibling studies. We use the four (4) regular[2] SHARE waves: the first collected in 2004, the second in 2006, the fourth in 2010 and the fifth in 2012. For ELSA, we use the waves 2 (2004), 3 (2006), 4 (2008), 5 (in 2010) and 6 (2012). Likewise, we exploit the HRS waves 7 (2004), 8 (2006), 9 (2008), 10 (2010) and 11 (in 2012).[3] Our analysis is exclusively based on respondents between 50 and 80 years old. This choice is motivated by the fact that few people are on the labor market after 80.

We essentially use three categories of variables from these surveys: the demographic variables, the labor market status and the household wealth. Demographic variables include:

gender, education, marital status, age, household size and health status. Two levels of education are considered: Highly educated individuals and the others. Highly educated are college graduate and over. We lump low and middle educated individuals together. Household size is the number of people in the household. As for the self-reported health status, three categories are retained: Very good health, Good health and fair/Poor health. The marital status is whether the respondent is currently married or not. The labor market status and the household wealth constitute together with the institutional variables, our main variables of interest. Table 1 summarizes descriptive statistics for selected variables.

With regard to the labor market status, we allow for three options: Self-employed, wage workers and non-working people. A self-employed [4] in our analysis, is someone who reports being self-employed and making a living only from that activity. In other words, we exclude those who declare being self-employed but not receiving earnings from it, and those who are self-employed but also hold a wage work in addition. Although this is a broad definition of entrepreneurship, it certainly includes people who possess and manage businesses –regardless of whether they are own-account workers or employers. Besides, self-employment as a measure of entrepreneurship is commonly used in the occupational choice literature, especially in empirical studies (as dicussed in Quadrini (2009)). Non-working population includes retired, unemployed, disabled (sick) respondents. Table 2 below displays the percentage of individuals in each group, by country.

The percentage of respondents in the non working population is remarkably important in all countries. This is not surprising given this group encompassses different sorts of people (retired, unemployed, disabled, sick). It can also be explained in some extent by the age characteristics of our sample (50 to 80 years old individuals). The share of self-employed is reasonably and unsurprisingly low. However, it also varies substantially across countries –from 3.34% in Austria to 13.19% in Greece. The latter is well known to have a high self-employment rate (in fact, one of the highest in Europe for many years[5]). This is also confirmed in our selected sample of older people. The last column of Table 1 reports the self-

Table 1 – Summary Statistics of Selected Variables

Variables	Mean	Standard Deviation	Minimum	Maximum
		Individual Level: Non-workers		
Female	57%	49%	0	1
Married	69%	46%	0	1
Household Size	1.98	0.85	1	15
Age	67	7	50	80
High Education	14%	35%	0	1
Good Health	39%	49%	0	1
Fair/Poor Health	42%	49%	0	1
		Individual Level: Wage workers		
Female	49%	50%	0	1
Married	73%	44%	0	1
Household Size	2.25	0.98	1	12
Age	55%	4%	50	80
High Education	32%	47%	0	1
Good Health	44%	50%	0	1
Fair/Poor Health	17%	37%	0	1
		Individual Level: Self-employed		
Female	35%	48%	0	1
Married	76%	43%	0	1
Household Size	2.40	0.98	1	10
Age	57%	5%	50	80
High Education	31%	46%	0	1
Good Health	42%	49%	0	1
Fair/Poor Health	17%	38%	0	1
		Individual Level: All Categories		
Female	54%	50%	0	1
Married	70%	46%	0	1
Household Size	2.05	0.90	1	15
Age	64%	8%	50	80
High Education	19%	39%	0	1
Good Health	40%	49%	0	1
Fair/Poor Health	35%	48%	0	1

Source: Authors' calculations using pooled data from SHARE, ELSA and HRS. Computed statistics are weighted based on sampling weights.

Table 2 – Occupational Status by Country

Country	Non-Workers	Wage Workers	Self-Employed	Self-Employment Rate
USA	72.46	19.38	8.16	29.64
Austria	83.22	13.44	3.34	19.90
Germany	68.07	26.53	5.40	16.90
Sweden	58.07	37.02	4.91	11.71
Netherlands	69.29	26.22	4.49	14.61
Spain	80.79	13.54	5.66	29.45
Italy	81.94	12.39	5.67	31.39
France	72.54	23.08	4.38	15.95
Denmark	60.10	35.34	4.56	11.44
Greece	68.20	18.61	13.19	41.47
Switzerland	59.03	31.85	9.12	22.26
England	61.69	31.07	7.25	18.92

Source: Authors' calculations using data from SHARE, ELSA and HRS. The unit is percentage (%). Computed statistics are weighted based on sampling weights and concern the population aged 50-80 and the years 2004, 2006, 2008, 2010 and 2012. The self-employment rate is defined as the percentage of self-employed over the working population.

employment rate for the group. It is computed as the percentage of self-employed individuals over the working population. The figures are higher if compared to statistics for the whole working population (regardless of age), which is consistent with the documented fact that self-employment increases with age.

Now, let us turn our attention to the second variable of interest: the household wealth. We use the net current wealth reported by individuals in the surveys. It is defined as the sum of the net value of housing, stocks, bonds, saving accounts, private retirement accounts and other annuities minus all debts the household may have. Wealth figures are all in Euros and adjusted for purchasing power parity, using OECD values. It is important to note that the wealth variable is not ex-ante (prior to employment transitions) but rather an estimation of (current) wealth at the time of the survey. Ideally, an ex ante measure would suit best the econometric analysis we undertake (next section) to test the validity of the start-up costs hypothesis. However, we show that a bias (if any at all) is very likely to be insignificant. Table 3 gives a glimpse of the repartition across wealth classes, by labor force status.

We can notice that contrary to wage workers and non working people who are more or less equally distributed across wealth classes, most of self-employed in our sample clearly belong

Table 3 – Distribution of Wealth by Occupational Status

Wealth classes	Self-Employed	Wage Workers	Non-Workers
Quantile 1	8.85	14.03	17.47
Quantile 2	15.29	18.63	19.40
Quantile 3	13.45	19.84	21.30
Quantile 4	20.52	25.16	22.80
Quantile 5	41.89	22.34	19.03

Source: Authors' calculations using pooling data from SHARE, ELSA and HRS. Individuals are classified into 5 equal wealth classes. Quantile 5 is the highest class (top 20 % of the wealth distribution. Figures (weighted statistics) represent the percentage of individuals in each class by labor force status)

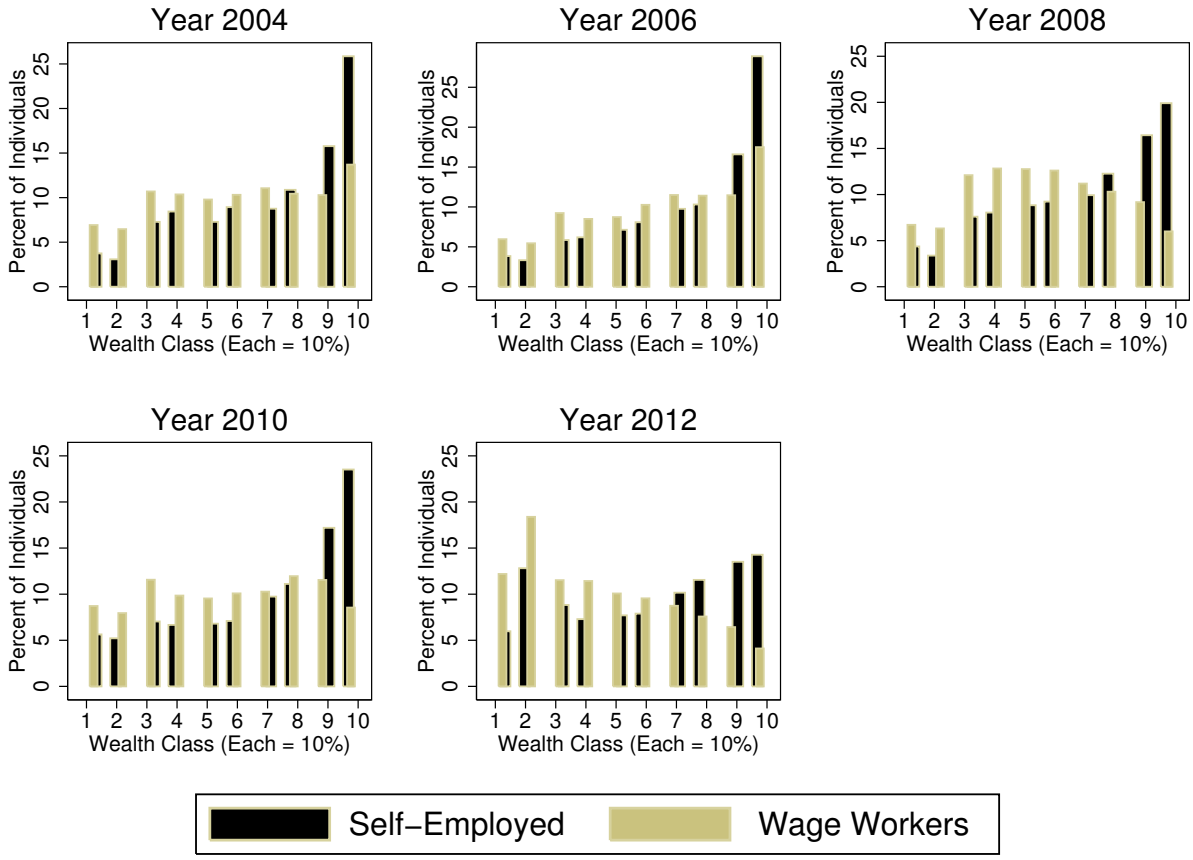
to top classes (Quantiles 4 and 5). In fact, 62.41 % of self-employed belong to quantiles 4 and 5, while only 47.50% of workers and 41.83% of non working belong to these top wealth classes. Although this does not necessarily mean that wealth is important for entrepreneurship entry, it does provide postive information in this direction.

