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Cross-cultural Empathic Communication of National Image: Analysis of International Communication Strategies and Effects of the Beijing Winter Olympic Games

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Abstract

With the advent of the international communication era, the multidimensionality of national image and the complexity of audience perception have become the real challenges facing national image communication. This paper compares the theoretical lineage and mechanism of national image and cross-cultural empathy communication, and points out that cross-cultural empathy communication, which pays more attention to audience characteristics and appeals to emotional empathy, can be a breakthrough in national image construction. The study specifies the cross-cultural empathy communication model of national image. Based on the international communication practices during the Beijing Winter (Paralympic) Games, this paper shows that the communicators of the Beijing Winter (Paralympic) Games mainly adopted communication strategies such as constructing multidimensional images for multiple subjects, deepening emotional identification, creative expressions to enhance interactive fun, and deepening emotions and cognition, which formed a new shared cultural space through the empathetic feedback and interaction of international audiences.

Keywords: communication, international communication, empathic communication, cross-cultural

1. Winter Olympics Communication and National Image

From the 2008 Beijing Summer Olympics to the 2022 Beijing Winter Olympics, the world political landscape and economic situation have changed dramatically, China's comprehensive national power has developed greatly, and the two-way relationship between China and the world, and the goals and visions of China's national image building have been constantly adjusted. The national image communication of this Beijing Winter Olympic Games has the outstanding characteristics of multi-dimensional connotation and subject to many layers. It is necessary to address people of different nationalities, cultural backgrounds and identity positions around the world and convey the image of China that contains multiple dimensions of civilization, technology, security and creativity.

Faced with a multi-dimensional communication environment with complex communication targets, the Beijing Winter Olympic Games has gradually awakened empathetic feedback from global audiences through direct audience demands, global consensus, creative expressions and deepened cultural connotations, setting an important benchmark for the media development of sporting events and an excellent example for considering how to realize empathetic communication of multi-dimensional national images. Therefore, this paper compares the real-life dilemmas of national image building, discusses in detail how empathic communication can empower China's national image building, and uses the international communication strategy and effect of the Beijing Winter Olympics as a case study to explore how both the transmitter and the receiver can form a new cultural space of communality in the process of empathic communication.

2. Multidimensional Communication of National Images: Status and Dilemmas

In fact, international communication researchers and practitioners have noticed the multidimensional nature of the country's image and the differences in audiences. However, with the rapid development of algorithmic technology, digital platforms are gradually becoming an important channel for international exchanges among different groups and a mainstream position for China to conduct international communication. "These new features of digital platforms provide opportunities to break down old communication barriers and create new communication spaces, but they also exacerbate problems such as the solidification of cognitive biases due to

algorithmic recommendations and the information cocoon effect. In the platform-based international communication environment, the multidimensionality of national images and the complexity of audience perceptions have been interpreted and polarized as never before.

Faced with the dilemma of national image communication theory and practice, we must rethink the essential characteristics and generation mechanism of national image, and propose a framework of national image construction that can not only gather consensus to the greatest extent, but also realize differentiated communication for the characteristics of different groups. This paper argues that through the reciprocal unification of the interests of the body and the interests of the others, and the sharing and co-creation of self-image and the perception of the others, cross-cultural empathic communication that pays more attention to audience differences and appeals to emotional resonance can become an important initiative for the construction of a multidimensional national image.

3. Cross-cultural Empathy: The Way of National Image Communication

This paper argues that the importance and feasibility of cross-cultural empathic communication of national images is based mainly on the essential link between national images and empathic communication. From the point of view of the occurrence mechanism, the state image can be considered as a product of empathy. As mentioned earlier, the image of the state is not a mechanical projection of the subject's will in the object's psyche, not a static and unchanging result, but a result of the interaction of different subjects. In this sense, there may be a discrepancy between the image of China as perceived by the public in other countries and the image constructed by China on its own initiative. The reason for this is that some of the dimensions of the image conveyed by China do not succeed in making the audience empathize, while some signals sent by other source subjects succeed in making the audience empathize and enter its cognitive system. Therefore, cross-cultural empathy is the only way to improve the effectiveness of national image communication. Only through active empathic substitution, symbolic code selection, positive feedback interaction and continuous adjustment, can the national image break through the barriers of information and cognitive barriers, and be truly felt and understood by the audience. Especially in the context of multi-dimensional national image communication for multi-dimensional audience groups, cross-cultural empathy communication has become an important initiative for national image communication.

This paper will further analyze the practical path of cross-cultural empathy communication based on the international communication strategies and effects of the Beijing 2022 Winter Olympic Games, which vividly illustrates the innovative meaning of cross-cultural empathy communication.

4. Beijing Winter Olympic Games: An Innovative Practice of Cross-cultural Empathetic Communication of National Image

As one of the largest and most influential international sporting events, the 2022 Beijing Winter Olympic Games is a grand stage to present a multidimensional national image to a diverse group of people. This paper focuses on the opening and closing ceremonies of the Beijing Winter Olympic Games and the Winter Paralympic Games, and analyzes the cross-cultural empathy significance of the opening ceremony elements, symbolic choices and creative expressions based on the director's statement and live presentation, so as to clarify the cross-cultural empathy communication mode of multidimensional national image. The study found that the communication subjects of the Beijing Winter Olympics adopted a cascading and interlocking communication strategy when communicating the national image, which is in line with the cascading nature of empathic communication.

4.1 Constructing a Multidimensional Image for Multiple Subjects

Only when the communication audience and the communication target are clearly defined can the communicator's empathic behavior have a place to land. Due to the inherent tension between the international and national character of the Olympic Games, it is often necessary to combine two sets of ideographic systems: the former refers to symbols that trigger responses through light, shadow and sound, which are not limited by language and cultural differences and are applicable to the largest international audience; the latter is more based on cultural consensus and is used to express the exclusive emotions among specific cultural groups. The Beijing Winter Olympic Games need to convey a multi-dimensional image of China to the widest audience at the same time, so the international communication has adopted a total and divided communication idea, which is not only cohesive but also highlights differences. Zhang Yimou, the chief director of the opening ceremony of the Winter Olympics, mentioned that he chose to have athletes and ordinary people rather than professional artists as the protagonists of the ceremony because he wanted to highlight the "people's nature" of the Winter Olympics, so the huge "snowflakes" made up of the names of all the participating countries and the release of the The huge "snowflakes" made up of the names of all the participating countries and the miniature torches releasing warmth

constitute a vivid metaphor for the unity of the world's people in confronting global challenges with the spirit of the community of human destiny. At the same time, the Beijing Winter Olympics will tell the memory of the "City of Two Olympics" to those who are familiar with the Beijing Summer Olympics, but also to those who do not know Beijing through the review of the 2018 Winter Olympics in Pyeongchang, South Korea and the prospect of the 2026 Winter Olympics in Milan-Cortina d'Ampezzo. But at the same time, through the review of the PyeongChang Winter Games in Korea in 2018 and the prospect of the Milan-Cortina Dampedzo Winter Games in 2026, viewers who do not know the history of Beijing as the "City of Two Olympics" can also perceive the historical depth of Olympic development. Through the organic combination of consensual and segmented communication, the Beijing Winter Olympics achieved a holistic perception and empathy for China's image.

4.2 Deepening Emotional Identity

After clearly defining the communication audience and image dimension, it is important to make the audience perceive the similarity between themselves and the communication subject through various means of meaningful symbols, which is the cornerstone of audience empathy. For example, during the New Crown epidemic, China and Japan used common cultural memory symbols such as "the mountains and rivers are different, but the wind and the moon are the same" and "the moon is the same as the two hometowns" to facilitate empathy between the aid recipients. In this year's Winter Olympics, the communicators evoked the shared emotions of the audience through a multimodal communication system, including the following aspects. First, the communicators highlighted the thematic elements of the world's common concern in the opening ceremony. With the addition of "more unity" to the Olympic motto, the international community hopes to unite the hearts and minds of the global community through sports events. Together for the Future" is China's powerful initiative for a "more united" world. Second, communicators use commonly perceived audiovisual texts. For example, the opening and closing ceremonies of the Beijing Winter (Paralympic) Games used the theme of "a snowflake" throughout. As an aesthetic and comprehensible visual symbol, the snowflake is a condensed expression of ice and snow sports and the spirit of the Winter Olympics. The audiovisual narrative of the Beijing Winter Olympics transcends the cognitive barriers of language and civilization. Third, the communicators have incorporated emotional memories that resonate with the world in the opening ceremony. The opening ceremony of the Beijing Winter Olympic Games has always taken "common feeling and unity" as the main tone, using the common narrative of human beings to convey the common aspirations of the world and express the common expectations of the global community for future development. Through the awakening of the common emotional vision of the hosts and the guests, the Beijing Winter Olympics has realized the emotional identification from "I" to "we" between the hosts and the guests.

4.3 Creative Expression for Interactive Fun

After the audience has formed an identity with the subject due to the connection of similarity, the communicator must enhance the audience's interactive experience of the communication process through aesthetic and creative expressions, so as to develop empathy to a deeper level on the premise that there is a clear boundary between the subject and the object. For example, the communicators of the Beijing Winter Olympics used the twenty-four solar terms in the opening ceremony to express the beautiful vision of the beginning of winter and the beginning of spring, and cleverly combined the twelve Chinese zodiac signs with ice skates in the closing ceremony. The creative expression of traditional cultural resources such as Chinese knots increases the interest of the communication content and provides the possibility for audiences to deepen their thinking and form deep empathy. The mascot of the Beijing Winter Olympics, Bingdun, has become a huge hit, based on the innovative design of the cute image of the panda. Creative expression can also be achieved through the creative development of emerging resources. One of the highlights of the opening ceremony of the Beijing Winter Olympics was the use of a miniature torch. The opening ceremony changed the tradition of burning torches from previous Winter Olympics, and used a lightweight miniature torch placed in the middle of the "snowflakes" made up of national nameplates, which not only brought a new sensory experience for the audience aesthetically, but also made a practical contribution to the low-carbon and green Olympics.

4.4 Deepening Emotions and Perceptions

The opening ceremony of the Beijing Winter Olympic Games incorporated spiritual implications in three main dimensions: first, to tell the world about China's cultural heritage and its development philosophy, and to demonstrate China's sincerity and goodwill; second, to call on the world to jointly implement the spirit of sports, athletics and the Olympic spirit, and to promote the development of ice and snow sports and the Olympic cause; third, to tell the world concept of "one family under heaven Thirdly, it tells the world concept of "one world" and

highlights the value of the community of human destiny. Through the organic integration of audiovisual symbols and spiritual connotations, the Beijing Winter Olympics communicators enable the international audience to feel close to them because of the commonality and gain pleasure because of the novel expressions, and then realize the leap from emotional empathy to cognitive empathy, from superficial similarity to deep identification, and finally construct a cascading empathic communication process.

5. Conclusion

This paper further clarifies the mechanism of cross-cultural empathic communication of multidimensional national image through the analysis of China's international communication strategies and effects during the Beijing Winter Olympics. It is emphasized that empathic communication must take the communicator's active empathic setting as the origin and go through a deeper process in layers, but it also requires empathic feedback and interaction from the communicating audience in order to constitute a sustainable positive communication model.

This study is a guide to the subsequent theoretical research and practical development of international communication. However, it is also important to recognize that the perfect empathic communication model is only an ideal, and the positive cycle is often difficult to fully realize. However, this is not a reason to turn up one's nose at empathic communication or to choke on it, nor should it be an excuse to turn empathic communication into a paper talk. The process of cross-cultural communication is bound to face many insurmountable gaps, and both practitioners and researchers should examine the multidimensional communication of national images in detail, so that empathic communication theory can truly contribute to the theoretical progress and practical development of international communication in China.

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Estimated the Willingness to Pay Levels for the Adoption of the Internet of Things-IoTs Technology: An Empirical Study in Swiftlet Farming in Binh Thuan Province, Vietnam

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Abstract

Imported into Vietnam since 2005, domestic swiftlet farming has been being received, noticed, and invested by various stakeholders and multi-local government levels. Entering the digital era, digital technologies are amending the farming of swiftlet and the application of the Internet of Things-IoT technology along with Artificial Intelligence-AI is expanding rapidly. IoTs and Artificial Intelligent positively support farmers in order to collect, synthesize and analyze statistics of data, to be able to self-control, adjust the behavior of the farming activities based on precisely dosed indicators to limit the potential risks due to the enemies of the swiftlet or the bad guys stealing bird's nest. This study investigated 120 producers in Phan Thiet, Ham Thuan Bac, and Bac Binh where the highest population of swiftlet activity in Binh Thuan province, Vietnam. The study applies the Willingness to Pay method in combining with the Linear Regression Model (LRS) to estimate the level of the Willingness to Pay (WTP) and its determinants for the adoption of the Internet of Things (IoT) technology. The findings indicated that producers agreed to pay 380 million VND (nearly 30% of total investment in equipment and technology) but the level of the WTP showed a large variation: 55 million of lowest group and while more than 1200 million of the highest one. The LRS model with 12 explanatory variables allowed to explain 51% of the factors' influence on the WTP. The findings indicated that should be taken into account the multi-aspects of solutions from producers, enterprises and local government achieve sustainable development in swiftlet farming.

Keywords: WTP; IoTs technology; swiftlet farming, empirical study, sustainable development

1. Introduction

The swiftlet *Aerodramus fuciphagus* (Ho Thi Loan, 2015) is a wild bird, nesting naturally in the island caves. In Vietnam, those kinds of bird have two subspecies: *Aerodramus fuciphagus germanium* (Comitee, 2017) and *Aerodramus fuciphagus amechanus* (Bach Phuong, 2018). In recent years, the swiftlet farming has been formed. In Vietnam, the swiftlet concentrates mainly in the coastal provinces of the country from Thanh Hoa to Ca Mau. In 2017, the Prime Minister issued Decision No. 553 / QD-TTg dated April 21, 2017 approved the plan for bio-industry development up to 2030, including related contents to the swiftlet (Comitee, 2017). Based on the legal basis and scientific evidence, submitting to the Prime Minister for approval Vietnamese Swiftlet is a national product is very necessary and can be developed toward the oversea market. Currently, the total supply have been satisfied around 50% for the global demand. According to the Vietnam Swiftlet Farmer's Association (VSFA), currently, there are 41 provinces and cities that have swiftlet houses. Places with rapid growth in construction such as Phu Yen, Binh Thuan (increase 10-12% / month), Rach Gia, Ha Tien cities (Kien Giang), Phan Rang - Thap Cham (Ninh Thuan) increased by over 12%. Industry experts estimate that Vietnam currently has no less than 11,000 swiftlet houses, with social capital invested in this industry nearly 18,000 billion VND. From 2015 onwards, the total farming floor area was approximately estimated at 2,350,000 m² (Thanh Nhan, 2019). Currently, the swiftlet farming mainly creates artificial habitats such as temperature, humidity, light ... similar to natural conditions to attract swiftlets to live, nest, and reproduce. Therefore, the swiftlet farmers need

to calculate and design the swiftlet house to ensure the appropriate micro-environment, use the method of seduction (sound, the smell of the herd ...), but based on experience is primarily.



Figure 1. Number of swiftlet houses in Binh Thuan province, 2007-2018
(Binh Thuan’s People committee, 2019)

