FACTORS AFFECTING THE PURCHASE OF COMMERCIAL ENDOWMENT INSURANCE FOR THE CHINESE ADULTS

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จุฬาลงกรณ์มหาวิทยาลัย
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น.ส.เทียนเทียน จิน

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต
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การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อสำรวจปัจจัยที่มีผลต่อการซื้อประกันชีวิตเพื่อการค้า
เชิงพาณิชย์สำหรับผู้ใหญ่ชาวจีนใช้ข้อมูลทุติยภูมิจาก"การศึกษาระยะยาวเพื่อสุขภาพจีนและการ
เกษียณอายุ"ข้อมูลนี้อ้างอิงจากครอบครัวและบุคคลที่มีอายุ45ปีขึ้นไปมีจำนวน17,000คนใน
ปี2558ในการศึกษานี้ร้อยละของผู้ที่มีประกันการค้าเชิงพาณิชย์คือ0.93%ในขณะที่ร้อยละของผู้ที่
ไม่มี99.07%จึงใช้รูปแบบโลจิสติกไบนารีปัจจัยที่มีการศึกษาจากลักษณะส่วนบุคคลประกอบด้วย
อายุเพศการศึกษาสถานะสุขภาพและรายได้และลักษณะครอบครัวประกอบด้วยจำนวนบุตรของ
ครอบครัวและสถานภาพสมรสและลักษณะภายนอกประกอบด้วยสถานที่อยู่อาศัยสำหรับผู้ใหญ่
ชาวจีน

การศึกษาสรุปสถิติของลักษณะส่วนบุคคลลักษณะครอบครัวและลักษณะภายนอกสรุป
ค่าเฉลี่ยและข้อผิดพลาดมาตรฐานของอายุและรายได้รวมทั้งการข้ามตารางเพศสถานะสุขภาพ
ระดับการศึกษาจำนวนบุตรของครอบครัวสถานภาพสมรสและการใช้ชีวิตสถานที่สำหรับตัวอย่าง
เต็มรูปแบบและมีและไม่มีประกันการบริจาคในเชิงพาณิชย์ในโมเดลการถดถอยโลจิสติกพบว่าอายุ
มีอิทธิพลอย่างมีนัยสำคัญที่ระดับ 10% และระดับรายได้มีอิทธิพลอย่างมีนัยสำคัญที่ 1%

สาขาวิชา	เศรษฐศาสตร์สาธารณสุขและ	ลายมือชื่อนิสิต	....
	การจัดการบริการสุขภาพ		
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The study aimed to explore factors affecting the purchase of commercial endowment insurance for the Chinese adults. It used secondary data from "China Health and Retirement Longitudinal Study", this data was based on family and individual who are 45 and over years old with a total of 17,000 individuals in 2015. In this study the percent of people with commercial endowment insurance is 0.93%, while the percent of people without is 99.07% so it used the Binary logistic model. Factors are studied from individual characteristic consists of age, gender, education, health status and income, and family characteristic composes of number children of family and marital status, and external characteristic was made up of living place for Chinese adults.

The study summarized statistics of individual characteristic, family characteristic and external characteristic, summarized the mean and standard error of age and income, as well as the cross-tabulation of gender, health status, education level, number children of family, marital status and live place for full sample and with and without commercial endowment insurance. In the logistic regression model, the results showed that age influenced at level of 10% significance, and income influenced at level of 1% significance.

Field of Study:	Health Economics and	Student's Signature ....
	Health Care Management	
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TABLE OF CONTENTS

จุฬาลงกรณ์มหาวิทยาลัย

CHULALONGKORN UNIVERSITY

LIST OF TABLES

จุฬาลงกรณ์มหาวิทยาลัย

CHULALONGKORN UNIVERSITY

LIST OF FIGURES

CHAPTER 1 INTRODUCTION

1.1 Problems and Significance

With the continuous development of China's economy and the improvement of people's living standards, the life expectancy of Chinese has been greatly extended. China entered an aging society in 2000, the scale and speed of China's aging population is the largest and fastest in the world, so ageing people has shown a significant aging trend in China. By 2020, the number of elderly people over 60 years old will increase to around 255 million, and the proportion of the total population will increase to about 17.8%, according to the statistics of the United Nations. The aging problem will influence the economy of China in the future, the burden of old-age care for society and family is increasing.

There are three types of public endowment insurances in China. It includes the New Rural Pension Insurance (NRPI), Enterprise Employee Pension Insurance (EEPI) and Urban Residents Pension Insurance (URPI). The New Rural Pension Insurance (NRPI) is for rural residents who are not registered in urban areas and who are over 16 years old, it is voluntary for rural residents to participate, the finance of NRPI is based on individual payment, supplemented by government subsidies, so it includes individual pension account and basic pension account. For individual pension account, rural residents have 8 levels to choose one person one year, from 14.2$, 28.5$, 42.8$, 57.1$, 71.4$, 85.7$, 100$ and 114.2$. At the same time, they can choose the different proportions for one year, from 5%, 10%, 20% and 30%. For basic pension account, the center government provides 7.8$ one person by the month, and local government can provide subsidy according to their finance situation. Pensioners who are age 60 or older will obtain the pension when their payment reached at least 15 years.

Enterprise Employee Pension Insurance (EEPI) means that enterprise must pay pension insurance for their employees according to its own economic strength, it is compulsory pension insurance program. It includes individual pension account and basic pension account, the individual pension account is from 8% of wage of employee, and the basic pension account is from at most 20% of payment of

enterprise, the payment of enterprise depends on the average wage in the local province. The formula of basic pension account is "AWL*(1+API)/2*PY*1%" (AWL= average wage in the local province; API= average payment index; PY= payment years), the API equals to 0.6, it will adjust according to economics every year from 0.6 to 3. Pensioners who male are 60 years old and who female are 55 years old will obtain the pension when their payment reached at least 15 years.