Figure 1 shows the distributions of self-employed and (wage) workers over wealth decile classes, for the five waves (periods) in our sample. As can be seen, the self-employed are disproportionately concentrated in the top classes (deciles 9 and 10) throughout the waves. Behind this general picture, there are some different configurations across countries. We report in Appendix A, selected country figures. For instance, the concentration of self-employed at the top of the wealth distribution is strikingly apparent in the Netherlands' case. Furthermore, a look at the entrepreneurs' wealth distributions before and after the crisis–that is, before and after 2006– shows some different evolutions. For instance, some countries (such as the US) move from the top to the bottom of the distributions, while others (such as England) move from top to the middle.

2.2 Institutional Data

We are interested in measuring start-up costs at the country level. To do so, we take advantage of a set of indicators provided by the World Bank's Doing Business Project.The latter was launched in 2002 and makes available objective and comparable measures of

Figure 1. Percentage of Self-Employed and Wage workers over Wealth Classes



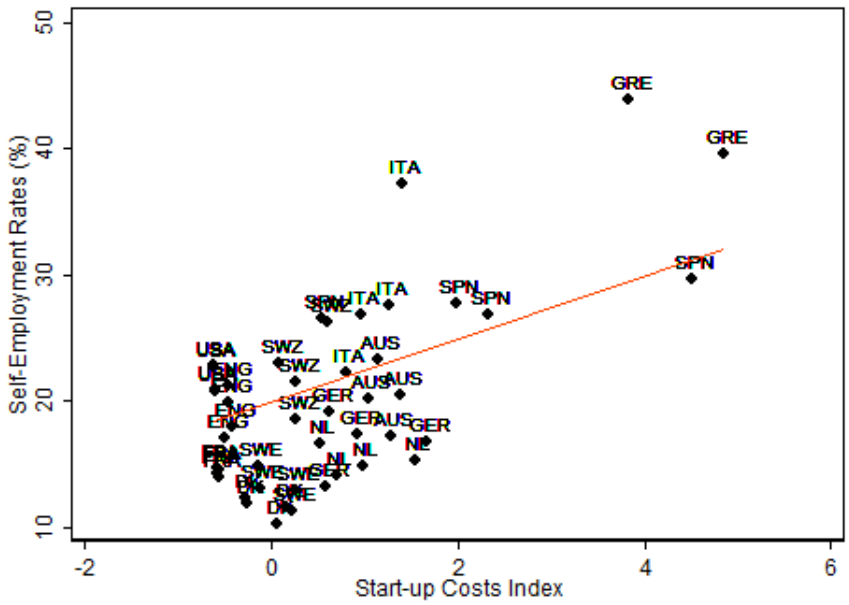
Note: Authors' calculations (weighted and pooled data). Individuals are now sorted into 10 ascending equal wealth classes –Each includes 10 % of all individuals

business regulations and their enforcement across many countries and selected cities over time. In order to exploit the maximum variability in the indicators, we use factor analysis procedure to construct a score[6] as a proxy for start-up costs at the country level. Factor analysis is often used for data reduction purposes. It can help to get a small set of variables (preferably uncorrelated) from a large set of variables (most of which are correlated to each other). Another purpose is to create indexes with variables that conceptually measure similar things. This last purpose serves precisely our needs.

Three institutional measures are used to compute the start-up costs index. The first is the total number of days required to register a business. It captures the median duration

that incorporation lawyers indicate is necessary to complete a procedure with minimum follow-up with government agencies and no extra payments. The second is a cost measure, expressed as percentage of the country's income per capita. It includes all official fees and fees for legal or professional services if such services are required by law. The third is also expressed in percentage of income per capita and measures the amount that the entrepreneur needs to deposit in a bank or with a notary before registration and up to 3 months following incorporation. Figure 2 plots the relationship between the constructed index - using Principal Component Factoring - and the self-employment rates across the countries of our sample. The self-employment country figures are computed as the percentage of self-employed individuals over the working group (self-employed and salaried workers).

Figure 2. Self-Employment Rates and Start-up Costs: Our sample



Note: World Bank's data and authors' calculations. USA=United States, UK=United Kingdom, DK=Denmark, SWE=Sweden, AUS=Austria, SPN=Spain, GRE=Greece, ITA=Italy, NL=Netherlands, GER=Germany, SWZ=Switzerland, FRA=France

The figure seems to depict a positive correlation between self-employment rates and the size of start-up costs at the country level. In other words, countries where start-up costs are higher, tend also to be the ones with the larger share of self-employed workers. The highest

rates of self-employment are found in Greece, where approximarely 40 % of the workers are self-employed. It is followed by the two other Southern European countries (Italy and Spain). The rest of the countries have generally modest self-employment statistics and relatively low start-up costs. They are concentrated around the lower end of the fitted line. This positive correlation between start-up costs and self-employment rates, may appear a priori counterintuitive. However, this does not tell us much about how the entry costs impact individuals' choices under liquidity constraints. In fact, we argue that the effect of start-up costs on entrepreneurship entry, makes more sense in a financial constrained environment; therefore should be accurately assessed through its influence on the wealth-entrepreneurship relationship. A positive (negative) correlation between self-employment and start-up costs, only tells us that self-employed individuals are more (less) likely to be in countries with more cumbersome entry costs. Yet, this gives us no information on the underlying mechanisms through which these costs operate at the individual level. We examine this issue in the next section.

Apart from our institutional variable of interest (the start-up costs measure), we also control for three other country level regulation measures: the ease of getting credit, a "tax" variable and the net pension replacement rates. As with the start-up costs index, the ease of getting credit is computed using Principal Component Factoring. To do so, another set of World Bank's Doing Business indicators[7] are used: the strength of legal rights index, the depth of credit information index, the credit registry coverage and the credit bureau coverage. The legal rights index ranges from 0 to 12 and measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending. Higher scores indicate that the laws are better designed to expand access to credit. The depth of credit information index measures the rules and practices affecting the coverage, scope and accessibility of credit information available through either a credit bureau or credit registry. Likewise, higher scores means better access to credit. The credit registry coverage reports the number (expressed as a percentage of the adult population) of individuals and

firms listed in a credit registry's database. Finally, the credit bureau coverage reports the number of individuals and firms, now listed in a credit bureau database (see World Bank's Doing Business Project for details).

The "tax" variable measures the total amount of taxes and mandatory contributions borne by the business in the second year of operation. It is expressed as a share of commercial profit and is designed to provide a comprehensive measure of the cost of all the taxes a business bears. Note that it differs from the statutory rate which merely provides the factor to be applied to the tax base. The third institutional variable is the net pension replacement ratio. Since our analysis is based on people aged 50 and more, it is important to control for the impact of the pension regulations at the country level on the individual occupational choice. The replacement rates are defined as the net pension entitlement as a percentage of pre-retirement earnings. We use OECD figures for an average single man earner. Table 4 summarizes descriptive statistics of aggregate country-level variables.

Table 4 – Country Level Indicators

Variables	Mean	Standard Deviation	Minimum	Maximum
Start-up Costs Index	0	1	-0.69	4.35
Credit Index	0	1	-2.31	0.97
Net Replacement Ratio	61.98%	20.48%	40.89%	110.75%
Tax	46.69%	11.72%	27%	76.8%

Source: Authors' calculations and World Bank's Doing Business indicators. Net Replacement Ratios come from OECD Statistics Database.

3 Econometric Strategy

The start-up costs hypothesis stipulates that wealthier people are more likely to become entrepreneur in presence of liquidity constraints; yet this advantage provided by wealth is attenuated by start-up costs. The latter act as a disutility and increase the threshold level of wealth that is necessary to start an own business. It is important to understand that it is not the "monetary value" of start-up costs which is at stake here, but instead the harmful

effects associated with the process of meeting the administrative regulations.