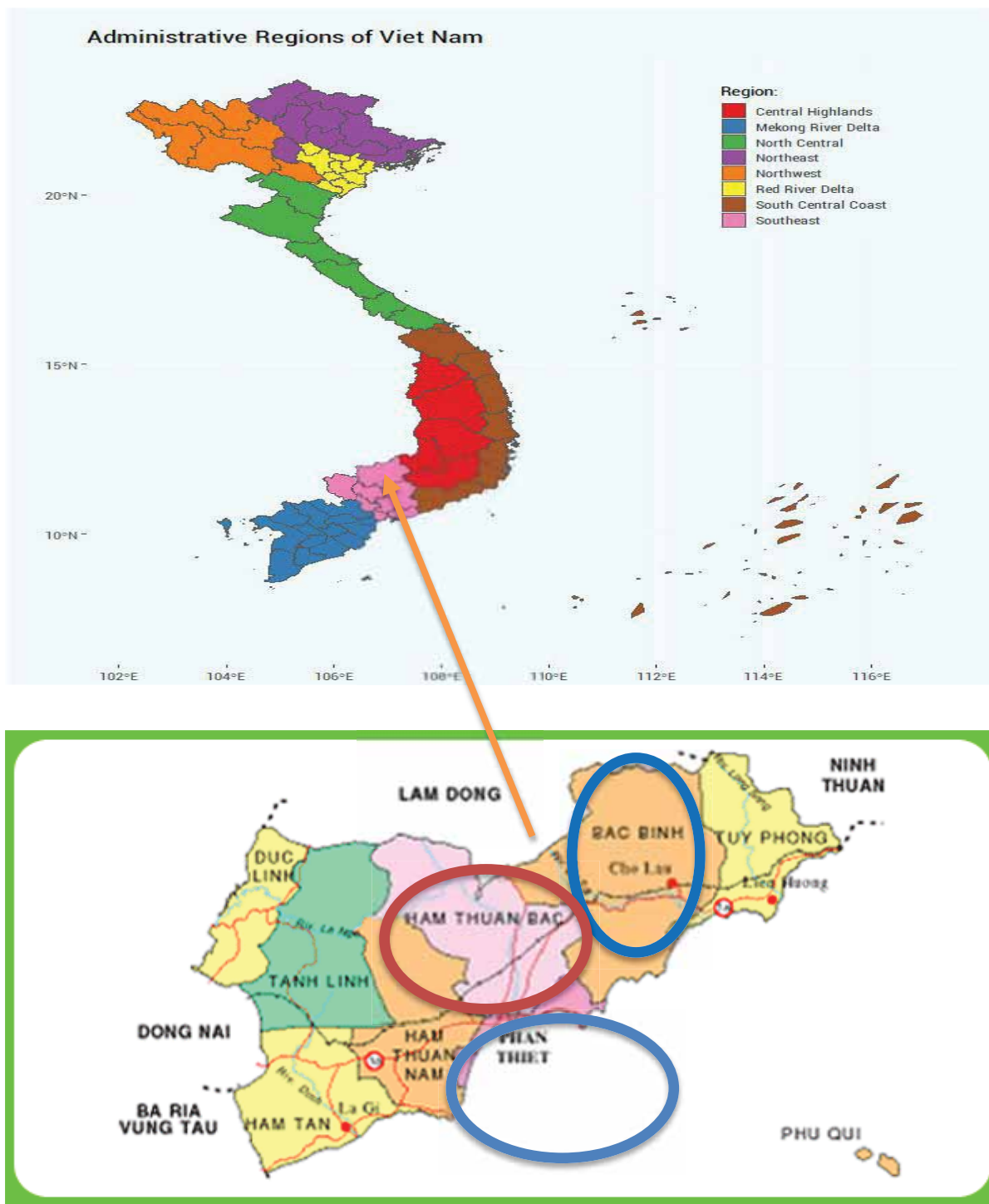
Binh Thuan is the second-largest homeland of swiftlet farming. This sector has been early started to developing since 2007 and extending dramatically in recent years (Figure 1). Thank to the potentially advanced conditions, this province has more chances of developing swiftlet farming recently and being one of the leading localities of Vietnam in domain of swiftlet herds (Do Van Hoan, 2018; Binh Thuan’s People committee, 2019; Le Cuc, 2019). Information from Figure 1 presents the number of swiftlet houses in Binh Thuan province has increased continuously year by year. The rapid growth clearly showed in the last 5 years because of its economic efficiency and exceptional expectations. The recent successes were a combination of absolutely natural conditions and the rapidly updated science and technology. However, there were limited empirical studies conducted in the fields of IoTs technology in swiftlet farming in Vietnam, especially in the term of market demand, accessibility, the willingness to apply the technology and the level of WTP for using the application. This study focused on two main objectives: (i) to survey the technology market for swiftlet farming, especially estimating farmers’ willingness to pay for software and equipment solutions and driving parameters affecting the WTP in applying IoTs; (ii) to propose suitable solutions to promote the development and application of software and equipment solutions package to improve productivity and efficiency of domestic swiftlet farming as well as maintain the stable development of swiftlets farming in Vietnam. The study is expected to achieve important contributions including: to provide scientific and practical arguments on the current situation of swiftlet farming in Vietnam; The application of technology and software solutions in the swiftlet farming is completely new research creating an important foundation for the implementation of further research in other fields in Vietnam and around the world. The findings could be valuable guidelines for policymakers and implementers to have effective orientations for long-term strategy.

The structure of the study includes an introduction describing the current status of swiftlet farming, its objectives and contributions. The next section presents the data and research methods, including the study area, sample size of the survey and methods of processing and analyzing data. The arguments for the explanatory variables included in the model and the expectations of the impact variables on WTP is presented following. The fourth presents the research results and discussions including the description of the WTP level of using the device solution package, the statistics of the results of the variables included in the model, and the results of the model estimation. The final section presents conclusions and recommendations.

2. Sample Size and Research Method

2.1 Materials and Sample Size

The data sources included primary and secondary. In which, the secondary data was collected through literature research annual reports to capture the picture of market supplier for swiftlet farming equipment; the primary data was collected through a prepared questionnaire intended for swiftlet farming households.



Map 1. Binh Thuan province and research areas

This study was carried out in Binh Thuan province, which is one of the localities with the largest number of swiftlet herds as well as the largest number of swiftlet farmers in Vietnam (Comitee, 2017; Do Van Hoan, 2018). To find out the current site as well as the need for technology to monitor and control the swiftlet farming environment in Binh Thuan province, the research team surveyed over 120 swiftlet farming households in the three leading localities for swiftlet farming in Binh Thuan province including Phan Thiet, Bac Binh, Ham Thuan Bac (Map 1). In addition, the study also consulted with 10 experts who were management staff, businessman that providing technology. The questionnaire is designed both opened and closed questions, asking directly about the awareness of IoTs solutions, the demand to use the equipment for monitoring, controlling the nesting environment, and the most necessary parameters that an IoT solution needs to provide.

2.2 Data Progressing

Primary data is directly and carefully adjusted and checked. Then, the final questionnaires were encoded and entered into the prepared template working on Excel and SPSS software for data processing. The statistical methods used include descriptive statistics, multiple-choice statistics, comparison methods.

2.3 Data Analysis

Model of willingness to pay

The research team selected the WTP criterion and proposed a new method to estimate the WTP. This approach works through identifying the needs of using a certain product or service based on different prices to measure the WTP of the interviewees. The Price Estimation (PE) is given, the WTP is the maximum amount people are willing to spend to buy a commodity or enjoy the quality of the improved environment. The WTP is seen as a method to determine the price/ value of the benefit to be received over the current conditions, the WTP also measures the personal or social preference for a certain commodity. The WTP is also the market demand curve for that commodity. This approach has been effectively applied and adopted in the previous studies related to different fields of study with especially in rural and farming activities(Asrat, Belay and Hamito, 2004; Othman *et al.*, 2009; Energyplus, 2011; Divilly, 2018; Etsay, Negash and Aregay, 2019; Shee, Azzarri and Haile, 2019, 2020; Chuang, Wang and Liang, 2020; Kansanga *et al.*, 2020; ÖZSAYIN, 2020).

$$WTP_{mean} = \frac{\sum_{k=1}^m WTP_k * nk}{\sum_{k=1}^m nk} \quad (1)$$

Function of the WTP estimation

In which:

WTP_{mean}: Average WTP of money paying for devices

k: index of WTP levels k = (1-m)

m: WTP levels that people are willing to pay for IoTs devices

nk: number of surveyed samples corresponding to WTP_k level

WTP_k: WTP level k

Linear regression model

There are two popular approaches could be applied to estimate the level of the WTP include discrete choice and linear regression model (Luqman & Van Belle, 2017; Nigussie *et al.*, 2017; Hsu & Lin, 2018; Carlina & Kusumawati, 2020; Pillai & Sivathanu, 2020). The selection of each method depends closely on the field of study, the availability of data collection, sample size method (Luqman & Van Belle, 2017; Antony *et al.*, 2020; Chuang, Wang, & Liang, 2020). The discrete choice model is common used in the adoption of a service or a technique where the value of the selection is ranked randomly and the collected data allow to classified to follow a standard distribution (Tun Oo, Van Huylenbroeck, & Speelman, 2017; Minh, Hao, & Lebailly, 2020). However, the limitation of this model comes from the completed steps and concrete conditions to estimate the model. While the linear regression has more popular and advanced to estimate the level of the WTP in case the large variation of the sample mean. In this study, the LRM is used to quantify the affect of the driving parameters on the WTP due to the fluctuation of the WTP of different producers acting in swiftlet farming. The regression model has the following form:

$$Y = \beta_0 + \beta_1 X_i + \varepsilon \quad (2)$$

Where:

Y: willingness to pay for using software and equipment solution packages

X_i: value of the independent variables (i = 1... n)

β₀ intersection point of the regression line and Y axis

β₁ coefficient

ε: model error

3. Literature on the IoTs Technology in Swiftlet Farming and Explanation of Driving Parameters of the Empirical Models

3.1 Related Studies on IoTs Technology and Its Application

Balance of demand and supply. According to Azahar Idris (2014), the estimated world business value of bird nests is 10 billion MYR (equivalent to 2.4 billion USD) and the demand for bird nests is very high while the supply reach only 50% needs of the whole world (Idris, Abdullah, & Abd-Rehman, 2014).

Suitable conditions. The location of the swiftlet house and the living environment are two strategic factors that determine the success of swiftlet farming, for example, the construction of swiftlet houses must be in a crowded area with a source of food. The environmental factors must to be noticed when building swiftlet houses are temperature, humidity and light intensity. Besides, according to research by Ibrahim (2018), the factor of wind speed also needs to be considered. Indoor air temperature should be maintained between 26-35°C, relative humidity between 80 and 90%, light intensity below 5 lux (Ibrahim et al., 2018). The installation of a suitable ventilation system and humidifier also assists swiftlet farmers to achieve a favorable environment.

Related studies on environmental control of swiftlet farming. Research by A. K. Othman et al. (2009) applied Wireless Sensor Networks (WSN) system to control environment in swiftlet farming in Sarawak, Malaysia. Research by Djunaidi Tristanto (2011) has built and evaluated the automatic control system to control the temperature and humidity of the swiftlet house to facilitate and effectively raise swiftlets (Othman et al., 2009). This system helps to control and report the state of the bird's nest as well as analyze the relationship between the amount of water brought into the house with temperature and humidity. S. H. Ibrahim et al. (2011) research on controlling ambient temperature and humidity in swiftlet farming in Malaysia using EnergyPlus software. In 2012, Syed Muhammad Mamduh et al. research on odor control system and toxic gas in swiftlet farming using Wireless Sensor Network (WSN). Next, Ahmad Rizan Ibrahim (2018) research on an environmental monitoring and control system using LoRaWan wireless sensor network. In this study, monitoring sensor data includes humidity, temperature, oxygen and light were recorded in a swiftlet house in Terengganu (Malaysia). The changes in humidity, temperature and oxygen were also studied. The IoTs technology and video analytics are used in this project. Studies indicated the right combination of temperature, humidity and oxygen inside the swiftlet house increases the amount of swiftlet nesting. The study provided some valuable findings of the advantages and limitations of current techniques then proposes the advanced know-how of the monitoring system. Research by Munirah Abd Rahman et al. (2018) on the effects of factors such as temperature, air humidity, light, and sound frequency on the success of the swiftlet farming industry in Terengganu, Malaysia. Since then, the research team determined that the nest productivity increased significantly when the environmental factors were controlled including air temperature 30.1°C; the air humidity is 83.7%; 0.16 lux light intensity; sound frequency 47dB (inside) and 68 dB (outside).

Related studies of application Internet of Things-IoT technology. Several studies focused on analyzing the human determinants of accessing the technique and then provide the solutions to distribute and encourage the machine in an efficient way (Hsu & Lin, 2018). While another article proposed to analyze the widen factors affecting the adoption of IoTs technology (Idris, Abdullah, & Abd-Rehman, 2014; Divilly, 2018). Some scholars have made more attempts to carry out the behavior of adopters in the short and long term periods to give the right direction for developing the application for farmers (Kansanga et al., 2020). In addition, they are also taken into the consideration the driving factors of birth rate class, space, communities as well as farming scale classification (Idris, Abdullah, & Abd-Rehman, 2014; Nigussie et al., 2017; Divilly, 2018; Etsay, Negash, & Aregay, 2019; Carlina & Kusumawati, 2020; ÖZSAYIN, 2020). However, there are no exit study related to the use of equipment, estimates of WTP as well as factors affecting the choice of equipment in the swiftlet farming. As a result of these problems, a study aimed at understanding the needs of equipment, estimating the WTP of IoTs machine, and the factors affecting affordability is very important that allow to estimate and measure the market volume as well as the current practice of machine application of producers. The findings and lesson learns from our study could support to provide precise evidences for policy makers, policy implementers as well as enterprises of IoTs machine

3.2 Explanation of Driving Parameters of the Empirical Models

Many different factors influence on the WTP for the application of a good or service. These factors can be classified according to the sources of influence such as internal factors and external factors. Internal factors such as the capacity of the producer /consumer establishment include the size of the labor, the quality of the labor (education level, skills, experience in the consumer manufacturing sector or gender) (Alemu et al., 2020; Antony et al., 2020). External factors include supply markets for products and services, distribution networks, production

and consumption customs, scientific and technological achievements (Divilly, 2018; Flydén & Haglund, 2018; Hsu & Lin, 2018). In addition, the classification of the effects can be based on the origin of capital sources such as natural capital including land size, climatic conditions, weather, physical capital sources such as equipment systems, material infrastructure (electricity system network, roads, school stations); Human capital includes household capacity as mentioned earlier; social capital sources such as participation in organizations like business associations, associations such as farmers' associations, women's unions, other mass organizations as well as support from other social networks; financial capital such as the availability of credit sources (Luqman & Van Belle, 2017). In addition, the group of elements of the infrastructure can be divided into hard infrastructure as mentioned including the electricity system - school - station and soft infrastructure groups such as preferential policy institutions.

Swiftlet farming is an agricultural product with high requirements of technology applications and large capital investment compare to traditionally agricultural products. Moreover, there were diverse factors that could potentially consider taking into account to analyze the level of the WTP for the use of IoTs technology. In this model, a total of 12 factors have been grounded carefully to estimate the WTP of swiftlet farms for the use of software solutions. The group of factors representing the production/consumption capacity of the facility includes the educational level, years of experience and occupation of the facility owner; factors that belong to the level of awareness include the facility's assessment of the status of swiftlet farming, and the assessment of the role of swiftlet farming in terms of income; geographical location are included to explain the differences in ecological characteristics, the impact of policy institutions at the district/city level on swiftlet farming in general, and investment in software solutions; the exposure to different risks in swiftlet farming is expected to increase the probability of investing in software and equipment solutions; The variable representing the type of the swiftlet farming is classified into an extensive and specialized farming type, specifically, extensive farming is based on house improvement, this form is accounted for with a lower total construction investment compared to farming under a specialized farming type, so the type of specialized farming is expected with a higher level of investment in technology solutions. However, the type of extension of farming will lead to negative impacts related to environmental and noise pollution. Understanding technical solutions and software plays an important role in the decision, which in turn relates to the quality and quantity of information supplied to production facilities. The assessment of the quality of information sources from different access sources is presented in another section, in this context, the number of accessible information sources are expected to increase the level of understanding of the equipment solutions, this increases the probability and level of investment.

Table 1. Explanation of variables and sign of expectation

List of variables	Measurement	Sign of expectation
WTP	1000 đ	
X1: Education level	Year	+
X2: Locality		
X21: Phan Thiet	0: Phan Thiet; 1: Bac Binh/ Ham Thuan Bac	+/-
X22: Bac Binh	0: Bac Binh; 1: Phan Thiet/ Ham Thuan Bac	+/-
X3: Years of experience	The year began to raise swiftlets	+
X4: Occupation		
X41: Farmer	0: Farmer; 1: Civil servant / Businessman	+/-
X42: Civil servant	0: Civil servant; 1: Farmer / Businessman	+/-
X5: Assessment of the status of swiftlet farming	0: Not successful; 1: being successful	+/-
X6: Role of swiftlet farming	0: Not the main income; 1: The main income	+/-
X7: The number of swiftlet houses	The number of swiftlet houses	+
X8: Risk	0: No risks; 1: Get risk	+
X9: type of farming	0: extension farming; 1: specialized farming	+
X10: Number of sources of access information	Number of sources of access information about IOT	+

In this study, some important factors were excluded due to the specificity of swiftlet farming. Specifically, the scale of the labor force is not included because swiftlet farming does not consume labor. Gender is eliminated by the same reason as above. The age of the producers is also listed out because it is necessary to invest in this activity with a large capital source, this segment only focuses on the elder who already owns certain assets.

Variables that have attended the training are also excluded because the surveyed results indicate that there were not many training courses related to the use of technology solutions. In addition, due to the research limitation and the duration of the topic, several other influencing factors are also excluded related to institutions, policies, and career planning. These factors are mainly mentioned when assessing the current status of swiftlet farming in another content of this study.

4. Findings and Discussions

4.1 The Classification of WTP Levels for IoTs Devices

In order to estimate the WTP model of swiftlet farms for the use of software solutions and IoTs devices, the first step is to study the level of payment by different groups. Table 2 presented the distribution of WTP of swiftlet farms by three different categories, including the lowest group with the WTP level below 250 million, the second group from 250 to 350 million, the third group from 350-450 million and the third group highest with WTP greater than 450 million VND DONG. The total baseline sample was 120 samples. However, there were several samples do not satisfy the testing conditions, only remaining 74 .

On average, swiftlet farms in Binh Thuan are willing to pay 373 million VND for the application, compared to the total investment cost, this payment is estimated about 30%. However, there is a far divergent in investment level, in particular, the household with the highest investment for the technology is more than 1.2 billion VND while the lowest level is 55 million VND. The findings also showed that the group with the lowest payment belongs to the type of extension, while the highest group is mostly under the specialized type, which is completely consistent with the reality. The distribution of the WTP was directly distributed across groups quite evenly, the proportion of establishments belongs to group 1st is the lowest at nearly 15% and the average payment level is about 170 million VND. The majority of establishments having the WTP level to main group 2nd and group 3rd are 32.4% and 31.1% respectively with the average level of payment over 300 and 396 million VND. Notably, there is a relatively high percentage of establishments paying for the use of software equipment solutions with 21.6% with an average of more than 615 million and the lowest is VND 465 million.

Table 2. Classification of WTP level

	WTP	Minimum	Mean	Maximum	Sample	Proportion (%)
1	< 250 million dong	55.0	168.6	215.0	11	14.9
2	250 - 350 million dong	265.0	300.6	350.0	24	32.4
3	350 -450 million dong	365.0	396.1	445.0	23	31.1
4	> 450 million dong	465.0	615.9	1215.0	16	21.6
5		55.0	373.8	1215.0	74	100

(Source: survey data in 2020)

4.2 Describe the Characteristics of the Variables in the WTP Model

The next section presents a description of the statistical results of the variables included in the model. The educational level of the owners' swiftlet farms is high, an average of 11.3 years to school nearby, which is much higher than the household in other agricultural sectors that have application solutions devices such as white shrimp farming. As a result of data cross-checking, most owners have a 12/12 educational degree because they are civil servants or businessmen. Moreover, several households have jobs in agriculture specifically dragon fruit cultivation, their educational level is lower.