Urban Residents Pension Insurance (URPI) is for urban residents who do not have job and who are over 16 years old, it is voluntary for urban residents to participate, the finance of URPI is based on individual payment, supplemented by government subsidies, so it includes individual pension account and basic pension account. For individual pension account, rural residents have 12 levels to choose one person one year, from 14.2$, 28.5$, 42.8$, 57.1$, 71.4$, 85.7$, 100$, 114.2$, 128.5$, 142.8$, 214.2$ and 285.7$. At the same time, they can choose the different proportions for one year, from 5%, 10%, 20% and 30%. For basic pension account, the center government provides 10$ one person by the month, and local government can provide subsidy according to their finance situation. Pensioners who are age 60 or older will obtain the pension when their payment reached at least 15 years.

Commercial endowment insurance refers to insurance products and services provided by a commercial insurance company with the main contents of pension risk protection and pension fund management. Commercial endowment insurance is a retirement savings program. This partially accumulated pension insurance system not only reflects the principle of fairness but also takes into account efficiency and achieves the enthusiasm of protecting workers and mobilizing workers. The beneficiaries of commercial endowment insurance are paid on the premise that the individual pays the corresponding endowment insurance (tax). The amount of benefit depends on the amount of payment.

Commercial endowment insurance can force adults to save, so the insured needs to pay on time, it will be a good pension plan. Compare with public endowment insurances, the collection time of commercial endowment insurance is flexible, and different product has different collection time. The government will issue delayed retirement policy in order to relief aging trend problem in several years, so it means

that pensioners will collect the delayed pension in public endowment insurances. In addition, if adult payers die before his retirement, the family member can only receive the portion of individual pension account, basic pension account will not be received, while commercial endowment insurance has nothing to do with when adult payers die, the heir on the contract can still receive full pension.

Commercial endowment insurance is the part of public endowment insurance system, China is facing the pressure of pension security, the government is taking action to reform and innovate social pension security system and continuously improve the multi-pillared social pension security system development, in order to find a balance between commercial endowment insurance and public endowment insurance system. Li defines the social pension security is a multi-level system, the New Rural Pension Insurance (NRPI) should be led by government, it reflects fairness. In the future, if there is the higher level social pension security system, commercial endowment insurance should be improved actively and introduced market mechanisms (Li, Moshirian et al. 2007). Most of research found that factors affecting the individual's willingness to purchase commercial endowment insurance are not one-sided, but the product of interaction with personal factors, family factors and social factors.

Wang focus on public endowment insurance, the New Rural Pension Insurance (NRPI) and commercial endowment insurance are supplementary, commercial endowment insurance can supplement shortcomings of the New Rural Pension Insurance (NRPI)'s security level, while the New Rural Pension Insurance (NRPI) can cover widely to bridge the limitations of commercial endowment insurance (Wang, Liao et al. 2012). Zhang defines that historical experience shows that the more developed social insurance, the more complementary and compatible the commercial endowment insurance and the New Rural Pension Insurance (NRPI). Thus, if commercial endowment insurance participates in social pension security system, it can not only help achieve the goal of a multi-level social pension security system, but also promote the development of economic environment for a country (Zhang and Zhang 2018).

1.2 Research question.

1)   What are the factors affecting the willingness to purchase commercial endowment insurance for Chinese adults?

2)   How to improve willingness that purchase commercial endowment insurance?

1.3 Objective

1.3.1 general objective

The paper aims at finding ways to increase the willingness to purchase commercial endowment insurance, particularly for those Chinese adults.

1.3.2 specific objective

To investigate factors that determine willingness to purchase commercial endowment insurance for Chinese adults.

1.4 Scope

This study uses secondary data, named "China Health and Retirement Longitudinal Study (CHARLS)", which was designed, distributed and recollected by Peking University Open Research Data. This data was based on family and individual who cover 28 provinces in China, choose 150 county-level units with 450 village-level units, it was launched in 2011 and was tracked investigation every two years. The data is used in this study in 2015.

This study mainly focuses on purchasing commercial endowment insurance of Chinese adults. The data includes approximately 10,000 households with a total of 17,000 individuals who are 45and over years old in 2015. Then, after cleaning up the data and making observations with complete information, the sample size was adjusted to include 3325 individuals. This study researches factors that affect the

purchasing commercial endowment insurance including individual factors, family factors, and external factor.

1.5 Hypothesis

The study includes individual factors, family factors, and external factor, individual factors include age, gender, education level, health status and income, family factors include children number of family and marital status. External factor includes live in urban and live in rural.

For the individual factors, the older adults, the greater demand for purchasing commercial endowment insurance. The men are greater demand than women for purchasing commercial endowment. The higher education level, the more willingness to learn the concept of risk, at the same time, easier to accept the risk of investment for commercial endowment insurance. The healthier the body, the less demand for purchasing commercial endowment insurance, while the unhealthier the body, the greater the demand. The higher income level, the more willingness to considering commercial endowment insurance.

For family factors, the fewer children number, the greater demand for purchasing commercial endowment insurance. The status of married people is better than those who are divorced.

For the external factor, the people live in urban have more preferential policies from the government, the greater the desire to purchase commercial endowment insurance, because the preferential tax policy will reduce the burden of family, so they will have higher willingness to purchasing.

1.6 Possible benefits.

This study is for the willingness of purchasing commercial endowment insurance among Chinese adults. The study will find factors affecting willingness. Commercial endowment insurance can make up for the shortage of social insurance

supply, at the same time, help to improve the social security level and build a comprehensive and multi-level public endowment insurance system in China. What's more, it is related to the fair and sustainable development of social security. Besides, it can not only reduce the dependence on the New Rural Pension Insurance also reduce the financial pressure for government and enterprises. And commercial endowment insurance can provide more independent investment options for Chinese adults. Policymakers may use these results to form policy that will improve the willingness of purchasing commercial endowment, thus, make the third pillar plays an important role so that the three pillars pension system will develop in a balanced situation.