3.1 The baseline model

Our strategy is to exploit the variation in start-up costs across countries (and periods) to identify how they affect the relation between the propensity to become self-employed and wealth. Although our main interest is to investigate the potential impact of the global financial crisis on the start-up costs effect, we begin by examining a baseline specification.

Consistently with the categorization adopted in the previous section, we allow for three options for the dependent variable (the occupational choice): Self-Employed, Wage Worker and Non-Worker. A non linear functional form is used as proxy for wealth since the wealth effects are most unlikely to be linear. Thus, we choose to use quintile dummies for net wealth. The model can be written as:

$$Y_{ijm,t} = \alpha_m X_{ij,t} + \sum_{k=2}^{5} \beta_{k,m} q_{ijk,t} + \sum_{k=2}^{5} \delta_{k,m} q_{ijk,t} \times SC_{j,t} + \gamma_m SC_{j,t} + \theta_j + \lambda_t + \epsilon_{ijm,t} \qquad (1)$$

where $Y_{ijm,t}$ represents the occupational choice m of the individual i in country j at time t, m taking the values 0, 1 and 2 respectively for "Non-worker", "Wage worker" and "Self-Employed"; $q_{ijk,t}$ takes the value 1 if the individual's net wealth in country j at time t is in the k^{th} quantile of the distribution across countries. The first quintile ($k = 1$) is omitted because of the constant parameter in the specification. $SC_{j,t}$ denotes our measure of start-up costs. θ_j and λ_t denote respectively country fixed effects and time fixed effects; $\epsilon_{ijm,t}$ represent the error term which is assumed to follow a logistic distribution. $X_{ij,t}$ is a vector of control variables (including the constant parameter). The control variables include individual demographic characteristics and country level regulation measures.

To be specific, the demographic variables we control for, are the individual's age (and the

age squared–to capture non-linearity in the age effects), his (her) gender, his (her) level of education (highly educated or not), his (her) marital status, the household size and health status. We also add an interaction term between the level of education and our measure of start-up costs, to capture the fact that the fraction of entrepreneurs in a specific country could depend on the share of highly educated people in this country. Another motivation for the inclusion of this interaction term is that, the level of entry costs might impinge on the type (or quality) of entrepreneurship. For instance, Monteiro and Assuncao (2012), Branstetter et al. (2013) and Rostam-Afschar (2013) find that low start-up regulations lead to the entry of low ability entrepreneurs who are mainly active in low-tech industries (e.g. retailing businesses). In the same vein, Block et al. (2015) argue that start-up costs impose a selection effect and increase the likelihood of innovative entrepreneurship in a country.

Let us examine the equation (1). For the start-up costs hypothesis to be validated, we should have $\beta_{5,2} > \beta_{4,2} > \beta_{3,2} > \beta_{2,2} > \beta_{1,2} > 0$ and $\delta_{k,2} < 0$. In other words, there exists a positive relationship between entrepreneurship and wealth (individuals belonging to wealthier quantiles are relatively more likely to be entrepreneur) but the slope of this relationship flattens with the magnitude of start-up costs at the country level. Another interpretation is that, the marginal value of wealth (for entrepreneurship entry) is decreased in countries with more substantial start-up costs. The inclusion of time fixed effects ensures that any cyclical effects of entrepreneurship entry in itself, are taken into account.

3.2 The dynamic specifications

Next, we turn our attention to the potential effects of the global financial crisis. The strategy here, is to exploit the timing of the global crisis to capture its effects. In particular, we assume that ceteris paribus, the effects of the crisis (if any at all) should be more pronounced in 2008. In fact, although the crisis officially started in the second half of 2007, 2008 was the "year of disaster". However, because 2008 individual data are only available for two countries (US

and England), the year 2010 is our period of particular interest to capture the crisis effects.

In order to investigate whether wealth played a bigger role for entrepreneurship entry during the crisis, we estimate the following equation, where the notations are unchanged.

$$Y_{ijm,t} = \alpha_m X_{ij,t} + \sum_{k=2}^{5} \beta_{k,m} q_{ijk,t} + \sum_{k=2}^{5} \eta_{k,m} q_{ijk,t} \times \lambda_t + \sum_{k=2}^{5} \delta_{k,m} q_{ijk,t} \times SC_{j,t}$$

$$+ \gamma_m SC_{j,t} + \theta_j + \lambda_t + \epsilon_{ijm,t} \tag{2}$$

The difference between equation (1) and equation (2) is the third term in the right hand side of equation (2): the interaction terms between wealth quintiles and period indicators. Special attention will be put on the parameters $\eta_{k,2}$, which will tell us how different are the slopes of the self-employment-wealth relationship across the periods. If the financial crisis made it particularly difficult for individuals to start a new venture because of more severe liquidity constraints, wealth should play a bigger role during 2010 (compared to the periods 2004, 2006 and 2012). Therefore, we should expect the 2010 interaction parameters to be significantly greater than the others (2004, 2006, 2012), for individuals belonging to top wealth classes (Quantiles 4 and 5), but lower for those belonging to bottom wealth classes (Quantiles 1 to 3). In other words, every other things being equal, wealthier people should be the ones more able to start a new venture during the crisis because of the occuring severe liquidity constraints. On the other hand, individuals at the bottom of the wealth distribution should be less likely to be entrepreneur in 2010 compared to the other years. Keep also in mind that the inter-period comparison is made independently for each wealth (quantile) class.

Finally, we examine whether the influence of start-up costs on the wealth-entrepreneurship relationship is different across the periods. This is implemented by adding to the previous specification (2), interaction terms of wealth, start-up costs and period indicators. That is,

by estimating:

$$Y_{ijm,t} = \alpha_m X_{ij,t} + \sum_{k=2}^{5} \beta_{k,m} q_{ijk,t} + \sum_{k=2}^{5} \eta_{k,m} q_{ijk,t} \times \lambda_t + \sum_{k=2}^{5} \delta_{k,m} q_{ijk,t} \times SC_{j,t}$$

$$+ \sum_{k=2}^{5} \psi_{k,m} q_{ijk,t} \times SC_{j,t} \times \lambda_t + \gamma_m SC_{j,t} + \lambda_t + \theta_j + \epsilon_{ijm,t} \quad (3)$$

The parameters of special interest in this full specification are the $\psi_{k,2}$ on the interaction terms of wealth, start-up costs and period dummies. They tell us if the negative impact of start-up costs on the self-employment-wealth relationship, vary with the periods. In particular, we examine whether the joint effect of start-up costs and liquidty constraints is (significantly) more severe during 2010 compared to the other periods. Remark that we still control for the non-dynamic impact of start-ip costs, as well as the (stand-alone) dynamic effect of wealth– that is, the third term in the right hand side of equation (2).

We implement a multinomial logit estimation for all our equations of interest. Because there is no natural baseline (comparison) outcome, we choose respectively Non-Worker and Worker as baseline outcomes. The first because it represents the most frequent outcome and also due to the age feature of our sample (older people). The second choice is to facilitate interpretation of entrepreneurship entry in direct comparison with wage work. We discuss all the estimation findings in the next section.

4 Estimation Results

We first present results from testing the (simple) start-up costs hypothesis (equation (1)). Then we discuss the crisis estimation results. All the estimation tables report marginal effects (instead of simple coefficients). The models generally fit well the data as shown by

the Pseudo R^2. Although we report outcome results for both self-employed and workers, our main interest and discussion are on the former (Predicted Outcome: Self-Employed). Because, estimated effects for the predicted outcome "Self-Employed" are not sensitive to the choice of baseline outcomes (Non-worker or Wage worker), we only present estimation tables with "Non-worker" as comparison outcome. Note however that the interpretations should always be made in reference to the benchmark outcome.

4.1 Testing the Start-up Costs Hypothesis: The baseline specification

Table 4 shows the results from estimating (1) taking "Non worker" as baseline outcome. Results confirm the positive relationship between self-employment and wealth (for all quintiles). That is, there exists a certain hierarchy in the marginal effects of wealth (as should be expected): individuals in the fifth quantile (the wealthiest) are relatively more likely than any other one to become self-employed compared to non-worker; those in the fourth quantile (Q4) are relatively more likely than others in poorer quantiles, and so on. Notice for instance that, this is not true for the wage workers: Especially , since the parameter on the fifth quintile is not significantly different of zero, that means that both individuals at the bottom and at the top of the wealth distribution have the same relative propensity to become self-employed.

The estimated positive relationship between self-employment and wealth is necessary but not sufficient to validate the start-up costs hypothesis. We also need to look at the sign of the quintiles interaction terms with start-up costs. With the exception of the fifth quintile, all others' interactions with start-up costs are significantly negative. Interestingly enough, the marginal effects are more pronounced in the middle of the wealth distribution (Quantile 3 and Quantile 4). The fact that the start-up costs' effects are found to be absent at the top of the wealth distribution is simply because the wealthiest are very unlikely to feel the burden

of entry costs. In particular, our empirical results show that the marginal effect of wealth on the relative probability to be self-employed is smaller in countries with more substantial start-up costs. In fact, depending on the wealth class of individuals (and/or the extent of start-up costs), some people could well find it difficult to entrer entrepreneurship.. The reason is that, these costs decrease the marginal value of wealth under liquidity constraints.