After rejecting establishments that did not participate in the test, there was a variation in sample structure by locality. The sample was distributed the highest in Ham Thuan Bac district with 43.2% (38%: calculated for 120 samples), Phan Thiet city with 40.5% (26.6% for 120 samples), and the rest in Bac Binh district with 16.2% (35%: for 120 samples). Thus, it can be seen that the sample variation comes from the city of Phat Thiet. The results explain that most of the establishments in the city of Phan Thiet have invested quite well in terms of equipment, so they are not willing to experience a group of new solutions. Besides, more than two remaining districts, Phan Thiet city also has many conditions to access better technology.

Regarding the occupational structure, the highest percentage of people participating in the experience of equipment solutions is the group of Businessman with 41.9%, followed by the group of civil servant 31.1% and the agricultural group is 27%. This is quite appropriate because the group of businessmen and civil servants are more sensitive to new experiences better than those whose main occupation is agriculture. Currently, the swiftlet farming in Binh Thuan province has mostly been operating after 2015, so it is not possible to accurately assess the success and role of swiftlet farming. The owners from the third year onwards can harvest and estimate

investment efficiency; in the 5th year onwards, the revenue will be stable, but the yield depends on many different factors. Research shows that about 52% of swiftlet farms say they have been successful, but only nearly 7% think swiftlet farming is the main source of income. This result has been explained previously, swiftlet farming is only one solution for income diversification and an investment for the future, so the owners do not see this as the main source of income. Most of each establishment only invests in one swiftlet house, especially in some cases it is considered a businessman field and established companies, so there are more swiftlet houses. Risk probability is also likely to affect willingness to pay, which at the current sample size is 12.2%, not much different from 120 samples. Most of the swiftlet houses are invested by type of specialized farming, far away from the houses, only about 10% of the establishments in type of extension. Sources of information to access equipment solutions are quite diverse. An establishment can learn from different sources with an average of four sources to find out information.

Table 3. Description of driving parameters in the WTP model

Variables	Unit	Minimum	Mean	Maximum
WTP	1000 đ	55.0	378.8	1,215.0
X1: education level	Year	8.0	11.3	12.0
X2: Locality				
Bac Binh	%	-	16.2	-
Phan Thiet	%	-	40.5	-
Ham Thuan Bac	%	-	43.2	-
X3: Years of experience	Year	0	4.3	15.0
X4: Occupation				
Farmer	%	-	27.0	-
Civil servant	%	-	31.1	-
Businessman	%	-	41.9	-
X5: Assessment of the status of swiftlet farming	% (being successful)	-	51.4	-
X6: Role of swiftlet farming	% (main income)	-	6.8	-
X7: The number of swiftlet houses	The number of swiftlet houses	1.0	1.3	10.0
X8: Risk	(%) Get risk	-	12.2	-
X9: Type of farming	% (specialized farming)	-	9.5	-
X10: Number of sources of access information	Number of sources of access information	0	4.0	6.0

(Source: survey data in 2020)

4.3 Estimation Results of the WTP Model for Equipment and Software Solution Packages

Table 4 presents the results of estimating the impact of the 10 input variables affect the willingness to pay for the birds nest basis for the application of equipment solutions and technologies. With the adjusted coefficient R² value of 0.510, this result explains that the variables included in the model explain 51% of the variation of the WTP value, and other factors such as infrastructure, institutions, and markets, training activities, social organizations, and Businessman explain the remaining 49% of the WTP’s variation.

In the total number of variables included in the model consists of 2 variables of the variable area of research and occupation, these are identity variables with 3 attributes, there are 8 variables with no statistical significance including X1- Cultural Level (+), Location - X21 (-), Location - X22 (+), Years of Experience - X3 (-), Occupation - X42 (+), Assessment of the status of swiftlet farming - X5 (-), Number of swiftlet houses - X7 (+), Model of swiftlet farming - X9 (+). This can be said that these variables cannot be used to explain the impact on WTP.

The quotation mark receives two values, the same dimensional impact shows the "+" sign, and the opposite effect shows the "-" sign.

According to the research data, there is no difference in educational level between farming groups so that educational level does not affect WTP. Geography does not affect the WTP because of the experiential

establishments that they had determined the level of investment required for pieces of equipment. Years of experience do not affect decision-making because the owners do not have much experience in this activity. As mentioned above, this activity has only really grown in recent years, and the results of farming activities also depend heavily on the equipment and technical factors. Likewise, the assessment of the status of swiftlet farming does not reflect the results of the swiftlet farming model. The scale of swiftlet farming is relatively evenly, so this variable does not affect WTP. Although the type of specialized farming has a positive value, due to the relatively low proportion of the type of extension farming and dispersal in three study areas, this variable does not explain the variation of WTP.

Table 4. Results of WTP model for swiftlet farms in Binh Thuan

Explanatory variable	Correlation coefficients (β)	t	Sig.
(Constant)	4.288	0.025	0.981
X1: Education level	2.962	0.207	0.836
X21: Phan Thiet	-38.769	-0.664	0.509
X22: Bac Binh	20.522	0.579	0.565
X3: Years of experience	-6.045	-0.984	0.329
X41: Farmer	73.284	1.829	0.072*
X42: Civil servant	45.279	1.053	0.297
X5: Assessment of the status of swiftlet farming	-0.187	-0.005	0.996
X6: Role of swiftlet farming	112.678	1.853	0.069*
X7: The number of swiftlet houses	14.768	1.243	0.219
X8: Risk	108.261	2.187	0.033**
X9: Type of farming	95.040	1.311	0.195
X10: Number of sources of access information	44.300	4.349	0.000***
R Square	0.591		
Adjusted R Square	0.510		
F	7.331		
Sig.	0.000		

(Source: survey data in 2020)

(Note: ***, ** and * significant at 1%, 5% and 10%)

In this model, four variables can explain for the WTP fluctuation including Farmers - X41 (+), Role of swiftlet farming - X6 (+), Risk - X7 (+), and Number of sources of access information - X10 (+). The above variables all have the same directional impact on the variable WTP, the specific impact level will be explained in turn as follows:

Farmers - X41 (+): the value of the coefficient is 73.2, this signifies the willingness to pay of farmers lower than those with the job as civil servants or Businessman a value of 73.2 million VND. This comes from the income of the base group which is farmers lower than the rest. Besides, the activities in the field of traditional agriculture led to the apprehension of risk when investing in an application or a new technology. 0.072 value of sig is meant conclusions about the impact of Farmers for WTP statistical significance with a significance level of 10%.

Role of swiftlet farming - X6 (+): the value of the coefficient is 112.6, this signifies that the owners agree with the view that swiftlet farming is the main source of income that will invest at a higher level of VND112.6 million compared to households that assess this is not the main activity. Similar to the previously explained content, the swiftlet farming activity, although it requires a large investment of capital, but brings huge income. According to the results from the interview experts active in the provision of services construction of the swiftlet house and the supply of equipment, with a swiftlet house after five years, monthly can collect from 1kg or more, it will be valued very large, can be up to more than 40 billion VND. The 0.069 value of sig is meant conclusions about the impact of the Role of swiftlet farming for WTP statistical significance with a significance level of 10%.

Risk - X8 (+), the value of the coefficient is 108.2, this signifies that the owners who have experienced risks in swiftlet farming are willing to pay for the use of new equipment and software solution packages a value of 108.2 million higher than the other group. With a 10% higher probability of risk, it is clear that this will be of great importance in making investment decisions for a new experience that can overcome existing risks. 0.033 value of sig is meant conclusions about the impact of Risk for WTP statistical significance with a significance level of

5%.

Number of sources of access information - X10 (+), the value of the coefficient is 44.3, when an producer has access to more than one source of information than the average of the remaining households, the level of willingness to pay will increase to more 44.3 million VND. As discussed in the above items, for the development of information networks, the farmers will have the opportunity to be more accessible to many suppliers of the IoTs and services not only locally but also internationally. The access to information as well as suppliers and direct effect on the willingness to pay for products and goods services, particularly package of equipment and technology in this study. The 0.033 value of sig is meant conclusions about the impact of the Number of sources of access information for WTP statistical significance with a significance level of 1%.

5. Conclusions and Recommendations

5.1 Conclusions

Through the WTP estimation and research process and model of factors influencing willingness to pay with 74 swiftlet farmers agreeing to participate in trials of software and equipment solution package, the research team came up with the following conclusions:

(i) There is a high percentage of the base is not willing to participate in testing: 36/120 cases (they were satisfied with the existing equipment); (ii) The average level of the WTP for equipment solutions is 380 million VND (nearly 30% of total investment in equipment and technology); (iii) The WTP has a large variation with the lowest level of 55 million and the highest of more than 1200 million; (iv) The estimation model with 12 explanatory variables is included in the model with high significance, explains 51% of the factors' influence on willingness to pay, has 8 variables included in the model, however, there are 8 variables that do not affect WTP, specifically, there are 3 variables having oppositely correlated and 5 variables positively correlated: No difference in the WTP for equipment in terms of education level, age of owner, location of study, assessment of the status of swiftlet farming and number of swiftlet houses; (v) There are 4 variables in the model explaining the variation of WTP with the strong correlation, specifically the occupation, the role of swiftlet, risk and type of swiftlet farming, in which the most influential variable is the number of sources of access information, followed by risk, the role of swiftlet farming and finally the occupation.

5.2 Recommendations

The following solutions should be taken for swiftlet farming activities in Binh Thuan province to achieve good results and stability in the long term: (i) Synchronize the equipment with the same provider instead of that of different vendors; (ii) Focus on developing and supplying equipment packages that the locality needs; (iii) At present, swiftlet farms have not yet gone into the harvest period, so it is necessary to have closely monitored to accurately assess the economic efficiency of this model; (iv) Develop equipment with the function of controlling risks from the outside environment such as natural enemies, cockroaches, ants; (v) Consider to providing a package of equipment to the swiftlet farming households by type of extension farming and environmental impact assessment; (vi) Increase the marketing of the solution package through information channels, especially distributors and suppliers, equipment installers, builders.

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Do Wage Subsidies to Nationals Enhance Their Employability? New Evidence from Kuwait

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Abstract

Due to the persistent unemployment of nationals in the midst of millions of gainfully employed foreign workers, Kuwait, the focus of this study, introduced a new generation of active labor market policies (ALMPs) in 2000, capped by an expansive wage subsidy to nationals who join the private sector. This study employs the Fully Modified Least Square (FM-OLS) model to evaluate the effectiveness of these policies by means of estimating employment elasticities of Kuwaitis in the private sector in response to wage subsidies. The results show that the subsidies have been ineffective, contrary to their well-documented broad positive impact in industrial economies. This outcome has been attributed generally to wage differentials between Kuwaitis and non-Kuwaitis. This study presents a holistic diagnosis of the problem by challenging the received 'wage differentials' as the sole cause. It identifies a host of heretofore-unidentified structural disequilibria in the labor market that are responsible for the subsidy's ineffectiveness such as the local economy's inherent bias towards low-tech methods of production that rely heavily on low-skilled labor, Kuwaitis' penchant to pursue higher levels of education, low national participation rates in the labor force, the absence of critical vocational training programs, and the government's liberal immigration policies. Based on the revised prognosis, a new integrated remedial plan of actionable steps is suggested to address the unemployment problem.

Keywords: wage subsidies, job nationalization, employment and substitution elasticities, Kuwait, GCC

1. Introduction

The continued presence of unemployed nationals amid millions of gainfully employed foreigners has long been an issue of national concern in the six Gulf Cooperation Council (GCC) countries¹. This paradox was first resolved by hiring nationals in the Civil Service Corps. However, as the number of nationals entering the labor market kept rising, the wage bill became burdensome and government bureaucracies became bloated. Governments then turned to private sector employers by appealing, and then (softly) mandating, them to hire nationals. When that failed, Kuwait, the focus of this study, introduced active labor market policies (ALMPs), the core of which lies in a wage subsidy paid directly to Kuwaitis working in the private sector.

This study serves several purposes. It provides the first evaluation of labor market policies in the region and, as such, it adds to the scant literature on the impact of ALMPs in developing economies. It also deviates from standard evaluation methods by singling out the impact on a subsector of the labor market, namely, *nationals* in the *private sector*. Additionally, it differentiates between the impacts of job creation (hiring nationals to fill new jobs) and job substitution (hiring nationals to replace non-Kuwaitis in existing jobs). The study also employs a robust econometric model that avoids the misleading results often encountered in past employment elasticity estimation studies due to non-stationarity and cointegration biases. Furthermore, it provides a holistic diagnosis of the problem by challenging the received 'wage differentials' as the sole cause, and based on the revised prognosis, a new integrated remedial plan of actionable steps was designed². Finally, lessons learned from Kuwait are more likely to influence ongoing labor nationalization discussions in the region.

This paper begins with a definition of the problem and a review of past domestic labor market policies. Next, the impact of ALMPs is quantified followed by an investigation into the underlying causes behind their unexpected

minimalist performance. A new diagnosis is made, and a remedial long-term strategy is proposed.

2. Background

Oil revenues transformed Kuwait from a rudimentary, resource-poor state to a modern functioning state.³ The transformation was made possible by the annual importation of thousands of workers to compensate for the country’s small, inexperienced workforce. Over time, unsettling employment and, hence, population imbalances surfaced. Kuwaitis became a minority in their country⁴ (Presently, they make up less than a third of the population). Nationals make up only 15.32% of total employment (Central Statistical Bureau [CSB], 2021); 85.27% of Kuwaitis work in the public sector⁵; and only 14.7% of all private sector jobs are held by Kuwaitis, while the remaining 64.11% are taken up by non-Kuwaitis (PACI, 2021). From 1993 to 2020, government jobs went mostly to nationals (209,480 versus 31,015 non-Kuwaitis) while private sector jobs went mostly to non-nationals (1.67 million non-Kuwaitis versus about 54 thousand Kuwaitis)⁶. In total, the economy generated an impressive two million jobs, of which only 13.4% went to nationals.

These developments generated other adverse side effects. First, dualities arose as the labor market became segmented into non-competing classes of labor. The segmentation ran along ethnicity (Kuwaiti vs. non-Kuwaiti) and workplace lines (public vs. private vs. household), each with different wage rates, regulations, labor rights, and job security⁷ (Forstenlechner & Rutledge, 2011). Second, anti-foreign sentiments, in general and against certain nationalities, surfaced and overtime, gave rise to concerns regarding: 1) social cohesion and national security⁸; 2) pressures on the country’s infrastructure; 3) the inability of the government to continue employing Kuwaitis apace; 4) the open unemployment of nationals in an economy awash with job availabilities; 5) large outflows of remittances; 6) gender disparities where foreign male workers outnumber foreign females in the private sector by a margin of 11 to 1; 7) exploitation of foreign labor through the sale of sham work permits; and 8) low and declining labor productivity.

3. The Problem

Despite the government’s preferential hiring of Kuwaitis, its numerous mandatory public instruments aiming at increasing the demand for nationals, the doubling of real GDP, the substantial growth in the aggregate demand for labor, and the introduction of the wage subsidy program [WSP]⁹, Kuwaiti unemployment persisted as shown in Table 1. Not only did their numbers increase, but the rate of unemployment also rose from 3.4% in 2003 to 7.2% in 2020¹⁰. Other anomalies emerged; more than half (52.4%) are unemployed longer than a year and 20% from 6 to 12 months; the share of Kuwaiti females in total unemployment grew from 15% in 1993 to 24.4% in 2000, and to 45.7% in 2020; and 79.3% of Kuwaiti females are government employees¹¹ (CSB, 2021).

Table 1. Number of unemployed nationals, 1995 to 2020

1995	2000	2005	2010	2015	2021
2,540	2,449	12,358	10,558	11,670	32,851

Source: PACI, 2021.

4. Evolution of Labor Market Policies

4.1 Passive Labor Market Policies

Up to the 1970s, the unemployment problem was dismissed as a form of voluntary unemployment, especially during epochs of wealth accumulation and budget surpluses, and, as a result, little was done to deal with it. As it persisted, however, a host of piecemeal, quick fixes were administered during the following two decades, aimed at increasing the demand for Kuwaitis and, concurrently, restricting the supply of expatriates. The former took the form of: 1) limiting work permits in certain occupations to Kuwaitis only¹²; 2) setting mandatory Kuwaiti quotas in private sector companies with penalties for non-compliance; 3) charging training fees for Kuwaitis from non-compliant private companies; and 4) pressuring state-owned enterprises (SOEs) to hire more Kuwaitis.

Policies to limit the supply of expatriates included:

- Raising annual work permits fees
- Limiting approvals for importing foreign workers
- Restraining household employment by mandating high minimum wages
- Ending the hiring of expatriates under the age of 30 with a university degree in government jobs
- Excluding expatriates from the country’s free public education system
- Raising the minimum income for family settlement

- Rescinding expatriates' access to the free public health care system
- Actively deporting foreign sojourners (Baldwin-Edwards, 2011)
- Maintaining the *Kafala* (sponsorship) system
- Ruling against the issuance of permanent residency permits¹³

Other lesser inconveniences were also enacted (De Bel-Air, 2019). Recently, the Civil Service Diwan, responsible for placing nationals in public sector jobs, took the extra step of terminating jobs held by foreign workers who switched from government contracts to other entities (Alqabas, 2021), and instructing the Kuwait Municipality to lay off a pre-set number of foreign workers¹⁴.

4.2 Active labor Market Policies (*The Wage Subsidy Program*)

As the preceding policy instruments failed to rein in the rising unemployment of Kuwaitis, the government introduced the wage subsidy program (WSP) in 2000 to spur Kuwaitis to enroll in the private sector coupled with offering training opportunities and a modest unemployment insurance scheme. In addition, it established a SMEs Fund in 2013 with KD 2 billion in paid-up capital to encourage self-employment¹⁵. The most important policy, however, is the cash wage subsidy, as it represents 99.9% of total spending on ALMPs¹⁶ (MGRP, 2017).