CHAPTER 2 LITERATURE REVIEW

2.1 Commercial endowment insurance.

Zhen defines that personal and family should be main undertaker of commercial endowment insurance, this is a measure to improve the third pillar of public endowment insurance system. At the same time, it is an inevitable choice to alleviate the pressure of aging population and reduce the burden of government, commercial endowment insurance should be a powerful promoter of the aged service industry(Zhen-zhen 2010). Wu, Lei and Zhou defines that China is at the initial stage of enterprise employee pension insurance, and commercial endowment insurance should play an inherent advantage in public endowment insurance system, and reflect its importance (WU, LEI et al. 2015).

Liu believes, with the development of the national economy, the people who live in the country already have the foundation and strength of purchasing commercial endowment insurance. If government improve development of commercial endowment insurance in rural, this will not only reduce the enormous pressure of financial expenditure for government, but also stimulate rural consumption and the rural economy, and the demand for endowment insurance in rural areas is very flexible, a small number of subsidies will greatly enhance the enthusiasm of farmers for purchasing. Thus, improve the quality of life and increase the incentives in rural areas (Liu 2004). Li believes that China's development of public endowment insurance system is relatively simple, and it is impossible to satisfy demand of different groups for adults, should develop at multiple levels for public endowment insurance system, the development of commercial endowment insurance has been lagged behind and should be promoted (Li, Moshirian et al. 2007).

2.2 Factors affecting purchase commercial endowment insurance.

2.2.1 Individual factors

- The purchase of commercial endowment insurance and age

There are four studies (Beck and Webb 2002, Beck and T. 2003, Li 2012, Alhassan and Biekpe 2016, Bairoliya, Canning et al. 2018) indicate how age affects the purchase of commercial endowment insurance. All the studies use the general population as the sample and focus on the decision to purchase commercial endowment insurance, Z. Li made the questionnaire survey in Zhejiang Province, she believed that below fifty years old people decreased the willingness to participate in, but over fifty years old, the willingness was increased. The greater the possibility of losing their life's safety, as someone get age older, because the older people, the narrower the source of income.

- The purchase of commercial endowment insurance and gender

There are three studies (Beck and Webb 2002, Beck and Webb 2003, Chang-ping 2008) that tell how gender affects the purchase commercial endowment insurance. T. Beck and Webb found that male affect their willingness to purchase, because male is willing to learn risk of commercial endowment insurance, women have a lower of economic security and self-security than men in rural areas. Chand found that gender has no significant impact on effective demand for commercial endowment insurance for Chinese adults, with using the linear regression model for empirical research.

- The purchase of commercial endowment insurance and education level

There are four studies (Leung 2003, Kjosevski 2012, Alhassan and Biekpe 2016, Bairoliya, Canning et al. 2018) demonstrated the relationship between education level and the purchase commercial endowment insurance. They all found that adults with higher education have higher demand for quality of live, when they purchase commercial endowment insurance, they will be more objective and rational, because adults with low education levels have few ways to learn and understand commercial

endowment insurance. At the same time, they will have higher awareness of risk and will do better in avoiding risks.

    - The purchase of commercial endowment insurance and health status.

    There are three studies (Petrichev and Thorp , Headen and Lee 1974, Beck and Webb 2003), that tell how gender affects the purchase commercial endowment insurance. Li and Lu believe that health status have no significant impact. T. Beck & Webb believe the health status is excellent, the risk of health is small in the future, so the demand for commercial endowment insurance is low, and if people are weak, high medical expenses will make them feel economic pressure, so they will consider their own future in advance.

    - The purchase of commercial endowment insurance and income

    There are four studies (Headen and Lee 1974, Hu 2012, Zerriaa and Noubbigh 2016) (Leung 2003) for income, they believe that income has the significant impact for purchasing commercial endowment insurance, if people have income, and the higher income, the more demands to purchase commercial endowment insurance. Income of adults directly affects ability of purchasing commercial endowment insurance, when their income increase, they will have a strong ability to pay, so demand for insurance will increase. Leung found when income of farmers has increased, most farmers still choose "self-reliance and pension", only a few farmers choose traditional pension insurance. There are three periods for income, in the low-income period, the relationship effect is relatively small, in the middle-income period, with the withdrawal of disposable income, people's demand for commercial endowment insurance also shows an increasing trend. But in the high-income period, people's demand for commercial endowment insurance will also be inhibited because of the level of business income(Leung 2003).

2.2.2 Family factors

- The purchase of commercial endowment insurance and number of children in family

Three these study the number of children in family (Petrichev and Thorp , Zhang and Zhang 2018, Wang, Zhu et al. 2019). People with more children, they will have higher consumption in family when the parents are around 45 years old, but if they are over 60 years old, the more children, the more help for parents in the family. Many families with only one-child, parents want to reduce the financial pressure for their child, so they always consider pension problem early, they will have a long-term plan for their own pension.

- The purchase of commercial endowment insurance and marital status

There are three studies (Yaari , Zietz 2003, Zhou, Chow et al. 2017, Bairoliya, Canning et al. 2018)for marital status, they all believe that it will directly affect life status of people, married people have been stable, so they have more demands for a long term living expectation, they will consider more types for choosing pension. They group marital status into two groups, there are married people and single people. Married people include those married with spouse present and married but not living with spouse temporarily for reasons such as work. Single people include those divorced, widowed and never married.

2.2.3 External factors

- The purchase of commercial endowment insurance and live place

There are three papers study the relationship between live place and commercial endowment insurance (Wang, Boyd et al. 2011, WU and WU 2011, WU, LEI et al. 2015). They said that government should support commercial endowment insurance, a reasonable tax system can promote effective market demand. Two papers

define that adults are in different life places when they purchase commercial endowment insurance and receive insurance pension, the marginal tax rate is quite different, tax policy in urban is more than in rural, there is a certain tax incentive for adults, which can stimulate the individual's demand to purchase commercial endowment insurance. Thus, this will bring a more valuable pension tool and management tool for adults.