The estimated (direct) marginal effect of start-up costs on the relative probability to become self-employed is found to be significantly positive (at the 10% level). Note however, that this is not a robust[8] result throughout all our specifications. That is, other things being equal, individuals are relatively more likely to become self-employed in countries with bigger start-up costs. Recall that we find a similar correlation (Figure 2) with aggregate country level self-employment rates. We emphasize the fact that this finding is not inconsistent with the start-up costs hypothesis. A positive (or negative for that matter) relationship between the relative propensity to become enrtepreneur and start-up costs, is in itself not that informative. What really matters, is the fact that these entry regulations soften the marginal value of wealth under liquidity constraints, thereby constituting an additional burden to overcome. If the aspiring entrepreneur is wealthy enough, start-up costs should not deter him (her) from his (her) purpose. Otherwise, he (she) might be discouraged by the costly entry regulations.

As discussed earlier in the paper, the wealth variable used to undertake the analysis, is not ex ante, but rather a measure of wealth at the time of the survey – that is current wealth. Therefore, one may (rightfully) think that the estimated marginal effects of wealth are biased because of the endogeneity of this variable[9]. We use current wealth as proxy for ex ante wealth. However, as a robustness check, we reestimate (1), using the previous period/wave's wealth as our indicator. The results in table C1 in Appendix C (using previous period's wealth measure) should be compared to those reported in table 5. As can be seen, the findings are generally the same. Besides, although it is true that many other observable and unobservable factors are likely to influence the occupational choice, our focus and interest

Table 5 – Pooled Multinomial Logit estimation with Non-Worker as comparison outcome – Start-up Costs Hypothesis

	Baseline Outcome: Non-Worker	
	Self-Employed	Wage Worker
Q2 Wealth	0.024***	0.074***
	(0.004)	(0.006)
Q3 Wealth	0.031***	0.066***
	(0.004)	(0.006)
Q4 Wealth	0.046***	0.049***
	(0.004)	(0.007)
Q5 Wealth	0.087***	0.003
	(0.004)	(0.007)
Q2 Wealth * SC	-0.008*	-0.057***
	(0.005)	(0.008)
Q3 Wealth * SC	-0.014***	-0.046***
	(0.005)	(0.008)
Q4 Wealth * SC	-0.013***	-0.032**
	(0.008)	(0.008)
Q5 Wealth * SC	-0.000	-0.012
	(0.005)	(0.009)
Credit	0.042***	0.032*
	(0.009)	(0.017)
SC	0.010*	0.026**
	(0.006)	(0.011)
Household Size	0.002**	0.007***
	(0.001)	(0.002)
Age	-0.017***	-0.027***
	(0.002)	(0.004)
Age Square	0.000***	-0.000
	(0.000)	(0.000)
High Education	0.017***	0.079***
	(0.003)	(0.004)
SC * High Education	0.005	0.033***
	(0.004)	(0.007)
Good Health	-0.016***	-0.053***
	(0.002)	(0.003)
Poor Health	-0.052***	-0.227***
	(0.002)	(0.005)
Female	-0.056***	-0.054***
	(0.002)	(0.003)
Married	-0.007***	-0.008*
	(0.002)	(0.004)
Tax	-0.001	-0.005***
	(0.000)	(0.001)
Replacement Ratio	-0.000	-0.000
	(0.000)	(0.000)
Constant	0.662***	2.059***
	(0.073)	(0.161)
Country Fixed Effects	Yes	Yes
Period Fixed Effects	Yes	Yes
Observations	130000	
Pseudo R^2	0.257	

Estimated coefficients are marginal effects at mean. Clustered standard errors at the individual level are in parenthesis. ***, **, * denote respectively significance at the 1%, 5% and 10% levels.

in this paper is on the role of start-up costs (as an institution). Since these entry regulations are measured at the country level, we should not expect any bias on their impact on the self-employment-wealth relationship.

4.2 Dynamic Analysis: Impacts of the Global Crisis

Without further ado, we now examine how the global financial crisis might have impinged on the occupational choice decision through its effects on wealth and start-up costs. We report in table 6, the results from estimating equation (2). For the sake of readability, we only show here, the estimation parameters of the key variables of interest. Note that 2004 is the omitted (reference) year. The negative impact of entry costs on the self-employment-wealth relationship is still present. We can however, notice that almost none of the interaction parameters between wealth quintiles and year indicators, is significant. In particular, the 2010 interaction terms do not seem to significantly differ from those of the 2004, 2006 and 2012 periods, and this holds for individuals in all wealth classes. What this suggests is that, there was no particular impact of the crisis on the wealth-entrepreneurship relationship. But what about the negative impact of start-up costs on this relationship? Is there any dynamic pattern?

Table 7 displays the results from the estimation of equation (3): the full dynamic specification[10]. An interesting pattern emerges. The year 2010 interaction terms with Start-up Costs and wealth quintiles (3, 4 and 5) become significantly negative (estimated marginal effects of -0.023, -0.015 and -0.022) respectively at the 1%, 10% and 1% significance level. Recall that the inter-period comparison is made within each wealth class and also that the year 2004 is the omitted benchmark comparison period in our estimations. For instance, if we consider individuals belonging to the wealth quantile 3 (those in the middle of the distribution), and taking into account that the estimated interaction coefficient of Q3 with Start-up Costs (SC) and year 2006, is also significantly negative (-0.019 at the 1% level),

Table 6 – Pooled Multinomial Logit estimation with Non-Worker as comparison outcome – Wealth and Period Interactions

	Baseline Outcome: Non-Worker	
	Self-Employed	Wage Worker
Q2 Wealth	0.028***	0.063***
	(0.006)	(0.009)
Q3 Wealth	0.033***	0.060***
	(0.006)	(0.009)
Q4 Wealth	0.045***	0.040***
	(0.006)	(0.009)
Q5 Wealth	0.087***	-0.011
	(0.005)	(0.009)
Q2 Wealth * SC	-0.008	-0.053***
	(0.005)	(0.008)
Q3 Wealth * SC	-0.013**	-0.044***
	(0.005)	(0.008)
Q4 Wealth * SC	-0.012**	-0.031***
	(0.005)	(0.009)
Q5 Wealth * SC	0.000	-0.008
	(0.005)	(0.009)
Q2 Wealth * Year 2006	-0.011	0.012
	(0.007)	(0.011)
Q3 Wealth * Year 2006	-0.006	0.007
	(0.007)	(0.010)
Q4 Wealth * Year 2006	-0.008	0.020
	(0.006)	(0.010)
Q5 Wealth * Year 2006	-0.009*	0.010
	(0.006)	(0.009)
Q2 Wealth * Year 2010	-0.005	0.013
	(0.007)	(0.012)
Q3 Wealth * Year 2010	-0.006	0.009
	(0.007)	(0.011)
Q4 Wealth * Year 2010	0.001	0.012
	(0.007)	(0.011)
Q5 Wealth * Year 2010	0.004	0.028**
	(0.006)	(0.011)
Q2 Wealth * Year 2012	-0.002	0.026**
	(0.007)	(0.012)
Q3 Wealth * Year 2012	0.001	0.010
	(0.007)	(0.013)
Q4 Wealth * Year 2012	0.010	-0.001
	(0.007)	(0.013)
Q5 Wealth * Year 2012	0.005	0.028**
	(0.007)	(0.013)
Country Fixed Effects	Yes	Yes
Period Fixed Effects	Yes	Yes
Control Variables	Yes	Yes
Observations	130000	
Pseudo R^2	0.257	

Estimated coefficients are marginal effects at mean. Clustered standard errors at the individual level are in parenthesis. ***, **, * denote respectively significance at the 1%, 5% and 10% levels. Year 2004 is the omitted (benchmark comparison) period.

our estimated parameter of -0.023 (for the 2010 interaction term), suggests that entry costs exert a more pronounced negative impact on the propensity of those individuals to become self-employed, in 2010 compared to the periods 2004, 2006 and 2012. That is the case for individuals in the fourth quantile, and even those at the top of the wealth distribution (fifth quantile). Because we exploit time variation to capture the crisis effects, these findings can be interpreted this way: Although the global crisis had not made wealthier people particularly more likely to start a new venture, it seems to have a negative impact on the propensity to become self-empployed, when the occurring severe liquidity constraints that took place during that period, are coupled with the additional burden of start-up costs. Interestingly enough, we also find that the non-dynamic effects of start-up costs (the wealth quintiles interaction terms with start-up costs) become insignificant once we introduce the dynamic effects (interactions with period indicators). This result highlights the fact that the joint effects of liquidity constraints and start-up costs on the propensity to become self-employed, have an important dynamic component, thus are likely to vary with the business cycle.