Wage incentives are generally designed to assist disadvantaged workers such as youth, females, old, disabled, long-term unemployed, inexperienced, and first-time job seekers (Honorati & Posadas, 2019). They Wage incentives are normally transitory (usually 6 to 24 months), countercyclical, and set in relation to existing wages. In Kuwait, however, they are permanent, available to all nationals, unrelated to existing wages (they are based on applicants' education levels and marital status) and are paid directly to nationals on top of their private sector wages. The maximum monthly subsidy is set at KD 1,248 (~ USD \$4,000) for a married individual with seven children and a university degree in medicine, engineering, or pharmacology, and the lowest at KD 481 (~ USD \$1,500) for an unmarried individual with an elementary degree or lower.¹⁷

The overall profile of the program's beneficiaries can be briefly delineated in the following three characteristics: (i) more than half are 35 years old or younger (20% in 18–25 and 47% in 26–35 years); (ii) almost two-thirds are semi-skilled (36.2% with < high school, and 29.9% are high schoolers); and (iii) three-fourth (75.4%) receive less than KD 500/mo. Thus, the typical beneficiary is about 26 years old, has less than high school diploma, and earns a wage subsidy of about KD 600/mo. The 2010–2019 average annual cost of the WSP, which is partly financed by a 2.5% profit tax on listed companies¹⁸, is KD 555 million, adding up to KD 5.2 billion or about USD \$17 billion since its inception. In terms of the GDP, total ALMPs averaged 0.86% from 2001 to 2019¹⁹ (AhwalKuwait, 2020; CSB, 2021).

4.3 Pros and Cons of New Active Policies

On the positive side, the program addresses the needs of the young, inexperienced, and first-time Kuwaiti job seekers; provides the incentive to Kuwaitis without connections to join the private sector instead of waiting for an uncertain government job; and, more importantly, it elevated the participation of Kuwaiti women in the private sector²⁰. On the negative side, a few businesses (especially banking and communications) reduced wages of subsidized nationals. Private Kuwaiti professional businesses (attorneys, physicians, etc.) took advantage of the program. Business owners and board members switched identities to 'workers'²¹. Non-compliant applicants were not sanctioned, frequent fraudulent enrollments were observed, and participants' earnings were negatively affected due to the 'lock-in' effect in which enrollees were discouraged from searching for better job opportunities once they were locked in with an employer (Wunsch, 2016). More significantly, perhaps, the program overlooked the wage gap between nationals and foreigners in the private sector. Rather than using the subsidy to increase the economic value of nationals to the employer by narrowing that gap and, hence, encouraging private employers to hire them, it opted instead to subsidize workers' incomes (Brown, 2015), which makes it more of an income rather than an employment subsidy.

5. Effectiveness of the Wage Subsidy Program

5.1 Review of the Literature

The underlying goal of ALMPs is to help jobseekers find jobs. To do so, ALMPs incorporate an array of support schemes, including personal counseling, follow ups, placement services, training, employer subsidies, wage incentives, public works, business startups, and self-employment support schemes. ALMPs' scope, objectives, targeted groups, durations, sanctions, and financial rewards differ across countries and over time.

Due to their widespread usage since the end of WWII and their high costs, much has been written about their effectiveness. The bulk of the literature is confined to case studies from developed economies. With the

proliferation of such studies, several studies employed meta-analysis of mostly randomized control trials in search of common outcomes (Brown & Freund, 2019; Card et al., 2017; Crépon & Van Den Berg, 2016; Kluve et al., 2007; Pignatti & Van Belle, 2021; Yeyati et al., 2019). In general, however, common grounds are difficult to find in the literature because of the diversity of research methodologies and dissimilarities in labor market institutions, programs (Yeyati et al., 2019; Brown & Freund, 2019), time horizons, sample sizes, country groupings, testable outcomes, and the authenticity of published studies (government-sponsored vs. independent research). Even though it is safe to conclude that the most telling inference is that there is no consensus regarding ALMPs' effectiveness (Escudero, 2018), especially in emerging economies²², there are specific individual policies on which there is a strong consensus, either negative or positive. These policies are reviewed below in the order of their (positive) effectiveness.

- 1) **Policy Execution and Labor Support Institutions**: Pignatti & Van Belle (2021) used panel data from 121 developed and emerging countries and concludes that policy implementation (i.e., resources, continuity, and timing) is critical in enabling ALMPs to generate positive outcomes. A study based on data from 31 advanced economies over the period from 1985 to 2010 affirmed the same conclusion (Escudero 2018). Another meta-analysis study on Latin American countries reports that design, targeting, and implementations are essential in ensuring the programs' effectiveness (Pignatti & Van Belle, 2021). To strengthen the prospects of success, some go as far as to suggest piloting and evaluating programs prior to full implementation (Brown, 2015) while others go farther by promoting piloting policy innovations against competing alternatives while evaluating each to select the most effective outcomes (Mckenzie, 2017).
- 2) **Individual Services and Sanctions**: By far the next most influential policy instrument is the cluster of soft policies: e.g., job matching, counseling, vocational guidance, rehabilitation, monitoring, tracking of participants, and sanctions in case of non-compliance. Their significance stems from their: 1) ability to directly minimize information asymmetry between firms and workers; 2) reduce unemployment durations, especially for long-term unemployed workers (Kluve et al., 2007; Kluve, 2010); 3) target multiple objectives simultaneously such as job creation, increasing labor participation, and reducing unemployment; 4) exert greater influence in the short and long-term in contrast with other policies (Card et al. 2017) and 5) low cost. Based on meta-analysis of ALMPs in Europe, Kluve (2010) concluded that "services and sanctions may be a promising measure" when compared to direct government jobs (negative employment effects), or training (mixed and moderate effects). As with other instruments, job search is more effective when combined with other policies (Card et al., 2017; Escudero, 2018; Katz, 1996).
- 3) **Employment Incentives**: Employment incentives take the form of either direct subsidies to employers and/or indirect subsidies in the form of transferable cash allowances from workers to employers, both of which are designed to lower wages to meet the anticipated low productivity of subsidized workers. In some cases, employment incentives are designed to assist specific groups of workers, e.g., the disadvantaged, long-term unemployed, females, or youth, among others. Almeida et al. (2014) reports that wage subsidies serve this group of individuals well in developing countries even though they are not effective in creating jobs. As to their effectiveness, the evidence leans more towards their significance. Yayati et al. (2019) reports that their greatest medium impact is on earnings relative to a control group. Escudero (2018) contends that in combination with startup incentives, wage subsidies exhibit a significant negative impact on unemployment rates and on low-skill workers. Estevão (2003) finds that direct subsidies were most effective in raising employment in 15 industrial economies during 1985–2000, and Kluve et al. (2007) finds them beneficial to individual's employment probabilities in Denmark, Spain, Sweden, Norway, and Italy, in the 1990s. Betcherman et al. (2007) also confirms the benefits of wage incentives in OECD, especially when combined with firm-provided training. Generally, there is a near consensus that they are most effective when combined with other soft policies. A few others, however, arrived at a different assessment. Boone et al. (2004) states that subsidized jobs are not effective²³, Honorati and Posadas (2019) find that their impact is modest, and Sahnoun and Abdennadher (2018) determined that their effectiveness was limited to their duration.
- 4) **Training**: In contrast with other active measures, such as job search, which seeks to create new jobs, training builds human capital. It targets medium- to long-term results (Brown, 2015; Card et al., 2010). Training is the most expensive (Escudero, 2018), the oldest, and the most used ALMP. Evidence-based findings are, at best, mixed. While Boone and Van Ours (2004) found that training was the most effective in 20 OECD countries during 1985–1999. Yayati et al. (2019) reviewed 102 randomized control trials involving 652 estimated ALMP impacts and concluded that vocational training has had moderate effects.
- 5) **Research Methods**: Economists' choice of a research methodology is diverse. It varies from randomized

control trials, econometric analyses, difference-in-difference estimation, to the instrumental variable technique, all of which result in asymmetrical conclusions even when they are estimating the same causal relationship between a policy instrument and its outcome. A debate arose as to which approach is optimal. The randomized control group methodology, though common, has its drawbacks. Card et al. (2018) state that the estimated impacts based on randomized control trials are not too dissimilar, on average, from the results obtained from non-randomized studies. In a more recent report, Honorati and Posadas (2019) critiqued ALMPs’ literature in general, and control trials in particular. They maintain that they provide little evidence from developing countries; place less focus on formal employment and earnings, and offer scant evidence on skills acquisition or general equilibrium effects.

- 6) **Public Works:** Most studies affirm the ineffectiveness of this policy option (Brown & Freund, 2019; Card et al., 202010; Yayati et al., 2019) and some even judge it as detrimental (Katz, 1996).

6. Methodology

The evaluation of the effectiveness of ALMPs/wage subsidy in Kuwait centers on testing the hypothesis that wage subsidies to nationals enhance their employability in the private sector. This is captured by estimating the employment elasticity coefficients of nationals in the private sector in response to wage subsidies. *A priori*, a large and statistically significant employment elasticity coefficient would corroborate the hypothesis, while a small and statistically significant coefficient would reveal their limited effectiveness. A negative coefficient would mean ineffectiveness. Given that employability occurs as a result of either hiring Kuwaitis due to job creation or by replacing foreign workers, both hypotheses are tested. Additional explanatory variables are explored to explain changes in Kuwaiti private employment, *ceteris paribus*. Towards this end, an econometric model is developed to identify the predictors of changes in Kuwaiti private employment, while at the same time assessing the impact of wage subsidies.

Empirically, employability is denoted by an increase in the number of private Kuwaitis employment and/or by a rise in the ratio of Kuwaitis to non-Kuwaitis in the private sector over the study period from 2001 to 2019. Subsidies are measured by total spending on ALMPs/subsidies. The additional explanatory variables include real GDP; real non-oil GDP; government expenditures; terms of trade; educational differentials between Kuwaitis and non-Kuwaitis in the private sector; and wage difference of nationals in government and the private sector.

Since OLS methods to estimate regressions involving non-stationary and co-integrated variables result in misleading interpretations, we employ the fully modified ordinary least squares (FMOLS) model (Phillips & Hansen, 1990), which is asymptotically unbiased allowing for standard Wald tests using asymptotic Chi-square statistical inference. It also eliminates endogeneity by adding leads and lags. Tests of Engle-Granger cointegration using possible constant, trend, no employment variables and potential instrumental variables, are also performed to properly specify the deterministic components of the FMOLS specification. Additionally, tests of stationarity were conducted and the results indicate that all variables, except wage and education indices, are non-stationary and are either integrated of order *I*(1) or *I*(2).

To start with, Kuwait’s long-run aggregate employment elasticity is estimated as a comparator to the employment elasticity estimates of Kuwaitis in the private sector.

The long-term employment elasticity β_2 is measured by:

$$\text{Ln } E_t = \beta_1 + \beta_2 \text{Ln } Y_t + \beta_3 T + u_t \tag{1}$$

E_t is total employment in year t ; Y_t , real GDP; and T , Trend.

Table 2. Long-term employment elasticity estimates, 2001-2019 (Equation 1)

	Coefficient	Std. error	t-stat	Prob.	Summary Statistics
Y_t	0.580	0.136	4.265	0.0008	R^2 -adj = 0.980
Constant	8.369	1.376	6.081	0.0000	S.E. of Regression = 0.02854
@ Trend	0.023	0.004	6.418	0.0000	Long-run variance = 0.00124

Note. The Engle-Granger cointegration test of -2.2052 and p-value = 0.7113, do not reject the null hypothesis that the series are not cointegrated.

Source: *E* and *Y* data from PACI (2020, Tables 14,15,16).

The results reported in Table 2 show that all coefficients have the expected signs and are statistically significant.

They also indicate that the demand for labor (Kuwaiti and non-Kuwaiti) is inelastic in that a 1% growth in real GDP brings about a 0.58% increase in employment²⁴. When real GDP is replaced by real non-oil GDP in Equation (1), the results are less robust, reflecting the indirect influence of government procurements on the private sector’s demand for labor

6.1 Evaluation of ALMPs/WSP’s Job Creation and Job Substitution

Two tests are undertaken to evaluate the effectiveness of ALMPs/subsidy program in the private sector. The first measures the extent to which private employers fill up new job openings by Kuwaitis (i.e., job creation, E_{kp}) while maintaining their ratio to non-Kuwaitis constant and the second measures the extent to which Kuwaitis are hired as replacements for non-Kuwaitis (i.e., job substitution, E_{kp}/E_p). Job creation and job substitution tests are given in Equation (2) and Equation (3), and the results reported in Tables (3) and (4), respectively.

$$\text{Ln } E_{kp,t} = \beta_1 + \beta_2 \text{Ln } S_t + \beta_3 \text{Ln } Y_t^{no} + \beta_4 \text{Ln } W_t + \beta_5 \Delta \text{Ln } ED_t + u_t \tag{2}$$

$$\text{Ln } (E_{kp,t}/E_{p,t}) = \alpha_1 + \alpha_2 \text{Ln } S_t + \alpha_3 \text{Ln } Y_t^{no} + \alpha_4 \text{Ln } W_t + \beta_5 \Delta \text{Ln } ED_t + u_t \tag{3}$$

Where S_t denotes subsidies; Y_t^{no} , real non-oil GDP (which is used instead of real GDP since subsidies are tied directly to the non-oil private sector); ΔED_{t-1} , year-to-year changes in the ratio of educational level index of Kuwaitis to non-Kuwaitis in the private sector; and W_t , wage ratio of Kuwaitis in the government to the private sector.

Table 3. Long-term impact of the wage subsidy program on job creation, 2004-2019 [Equation 2]

	Coefficient	Stderror	t-stat	Prob.	Summary Statistics
Ln Y^{no}	0.771	0.204	3.789	0.0030	R^2 -adj = 0.9565 S.E.of Reg. = 0.0807 Long-run Variance = 0.004116
Constant	1.933	1.824	1.060	0.3120	
Ln S	0.341	0.029	11.905	0.0000	
Ln W	- 1.718	0.301	- 5.715	0.0001	
Δ Ln ED	1.0534	0.526	2.003	0.0705	

Note. The Engle-Granger cointegration test = -5.82992, with p-value = 0.0018 – do not reject the null hypothesis that the series are not cointegrated.

Source: E , Y^{no} , Y , W from CSB, 2021 and S from PACI (2020).

Table 4. Long-term impact of the wage subsidy program on job substitution, 2004-2019 [Equation 2]

	Coefficient	Std. error	t-stat	Prob.	Summary Statistics
Ln Y^{no}	0.904	0.245	3.689	0.0036	R^2 -adj = 0.8982 S.E. of Reg. = 0.0899 Long-run Variance = 0.005964
Constant	- 12.646	2.195	- 5.760	0.0001	
Ln S	0.145	0.034	4.207	0.0015	
Ln W	- 2.406	0.362	- 6.650	0.0000	
Δ Ln ED	1.468	0.633	2.319	0.0407	

Note. The Engle-Granger cointegration test = -3.7112, with p-value = 0.0553 – do not reject the null hypothesis that series are not cointegrated.

Source: See Table 5.

Three important findings emerge: first, while the impact of the wage subsidy (S) is positive but its magnitude is modest at best and negligible at worst in that an $x\%$ increase would generate only $0.34x\%$ increase in hiring nationals and $0.15x\%$ rise in the ratio of Kuwaitis/non-Kuwaitis, *ceteris paribus*. This is corroborated by actual data from the corporate sector wherein the employment of Kuwaitis increased only from 5.5% to 6.5% during the WSP’s life cycle. That is, of the additional 29,139 private Kuwaitis jobs during the period 2003–2019, 5,709 are accounted for by SOEs and the remaining 23,430 (80.4%) are hired by 42,082 privately owned enterprises (CSB, 2019). This implies that each private firm, on average, hired 0.56 Kuwaiti workers over 16 years, confirming the WSP’s limited effectiveness in the private sector.

Second, regarding the elasticity of the demand for Kuwaitis in the private sector in response to economic growth (Y^{no}), the results, which show that all coefficients have the expected signs and are statistically significant,

indicate that it is inelastic ($\beta_3 = 0.77$). That is, a KD 2 billion increase in non-oil GDP (= 8.6% annual growth rate) would create about 4,800 new jobs for Kuwaitis, which falls short of the approximately 25,000 Kuwaitis entering the labor market each year. Similarly, economic growth exerts a marginal influence on the substitutability of Kuwaitis for non-Kuwaitis in the private sector, albeit in a slightly stronger extent ($\alpha_3 = 0.90$).

Third, two variables stand out as the most impactful on private Kuwaiti employment: wage differentials (W) and the education index (ED). The former shows a noticeable negative influence on job creation ($\beta_4 = -1.72$) and job substitution ($\alpha_4 = -2.46$). Such a strong response can be traced to money wage differentials in addition to various non-pecuniary benefits associated with government jobs, described below. On the other hand, the education index indicates that higher levels of education among Kuwaitis compared to non-Kuwaitis is strongly associated with a higher demand for Kuwaitis. This is due to: 1) the relatively narrow wage *and* skill gaps between Kuwaitis and non-Kuwaitis compared to their low skilled cohorts; 2) the competitive edge of educated Kuwaitis in terms of their social, cultural, and language comparative advantages; and 3) less-skilled Kuwaitis' disdain of low skill, low-wage jobs.

7. Causes of ALMPs/WSP's Failure

Given the overall positive influence of wage subsidies elsewhere and their marginal impact in Kuwait, other heretofore-overlooked factors are examined in an attempt to explain away the divergence between them.