2.3 Type of model.

The subject of this study, the willingness of Chinese adults to purchase commercial endowment insurance, for the dependent variable, it has only two possible outcomes, willing or unwilling to purchase. Because of dichotomous variable of 0-1 distribution, the study will choose binary logistic regression model to analyze results(Forte, Olson et al. 2009) (Forte, Olson et al. , Liu and Chen 2002, Bourne and Kerr-Campbell 2010, Jia 2015).
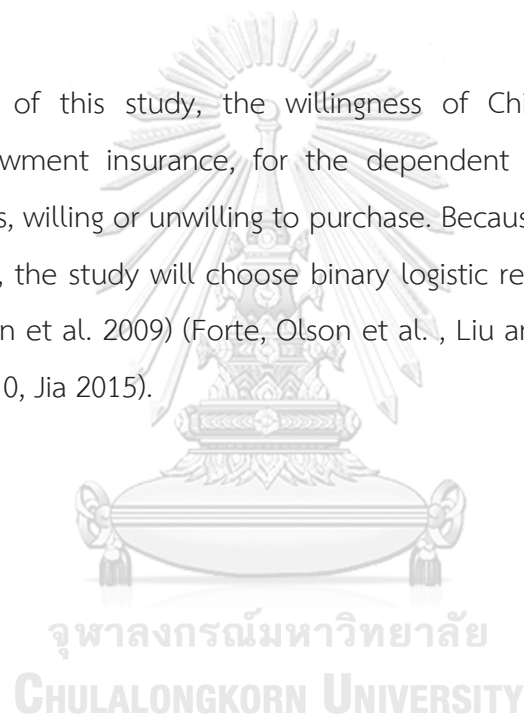
CHAPTER 3 METHODOLOGY

3.1 Scope of the study.

This study uses secondary data, named "China Health and Retirement Longitudinal Study (CHARLS)", which was designed, distributed and recollected by Peking University Open Research Data. This data was based on family and individual who cover 28 provinces in China, choose 150 county-level units with 450 village-level units, it was launched in 2011 and was tracked investigation every two years. The data is used in this study in 2015, after cleaning up the data and making observations with complete information, the sample size was adjusted to include 3325 individuals.

The study examines two perspectives to analyze factors that affect the willingness to purchase commercial endowment insurance in China, consumer perspective and government perspective explore the individual factors, family factors, and external factor.

3.2 Conceptual framework.

For the methodology, I would like to use a binary logistic regression model, analysis the factors from individual factors, family factors, and external factor. Individual factors include age, gender, education level, health status, and income, family factors include number children of the family and marital status, external factor includes live place. To make clearer about the model, the conceptual framework is diagrammatically represented as follows:
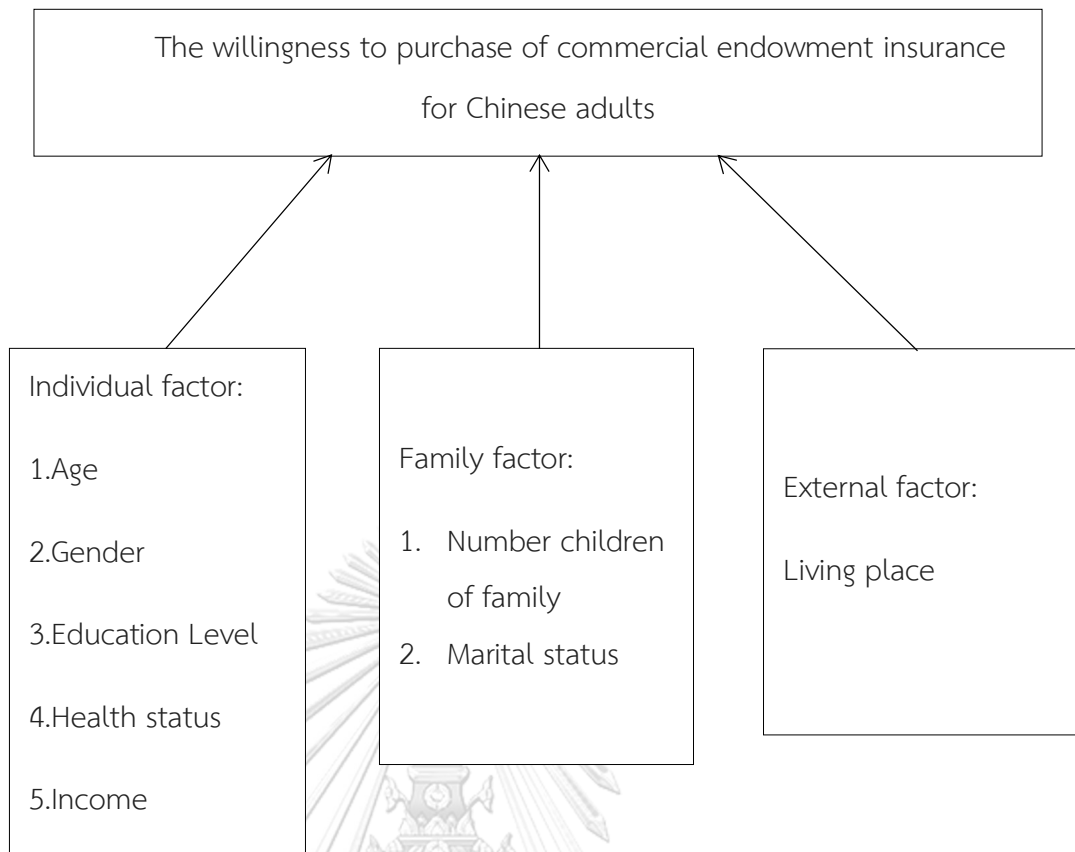
Figure 1 conceptual framework

3.3 Variables used in the model

This study is based on data from the China Health and Retirement Longitudinal Study (CHARLS). CHARLS is a nationally representative longitudinal survey of adults aged 45 years or older in China. The present analysis uses the most recent data in 2015.