A few words can be said regarding our control variables. With respect to the socio-demographic variables, the results are generally consistent with what has been documented in many other empirical studies in the occupational choice literature. For instance, highly educated individuals and men are relatively more likely to be self-employed, while married persons are found to be less inclined to become so. Since our target population is people aged 50 and more, the entrepreneurship-age profile has an inverted U-shape, which is consistent with the fact that self-employment increases with age, but at the same time, highlights the evidence that the non-employment population is rather preponderant (compared to entrepreneurs) after a certain advanced age. We do not find significant evidence that higher start-up costs are associated with higher quality (or innovative) entrepreneurship. Recall that we capture this possibility by introducing an interaction term between start-up costs and education (a proxy for ability). This result is somehow consistent with the ambiguity that exists in this regard in the literature. In fact, it has also been argued that low start-up

Table 7 – Pooled Multinomial Logit estimation with Non-Worker as comparison outcome – Testing Crisis and Start-up Costs Interaction Effects

	Baseline Outcome: Non-Worker	
	Self-Employed	Wage Worker
Q2 Wealth	0.029***	0.063***
	(0.006)	(0.009)
Q3 Wealth	0.036***	0.060***
	(0.006)	(0.009)
Q4 Wealth	0.047***	0.039***
	(0.006)	(0.009)
Q5 Wealth	0.088***	-0.012*
	(0.006)	(0.009)
Q2 Wealth * Year 2006	-0.012	0.005
	(0.008)	(0.012)
Q3 Wealth * Year 2006	-0.013*	0.007
	(0.007)	(0.011)
Q4 Wealth * Year 2006	-0.011	0.022**
	(0.007)	(0.010)
Q5 Wealth * Year 2006	-0.011*	0.011
	(0.006)	(0.010)
Q2 Wealth * Year 2010	-0.009	0.026**
	(0.009)	(0.013)
Q3 Wealth * Year 2010	-0.016**	0.007
	(0.008)	(0.011)
Q4 Wealth * Year 2010	-0.006	0.020
	(0.007)	(0.012)
Q5 Wealth * Year 2010	-0.006	0.036***
	(0.007)	(0.012)
Q2 Wealth * Year 2012	0.053	0.334***
	(0.049)	(0.079)
Q3 Wealth * Year 2012	0.063	-0.096
	(0.041)	(0.076)
Q4 Wealth * Year 2012	-0.039	-0.287***
	(0.038)	(0.083)
Q5 Wealth * Year 2012	0.000	-0.369***
	(0.037)	(0.104)
Q2 Wealth * SC * Year 2006	-0.002	-0.018
	(0.007)	(0.011)
Q3 Wealth * SC * Year 2006	-0.019***	-0.004
	(0.006)	(0.010)
Q4 Wealth * SC * Year 2006	-0.008	0.006
	(0.006)	(0.010)
Q5 Wealth * SC * Year 2006	-0.005	0.005
	(0.004)	(0.010)
Q2 Wealth * SC * Year 2010	-0.007	0.026*
	(0.010)	(0.016)
Q3 Wealth * SC * Year 2010	-0.023***	0.014
	(0.009)	(0.014)
Q4 Wealth * SC * Year 2010	-0.015*	0.017
	(0.007)	(0.014)
Q5 Wealth * SC * Year 2010	-0.022***	0.016
	(0.006)	(0.014)
Q2 Wealth * SC * Year 2012	0.086	0.483***
	(0.076)	(0.123)
Q3 Wealth * SC * Year 2012	0.094	-0.172
	(0.063)	(0.123)
Q4 Wealth * SC * Year 2012	-0.082	-0.461***
	(0.060)	(0.133)
Q5 Wealth * SC * Year 2012	-0.010	-0.621***
	(0.058)	(0.162)

Year 2004 is the omitted (benchmark comparison) period. We still control for the non dynamic effects of SC on wealth quintiles, and they turn out to be all insignificant for the entrepreneurs predicted outcome. They are omitted from the table for the sake of readability.

costs may lead to the entry of high quality entrepreneurs because lower costs are associated with more dynamic markets and lower levels of corruption (see Djankov et al., 2002 or De Soto, 1989). As for the institutional control variables, we find that better access to credit has a positive effect on the relative propensity to become self-employed. However, the tax regulations and the replacement ratio configurations do not appear to play a significant role in the occupational choice decision.

5 Conclusion

Recent theoretical work and empirical evidence show that institutional factors such as the extent of liquidity constraints and start-up costs, significantly influence the individual decision to become self-employed. This paper takes advantage of new data to further explore this issue. Our interest has been on the joint effect of liquidity constraints and start-up costs on the propensity of individuals to start their own business. We refer to this effect as the start-up costs hypothesis. The idea is that, wealthier individuals are more likely to become self-employed, yet start-up costs decrease the marginal value of wealth. As a result, there is an increase in the minimum level of wealth which is optimally required to start one own business. We stress the fact that start-up costs in our sense, need to be viewed as a disutility coming from the burdensome regulations that an aspiring entrepreneur has to comply with, before starting his (her) new venture. The dynamic feature of our data has allowed us, in particular, to investigate effects of the 2008 global crisis. The latter has brought the issue of liquidity constraints to the forefront because of the large and rapid decline in personal wealth and venture capital funding, as well as the severe tightening of credit to small businesses, which took place. Given this unfavourable global economic and financial environment, one can imagine that wealth might play a bigger role for entrepreneurship entry, and that the marginal effects of start-up costs might be more pronounced.

We have documented a positive relationship between self-employment and wealth. More

importantly, the start-up costs hypothesis is supported by our empirical analysis. Our identification strategy has been to exploit the timing of the crisis to capture its effects. We have not found strong evidence that wealth had particularly played a bigger role during the crisis period (that is in 2010, compared to the periods before and after). However, results clearly show that the detrimental impacts of start-up costs–on the entrepreneurship-wealth relationship– had been more marked during the crisis. In other words, the addition of start-up costs to the liquidity constraints, had been the main driver of the negative influence of the global crisis.

Our analysis is based on data on older people (50-80 years old). We have highlighted the fact that the effects of entry costs essentially depend on individual's level of wealth. Assuming that older people are generally wealthier than younger people, the effects might be particularly substantial if the latter are included in the analysis. It might be interesting to perform a life cycle empirical investigation. But this depends in great extent on the availability of relevant data. Further research could also build on the evidence in this paper to investigate at the theoretical level the mechanisms through which costly entry regulations could intervene in the occupational choice decision during times of severe liquidity constraints such as in credit crunches or following negative wealth shocks.

References

[1] Block, J. H. , P. Darnihamedani, J. Hessels and A. Simonyan, 2015, "Start-up Costs, Taxes and Innovative Entrepreneurship", *Tinbergen Institute Discussion Paper* 2015-013/VII

[2] Bosch, M. and W. Maloney, 2008, "Cyclical Movements in Unemployment and Informality in Developing Countries", mimeo.

[3] Branstetter, L. , F. Lima, L. J. Taylor and A. Venancio, 2013, "Do Entry Regulations

Deter Entrepreneurship and Job Creation? Evidence from recent reforms in Portugal", *The Economic Journal* 124(577), 805-832.

[4] Cagetti, M. and M. De Nardi, 2006, "Entrepreneurship, Frictions, and Wealth", *Journal of Political Economy* 114(5), 835-870.

[5] De Soto, H. ,1989, "The Other Path: The Invisible Revolution in the Third World", *New York, USA: Harper and Row.*

[6] Djankov, S. , R. La Porta, F. Lopez-de-Silanes and A. Shleifer, 2002, "The Regulation of Entry", *Quaterly Journal of Economics* 117(1), 1-37.

[7] Evans, D. S. and B. Jovanovic, 1989, "An Estimated Model of Entrepreneurial Choice under Liquidity Constraints", *Journal of Political Economy* 97(4), 808-827.

[8] Fonseca, R., P. Lopez-Garcia and C. A. Pissarides, 2001, "Entrepreneurship, Start-up Costs and Employment", *European Economic Review* 45(4-6), 697-705.

[9] Fonseca, R., P. C. Michaud and T. Sopraseuth, 2007, "Entrepreneurship, Wealth, Liquidity Constraints and Start-up Costs", *Comparative Law and Policy Journal* 28(4), 637-674.

[10] Hochguertel, S. , 2010, "Self-Employment Around Retirement Age", *Tinbergen Institute Discussion Paper* (TI) 2010-067/3.

[11] Hurst, E. and A. Lusardi, 2004, "Liquidity Constraints, Household Wealth and Entrepreneurship", *Journal of Political Economy* 112(2), 319-47.

[12] Kaiser, H. F. , 1960, "The Application of Electronic Computers to Factor Analysis", *Educational and Psychological Measurement* 20, 141-151.