7.1 Kuwait's Economy is Intensive in the Use of Less-Skilled Labor

Since the start of the import-substitution industrialization of the 1960s, Kuwaiti investors did not actively seek foreign investments on account of the country's capital surplus, especially after the 1973 oil price hike (Girgis et al., 2003). They opted instead for low-skill intensive technologies in light of the abundance of cheap foreign workers and the familiarity with, and access to, simple technologies in neighboring countries²⁵. Statistical evidence corroborates the low skill bias; in 2020, less skilled workers (secondary education and lower) made up 77.4% of the workforce (PACI, 2021). In contrast, the comparable figure in an industrial economy, such as the US in 2010, is 41.8% (Bean et al., 2014). Furthermore, less-skilled jobs accounted for the largest increment in the labor force between 2000 and 2020: 1,188,473 less skilled versus 244,913 high skilled (> secondary).

Over time, this bias was strengthened by the gradual shift in consumer demand towards tertiary sectors (wholesale and retail trade, hotels, restaurants, and community services), which are typically low-skill-labor-intensive activities. To wit, the share of these activities in GDP rose from 29.3% in 1966–1968 to 44.5% in 2013–2015, and to 58.3% in 2020 (CSB, 2021). The bias was further reinforced by the dominance of monopolistic market conditions, which has had the effect of disincentivizing businesses from modernizing their dated technologies. Estimates of the Herfindahl-Hirschman's market concentration index show that 329 product groups (at the 5-digit ISIC) out of a possible 493 are 'highly concentrated,' and 136 of those are pure monopolies²⁶. Additional evidence of the bias is seen from the state of managerial skills in SMEs, which represent 99.9% of all enterprises. A recent survey of more than 39,000 registered firms shows that only 0.4% conduct manpower training programs; 2.5% maintain final audited accounts; 0.21% use computers; 0.2% carry out market surveys; and 6.2% have access to the Internet. Furthermore, only three enterprises met all five conditions. Over time, the number of SMEs that carried out audited accounts, training, and Internet use, increased from 30 to only 47 from 2003 to 2018 (Girgis & Al-Fulaij, 2018). In brief, apart from large enterprises, most of which are SOEs, entrepreneurship in Kuwait is steeped into low-tech systems, favoring low-skilled workers, and the latter are considerably cheaper when imported than when hired from the local market.

7.2 Kuwaitis Pursues Higher Levels of Education That Deviates From Private Sector Needs

While the private sector keeps on hiring less-skilled workers, Kuwaitis continue pursuing high levels of education to qualify for high wage, white-collar jobs. Between 1965 and 2020, the weighted average index of education of Kuwaiti workers rose from less than Read and Write (1.6 yrs.) to Secondary (12.05 yrs.)²⁷, while for non-Kuwaitis, it inched up slightly from less than Primary (3.03 yrs.) to slightly above Primary (5.45 yrs.). That is, while the average Kuwaiti worker acquired 10.45 additional years of education, the private sector, the dominant employer, required only 2.42 additional years of education. In fact, the number of less skilled Kuwaitis was 653 less in 2020 than in 2000. Conversely, high-skilled Kuwaitis increased their share in total employment from 30.2% in 2000 to 46.9% in 2020 (PACI, 2021). In 2020, they made up about half (49%) of all Kuwaiti employees. Clearly, the private sector's demand for labor and the supply of Kuwaiti workers have been trending in opposite directions.

Whereas seeking higher levels of education is a personal choice, it has nonetheless been encouraged and financed by the government through free education policies across all levels, cash stipends to university students, and fully financed wide-ranging external and internal university scholarships²⁸, among others. This choice is also

driven by a strong expectation of qualifying for a government job, since governments tend to employ relatively more educated employees.²⁹ This factor is of special importance in Kuwait because government jobs offer significant non-financial benefits, which the private sector can ill afford. To wit, besides higher wages, government jobs demand minimal academic qualifications, grant frequent salary raises, and offer job security, less accountability, shorter working hours, and fast promotions based on nationality and/or connections. Government employees are also allowed to double dip by running their own private businesses³⁰, a benefit buttressed by legal rentier practices. These explain the seemingly paradoxical juxtaposition of 32,851 unemployed Kuwaitis in 2021, of whom 9,458 are high skilled, while the private sector employs 159,041 foreign cohorts (PACI, 2021). It is this paradox that underpins the unemployment phenomenon in Kuwait. Due to the government's lucrative pecuniary as well as non-pecuniary perks, most Kuwaitis prepare to work in the government sector, and since minimal qualifications are demanded, they select less demanding academic disciplines and, for some, specialize in fields in which they know *a priori* that are not within the domain of private sector needs.³¹ Many wait long periods for the 'right' government job.³² Meanwhile, local businesses are reluctant to hire them due to a perception of their low-quality education³³, higher wages, and a lack of technical, as well as, soft skills.

That the labor market has become highly segregated as a result of past labor market policies, can be seen from estimating the Duncan Index, which measures the degree of occupational segregation between Kuwaitis and non-Kuwaitis. The index $D = \frac{1}{2} \sum |E_{k,i} - E_{nk,i}|$ where $E_{k,i}$ is the % of Kuwaitis in total Kuwaiti employment in occupation i and, $E_{nk,i}$ is the % of non-Kuwaitis in total non-Kuwaiti employment in occupation i . Total segregation is indicated by $D = 1$ and perfect demographic representation or total integration by $D = 0$. From 1994 to 2021, the index increased from 0.575 to 0.667 (computed from PACI, 2021).³⁴ Notable outliers of near equal demographic representations ($D = \leq 0.011$) are observed in 'corporate managers,' 'legislators and senior officials,' and 'physical, mathematical, engineering science professionals' occupations, while, adversely, those that lie at the other end are observed in 'models, salespersons, and demonstrators,' 'ordinary workers,' and 'drivers and mobile plant operators' occupations, which are overwhelmingly manned by foreign workers ($D = \geq 0.11$). In brief, too many university-educated Kuwaitis are chasing a few top white-color jobs and too few less-skilled Kuwaitis are available to meet the considerable demand for blue-color laborers.

7.3 Low Participation Rates in the Labor Force

The participation rate of Kuwaitis in the labor force is much lower than in other countries; it was 46.6% in 2018 (PACI, 2021) compared to a global average of 66.5% (World Bank 2019)³⁵. That almost half of the national labor force chooses not to work is attributed to a host of factors, including social norms that limit females' participation, a generous retirement system, and, to some, a rentier mindset in which one earns income without effort such as in renting business licenses, selling work permits, receiving job promotions through connections, etc. The national work/leisure decision is greatly influenced by a local growth model designed to improve living standards through oil dividends. The result is a welfare model that subsidizes practically every aspect of life, e.g., free health care, free education, free foodstuff, job entitlement, monthly child allowance, and wage subsidies, in addition to other support schemes for marriages, housing, building materials, rents, mortgages, energy (gas, water, and electricity), price controls (bread), free medical treatment overseas, and no taxes. In FY 2020/2021, KD 14.3 billion were earmarked for subsidies, grants, social benefits, and salaries, which comprised two thirds of government expenditure and exceeded oil revenue by KD 5.5 billion (Ministry of Finance, 2021).

7.4 A Small Population

As of mid-June 2021, there were 1.4 million Kuwaitis employing 2.4 million foreigner workers. Moreover, 560,317 or 38.03% of all Kuwaitis are outside the labor market as they are either younger than 15 or older than 65 years. Clearly, neither the population size nor its above-mentioned demographic anomalies bode signs of being able to rebalance the current Kuwaiti/non-Kuwaiti labor market disparity³⁶, a fact that implies that the disproportionality of Kuwaiti and non-Kuwaiti residents would appear to remain the same for the foreseeable future.

7.5 Laissez Passe Immigration Policies

In theory, employers hire workers when their economic value to the firm exceeds their cost. Employers in Kuwait have been able to meet their increasing demands for labor over the last five decades by relying on imported foreign workers whose costs are considerably lower than the value of their marginal physical product. This strategy was made possible by the government's *laissez passe* immigration policies, representing an escape hatch, which has long underscored the political weight of the business class in matters of national labor market policies.

7.6 Limited Training

Available official data show that training constituted 0.16% of total ALMPs/WSP spending in 2016 (MGRP, 2017), which explains in part the program's ineffectiveness.

8. Conclusion and a Proposed National Renewal Plan

The preceding assessment indicates that Kuwait's demographic challenges stemmed in large part from pursuing well-intended short-term policies with unintended consequences. Examples include subsidizing Kuwaitis to join the private sector while bolstering the rewards of working in the government sector, or by imposing restrictions on the functioning of the labor market (e.g., the Kafala system along with the other short-term fixes) while trying to integrate the labor market. Or by incentivizing nationals to pursue higher levels of education while expecting them to replace low-skilled foreign workers. Or by actively distorting factor and product prices through widespread consumption and production subsidies serving short-term goals while overlooking their inherent adverse economic effects on the country's demographic structure. Or by giving considerable financial support to the traditional education system while disregarding the need to train large numbers of Kuwaitis—who do not wish to pursue a university education—to acquire the technical skills required to replace highly paid foreign workers engaged in critical government-owned oil, medical, and public utilities companies.

The open unemployment of nationals is a long-term, structural phenomenon whose solutions must address its symptoms and seek long-term structural remedial changes. In what follows, we suggest such a policy: a package of interrelated, market-driven set of actions designed to achieve a long-term solution to the existing unemployment problem. The proposed plan, which consists of three stages, is in effect a national renewal plan, as it simultaneously tackles other related socio-economic challenges.

The first stage, *human capital investment*, calls for the establishment of special two-year colleges for the upgrading of nationals' skillsets. The training would be in occupational specialties emphasizing analytical disciplines like higher mathematics, statistics, computer programming, English language and, possibly, managerial skills. The choice of skill training should begin with areas in which Kuwait is especially dependent on high-paid foreigners and in areas where the highest rates of replacement have already taken place in recent years³⁷. Priority must be given not only to critical foreign-dominated skills in areas such as power generation, water desalination, oil refining, petrochemicals, and health care, but also to soft skills. Student graduation must be contingent upon enrollees' superior performance based on objective evaluations. While government support to on-the-job training in SOEs and private firms is necessary, it should be partially funded to give the institutions a stake in the program, to improve the selection of trainees, and to avoid the O-J-T becoming a dumping ground for unqualified individuals.

Simultaneously, the second stage, *labor market reforms*, would pursue:

- Abolishing the *Kafala system* and eliminating rentier practices to motivate Kuwaitis to compete on equal footing with non-Kuwaitis
- Advocating self-reliance in place of dependence on government paternalism e.g., by ending government's job guarantee to nationals
- Initiating civil service reforms by matching government salaries to levels of job qualifications and responsibilities
- Selecting nationals based on merits, instituting performance-based promotions, and moderating public job expectations
- Curbing and eventually eliminating cronyism (*wasta*) and tribalism, especially in critical leadership positions
- Restructuring incentive systems to encourage skill acquisition
- Improving the administration of labor market agencies
- Focusing on promoting innovation, exports, and expansion in the private sector rather than on restricting the supply side of the labor market (McKenzie, 2017)
- Raising the cost of employing white collar foreign workers
- Increasing the incentives of private sector employers to seek nationals by modifying the wage subsidy to narrow down the wage gap of high skilled jobs between Kuwaitis and non-Kuwaitis, and also by limiting the duration of the wage subsidy to 2–3 years
- Reenergizing the SMEs Fund

- Linking production subsidies to hiring of nationals
- Scaling down social dividends and government wages to lower nationals' reservation wages
- Enhancing labor market information system and, most importantly
- Reversing the deterioration in the quality of education across all levels³⁸.

The preceding two stages contain the necessary conditions. The third stage, the *socio-macroeconomic structural reforms*, embodies the sufficient conditions. It relies on four fundamental structural adjustments. The first calls for modifying the social contract from the current ad hoc distribution of oil wealth, which has created an expansive and distortive 'womb to tomb' welfare system, to one in which oil revenues are distributed equally as a form of income to all citizens. This policy, adopted successfully elsewhere, would eliminate current consumption subsidies and remove factor and product price distortions, leading to a more optimal resource allocation and reviving past self-reliance among nationals. The second involves pursuing a long-term, *high value added strategy* in which domestic production centers of tradables are to be relocated to foreign low-wage countries, while high-value-added functions (e.g., engineering, finance, design, accounting, marketing, etc.) are to stay in Kuwait, thereby hollowing out the demand for less-skilled foreigners while expanding the demand for high-skilled Kuwaitis (CMT, 1989; Amsden & Girgis, 1990). The third rests on enabling the private sector to widen its base through a transparent privatization of the current expansive SOEs sector and loosening current restrictive business regulations, thereby broadening the scope of the demand for nationals. Lastly, this stage must maintain safety net provisions, especially those that augment productivity, such as health and education.

If pursued as proposed, this national renewal plan would serve Kuwait's macroeconomic goals as well, namely, the provision of sufficient meaningful jobs for all job-seeking Kuwaitis, economic diversification, productivity growth, better balanced demographics, fiscal restraint, and a self-sustaining economic development.

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Notes

- ¹ The GCC countries are Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.
- ² To the extent that labor market imbalance is the *raison d'être* of the population imbalance, corrective policies of the former will have analogous effects on the latter.
- ³ The Kuwaiti economy is heavily indebted to oil revenues in that between FY 2009/2010 and FY 2019/2020, it contributed 91.5% of the government budget and made up 53.7% of the GDP (CSB, 2021; Ministry of Finance, 2021). However, due to the instability of the oil market, per national capita, which reached USD 113,418 in 2010, fell to USD 71,379 in 2020.
- ⁴ Kuwaitis became a minority as far back as in 1962 when there were 174,812 nationals and 178,104 non-nationals (CSB, 2021).
- ⁵ The 'public sector' heretofore refers to the government sector plus state-owned enterprises [SOEs].
- ⁶ This implies that the private sector absorbed 20.4% of the net increase in Kuwaiti employment between 1993 and 2020, and the remaining 79.6% were given government jobs (PACI, 2021).
- ⁷ In all, most foreign workers earn substantially lower wages and face more regulations, fewer rights, and less job security. Official statistics show that the average monthly wage rate of Kuwaitis is 4.5 times that of non-Kuwaitis (KD 1,490 vs. KD 331) in 2021 (CSB, 2021).
- ⁸ Forstenlechner & Rutledge (2011) concluded that "national/non-national demographic imbalance now tops the political agenda of most if not all, [GCC] states," (Forstenlechner & Rutledge, 2011).
- ⁹ Kuwait's employment data are distorted by the extent to which the *Bedoons* (stateless residents) became noncitizens after 1989 (De Bel-Air, 2019). It is estimated there are 90,000 to 115,000 *Bedoons*.
- ¹⁰ There were 49.3 expatriate jobs (excluding household jobs) for every unemployed Kuwaiti in 2020 (PACI, 2021).
- ¹¹ Besides the rise in females entering the labor force, the government's slowdown in hiring nationals account for their rising rates of unemployment, especially that government jobs to Kuwaiti females are first, and often, last priority.
- ¹² This policy is practiced widely in the GCC. Oman, in 2022, restricted work to nationals in 207 occupations.

¹³ Whereas most foreign-labor-importing countries have citizenship-paths mechanisms for immigrant workers, Kuwait does not provide any, nor do the other five GCC countries.

¹⁴ Other institutions balked at the Diwan's interventionist stance. Example: Kuwait University decided to halt staff Kuwaitization for four years (Alqabas, 3/3/2022) when it was requested to lay off 391 out of 534 non-Kuwaiti staff members to meet its Kuwaitization quota.

¹⁵ However, in response to fiscal exigencies facing the government budget in FY 2021/2022, the Fund suspended its lending activities.

¹⁶ Hence, wage subsidies and ALMPs are used interchangeably.

¹⁷ A Kuwaiti Dinar is worth about USD 3.30.

¹⁸ It is not known if and by how much government funds contribute to WSP. However, government budget data show that in FY 2015/2016 (the latest available), total income and profit taxes amounted to KD 141.9 million, while spending on the WSP was KD 459.2 million. This clearly shows that the bulk of the WSP is borne by public funds.

¹⁹ This compares favorably with 0.5% in OECD (Brown & Freund, 2019) and 0.4% in Latin America (Pignatti & Van Belle, 2021). Kuwait's estimate is computed as the percentage of cumulative ALMS spending in GDP during the nine-year period from 2001 to 2019, to avoid swings in income due to oil price fluctuations.

²⁰ Kuwaiti females in 2020 made up 50.2% of Kuwaiti employment in the private sector (CSB 2020).

²¹ Based on a firm-based survey, 21.3% of Kuwaitis were identified in 2003 as owners. This percent dropped to 3.3% in 2019 despite the increase in the number of firms surveyed from 38,639 to 42,577, respectively (CSB 2019).

²² Whereas active labor market policies interact with passive labor market policies, reinforcing each other to positively impact employment in developed economies, they negatively influence "all outcomes of interest" in developing and emerging economies (Pignatti & Van Belle, 2021).

²³ In Jordan, wage subsidy participants were given six non-transferable monthly vouchers to be presented to employers. The face value of the voucher was close to the minimum wage rate. Groh et al. (2016) evaluated the program and concluded that its impact was limited to its duration. Little long-term effect on employment was observed. The same conclusion was reached in a similar study of wage subsidies in the US from 1979 to 1994 (Katz, 1996).

²⁴ Based on the 0.58 employment elasticity coefficient, and given the economy's overall average growth rate of 4.5% annually, the economy creates more jobs (77,191) than Kuwaitis looking for jobs (25,000).

²⁵ The technological bias was supported by a local protective environment (e.g., low customs duties, exemptions on raw materials, and 25% protective tariff on competitive imports) in addition to the free passage of local goods to the other five GCC-free-trade states.

²⁶ While low-tech systems reduce the cost of production, dampen inflation pressures, and strengthen the competitiveness of local firms, they also conceal low productivity levels. Employing the identity $G = EV$, where G denotes real non-oil GDP (2015 = 100); E , employment; and V , labor productivity (G/E), a straightforward calculation shows that V fell steadily from KD 19,894 in 1993 to KD 13,094 in 2020, or by 34.2%²⁶. This is confirmed by the IMF, which showed that total factor productivity exhibited negative growth rates during 1990–2012²⁶ (IMF, 2013).