Dependent variable:

$Y_i=1$ Chinese adults are willing to purchase the commercial endowment insurance; 0 if otherwise.

Independent variable:

Xi=age, gender, health status, education level, income, number children of family, marital status and live place of commercial endowment insurance. Details are described as follow.

3.3.1 Age

Age is a continuous variable, according to national regulations, men are 60 years old, women are 50 years old or 55 years old, the whole country reaches retirement age and can receive pension insurance every year (Interim Measures of the State Council on Workers' Retirement and Resignation). Unmarried youth stage, middle-aged stage, and early age stage. At this time, the body is healthier and can accumulate wealth; but as the age increases, the old age loses. Labor ability, at this time, the body function is gradually depleted, and the risk of disease is high.

3.3.2 Gender

Gender is a dummy variable, the perspective of male and female considerations and the attitudes of things development are different. Generally speaking, women will pay more attention to the quality of life for the current family and will not consider the quality of life in the future. Men will have a longer-term perspective when considering issues and will focus on the long-term quality of life of the family, thus preparing for the pension in advance.

3.3.3 Health status

Health status is the categorical variable, this study classifies five levels for health status, excellent, very good, good, fair and poor. When a person is weak, disease-ridden, and high medical expenses will make him feel economically nervous, he will consider his future ahead of time and consider his old-age problems early. When a person is healthy and has no disease problems, it is likely to ignore the consideration of old age.

3.3.4 Education level

This study regroups the education level into three categories, they are a primary school, middle school, and high school. The level of education reflects the knowledge structure and ability literacy of employees. Based on the literacy review, workers with high education level have a stronger awareness of risk prevention and are more likely to search and identify complex the information when purchasing insurance. The cost of information search is low; while those with low education levels have low observational learning ability.

3.3.5 Income.

Income is the continuous variable in this study, the economic income of the main members of the family had a great impact on the consumption structure of the family. The literature review shows that families with more incomes are more willing to consider commercial endowment insurance with high returns.

3.3.6 Number children of family

Number children of family are grouped four groups in this study, none, have one child, have two children and have more than two children. The more children there are in the family, the heavier the burden of the parents, and there is no extra energy and financial resources to consider their pension problems. Many families with only one-child families and families with fewer children, parents have more financial resources to reduce the pressure on their children, and have a long-term plan for their own pension.

3.3.7 Marital status

Marital status is grouped into two broad categories, which are married and single, the married include married with spouse present and married but not living with

spouse temporarily for reasons such as work, the single include separated, divorced, widowed and never married, it is the dummy variable, of which 1 stands for single and o for others. Based on the literature review, the marital status will directly affect the living conditions of a person. The family of the married person is already quite stable. People have more needs for a long-term stable living situation, and may consider the problem of old-age care early. The divorced or widowed person lacks dependence and responds, so they have higher demand of commercial pension insurance.

3.3.8 Living place

The tax-deferred commercial pension insurance means that the premium paid by an individual can be deducted from the pre-tax salary within a certain amount, and then paid after receiving the insurance payment after retirement in the future. Personal purchase tax-deferred commercial pension insurance products can be deducted before tax within the specified amount of income 6% (maximum not more than 12,000 yuan per year), which means that the premium for purchasing qualified pension insurance products within the credit can be deducted from the individual. Pay before income tax. It is beneficial for income more than 1000$ adults, if income of adult higher, the pension will more after retirement. The urban of Shanghai, Fujian and Suzhou Industrial Parks began piloting individual tax-deferred commercial pension insurance in May in 2018, while the income of rural residents is low, this beneficial policy will not work for them.

Table 1 Model can be summarized below.

Type	Name	Variable	Description	Expected sign
Individual factor	Age	AGE	Continuous	+
	Gender	GEN	GEN=1 if male, = 0 otherwise	-
	Health status	HEA	HEA 1= 1 if Excellent, 0= otherwise HEA 2= 1 if Very good, 0=otherwise HEA 3= 1 if Good, 0=otherwise	+

		HEA 4= 1 if Fair, 0=otherwise	
		HEA 5= 1 if poor, 0=otherwise	
Education level	EDU	ED 1=1 if Primary school, = 0 no education ED 2= 1 if Middle school, = 0 no education ED 3=1 if High school, = 0 no education	+
Income	INC	Continuous	+
Family factors	Number children of family	NUM	NUM 1=1if have none, NUM 2=1 if have 1, NUM 3=1 if have 2, NUM 4=1 if have more than 2,	-
	Marital status	MAR	MAR =1 if Single, =0 otherwise	-/+
External factors	Living place	LP	LP =1 if live in urban, =0 otherwise	-

3.4. Analysis Models

The subject of this study, the willingness of Chinese adults to purchase commercial endowment insurance, for the dependent variable, it has only two possible outcomes, willing or unwilling to purchase. Because of dichotomous variable of 0-1 distribution, the study will choose binary logistic regression model to analyze results.

The Binary logistic model as follow:

$$\text{logit(p)} = \ln\left(\frac{p}{1-p}\right) = \beta 0 + \beta 1X1 + \beta 2X2 + \cdots + \beta nXn + \varepsilon$$

or:

$$p\left(y = \frac{1}{X1X2\ldots Xm}\right) = \frac{1}{1 + e^{-(\beta 0 + \beta 1 X1 + \beta 2 X2 + \cdots + \beta n Xn)}}$$

so:

$$p = \frac{\exp(\beta 0 + \beta 1 X1 + \beta 2 X2 + \cdots + \beta n Xn + \varepsilon)}{1 + \exp(\beta 0 + \beta 1 X1 + \beta 2 X2 + \cdots + \beta n Xn + \varepsilon)}$$

Where P represents probability of occurrence with dependent variable, Xi is the observed independent variable, β is a vector of coefficient estimates, and ε is the error term.

$$OR = \frac{p(y)}{1 - p(y)} = \exp(\beta 0 + \beta 1 X1 + \beta 2 X2 + \cdots + \beta n Xn + \varepsilon)$$

The Odds Ratio is the ratio of the probability of occurrence of an event to the probability of non-occurrence, in this paper, the probability of residents with commercial endowment insurance and without in commercial endowment insurance. We further assume that:

Yi=1 if Chinese adults are willing to purchase the commercial endowment insurance,

Yi=0 Chinese adults are not willing to purchase the commercial endowment insurance.