[13] Klapper, L. , L. Laeven and , R. Rajan, 2006, "Entry Regulation as a Barrier to Entrepreneurship", *Journal of Financial Economics* 82(3), 591-629.

[14] Loayza, N. V. and J. Rigolini, 2011, "Informal Employment: Safety Net or Growth Engine?", *World Development* 39(9), 1503-1515.

[15] Monteiro, J. C. M. and J. J. Assuncao, 2012, "Coming out of the Shadows? Estimating the Impact of Bureaucracy Simplifications and Tax Cut on Formality in Brazilian Microenterprises", *Journal of Development Economics* 99(1), 105-115.

[16] Nicoletti, G. , S. Scarpetta and O. Boylaud, 1999, "Summary Indicators of Product Market Regulation with an Extension to Employment Protection Legislation", *OECD Economics Department Working Paper 225*

[17] Quadrini, V. , 2009, "Entrepreneurship in Macroeconomics", *Annals of Finance* 5(3-4), 295-311.

[18] Quinn, J. F. ,1980, "Labor Force Patterns of Older Self-Employed Workers", *Social Security Bulletin* 43(4), 17-28.

[19] Rissman, E. R. , 2007, "Labor Market Transitions and Self-Employment", *Working Paper No. 2007-14, Federal Reserve Board of Chicago.*

[20] Rostam-Afschar, D. , 2013, "Entry Regulation and Entrepreneurship: A Natural Experiment in German Craftsmanship", *Empirical Economics*, December, 1-35.

[21] Zissimopoulos, J. M. and L. A. Karoly, 2007, "Transition to Self-Employment at Older Ages: The Role of Wealth, Health, Health Insurance and Other Factors", *Labour Economics*14(2), 269-295.

Notes

[1]We use the terms start-up costs and entry costs interchangeably throughout the paper

[2]The third wave (SHARELIFE) which is conducted in 2008/2009, focusses on people's life histories and is not relevant for our work.

[3]Because the 2008 observations are only available for ELSA and SHARE, we do not include them in the econometric analysis undertaken in the next section.

[4]We use the terms "self-employed" and "entrepreneur" interchangeably.

[5]See OECD (2011), Labour Force Statistics or World Development Indicators (World Bank DataBank)

[6]Kaiser (1960)'s criterion (which is to keep factors with eigenvalues ≥ 1) is used to retain relevant factors and predict scores. The latter are centered to 0 and normalized to have unit variance by default.

[7]Further details on all these indicators can be found on the World Bank's Doing Business website.

[8]In fact, the "Start-up Costs" variable (SC) loses its significance in our full specification: equation (3)

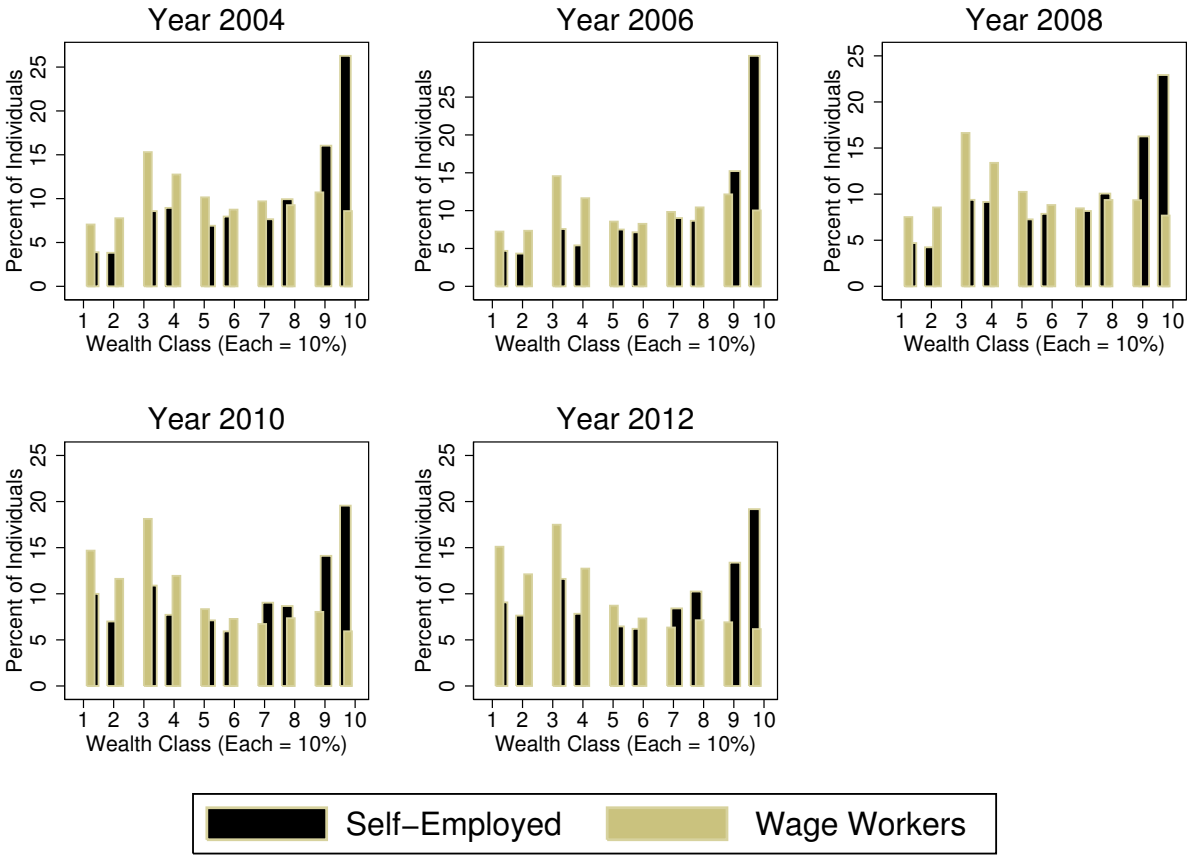
[9]Using current wealth instead of wealth at the moment of transitioning, can be viewed to some extent, as committing a measurement error on the true value of wealth (ex ante). In that particular case, our estimated effects should suffer from attenuation bias (downward bias). This bias is not a concern here because a correction would only strengthen our main results. Another source of endogeneity of the wealth variable is the reverse causality issue (simultaneity bias). That is, self-employment helping people to become wealthier. Although we cannot totally discard this possibility, one should nevertheless keep in mind that our measure of wealth is not an ex-post measure neither; therefore the bias (if any at all) is most likely to be marginal.

[10]We only report the key estimated interaction parameters of interest. Remaining estimates are available upon request

Appendices

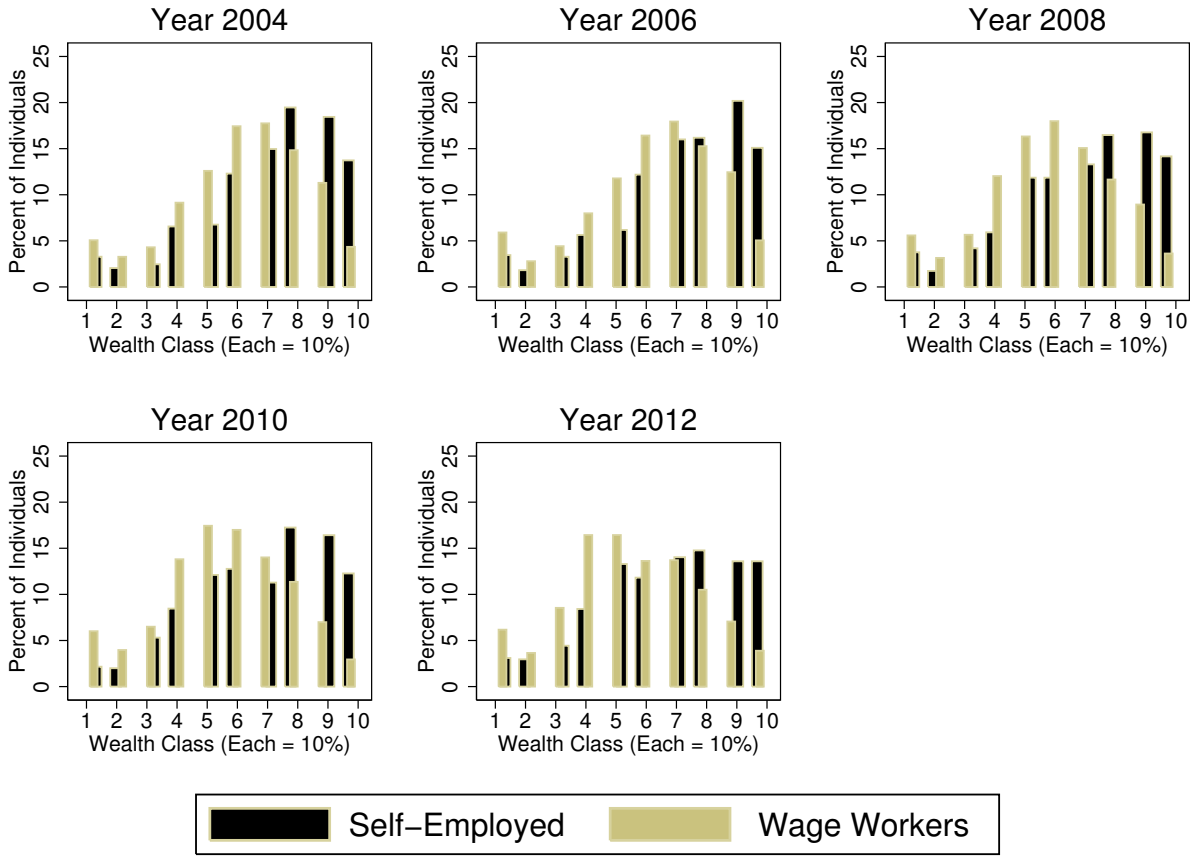
A Selected country figures

Figure A1. United States: Percentage of Self-Employed and Wage workers over Wealth Classes