²⁷ The fastest educational progress among Kuwaiti employees occurred between 1965 and 1985 (1.6 to 8.31) compared to 2005 to 2020 (11.21 to 12.05). In contrast, non-Kuwaitis' levels fell from 6.21 in 1985 to 5.08 in 2005.

²⁸ The government sponsored 40,262 scholarships during 2001–2022, most of which are in overseas universities. Allowances for US-based students, as an example, consist of \$2600/mo. plus \$2,756 for books and clothes (Ministry of Higher Education website, Statistics).

²⁹ In Kuwait, the weighted average level of education in government is 13.9 yrs. (> secondary) compared to 9.5 yrs. (slightly higher than intermediate) in the private sector.

³⁰ In a recent CSB survey of unemployed Kuwaitis, 58% expressed willingness to work only for the government.

³¹ Examples of the widespread educational mismatch: the Civil Service Diwan reports an excess supply of Kuwaitis with university degrees in 2018 in Islamic Jurisprudence (587), mechanical engineering (481), law (411), and industrial engineering & MIS (370), among others. Private sector employers attribute the lack of demand to either irrelevance (e.g., Law or Islamic Studies) or dated technologies (e.g., I.E. or ME) or inept managerial capabilities (e.g., MIS).

³² The Civil Service Diwan reports 6,081 job offers were rejected by unemployed nationals in 2018, and, on average, each applicant rejected a government job offer five times.

³³ Kuwait University is ranked 801–1000th in 2021, down from 601–800th in 2017 (QS World University Ranking, 2021).

³⁴ This also indicates that the labor market was significantly segregated even before 1994.

³⁵ The low rate of participation of nationals in the labor force is not overwhelmingly gender biased, as is generally believed in the GCC, in that females' rate in Kuwait in 2020 is only slightly higher than males': 57.6% vs. 42.4% (CSB, 2021).

³⁶ The claimed goal of reversing the population mix from 30/70 (Kuwaiti/non-Kuwaiti) to 70/30 does not seem feasible due to the considerable magnitude of the demographic gap, as well as to natural physical demographic constraints of the Kuwaiti population. This desired demographic reversal is the more difficult when one considers the 1.5 million foreigners privately employed, plus the 714 thousand in the household sector (PACI, 2021).

³⁷ An analysis of the evolution of the value of the D Index regarding the 27 different occupations listed in PACI's dataset would provide clear signals as to which occupations are most favored by Kuwaitis.

³⁸ See a thorough treatment of required labor market reforms in short-, mid- and long-terms in Girgis et al. (2003).

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Gender Violence Suffered by the Daughter-In-Law in the Changing Chinese Family — A Case Study from the Perspective of Family Power Structure

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Abstract

With the development of society, the structure and function of the Chinese family have undergone great changes but gender violence still exists. Through in-depth interviews with two in-laws families, the article describes the gender violence suffered by three daughters-in-law (DILs) within two generations from the 1970s to the 2000s, discovering that despite the nuanced differences in the forms and frequencies of gender violence, three DILs were all at the inferior status in the stem family and were victims of family power inequality. It was revealed that the family power inequality gave rise to gender violence toward the DIL, inducing severe physical or mental injury to the DIL. However, family power inequality was rooted in the traditional gender ideology. The traditional gender ideology originated from the feudal society of China and still pervaded modern society. Consequently, the traditional gender ideology was the rooted cause of the occurrence of gender violence. The article concludes with a reminder of reflecting upon the impacts of the traditional gender ideology on our lives and promoting a new gender consciousness.

Keywords: Gender Violence, Daughter in Law (DIL), Family Power Inequality, Traditional Gender Ideology

1. Introduction

As a pervasive phenomenon in human society, gender violence toward women has been rooted in various cultures and has taken multiple forms (Russo & Pirlott, 2006; Mitchell & Freitag, 2011; Fernandez, 2006; Merry, 2009; Vandello & Cohen, 2008). In many cultures like China, Japan, Latin America, Vietnam, Ghana, etc, women as the daughter-in-law (DIL), were in a submissive position relative to their husbands (Fernandez, 2006) and suffered domestic violence not only from their husbands but also from the parents-in-law (PIL). Though abundant literature explored a series of issues on gender violence, encompassing the causes that might lead to gender violence (Carlson, 1984; Farmer & Tiefenthaler, 1997; Aizer, 2010; Gracia & Herrero, 2006; Mshweshwe, 2020), the adverse health consequences (Heise, Ellsberg, & Gottmoeller, 2002; Chrisler & Ferguson, 2006), the gender violence prevention (Chrisler & Ferguson, 2006; Mitchell & Freitag, 2011), the mechanism for the transmission across generations (Pollak, 2002) and the interventions to breaking the cycle of gender violence (Livings, Hsiao, & Withers, 2022). However, the literature is absent of the perspective of the DIL, which has been an important role in the Chinese family.

Gender violence suffered by the DIL was embedded in the structure of power within a family shaped by the patriarchal culture (Merry, 2009). The physical violence and mental abuse subjected by the wives were thought to be normative and culturally sanctioned in a patriarchal society (Mitchell & Freitag, 2011). Moreover, gender violence toward the DIL emanated from the unequal cultural context, within which the older family member of the previous generation dominated the DIL in the private sphere and exerted control over the DIL by the form of role expectations (Katz, 2006; Merry, 2009), which was totally ignorant of the DIL's feelings and injured their dignity as a human. For example, the DIL had been treated as inferior and must be obedient to her husband and PIL in traditional Chinese culture (Gallin, 1994).

Some research focused on the gender violence suffered by the DIL within the scope of the family from the views of the relationship between the DIL and MIL, or the relationship triangle among the MIL, the husband, and the DIL, such as analyzing the causes and consequences of the conflicts between the MIL and DIL (Adhikari &

Bharati-Santiniketan, 2015), and exploring how to maintain a good relationship between the MIL and DIL within the relationship triangle with the son and husband (Woolley & Greif, 2018). Focusing on the changes in intergenerational relations between the MIL and DIL during the 1950s and the 1980s in rural Taiwan, the academics found out that in some families the balance of power between MIL and DIL was reversed to the opposite one, while others continuously sustained the previous authoritarian hierarchy in the 1980s (Gallin, 1994).

As far as the Chinese family was concerned, the status of the DIL in a modern nuclear family was higher than that of in the traditional stem family. However, gender violence still pervaded the modern family in various forms. It has been a neglected area to research what changes had happened in the gender violence suffered by DILs in different generations. The article attempts to examine the power inequality in the stem family through the lens of family power structure (Sprey, 1972; Safilios-Rothschild, 1970); the connection between the family power inequality and the gender violence toward the DIL; the rooted cause of the occurrence of gender violence.

2. Methodology

The data used in the study was collected through in-depth family interviews with the two in-law families. As a result of the fact that I was familiar with the two families, having known and lived near them in my hometown when I was a teenager, I had the strength to build good relationships with the DIL, the husband, and other family members, so I conducted the in-depth family interviews smoothly. The interview outline was composed of the rough questions as follows. First, for the two rural stem families in the 1970s, (1) Who was the head of the family? (2) How did the MIL and father-in-law (FIL) get along with the DIL? Who would quarrel with the DIL? (3) What did they quarrel about? Why did it happen? What did the DIL think about it? What did the PIL think about it? (4) What was the consequence of the quarrel? Who would be the injured? (5) What was the position of the son or husband? How did the son or husband look at his mother and his wife in the conflict? Whose side will the son or husband join in? Why? (6) What was the relationship between the husband and his wife? Second, for the nuclear family in the 2000s: (1) How often did the young couple meet the husband's parents? (2) Did the husband's parents make any demands on the DIL? What were those demands? What was the reaction of the DIL? (3) When the PIL and the DIL disagreed with each other, did the DIL insist on her own opinion, or give in? (4) What did the DIL do when she disagreed with the MIL? And what would the husband do? (5) How was the relationship between the husband and the wife?

Each family interview lasted from 120 to 240 minutes intermittently, mostly taking place at the home of each participant. The interviews were recorded and transcribed with the family's agreement. And the transcription was sent to the individual participants to review and check for accuracy. To protect the privacy and show respect to the three families, I had promised that I will strictly adhere to confidentiality, so all the names used in the article were pseudonyms. Permission has been obtained from each family to quote their words.

3. Case Study

The case study was designed to discover the connection between family power inequality and the occurrence of gender violence from the angle of DIL. The case was the pair of in-laws families, consisting of two rural families, Mary and Jane's stem families, and one urban family, Lily's conjugal family. The two DILs in the older generation were Mary, who was born in 1949, and Jane, who was born in 1951; the DIL in the younger generation was Lily, who was born in 1974. They had become in-laws families since Mary's daughter Lily married Jane's son in 2000. There were different patterns of power inequality within the three families.

3.1 *The MIL-Dominated Stem Family in the 1970s: MIL-Husband Alliance*

Since Mary married Tom in 1969, Mary had become a housewife, and her husband Tom became the breadwinner, commuting from the village to the factory every day. Living together with Tom's parents and younger siblings, Mary was subordinated to Tom's family and burdened with most of the housework. But Mary occasionally had quarrels with her MIL over trivial matters in daily life. Each time after a conflict when Mary's husband Tom came home from work, the MIL would retaliate by instigating Tom to beat her. Thus, Mary was battered by her husband time and time again whenever she hadn't satisfied the MIL or didn't show obedience to the MIL.

The reason for the inferior status of Mary in the stem family can be presented clearly from the triangle relationship among Mary, MIL, and Tom in the genogram of figure 1. The closeness between Tom and his mother, and the alienation between Tom and his wife, were displayed clearly in the triangle. In this stem family, Mother had more control and dominance over the son. The MIL plotted to exert control over the DIL, which was explained by the academics as the result of the mother's limerent passion for the son (Adhikari & Bharati-Santiniketan, 2015). Furthermore, as the older son of the family, Tom knew well that he must show filial

piety to his mother through obedience. His mother took it for granted and expected it, thus resulting in more interference in the son's married life and more requirements for the son. To some extent, Tom and his mother formed a close alliance in the subjugation of Mary. As a result, Mary was placed in the inferior status within the stem family and subjected to gender violence physically and mentally from her husband incited by the MIL.

Another case also indicated that in the stem family, the husband's violence toward his wife was usually instigated by the older, authoritative member of the family. Tom's younger brother, the second son of the family, resisted obstinately his mother's meddling in his married life. Speaking concretely, instead of showing obedience to his mother, he often refused to obey his mother's orders. He tried all the ways to avoid beating his wife even though his mother tried to coerce him to act according to her order. It was clear to see that only the husband who dared to challenge the parents' authority, could he break the cycle of command-obey authority structure and protected his wife from violence.

The alliance between Mary's MIL and Mary's husband reinforced the dominance of the MIL, leaving Mary in a more fragile situation within the family. The pattern of power inequality within the family could be summarized as a MIL-husband alliance, which means the power to batter the wife was passed on to the husband from the older generation.

3.2 The FIL-Dominated Stem Family in the 1970s: Direct Control of FIL

In 1972, Jane married a young man living near her village, and the young man was the only son of a prosperous peasant couple. Since married, Jane had given birth to four babies. The older one was a boy and the other three were girls. Longing for two grandsons, Jane's PIL were disappointed at having only one grandson because they desired more grandsons with the hope of more male offspring bringing more happiness. Despite that Jane was a gentle and diligent DIL, the FIL, the head of the family, usually scolded Jane strictly for some seemingly insignificant matters. He disliked Jane's style of speaking and acting and thought of Jane as an incompetent DIL. Then severe reprimand was inflicted upon Jane repeatedly. And Jane lived in a state of depression and anxiety, finally, she developed severe insomnia. Nonetheless, compared with Mary, Jane was a bit lucky for never being battered by her husband in the family.

The dominant FIL was observed to exert power over his son and his DIL separately and directly. That is to say, instead of being allied with the son, the authoritative FIL exerted the power over the son and the DIL respectively, so the pattern of power structure could be defined as direct control of the FIL.

Seen from the genograms, two DILs in the 1970s were both at the bottom of the family power hierarchy, being subjected to physical or psychological violence directly or indirectly from the older generation. Further, they sustained the gender violence and accepted it as a normal life at that time. In the 1970s, ordinary people considered it a personal affair for a husband to batter his wife, and they never took it as a serious matter, nor could they consider it as a human rights violation (Bunch & Carrillo, 1991).

3.3 The Nuclear Family in the 2000s: Limited Interference from MIL

With the social and economic progress, an increasing number of women had attained high levels of education and participated in social life, then the traditional image of women as submissive and powerless changed to some extent in the 2000s. More couples chose to live apart from the older generations and enjoyed the intimate space for conjugal life. However, the rise of women's status in society in the social sphere neither led to significant changes in the role of a DIL within a family.

When Lily married Jane's son in 2000, the couple began their postgraduate education with the purpose of getting Master's and Doctorate degrees in the metropolis. During the long period of studying at university, whenever the couple went back to the husband's home on holidays, Jane would express a strong desire of hoping for them to bear a baby as early as possible. Sometimes Jane even threatened Lily to say, "if you refuse to bear a baby, we will go somewhere to buy a male baby", sometimes she deliberately satirized Lily, saying that "the tree is very big but bears no fruit". Jane was a straightforward MIL, whose insulting words manifested the so-called role expectations to the DIL in an agnation society, but she hurt Lily.

In essence, the value of a DIL in a rural family was nothing to do with higher education and living an independent life but intertwined firmly with reproducing offspring for the husband's family. Having been married by free choice and living apart from her husband's home, Lily was obviously enjoying more freedom and autonomy than her mother Mary, and her MIL Jane. But the role of DIL means it was her duty to meet the expectation and requirements of the PIL under the patriarchal culture. Therefore, despite that Lily had a high level of education, she remained to need to meet the requirement of her PIL as she was their DIL. Years later, Lily achieved a Doctorate degree and got a job, then she gave birth to a male baby in 2009, which undoubtedly

satisfied the husband’s family. In November 2015 when the government relaxed birth control and promulgated a new policy of “one couple, two children”, Jane could hardly wait to call Lily to prepare for having a second male baby.

Gender violence toward Lily seemed more limited than that of the previous generation. Lily escaped from being blamed for all aspects of life except for procreation, while Mary and Jane both lived together with their PIL and were blamed for various aspects. Although Lily only had limited occasions to meet up with her MIL, she remained to endure the harsh words and tough attitude from her MIL on the matter of bearing a baby whenever they met. We could conclude that Jane had power over her DIL at the point of reproduction. Thus, Lily had to endure limited interference from her MIL in the stem family.

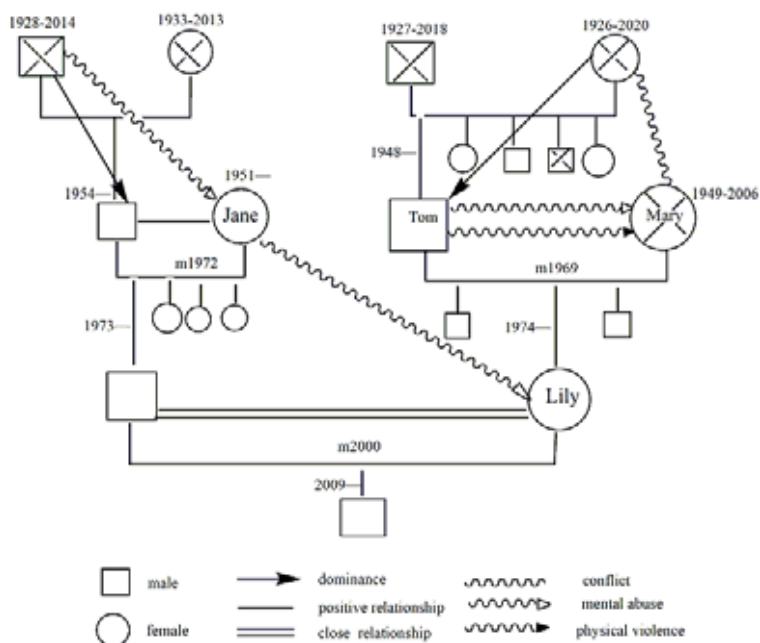


Figure1 Genogram

4. Discussion

As seen from the genogram of figure1, the parents of the older generation had absolute power over the younger generation within the Chinese stem family in the patriarchal culture in the 1970s. Three DILs were subjected to different forms of gender violence within the unequal power structure of the stem family. Mary was subjected to severe physical and psychological violence from the alliance between her MIL and her husband. Jane sustained mental abuse from the direct control of her FIL. Lily was occasionally exposed to the mental abuse of her MIL. It could be found that the gender violence sustained by Lily in the 2000s was apparently reduced in scope and frequency, but it still existed. Looking back on the changes that Chinese families took place during the 30 years, we might find the rooted cause behind the family power inequality and the occurrence of gender violence.

4.1 Chinese Families Had Undergone Great Changes in the Past Centuries

First, the size of the family had become smaller. A Chinese sociologist verified Parsons’s hypothesis that with the development of industrialization, the family of the young generation became smaller than that of the old generation through a case study on six generations of a traditional Chinese family in a suburb of Beijing (Li, 2003). With the development of society, more and more women participated in social affairs and attained higher social status than before. Hence, the DILs of the younger generation had more choices than the DILs of the older generation. The young couple had the freedom to live independently rather than living together with their older generation. Consequently, the stem family had been replaced mostly by the conjugal family or nuclear family in the developed society.

Second, the function of the family underwent important changes. In the agrarian society, the role of DIL was defined as a female giving birth to babies and caring for others. A married woman who was incapable of giving birth to a baby would face severe consequences. As the expectations to the role of DIL were constructed by the culture, we could find clues from the traditional ideology that originated from feudal societies thousands of years ago. The famous saying such as “no offspring is the worst one of the three ways unfilial to our parents” and “the

more sons, the more blessings” had dominated the Chinese agrarian society for a long time. Therefore, Procreation was the foremost function of a traditional Chinese family. However, in the modern nuclear family, more and more couples had the right to determine whether they had a baby or not, though their parents might sometimes try to persuade them to do so. Interestingly, the family was becoming a multi-functional space, not only for bearing offspring but also for the relaxation and intimacy of couples.