Independent variable:

AGE= age of Chinese adults;

GEN= gender of Chinese adults, male and female;

HEA= health status of Chinese adults, excellent, very good, good, fair and poor;

EDU= education level of Chinese adults, primary school, middle school and high school;

ICM= income of Chinese adults;

NUM= number children of family for Chinese adults, none, one, two and more than two;

MAR= marital status of Chinese adults, single and marital;

LP=Chinese adults living place, urban and rural.

The empirical model by regression model following:

$$Y_i = \beta_0 + \beta_1 \text{ AGE} + \beta_2 \text{ GEN} + \beta_3 \text{ EDU} + \beta_4 \text{ HEA} + \beta_5 \text{ ICM} + \beta_6 \text{ NUM} + \beta_7 \text{ MAR} + \beta_8 \text{ LP} + \varepsilon$$

Chapter 4 Results and Discussion

According to the research methodology discussed in the previous chapter, this chapter illustrates results and discussion, it shows data analysis that affects the willingness of Chinese adults to purchase commercial endowment insurance.

4.1 General description of the individual variables, family variables and external variable.

4.1.1 Summary statistics on commercial endowment insurance.

As shown in table 2, there are 31 observations for purchasing commercial endowment insurance, while 3294 observations do not purchase commercial endowment insurance. 0.93% of the sample has purchased commercial endowment insurance, while 99.07% of the sample has not purchased commercial endowment insurance. Anyhow the proportion of people purchasing commercial endowment insurance was much lower than those who not purchase it.

Table 2 Summary statistics on the dependent variable.

Variable	Frequency	Percent
With commercial endowment insurance	31	0.93
Without commercial endowment insurance	3294	99.07
Total	3325	100

4.1.2 Summary statistics for individual characteristic.

Table 3 represents the distribution of the age, gender, education level, heath status, income with a total 3325 individuals in terms of their different characteristics. Age is the continuous variable, its mean is 59.84571, and the standard error (SD) is 0.1894382. And table 3 shows the cross-tabulation between the decision to purchase

commercial endowment insurance versus not purchase of age. The mean that Chinese adults purchase commercial endowment insurance is 53.58065, and the standard error (SD) is 1.271503. While the mean that Chinese adults do not purchase commercial endowment insurance is 59.90468, and the standard error (SD) is 0.1905616. Use the age and commercial endowment insurance to make the t test, I get the t equal to 3.2128 according to value of t, the age has the significant impact for commercial endowment insurance.

Table 3 shows male is 37.68% and female is 63.32% in full sample. What's more, the cross-tabulation between the decision to purchase commercial endowment insurance versus not purchase of gender. The higher proportion that Chinese adults purchase commercial endowment insurance is male group, it is 1.038%, and the lower proportion that Chinese adults purchase commercial endowment insurance is female group, it is 0.869%. The higher proportion that Chinese adults do not purchase commercial endowment insurance is female group, it is 99.131%, and the lower proportion that Chinese adults do not purchase commercial endowment insurance is male group, it is 98.962%. Because the gender is used the chi-square test with commercial endowment insurance, the value of chi-square is 0.2408.

Table 3 shows primary school is 20.57% in full sample, middle school is 2.80% and high school is 76.63%. And it shows that the cross-tabulation between the decision to purchase commercial endowment insurance versus not purchase of education level. The highest proportion that Chinese adults purchase commercial endowment insurance is middle school group, it is 3.226%, and the lowest proportion that Chinese adults purchase commercial endowment insurance is high group, it is 0.86%, and the proportion of primary school is 0.877%. While the highest proportion that Chinese adults do not purchase commercial endowment insurance is also the high school group, it is 99.137%, the lowest proportion that Chinese adults do not purchase commercial endowment insurance is middle group, it is 96.774%, and the proportion of primary school is 99.123% for Chinese adults do not purchase commercial endowment. Education level is used the chi-square test with commercial endowment insurance, the value of chi-square equals 5.498.

Table 3 shows excellent of health status is 22.32% in full sample, and very good, good, fair and poor are respective 49.44%, 15.64%, 12.06% and 0.54% in full sample. When make the cross-tabulation between the decision to purchase commercial endowment insurance versus not purchase of health status. The highest proportion that Chinese adults purchase commercial endowment insurance is good group, it is 1.731%, and the lowest proportion that Chinese adults purchase commercial endowment insurance is poor group, it is 0%, and the excellent group is 0.404%, very group 0.852%, the fair group is 1.247%. While the decision which do not purchase commercial endowment insurance among Chinese adults, the highest proportion is fair group, it is 98.753%, and the lowest proportion is excellent group, it is 99.596%, at the same time, the very good, good and poor group are respective 99.148%, 98.269% and 100%. The health status is used the chi-square test with commercial endowment insurance, the value of chi-square is 6.5439.

Income is a continuous variable, Table 3 shows that its mean is 16316.91, and the standard error (SD) is 408.77, at the same time, table 3 shows the cross-tabulation between the decision to purchase commercial endowment insurance versus not purchase of income. The mean that Chinese adults purchase commercial endowment insurance is 44270.16, and the standard error (SD) is 15580.38. While the mean that Chinese adults do not purchase commercial endowment insurance is 16053.84, and the standard error (SD) is 383.6533. Use the income and commercial endowment insurance to make the t test, I get the t equal to -6.6772.

Table 3 Summary statistics on individual characteristic.