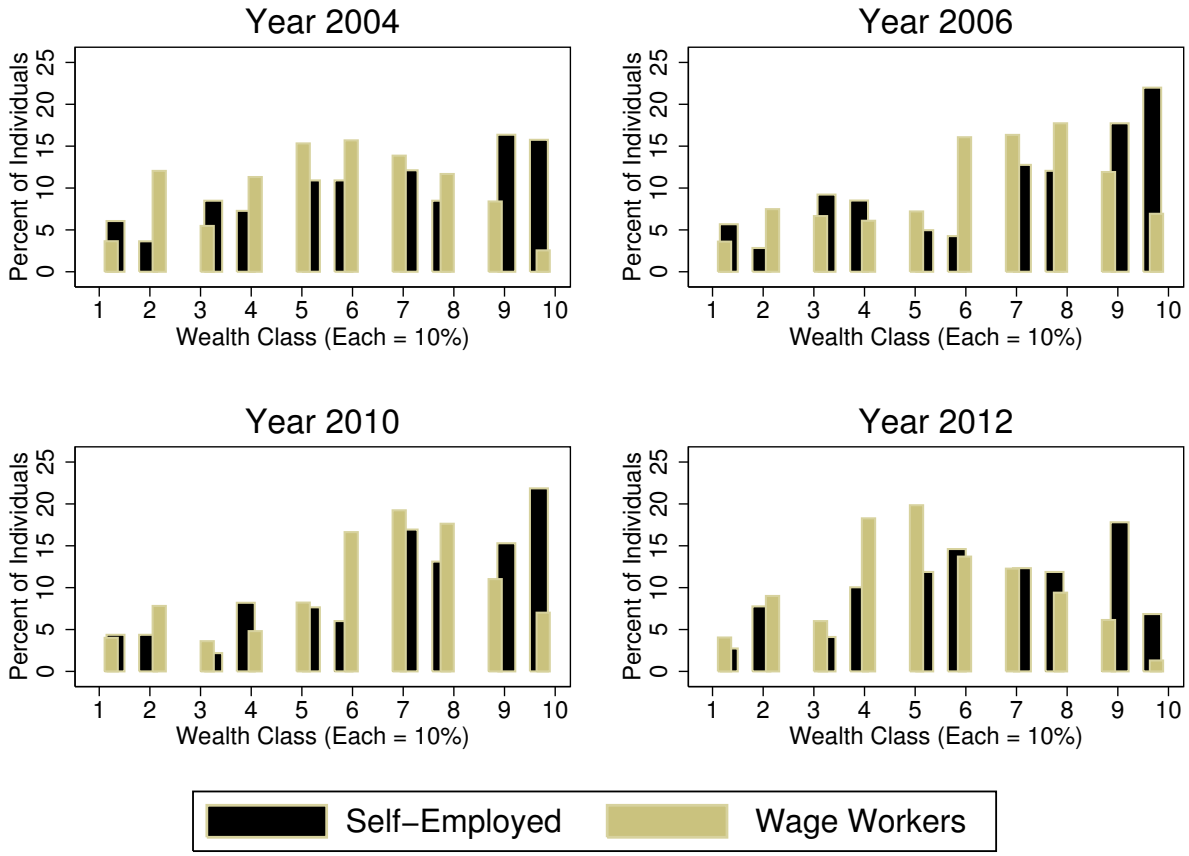
Note: SHARE, HRS and ELSA data and authors' calculations. Individuals are now sorted into 10 ascending equal wealth classes –Each includes 10 % of all individuals

Figure A2. England: Percentage of Self-Employed and Wage workers over Wealth Classes



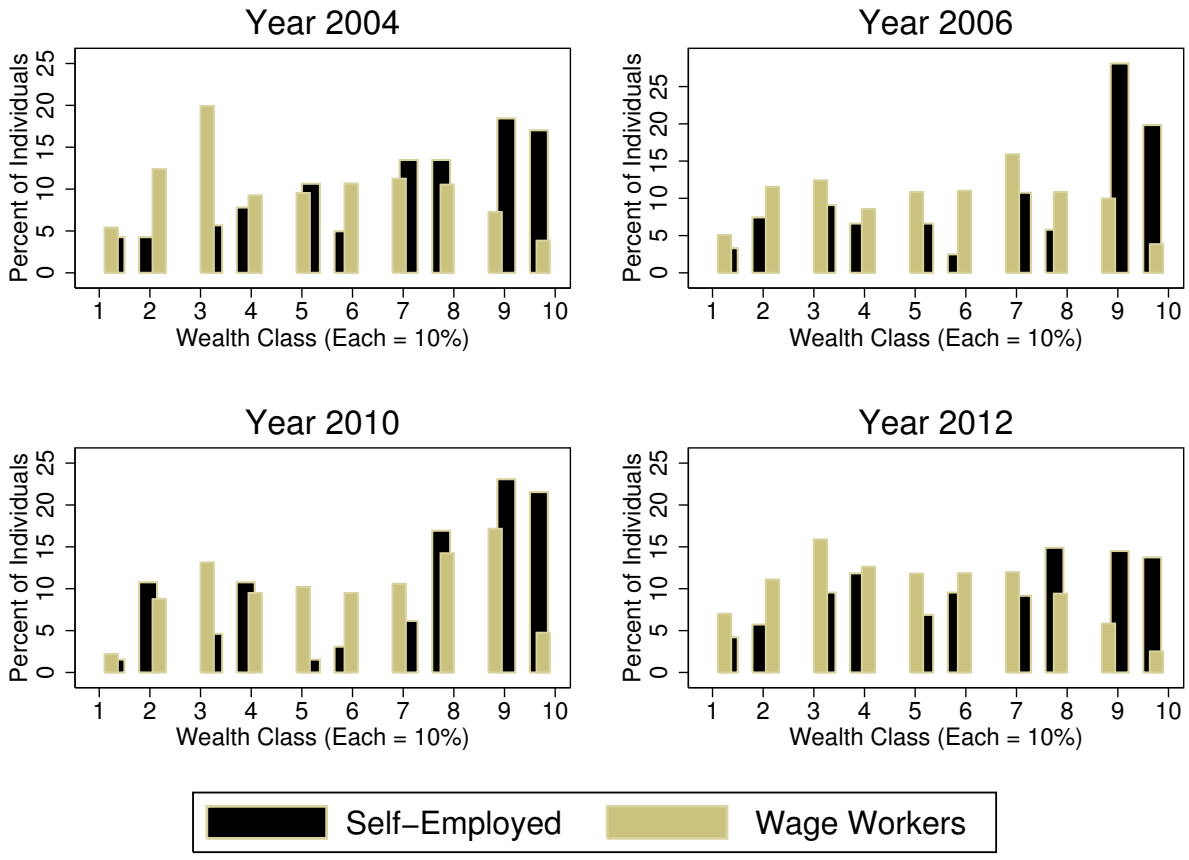
Note: SHARE, HRS and ELSA data and authors' calculations. Individuals are now sorted into 10 ascending equal wealth classes –Each includes 10 % of all individuals

Figure A3. Italy: Percentage of Self-Employed and Wage workers over Wealth Classes