Third, the conjugal relationship was becoming more important in the modern family than in the traditional family which focused on the parents-children relationship. In a traditional Chinese stem family, the parents had authority over their sons including interference in the son’s personal affairs. Moreover, the son, especially the elder son, who was always obedient to his parent, would be regarded as having filial piety, a quality eulogized by the traditional filial piety culture. At the same time, the DIL was the person who behaved in a totally submissive manner. However, in a modern nuclear family, without the interference of the older generation, the couple were equal to face and tackle their problems together. Furthermore, they are more equal than ever and the conjugal relationship was becoming the dominant relationship in the nuclear family (Li, 2003).

4.2 The Traditional Gender Ideology in the Feudal Society of China Shaped the Social Expectations to the Role of DIL

The social expectations to the role of DIL remained unchangeable, though Chinese families had undergone great changes in the past centuries. It was noticed from the experiences of three DILs of two generations that gender violence is transmitted from generation to generation. In a traditional stem family, the DIL was treated as an inferior member and had responsibilities of producing offspring, taking care of other family members, etc. DILs mostly had neither significance nor position until she became a MIL. When Jane was young, she had to subordinate to the commands from her PIL and had to put offspring reproduction as her foremost task to fulfill for her husband’s family. In the end, she survived and completed the requirement from her PIL. Thus, it was her turn to exert the same authority over her DIL by demanding a male baby. That is to say, if she had given birth to and reared a son for her husband’s family, then she could get a higher status in the family power structure (Gallin, 1994).

The traditional gender ideology in the feudal society of China shaped the social expectations to the role of DIL. Characterized by “male superiority and female inferiority”, the traditional gender ideology originated from the feudal society in Chinese history. Having been prevalent in feudal societies for thousands of years, the gender ideology consisted of a series of traditional disciplines which was supposed to control the female’s behavior from all aspects of life. One of the disciplines was ‘three obediences and four virtues’. ‘Three obediences’ means that the female should be obedient to her father before she marries; the female should be obedient to her husband after she marries; the female should be obedient to her son after the death of her husband; and ‘four virtues’ means that the female should have high morality, speak properly, behave in a modest manner and work diligently (Hao, 2002). Having been confined by those disciplines, women were put in an inferior status, thus resulting in power inequality in the family, then women became the victims of gender violence.

As a result, as Figure 2 shows, the family power inequality induced gender violence toward the DIL, while the family power inequality was rooted in the traditional gender ideology. Therefore, the rooted cause of the occurrence of gender violence was the traditional gender ideology.

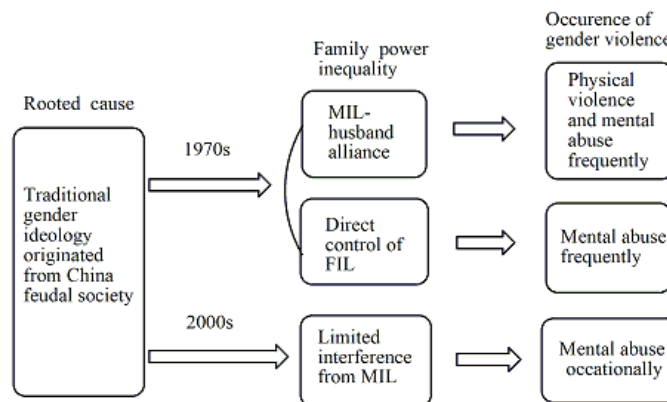


Figure 2. The rooted cause for the occurrence of gender violence

5. Conclusion

The gender violence suffered by the DIL was constructed by the traditional gender ideology and legitimized by

society. Apart from the nuanced difference in the forms and frequencies of gender violence sustained by three DILs of two generations, we were able to find that the rooted cause for DILs suffering unjust treatment was the traditional gender ideology. Originating from feudal societies thousands of years ago, the traditional gender ideology still pervaded modern society. From the sociological perspective, the traditional gender ideology is transmitted from generation to generation through the internalization of cultural values in the process of individual socialization.

The article discovers the significant role that the traditional gender ideology had played in resulting in the gender violence toward the DIL in the background of family changes. The gender roles and expectations based on the traditional gender ideology have legitimized, rendered, and helped to perpetuate the violence against the DIL from generation to generation (Russo & Pirlott, 2006). To break the cycle of intergenerational transmission of gender violence toward the DIL, we must spontaneously realize and reflect upon the impacts of the traditional gender ideology on our lives and substitute it consciously with a new gender consciousness characterized by respect and equality.

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The Impact of “Three Zones” Closed-off Management in Communities on Individuals’ Mental Health and Lifestyle During the COVID-19 Pandemic

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Abstract

The "three zones" closed-off management in communities is an innovative anti-pandemic measure in China that divides communities into lockdown zones, controlled zones, and precautionary zones to contain the spread of the pandemic and reduce the infection rate. This paper aimed to explore the impact of "three zones" closed-off management in communities on individuals' mental health and lifestyle. Two hundred participants were recruited from Shenzhen city, where a seven-day "three zones" closed-off management was implemented, to complete the online survey made available through a link shared via the Wechat group. The study found that during the lockdown period, individuals' positive mental health, unhealthy eating behaviors, physical activity, and sleep quality decreased by 8.5%, 5.4%, 22.0%, and 10.2%, respectively, while sedentary time increased by 21.7% markedly. In addition, residents living in controlled zones had poorer mental health but more physical activities than those residing in precautionary zones; residents living in lockdown zones had worse sleep quality and more sedentary time than those living in precautionary zones. These findings are essential to enrich and improve research beyond public health measures during the pandemic.

Keywords: COVID-19 pandemic, three zones, mental health, unhealthy eating behaviors, sleep quality

1. Introduction

Since 2022, there has been a surge in new confirmed cases of COVID-19 in various regions of China. To effectively contain the spread of the epidemic, the Chinese government has adopted the "dynamic COVID-zero" policy and "three zones" closed-off management in communities (Liang et al., 2022). The "three zones"—lockdown, controlled, and precautionary—are divided according to the local transmission risk and control intensity (see Figure 1). The lockdown zones refer to areas where new infections were reported within the past week, and inhabitants are required to remain at home for a week under closed-off management. Meanwhile, community workers will provide door-to-door services, such as nucleic acid testing and the distribution of everyday necessities. The controlled zones refer to communities where no infections were reported during the preceding week. This region's pandemic prevention and control strategy for the first four days is identical to the lockdown area's. On the fifth day, residents will be permitted to receive food deliveries and take walks at specific locations and at staggered times within the enclosure. The perimeter of the lockdown and controlled zones are precautionary zones. Residents are permitted to leave their area, but they must remain within their subdistrict, and they are encouraged to limit their movement (Shenzhen Health Commission, 2022). Compared to previous home quarantines, the "three zones" closed-off management in communities represents an improvement in pandemic prevention policies. The degree of prevention and control reduces in the lockdown zones, control zones, and preventive zones while the freedom and activity scope expands.

Numerous studies have examined home quarantine's negative impact on an individual's mental health and lifestyle (Ammar et al., 2021; Brühlhart et al., 2021; Proto & Zhang, 2021; Robinson et al., 2022). In terms of mental health, quarantine means less social and physical interaction with others, leading to boredom, depression, and isolation, thus making people distressed and unhappy (Wang et al., 2021). For individuals with mental or physical issues, infection or suspected infection, relatively poor financial status, and residing in regions hard hit by the disease, quarantine can exacerbate the risk of mental illnesses. In addition, the uncertainty of quarantine

durations, the fear of being infected, the possible shortage of supplies, the lack of punctual updates from public health authorities, the economic losses, and the post-pandemic stigma put people under additional strain (Brooks et al., 2021). According to a survey of 56,679 people in China, 34.1 percent of those who experienced quarantine reported at least one psychological symptom, such as anxiety, sadness, insomnia, or acute stress, significantly greater than those who were not quarantined (Wang et al., 2021). Another online survey of 18,000 people in Italy shows that 37% of participants suffer from posttraumatic stress because of the lockdown, and approximately 20% suffer from depression, anxiety, or high-sensitivity stress (Rossi et al., 2020). Besides, a survey of Norwegian adolescents reveals higher depressive symptoms and less optimistic future life expectations during the pandemic (von Soest, et al., 2022). A globally representative sample from countries in Europe, North Africa, West Asia, and the Americas shows that quarantine harms public mental health and emotions, with a more significant proportion of individuals suffering from psychosocial and emotional disorders (Ammar et al., 2021). The psychological effect of home confinement during the COVID-19 pandemic is pervasive and substantial and may be long-term.



Figure 1. Diagram of "three zones" closed-off management in communities

Individuals' eating behavior is also being impacted by home quarantine (Souza et al., 2022). One point of view is that people eat healthier to strengthen their immune systems and protect themselves against COVID-19. For example, Molina-Montes et al. (2021) examined the COVID-19 confinement impact on adults' eating behaviors in 16 European countries. They found that people's compliance with the Mediterranean diet (MedDiet) attained rapid growth in all countries during the confinement, with the most significant increase in Greece and Macedonia, meaning that people were more willing to form healthy eating habits. A study in Spain also found that during the home confinement period, 57.2% of people increased their fresh food intake (López-Moreno et al., 2020). Another point of view is that people who are worried about COVID-19 may consume more alcohol and eat more unhealthy meals (such as snacks and cakes) to make themselves feel better. Ammar et al. (2020) found in an international survey that people's food consumption and dietary patterns became un-healthier during the lockdown. Yang et al. (2021) also found that 38.2% of the population had more snacks in China's early stages of COVID-19 confinement. In addition, Janssen et al.'s (2021) research on the frequency of food consumption before and during the pan-demic among 2,680 residents in Denmark, Germany, and Slovenia showed that the total consumption of fresh food decreased, while the consumption of food with a longer shelf life increased.

Additionally, people's daily routine of physical exercise and sleep has also been disturbed during the quarantine (Massar et al., 2022; Salehinejad et al., 2021). People have much less time for physical activities due to stringent restrictions on going outside (Bu et al., 2021). Based on wearable app data, Di et al. (2020) discovered that Canadians experienced significant declines in high-intensity exercise, low-intensity exercise, and walking steps during the lockdown. It took six weeks for high-intensity practice to return to pre-pandemic levels, while low-intensity exercise and step counts remained significantly lower than pre-pandemic levels. The international online survey by Ammar et al. (2020) showed a sharp decline in physical activity at any level of intensity during home quarantine. In addition, data from Spain and China indicate that 45.9% and 54.3% of individuals engage in less physical activity during lock-downs (López-Moreno et al., 2020; Yang et al., 2021). Although studies have

shown that people slept more and spent more time in bed during periods of lockdown (Trabelsi et al., 2021; Yang et al., 2021), the incidence of sleep disorders was higher than usual. According to statistics, during the COVID-19 pandemic, the global prevalence of sleep disorders was 40.49% (Jahrami et al., 2022). People's sleep quality also worsened during home confinement, with a study in Spain finding that approximately 40.7% of people experienced negative changes in sleep quality (López-Moreno et al., 2020).

In summary, previous research mainly focused on the effects of home quarantine on mental health and lifestyle in the early phases of the COVID-19 pandemic. However, with the continued expansion of the pandemic and people's comprehension of the novel coronavirus, it needs a better understanding of how "three zones" closed-off management in communities, a new strategy for pandemic prevention and control, impact individuals' mental health and lifestyle. Shenzhen, which is geographically close to Hong Kong and has the third highest GDP in China, announced "three zones" closed-off management in communities for the entire city from March 14 to March 20, 2022. So this allows us to answer that question. We first evaluated individuals' mental health and lifestyle changes before and during the community lockdown. And then, we analyzed the impact of lock-down zones, controlled zones, and precautionary zones on individuals' mental health and lifestyle. This study's findings contribute to the literature on home quarantine and give valuable supplements and references for enhancing public health measures during the pandemic.

2. Materials and Methods

2.1 Participants

From March 18 to March 20, 2022, this study distributed 417 online questionnaires to Shenzhen residents in different areas through WeChat groups. After excluding incomplete questionnaires, 200 valid questionnaires were received for an effective response rate of 47.96%.

2.2 Measurement

2.2.1 Warwick-Edinburgh Mental Wellbeing Scale, WEMWBS

The Warwick-Edinburgh mental well-being scale is an effective mental health measuring instrument (Tennant et al., 2007). This study followed Trabelsi et al.'s (2021) methodology and identified 7-items that may have greater clinical significance. Each item uses a Likert 5-point scale, and the overall score ranges between 7 and 35 points. The higher the participants' scores, the more positive their mental health is. A score of 17 or less suggests an increased risk of depression, 18-20 indicates the possibility of depression, 21-27 shows positive mental health, and 28-35 means very positive mental health.

2.2.2 Unhealthy Eating Behavior Survey

The questionnaire for the study on unhealthy eating behavior was developed by Ammar et al. (2020). The questionnaire consists of five questions or prompts on "eating unhealthy food," "binge eating," "snacking between meals," "binge alcohol drinking," and "numbers of main meals per day." The first four questions are on a four-point scale (Never = 0; Sometimes = 1; Often = 2; Always = 3); the options and points for "number of meals" are as follows: "1-2" = 1; "3" = 0; "4" = 1; "5" = 2; ">5" = 3. The more meals people have daily, the higher the chances they will develop obesity and diabetes, so additional meals and snacks between the main meals are seen as unhealthy eating behaviors (Harder-Lauridsen et al., 2017). Adding the scores for each item yields a total score ranging from 0 to 15, showing the participants' unhealthy eating habits. The more a person scores, the less healthy their eating habits are.

2.2.3 International Physical Activity Questionnaire Short Form, IPAQ-SF

The International Physical Activity Questionnaire is a cost-effective method for assessing physical activity. The questionnaire mainly contains the time and frequency of individuals' vigorous physical activities, moderate physical activities, and walking per week. Vigorous physical activities include exercise during which people find breathing harder than usual, such as weightlifting, digging, aerobics, and fast cycling. Moderate physical activities are when people find breathing slightly more complicated than usual, such as light-load exercise, cycling at a uniform speed, or tennis doubles, excluding walking (Craig et al., 2003). According to the official IPAQ-SF guidance, exercises of different intensities are assigned various metabolic equivalents (METs): vigorous physical activities = 8.0 METs, moderate physical activities = 4.0 METs, and walking = 3.3 METs. Therefore, the total number of weekly physical activities can be calculated by adding the METs for each exercise. In addition, sedentary time was measured in this study.

2.2.4 Pittsburgh Sleep Quality Index, PSQI

The Pittsburgh sleep quality index is an assessment of sleep quality that has been extensively validated in

different cultures and populations (Buysse et al., 1989). This study uses 14 questions covering sleep quality, bedtime, quantity, sleep efficiency, sleep disorders, hypnotic drugs, and daytime dysfunction, which are the seven components of sleep quality. Each part contains 0-3 points. The total score from the sum of scores for each piece ranges from 0-21. The lower the scores that people obtain the better their sleep quality.

2.3 Statistical Analysis

In this study, a Shapiro-Wilks normality test based on SPSS 26.0 revealed that the data did not conform a normal distribution. So we used the Wilcoxon signed rank test to analyze individuals' mental health and lifestyle changes before and during the community lockdown. The effect size of the parametric test was calculated using $ES = Z/\sqrt{N}$. ES can be interpreted as follows: small (0.10-0.30), medium (0.30-0.50), large (>0.5), and its statistical significance is set at $P < 0.05$ (Rosenthal, et al., 1994). Finally, we use regression analysis to examine the impact of lockdown zones, controlled zones, and precautionary zones on people's mental health and lifestyle changes.

3. Results

3.1 Demographics

Of the total 200 participants, the average was 34.8 years old. Women accounted for 61.5%. A total of 61.0% of the participants were in precautionary zones. Nearly 70% were from the districts of Nanshan and Futian. A total of 67.5% were married or living with partners. Approximately 66.5% had a bachelor's degree or more. 56.0% of the population had an average monthly income greater than 8,000. 65.0% had received three vaccination doses, and 92.0% were in a healthy state (Table 1). In addition, the number of family members significantly dropped from 3.09 before the community lockdown to 2.97 ($Z = 2.863, p = 0.004, ES = 0.202$).

Table 1. Demographic characteristics of the participants (n = 200)

Variables	n (%)	Variables	n (%)
Gender		District	
Male	77(38.5%)	Futian	63(31.5%)
Female	123(61.5%)	Nanshan	75(37.5%)
Type of zones		Baoan	7(3.5%)
Lockdown	35(17.5%)	Longgang	17(8.5%)
Controlled	43(21.5%)	Longhua	13(6.5%)
Precautionary	122(61.0%)	Luohu	11(5.5%)
Marital Status		Guangming	11(5.5%)
Single	59(29.5%)	Pingshan	1(0.5%)
Married/Living as couple	135(67.5%)	Yantian	2(1.0%)
Divorced/Separated	6(3.0%)	Vaccination Status	
Education		Unvaccinated	9(4.5%)
High School and below	24(12.0%)	First shot	5(2.5%)
Junior College	43(21.5%)	Second shot	56(28.0%)
Undergraduate	90(45.0%)	Third shot	130(65.0%)
Master or above	43(21.5%)	Health Status	
Monthly Income (¥)		Healthy	184(92.0%)
<3000	17(8.5%)	With risk factors for cardiovascular disease	13(6.5%)
3000-5000	27(13.5%)	With cardiovascular disease	1(0.5%)
5000-8000	44(22.0%)	With Cognitive impairment	2(1.0%)
8000-15000	42(21.0%)		
>15000	70(35.0%)		

3.2 Comparison of Positive Mental Health and Lifestyle Before and During Lockdown

The positive mental health and lifestyle before and during the lockdown are compared in Table 2. First, there is a critical decline in all measurements of positive mental health compared to the days before the lockdown, and the effect sizes were all medium. Positive responses to the prompts, “I’ve been feeling optimistic about the future” and “I’ve been feeling relaxed”, declined by 10.2% ($Z = 6.733, p < 0.001, ES = 0.476$) and 10.8% ($Z = 5.989, p < 0.001, ES = 0.423$), respectively. The total score of positive mental health decreased by 8.5% ($Z = 7.762, p < 0.001, ES = 0.549$), with a relatively large effect size. Overall, during the community lockdown, there was a reduction in positive mental health, and residents expressed worries about the future.