Variable	Full sample	With commercial endowment insurance	Without commercial endowment insurance	Mean comparison test/Independence test
Age –Mean (SD)	59.84571 (0.1894382)	53.58065 (1.271503)	59.90468 (0.1905616)	$t = 3.2128$
Gender –Frequency (Percent)				

Male	1253 (37.68%)	13 (1.038%)	1240 (98.962%)	$x^2 = 0.2408$
Female	2072 (63.32%)	18 (0.869%)	2054 (99.131%)	
Education level—Frequency (Percent)				
primary school	684 (20.57%)	6 (0.877%)	678 (99.123%)	$x^2 = 5.498$
middle school	93 (2.80%)	3 (3.226%)	90 (96.774%)	
high school	2548 (76.63%)	22 (0.863%)	2526 (99.137%)	
Health status—Frequency (Percent)				
Excellent	742 (22.32%)	3 (0.404%)	739 (99.596%)	$x^2 = 6.5439$
Very good	1644 (49.44%)	14 (0.852%)	1630 (99.148%)	
Good	520 (15.64%)	9 (1.731%)	511 (98.269%)	
Fair	401 (12.06%)	5 (1.247%)	396 (98.753%)	
Poor	18	0	18	

	(0.54%)	(0%)	(100%)	
Income---- Mean (SD)	16316.91 (408.77)	44270.16 (15580.38)	16053.84 (383.6533)	$t = -6.6772$

4.1.3 Summary statistics on family characteristic.

As shown in table 4, the distribution of family factors. The number children of family is divided into four group, when the number of children is none, the proportion is 9.17%, the proportion of one child is 22.44%, the proportion of two children is 31.76% and the proportion of more than two children is 36.63% in full sample. Table 4 shows the cross-tabulation between the decision to purchase commercial endowment insurance versus not purchase of number children of family. The highest proportion that Chinese adults purchase commercial endowment insurance is two children group, it is 10.947%, and the lowest proportion that Chinese adults purchase commercial endowment insurance is none children group, it is 0.984%. And the one child's proportion of purchasing commercial endowment insurance among Chinese adults is 1.475%, the more than two children's proportion is 10.575%. While the highest proportion that Chinese adults do not purchase commercial endowment insurance is more than two children group, it is 99.425%, the lowest proportion that Chinese adults do not purchase commercial endowment insurance is none children group, it is 99.016%. And the proportion of one child is 98.525% among Chinese adults who do not purchase commercial endowment insurance, the proportion of two children is 99.053% among Chinese adults who do not purchase commercial endowment insurance. Number children of family is used the chi-square test with commercial endowment insurance, the value of chi-square is 4.0720.

As shown in table 4, the proportion of single group is 20.78% and proportion of married group is 79.22% in full sample. Table 4 shows the cross-tabulation between the decision to purchase commercial endowment insurance versus not purchase of marital status. The higher proportion that Chinese adults purchase commercial

endowment insurance is married group, it is 10.434%, and the lower proportion that Chinese adults purchase commercial endowment insurance is single group, it is 1.063%. While the higher proportion that Chinese adults do not purchase commercial endowment insurance is single group, it is 99.566%, and the lower proportion that Chinese adults do not purchase commercial endowment insurance is married group, it is 98.937%. Marital status is used the chi-square test with commercial endowment insurance, the value of chi-square is 2.3438.

Table 4 Summary statistics on family factors.

Variable	Full sample	With commercial endowment insurance	Without commercial endowment insurance	Mean comparison test/Independence test
Number children of family—Frequency (Percent)				
0	305 (9.17%)	3 (0.984%)	302 (99.016%)	$x^2 = 4.0720$
1	746 (22.44%)	11 (1.475%)	735 (98.525%)	
2	1056 (31.76%)	10 (10.947%)	1046 (99.053%)	
>2	1218 (36.63%)	7 (10.575%)	1211 (99.425%)	
Marital status—Frequency (Percent)				
single	691 (20.78%)	3 (10.434%)	688 (99.566%)	$x^2 = 2.3438$
married	2634 (79.22%)	28 (1.063%)	2606 (98.937%)	

4.1.4 Summary statistics on external characteristic.

As shown in table 5, the percent of Chinese adults live in urban is 73.56% and live in rural is 26.44% for full sample. For Chinese adults who purchase commercial

endowment insurance in urban, the percent is 0.859%, while for Chinese adults who do not purchase commercial endowment insurance, the percent is 99.141%. At the same time, if they live in rural, they purchase commercial endowment insurance 1.138% while they do not purchase commercial endowment insurance 98.826%.

Table 5 Summary statistics on external factors.

Variable	Full sample	With commercial endowment insurance	Without commercial endowment insurance	Mean comparison test/Independence test
Live place—Frequency (Percent)				
Live in urban	2426 (73.56%)	21 (0.859%)	2425 (99.141%)	$x^2 = 0.5454$
Live in rural	879 (26.44%)	10 (1.138%)	869 (98.826%)	

4.2 Logistic regression results.

For the model, put the individual factors, family factors and external factors in the logistic regression model. Individual factors include age, gender, education level, health status and income. Family factors include number children of family and marital status in the logistic regression model. External factor includes the live place, put the whole factors in logistic regression model.

According to the result of logistic regression analysis, age and income of Chinese adults have significant impact for the willingness of purchasing commercial insurance among Chinese adults. P value of age is less than 10% and P value of income is less 1%. While gender, education level, health status, number children of family, marital

status and live place, they do not have significant impact for purchasing commercial endowment insurance.

The odd ratio (OR) of age is 0.951 and the standard error (SE) of age is 0.026. For age group, when the odd ratio of age equals to 0.951, it means that possibility (the odds) that older people would purchase a commercial endowment insurance is 0.951 times than younger people. The odd ratio (OR) of income is 1 and the standard error (SE) of income is 3.33e-06. For income group, when the odd ratio of income equals to 1, it means that possibility (the odds) that rich people would purchase a commercial endowment insurance is 1 time than poor people.

