Demographic, Macroeconomic and Institutional Determinants of Life Insurance Consumption: Evidence from countries in Asia

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ปัจจัยด้านประชากร เศรษฐกิจมหภาค และสถาบัน ต่อการบริโภคประกันชีวิตในทวีปเอเชีย

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การศึกษานี้มีวัตถุประสงค์เพื่อตรวจสอบปัจจัยที่กำหนดการบริโภคประกันชีวิตในด้านของสภาพประชากร เศรษฐกิจมหภาค และสถาบัน จาก 26 ประเทศในเอเชีย ครอบคลุมช่วงปี 2523 ถึง 2562 โดยประกอบไปด้วยตัวแปรต่างๆ ได้แก่ ตัวแปรทางประชากร 4 ตัวแปร, ตัวแปรเศรษฐกิจมหภาค 7 ตัวแปร และตัวแปรสถาบัน 3 ตัว โดยการศึกษานี้ได้ตรวจสอบความแตกต่างของผลกระทบของตัวแปรที่มีผลต่อการบริโภคประกันชีวิตในประเทศที่มีลักษณะเฉพาะ ได้แก่ ประเทศที่นับถือศาสนาอิสลามเป็นหลัก, ประเทศที่มีรายได้สูง และประเทศที่มีอัตราส่วนผู้สูงวัยสูง ผลการวิจัยพบว่าการบริโภคประกันชีวิตมีความสัมพันธ์เชิงบวกอย่างมีนัยสำคัญกับอายุขัย สำหรับประเทศที่มีรายได้สูงพบว่าอัตราส่วนจำนวนผู้สูงวัยมีผลกระทบน้อยกว่าประเทศอื่นๆ ในทางตรงกันข้ามค่าใช้จ่ายด้านสุขภาพและน่าเชื่อถือของสถาบันส่งผลต่อการตัดสินใจซื้อประกันชีวิตมากกว่าประเทศอื่นๆ และสุดท้ายอัตราส่วนจำนวนผู้สูงวัยและอัตราเงินเฟ้อมีผลกระทบน้อยกว่าในประเทศที่มีอัตราส่วนผู้สูงวัยสูง

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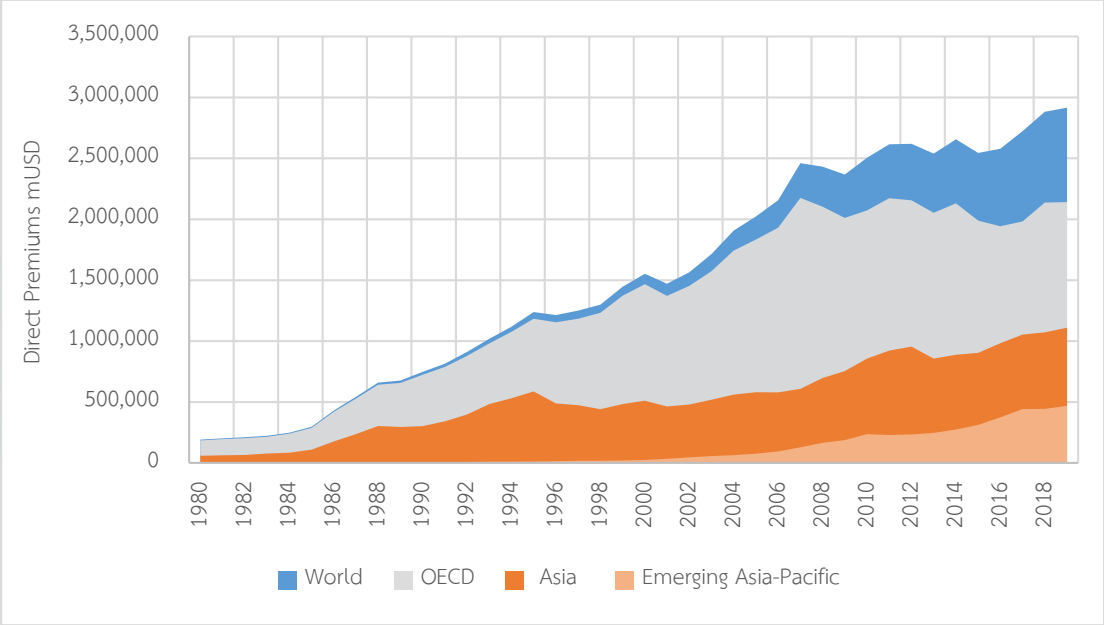
1. Introduction

1.1 Background

People are consistently more interested in investing in insurance to manage the risk of losing their lives and their loved ones. Along with an increase in health spending and health risks, such as air pollution or newly emerged epidemic, it has caused preventive healthcare. For example, the current situation of the COVID-19 outbreak is taking place around the world. Since the first occurrences, the cumulative death rate as of 19 December 2020 is up to 13,289 people, showing the further reinforcement of the risk of death can happen at any time. Thus, life insurance is taking an increasingly important role as shown in Figure 1.