Table 2. Comparison of positive mental health and lifestyle before and during lockdown

Variables	Items	Before Lockdown	During Lockdown	$\Delta(\Delta\%)$	Z	P value	Effect Size
Positive Mental Health	I’ve been feeling optimistic about the future.	3.81±0.83	3.42±1.03	-0.39(-10.2%)	6.733	<.001	0.476
	I’ve been feeling useful.	3.89±0.85	3.57±0.99	-0.32(-8.2%)	5.728	<.001	0.405
	I’ve been feeling relaxed.	3.42±0.92	3.05±1.01	-0.37(-10.8%)	5.989	<.001	0.423
	I’ve been dealing with Problems well.	3.69±0.79	3.32±0.89	-0.37(-10.0%)	6.339	<.001	0.448
	I’ve been thinking clearly.	3.89±0.69	3.66±0.86	-0.23(-5.9%)	5.482	<.001	0.388
	I’ve been feeling close to other people.	3.60±0.86	3.28±0.99	-0.32(-8.9%)	5.618	<.001	0.397
	I’ve been able to make up my own mind about things.	3.97±0.68	3.74±0.85	-0.23(-5.8%)	5.001	<.001	0.354
	Total score	26.26±4.23	24.02±5.20	-2.24(-8.5%)	7.762	<.001	0.549
Unhealthy Eating Behaviours	How likely are you to have an unhealthy diet/food?	1.14±0.61	0.99±0.67	-0.15(-13.2%)	3.378	0.001	0.239
	How often have you found yourself being eating out of control (binge-eating)?	0.68±0.62	0.59±0.65	-0.09(-13.2%)	2.126	0.034	0.150
	How likely are you to have a snack between meals or a late night snack?	1.12±0.60	1.08±0.69	-0.04(-3.6%)	1.041	0.298	0.074
	Do you engage in binge alcohol drinking (5 or more drinks in a sitting)?	0.18±0.44	0.09±0.37	-0.08(-44.4%)	2.717	0.007	0.192
	How many main meals do you eat a day?	0.20±0.47	0.36±0.52	0.16(80.0%)	4.251	<.001	0.301
	Total score	3.32±1.72	3.14±1.67	-0.18(-5.4%)	1.993	0.046	0.141
	Physical Activity and Sedentariness	Vigorous physical activities	days/week 2.15±1.95	1.40±1.95	-0.75(-34.9%)	5.605	<.001
		minutes/day 20.79±30.12	15.77±24.85	-5.02(-24.1%)	3.221	0.001	0.228
		MET 631±1125	455±998	-176 (-27.8%)	3.122	0.002	0.221
Moderate physical activities		days/week 1.55±1.74	0.92±1.64	-0.63(-40.6%)	5.726	<.001	0.405
		minutes/day 13.70±25.12	11.04±23.51	-2.66(-19.4%)	2.260	0.024	0.160
		MET 181±405	148±447	-33(-18.0%)	2.236	0.025	0.158
Walking		days/week 3.82±2.38	2.09±2.45	-1.73(-45.3%)	7.670	<.001	0.542
		minutes/day 22.95±33.43	17.99±37.90	-4.96(-21.6%)	3.542	<.001	0.250
		MET 348±598	262±628	-86 (-24.8%)	3.762	<.001	0.266
Total exercise time		minutes/day 57.44±70.21	44.79±67.18	-12.65(-22.0%)	4.170	<.001	0.295
	MET 1160±1732	866.±1659	-295 (-25.4%)	3.951	<.001	0.279	
Sedentary time	hours/day 5.39±4.10	6.56±5.97	1.17(21.7%)	5.309	<.001	0.375	

Pittsburgh Sleep Quality Index	Sleep quality	1.15±0.79	1.29±0.82	0.14(12.2%)	4.115	<.001	0.291
	Bedtime(minutes)	17.64±16.71	26.75±33.29	9.11(51.6%)	6.697	<.001	0.474
	Sleep duration(hours)	7.16±0.91	7.44±1.34	0.28(3.9%)	3.717	<.001	0.263
	Time laying on bed(hours)	7.98±0.92	8.46±1.43	0.48(6.0%)	5.505	<.001	0.389
	Sleep efficiency	0.33±0.63	0.43±0.72	0.10(30.3%)	2.466	0.014	0.174
	Sleep disorder	1.31±0.77	1.42±0.82	0.11(8.4%)	3.068	0.002	0.217
	Hypnotic drug	0.16±0.50	0.19±0.59	0.03(18.8%)	1.393	0.163	0.098
	Daytime dysfunction	0.70±0.66	0.80±0.78	0.10(14.3%)	2.647	0.008	0.187
	Pittsburgh Sleep Quality Index (PSQI)	5.61±2.82	6.18±3.25	0.57(10.2%)	3.213	0.001	0.227

In terms of unhealthy eating behaviors, the scores for "unhealthy diet/food" and "eating out of control" had decreased by 13.2% when compared to the days prior to lock-down ($Z = 3.378, p = 0.001, ES = 0.301; Z = 2.126, p = 0.034, ES = 0.150$). While there were no significant differences in the frequency of "snacks between meals or a late-night snack," the score for "binge alcohol consumption" dropped by 44.4% ($Z = 2.717, p = 0.007, ES = 0.192$). The overall score for unhealthy eating habits during lockdown decreased by 5.4% ($Z = 1.993, p = 0.046, ES = 0.141$), and a growing trend in the proportion of major meals can be noticed ($Z = 4.251, p = 0.001, ES = 0.301$). In conclusion, the lockdown resulted in a decline in unhealthy eating habits.

In terms of physical activity and sedentary time, the number of days and minutes spent engaging in vigorous physical activity decreased by 34.9% ($Z = 5.605, p = 0.001, ES = 0.396$) and 24.1% ($Z = 3.221, p = 0.001$), respectively, in comparison to the days before to lockdown, and MET decreased by 27.8%. Along with a fall of 18.0% in MET, the number of days and minutes spent participating in moderate physical activity fell by 40.6% ($Z = 5.605, p = 0.001, ES = 0.396$) and 19.4% ($Z = 5.605, p = 0.001, ES = 0.396$), respectively. With a decrease of 24.8% in MET, the number of days and minutes of walking decreased by 45.3% ($Z = 5.605, p = 0.001, ES = 0.396$) and 21.6% ($Z = 5.605, p = 0.001, ES = 0.396$), respectively. Overall, all types of physical activity exhibit a sharp decrease in minutes and MET during the lockdown. But compared to the days before the lockdown, their sedentary time increased from 5.39 hours per day to 6.56 hours per day, a rise of 21.7% ($Z = 5.309, p = 0.001, ES = 0.375$).

Regarding sleep quality, except for hypnotic drugs, other components of the sleep quality index experienced rapid changes during the lockdown of the community. On the one hand, bedtimes were earlier (6%, $Z = 5.505, p = 0.001, ES = 0.389$) while bedtimes were longer (51.6%). On the other hand, the Pittsburgh Sleep Quality Index scores, which measure the quality of sleep, increased by 12.2%, 30.3%, 8.4%, 14.3%, and 10.2%, respectively. Overall, despite spending more time in bed and going to bed earlier, people's overall sleep quality declined.

3.3 The Impact of "Three Zones" on Individuals' Mental Health and Lifestyle

In implementing the "three zones" closed-off management in Shenzhen, the prevention and control intensity in the precautionary zones is the weakest and closest to normal living, providing an opportunity for this study to conduct a quasi-natural experiment. Therefore, we designated the samples from the precautionary zones as the control group and the samples from the lockdown and controlled zones as the experimental group. We applied the principle of differences-in-differences. The following regression model was established to examine the impact of lockdown zones, controlled zones, and precautionary zones on people's mental health and lifestyle changes.

$$\Delta y_i = \alpha + \beta_1 \text{Lockdown zones} + \beta_2 \text{Controlled zones} + X_i + \text{Dummy}_{\text{district}} + \varepsilon_i \tag{1}$$

In this model, i means residents. The independent variable Δy_i represents the changes in scores for mental health, lifestyle, and other variables, which are the measurements before lockdown minus the corresponding number after lockdown, including changes in positive mental health, unhealthy eating behaviors, physical activity, sleep quality, and sedentary time. Since the change in scores for physical activity is starkly different from other variables, we used the formula $\ln(x + \sqrt{1 + x^2})$ for logarithmic processing. *Lockdown zones* and *controlled zones* are the main focused independent variables of this study, which are dummy variables representing the lockdown and controlled zones; if the community where the resident is located is a lockdown zones, *lockdown zones* is equal to 1; otherwise, it is 0; if the community where the resident is located is the controlled zones, *controlled zones* is equal to 1; otherwise, it is 0. In addition, we controlled for residents' characteristic variables X_i , including vaccination, age, sex, education, marital status, work, income, and health condition. Since various districts of Shenzhen may have different policies or ways to implement policies, and the economic development,

industrial structure, and overall residential characteristics vary from district to district, we also controlled the urban fixed effect $Dummy_{district}$ to eliminate the impact of these factors.

Table 3 presents descriptive statistics on changes in individuals' mental health and lifestyle in the "three zones." The controlled zone ranked first in terms of changes in positive mental health, followed by the lockdown zones and precautionary zones; the lock-down zones ranked first in terms of changes in unhealthy eating behavior, sedentary time, and sleep quality index; and the precautionary zones ranked first in terms of changes in physical activity.

Table 3. Descriptive Statistics of Changes in Mental Health and Lifestyle in the “Three Zones”

	Lockdown zone (n=35)				Controlled zone (n=43)				Precautionary zone (n=122)			
	Mean	SE	95% CI		Mean	SE	95% CI		Mean	SE	95% CI	
			lower bound	upper bound			lower bound	upper bound			lower bound	upper bound
Δ Positive Mental Health	2.657	0.647	1.343	3.972	3.860	0.659	2.532	5.189	1.541	0.338	0.871	2.211
Δ Unhealthy Eating Behavior	0.000	0.355	-0.722	0.722	0.605	0.206	0.190	1.019	0.074	0.114	-0.152	0.300
Δ Physical Activity	1.508	0.850	-0.218	3.235	0.011	0.843	-1.690	1.712	2.150	0.436	1.287	3.013
Δ Sedentary time	-2.315	0.422	-3.173	-1.458	-0.279	0.647	-1.584	1.026	-0.604	0.221	-1.041	-0.167
Δ Sleep Quality Index	-1.429	0.463	-2.369	-0.489	-0.233	0.339	-0.917	0.452	-0.443	0.164	-0.767	-0.118

The regression results are shown in Table 4. The results in the first column demonstrate the impact of various zones on residents' positive mental health changes. Compared with the precautionary zone, the controlled zones had a significantly positive impact on individuals' positive mental health changes. In other words, compared with people in precautionary zones, residents in controlled zones suffered a relatively significant decline in positive mental health. In contrast, the lockdown zones showed no sign of affecting mental health. The results in the second column show no difference among individuals in the three zones regarding changes in unhealthy eating behavior. The results in the third column show that, compared with precautionary zones, residents in controlled zones were more active in physical activity. At the same time, there was no change among residents of lockdown zones. We also examined the impact of the lockdown and controlled zones on individuals' sedentary time. In the fourth column, compared with individuals in the precautionary zones, residents in lockdown zones spent more time sitting, while the controlled zones showed no effect. Finally, the last column shows the impact of changes in the sleep quality index. Compared with precautionary zones, lockdown zones have a significantly negative impact on individuals' sleep quality. Compared with people in precautionary zones, residents in lockdown zones have better sleep quality, while the controlled zones show no effect.

Table 4. The impact of “three zones” on individuals' mental health and lifestyle

	(1)	(2)	(3)	(4)	(5)
	Δ Positive Mental Health	Δ Unhealthy Eating Behavior	Δ Physical Activity	Δ Sedentary Time	Δ Sleep Quality
Lockdown zone	0.945 (0.793)	-0.377 (0.302)	-0.459 (1.144)	-1.694*** (0.611)	-1.112** (0.501)
Controlled zone	1.836** (0.915)	0.393 (0.306)	-2.077* (1.244)	0.025 (0.664)	0.174 (0.471)
Observations	200	200	200	200	200
Adjusted R ²	0.096	0.090	-0.036	0.043	0.060
Individual controlled variables	YES	YES	YES	YES	YES
District fixed effect	YES	YES	YES	YES	YES

Note. 1) Robust standard deviations are in brackets. 2) *, ** and *** represent significance levels of 10%, 5% and 1%, respectively. 3) Individual controlled variables include vaccination, age, sex, education, marital status, work, income, and health condition. 4) Logarithmic processing of changes in physical activity was conducted using the formula $\ln(x + \sqrt{1 + x^2})$.

4. Discussion

This study aimed to explore the impact of "three zones" closed-off management in communities on individuals' mental health and lifestyle during the COVID-19 pandemic. The study's results showed significant changes in positive mental health and eating behaviors, physical activity, and sleep.

First, the total score for positive mental health during lockdown dropped by 8.5% compared to before the lockdown, especially regarding two items: "I've been feeling optimistic about the future" and "I've been feeling relaxed." The resurgence of the pandemic revived many uncertainties in the future, making it difficult for people to be relaxed and optimistic. This conclusion is consistent with previous research (Ammar et al., 2021). Although there was a decrease in positive mental health during the lockdown, the average score for this measurement was still higher than 15.8 (Trabelsi et al., 2021), which indicates that the community lockdown had little impact on people's psychological health and that the general public maintained positive mental health. Especially as cities resumed normal operations and students returned to campus, people's overall mental health also recovered. Further analysis showed that controlled zones significantly impacted people's positive mental health changes compared to the precautionary zones. In other words, compared with people in precautionary zones, residents in controlled zones suffered a relatively significant decrease in positive mental health. This is mainly the result of the "three zones" strategy. Although residents in lockdown zones had to accept not leaving their homes, people in controlled zones faced the risk of lockdown at any time despite being under relatively looser restrictions, which led to a more significant fluctuation psychologically and a worse mental condition. Given this, the local authorities should not lose sight of people's psychological states and release information on time to help free them from worry.

Second, the scores for unhealthy eating behavior during the lockdown dropped by 5.4% compared with those before the lockdown. People tended to consume significantly less unhealthy food and avoid binge eating and drinking, which confirms that the pandemic pushed people to eat healthier to strengthen their immunity and prevent COVID-19 infections (Molina-Montes et al., 2021). It is important to note that the score for "How many main meals do you eat a day?" significantly increased, reflecting that people's eating habits become erratic during the lockdown. This could be because people's time is no longer constricted and limited during home isolation, making it difficult to eat at a regular hour. Further analysis found that there was no significant difference in the unhealthy eating behavior of people in the three zones, probably because Shenzhen's policies provided supplies, such as the delivery of medicines, express, and groceries (including fresh vegetables). Regardless of which zones people lived in, their healthy eating behaviors were not significantly affected.

Third, consistent with previous studies (Ammar et al., 2021), the scores for physical activity, whether vigorous physical activities, moderate physical activities or just walking, decreased significantly during the lockdown, among which the decline in walking was the most prominent, reaching approximately 45.3% of the population. Sedentary time rose from 5.39 hours/day before the lockdown to 6.56 hours/per day during the lockdown, an increase of approximately 21.7%. It is explained that people have limited outdoor space during a community-wide lockdown and can only stay at home most of the time. According to the World Health Organization (WHO, 2010), adults aged 18-64 should engage in at least 150 minutes of moderate physical activity or at least 75 minutes of vigorous physical activity per week. The duration and intensity of residents' physical exercise during the lockdown were well below the World Health Organization recommendations. Further analysis found that compared with the precautionary zones, residents in the controlled zones were more engaged in physical activities, which may be how to deal with psychological fluctuations, while residents in the lockdown zones had more sedentary time than those in the precautionary zones. For people in controlled zones, increased physical activity meant no considerable change in sedentary time. Physical activity boosts immunity, reduces inflammation, and is effective in preventing and treating secondary diseases such as heart disease and diabetes. Therefore, the government should encourage residents to continue to engage in physical exercise and reduce their sedentary time under pandemic restrictions.

Finally, the scores for sleep quality increased by 10.2% compared with before the system was implemented, indicating that people's overall sleep quality worsened. Although time in bed and sleep duration rose dramatically, the bedtime, or the sleep latency time, also skyrocketed by approximately 51.6%. There is an excellent possibility that people suffer from poor diet and mood, stress at work, financial insecurity working from home, and experiencing difficulties falling asleep. Further analysis found that residents' sleep quality in the lockdown zone was much worse than that of residents in the precautionary zones. This is mainly because residents in lockdown zones were at home all day and had no space to exercise; besides, they had more sedentary time and might be addicted to Tiktok or mobile games. All these lead to worse sleep quality.

5. Conclusions

"Three zones" closed-off management in communities has played an important role in containing the spread of the pandemic and reducing the infection rate. However, it has also profoundly impacted an individual's mental health and lifestyle. The limitation of this study is the relatively limited sample size, which can be further expanded in the future to support the findings of this study. In addition, quarantine led to the suspension of a large number of business activities, which caused financial losses for many people. Future studies should include the variable of economic status in the overall regression analysis to examine its effect on public mental health and lifestyle.

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