As shown in table 6 for the marginal effects for commercial endowment insurance, the marginal effects of age equal to -0.045% and the standard error (SE) of age equals to 0.00026. There is a negative significant between age and willingness of purchasing commercial endowment, by looking at the marginal effect, being in age of probability for purchasing commercial endowment when they increase one-year old decrease by 0.045%. The marginal effects of income equal to 1.16e-07 and the standard error (SE) of income equals to 3.41e-08. There is a positive significant between income and willingness of purchasing commercial endowment, the probability of income for purchasing commercial endowment insurance increase by 1.16e-07 when their income increase.

Table 6 Regression analyze on decision to purchase commercial endowment insurance.

Variables	Odd Ratio (Standard Error)	Marginal Effect (Standard Error)	P
Age	0.951 (0.026)	-0.00045 (0.00026)	0.068*
Gender---- Male	0.694 (0.265)	-0.00345 (0.00378)	0.339
Education level: Middle school	2.656 (1.974)	0.01719 (0.01694)	0.189
High school	0.719	-0.00307	0.491

	(0.345)	(0.00491)	
Health status Very good	1.582 (1.003)	0.00309 (0.00388)	0.478
Good	2.724 (1.869)	0.00900 (0.00578)	0.144
Fair	1.814 (1.386)	0.00430 (0.00556)	0.436
Poor	1 (---)	--- (---)	---
Income	1.000 (3.33e-06)	1.16e-07 (3.41e-08)	0.000***
Number children of family 1	1.703 (1.154)	0.00446 (0.00513)	0.432
2	1.300 (0.911)	0.00192 (0.00484)	0.708
>2	1.538 (1.181)	0.00343 (0.00589)	0.575
Married status: Single	0.743 (0.477)	-0.00242 (0.00469)	0.643
Living place: Living urban	1.621 (0.752)	0.00408 (0.00370)	0.298
Constant	0.053 (0.090)	----	0.083

Noted: *=10% level of significance, **=5% level of significance, ***=1% level of significance.

Chapter 5 Conclusion and Recommendations

5.1 Conclusion

This study aimed to investigate the factors affecting the purchase of commercial endowment insurance for the Chinese adults, these factors include individual factors, family factors and external factor, next find the factor influence on willingness of purchasing commercial endowment insurance among the Chinese adults. At the same time, give the recommendations to Chinses adults according to those factors. we find that demographic variables play very important role in driving life insurance.

Firstly, the study found the percent of people who are participating in commercial endowment insurance and not participating in commercial endowment insurance respectively, the percent of people with commercial endowment insurance is 0.93%, and the percent of people without commercial endowment insurance is 99.07%. Then the study summarized statistics of individual characteristic, family characteristic and external characteristic, summarized the mean and standard error of age and income, as well as the cross-tabulation of gender, health status, education level, number children of family, marital status and live place for full sample and with and without commercial endowment insurance.

Finally, the study explored factors that influence on willingness for purchasing commercial endowment insurance from individual characteristic, family characteristic and external characteristic through logistic regression model. The study find that individual factors play a very important role in driving commercial endowment insurance in China, specifically, I find age and income as the significant individual determinants of commercial endowment insurance. Age influenced at level of 10% significance, income influenced at level of 1% significance. Gender, health status, education level, number children of family, marital status and live place did not influence the willingness of purchasing commercial endowment insurance.

5.2 Limitations.

Firstly, this study used the data from "China Health and Retirement Longitudinal Study" (CHARLS) in 2015, only one year, because the data of 2017 did not release yet, so it did not compare the results with other years and see the change. Secondly, the Chinese adults purchase commercial endowment insurance is 0.93% in data, this proportion is too small to analyze, because most adults wait for the subsidy from government, especially rural residents. Thirdly, the study do not analyze age-squared and income-squared because of data, when I try to add them, it is insignificant in study. Lastly, the aging people are most in the sample after clean the data.

5.3 Recommendations

As the result of model analysis, policy recommendations can be made.

5.3.1 To the government

The results suggest that the government find ways to improve adults' income level, for example, provides more job opportunities to adults. When they have enough money, they will have ability to purchase commercial endowment insurance. At the same time, the government encourage students to improve their academic qualifications and abilities. Furthermore, the government gives more economic subsidies to students from poor families, focus on the poor family. In addition, the government increase the financial subsidies and tax incentives for commercial endowment companies.

5.3.2 To commercial company.

The commercial company develops more commercial endowment insurance products and effectively improve the quality of management services. Then, play close attention to elder adults and rich people, in order to improve targeting people. At the same time, a seminar of commercial company will be held to introduce the benefits

of commercial endowment insurance, so that people have more understanding for insurance products.

5.3.3 To individual.

For the elder adults and rich people, improve the awareness of purchasing commercial endowment insurance, form the awareness of self-protection and insured consumption habit.

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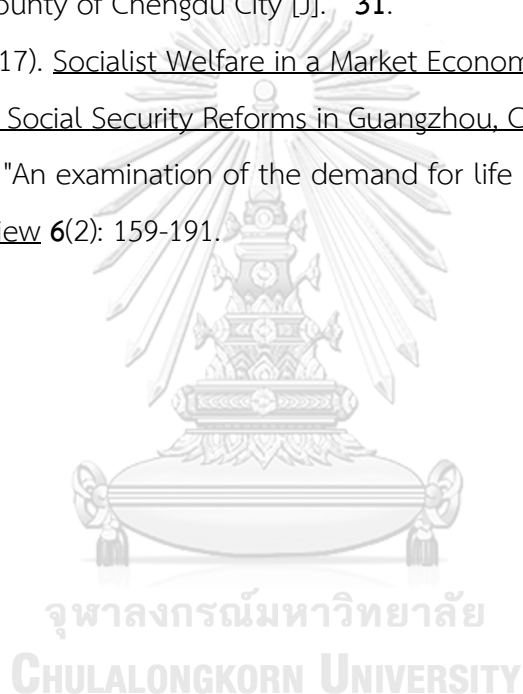
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