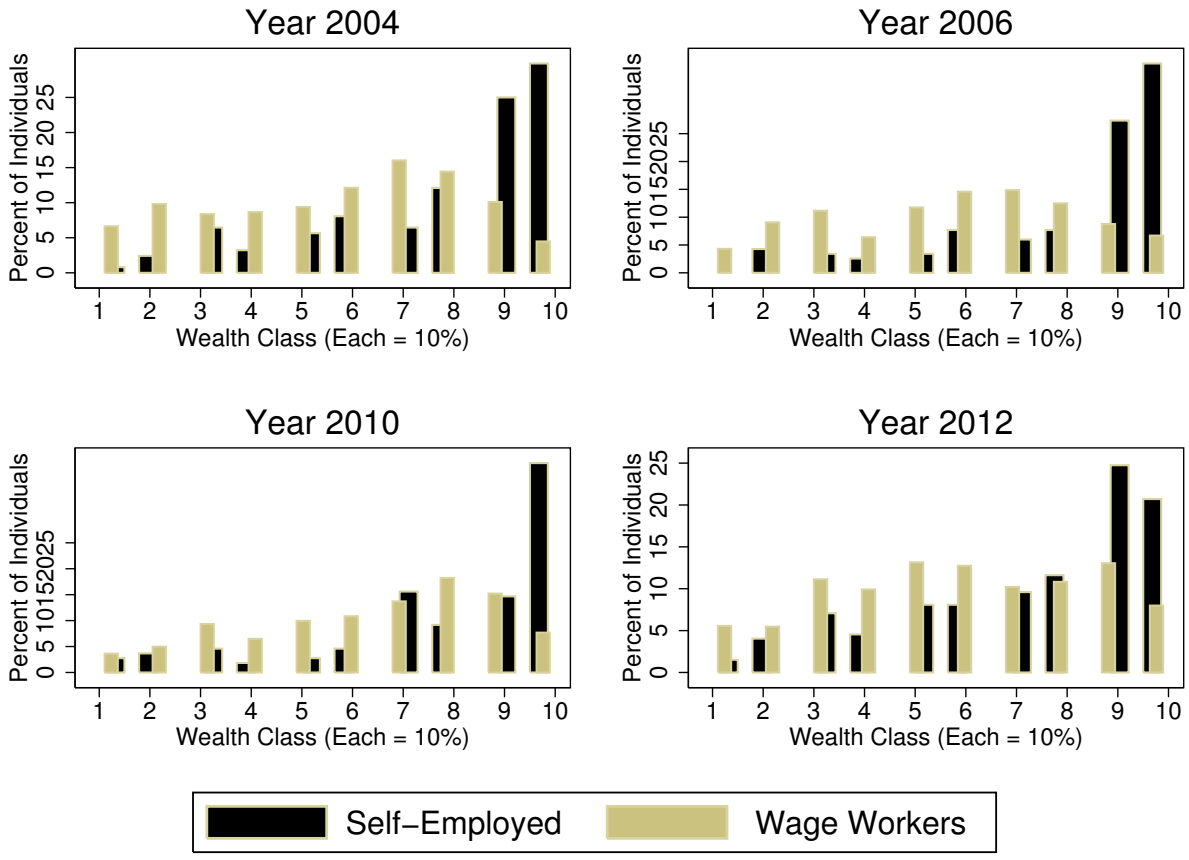
Note: SHARE, HRS and ELSA data and authors' calculations. Individuals are now sorted into 10 ascending equal wealth classes –Each includes 10 % of all individuals

Figure A4. Germany: Percentage of Self-Employed and Wage workers over Wealth Classes



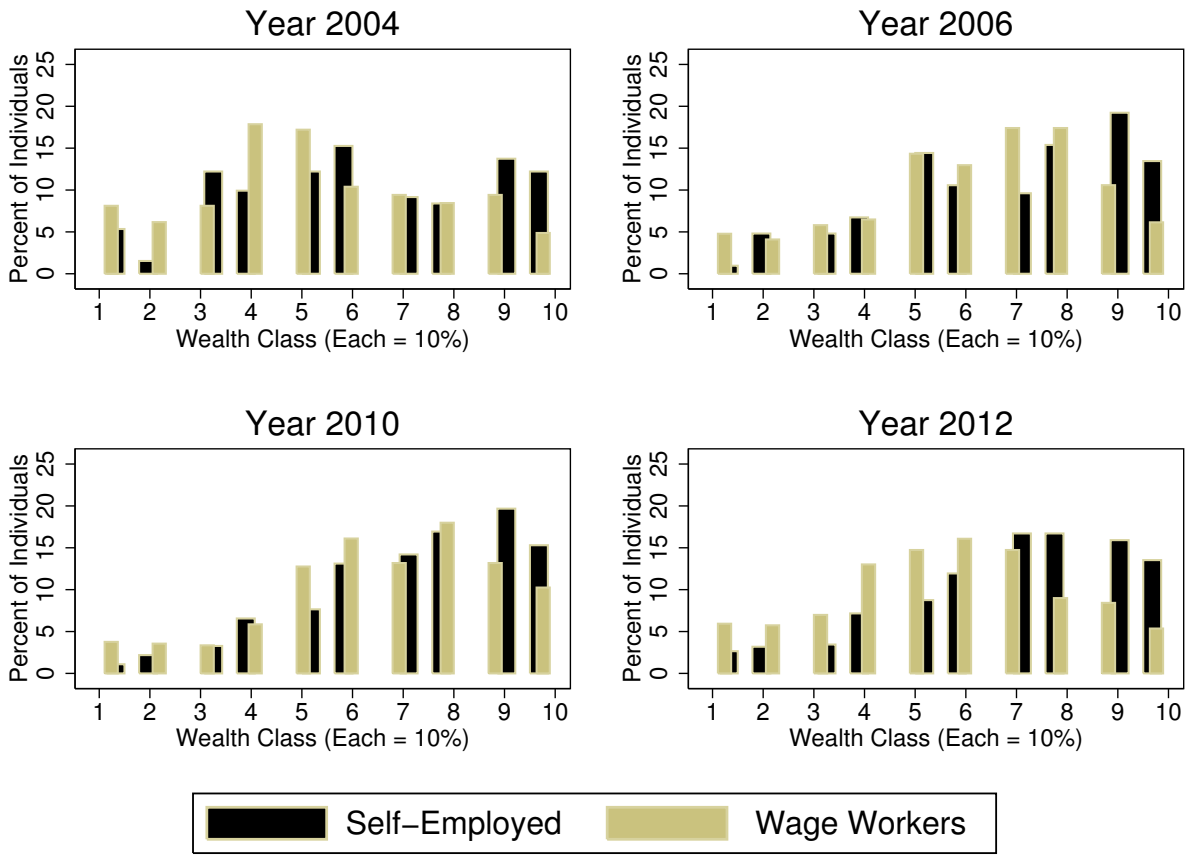
Note: SHARE, HRS and ELSA data and authors' calculations. Individuals are now sorted into 10 ascending equal wealth classes –Each includes 10 % of all individuals

Figure A5. The Netherlands: Percentage of Self-Employed and Wage workers over Wealth Classes



Note: SHARE, HRS and ELSA data and authors' calculations. Individuals are now sorted into 10 ascending equal wealth classes –Each includes 10 % of all individuals

Figure A6. Spain: Percentage of Self-Employed and Wage workers over Wealth Classes



Note: SHARE, HRS and ELSA data and authors' calculations. Individuals are now sorted into 10 ascending equal wealth classes –Each includes 10 % of all individuals

B Robustness

Table B1 – Pooled Multinomial Logit estimation with Non-Worker as comparison outcome – Start-up Costs Hypothesis: Using Previous Period's Wealth

	Baseline Outcome: Non-Worker	
	Self-Employed	Wage Worker
Q2 Lag Wealth	0.022***	0.049***
	(0.004)	(0.006)
Q3 Lag Wealth	0.029***	0.029***
	(0.004)	(0.006)
Q4 Lag Wealth	0.041***	0.009
	(0.004)	(0.007)
Q5 Lag Wealth	0.076***	-0.044***
	(0.004)	(0.007)
Q2 Lag Wealth * SC	-0.010**	-0.041***
	(0.005)	(0.008)
Q3 Lag Wealth * SC	-0.018***	-0.035***
	(0.005)	(0.008)
Q4 Lag Wealth * SC	-0.020***	-0.012
	(0.005)	(0.009)
Q5 Lag Wealth * SC	-0.006	-0.019*
	(0.005)	(0.010)
Credit	-0.002	0.003
	(0.018)	(0.028)
SC	-0.038*	0.013
	(0.022)	(0.039)
Household Size	0.002**	0.007***
	(0.001)	(0.002)
Age	-0.020***	-0.060***
	(0.002)	(0.005)
Age Square	0.000***	0.000***
	(0.000)	(0.000)
High Education	0.017***	0.064***
	(0.003)	(0.005)
SC * High Education	0.009**	0.020***
	(0.004)	(0.007)
Good Health	-0.016***	-0.052***
	(0.002)	(0.004)
Poor Health	-0.050***	-0.208***
	(0.003)	(0.005)
Female	-0.051**	-0.047***
	(0.002)	(0.004)
Married	-0.007***	-0.002
	(0.003)	(0.005)
Tax	0.003*	-0.005
	(0.002)	(0.003)
Replacement Ratio	0.000	0.001
	(0.000)	(0.001)
Country Fixed Effects	Yes	Yes
Period Fixed Effects	Yes	Yes
Observations	80120	
Pseudo R^2	0.246	

Estimated coefficients are marginal effects at mean. Clustered standard errors at the individual level are in parenthesis. ***, **, * denote respectively significance at the 1%, 5% and 10% levels.