Figure 1 Direct life insurance premiums written from 1980 - 2019



Source: Sigma research, Swiss Re

Moreover, life insurance is also one of the critical factors for the capital market as it is the primary source of market growth through financial intermediation. Life insurance is a long-term investment that has a massive impact on emerging markets like Thailand since emerging markets need internal fund mobilization. Insurance companies are a significant part of it because life insurance consumption creates activity through financial agents and intermediaries.

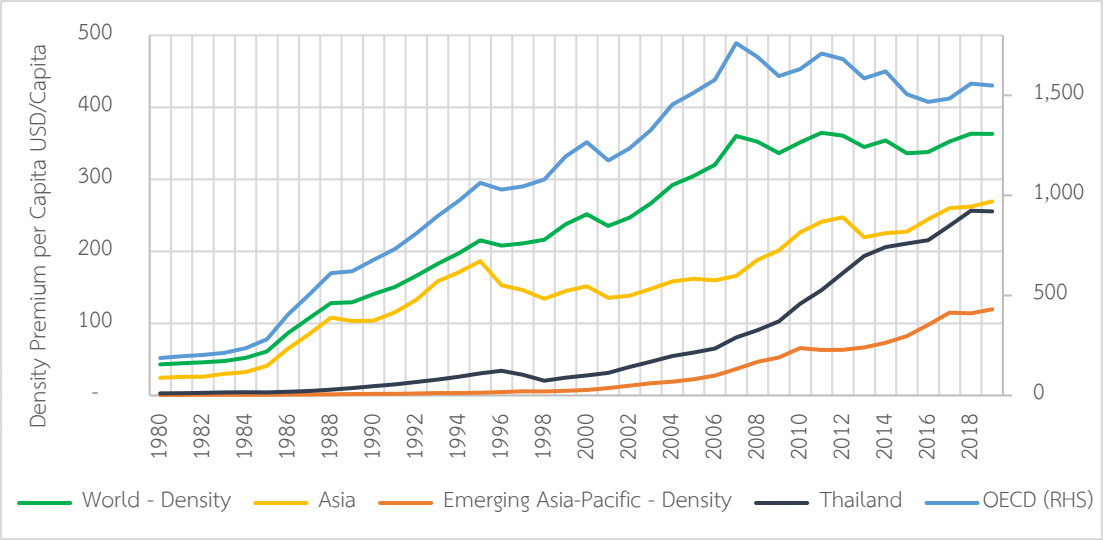
When looking at the life insurance business market in Thailand, it was found that Thailand can further expand the insurance business. Since policy holding rate of the Thai population remain low at 39%, while developed countries like the USA are at 54%. This means that there is enough room for growth in an untapped market.

Also, as Thailand tends to be an aging society in the upcoming 2030, the population who is over 60 years old or retirement will make up 20% of the total population in the country, due to the continuous decrease in the birth rate. Currently, the aged dependency ratio is 15.49% (as of 2019), which resulted in the government having an obligation to increase the welfare of the elderly in the future. At the same time, taxes from the middle-aged have continued to decline. In the view of the policyholder, life insurance products are also a tool to help ease the health burden and save for retirement plans, which will become enormously influential in the future. Life insurance products can protect the insured's wealth when an unforeseeable event occurs. Also, there are products designed to offer both protection and investment return simultaneously.

With all the reasons mentioned above, policymakers must understand what variables affect life insurance consumption to develop the life insurance business strategies. Many shreds of evidence affect life insurance consumption, and it is

divided into three groups: Demographic, Macroeconomic and Institutions quality. Therefore, this study will give a more in-depth understanding of which determinant affects the utilization of life insurance in Asia. In this region, life insurance is growing continuously and can expand the life insurance business. As shown in Figure 2, the premiums per head of Asian is growing continuously especially in Thailand.

Figure 2 Density life insurance premiums from 1980 - 2019



Source: Sigma research, Swiss Re

Besides, the demand for life insurance in a country may be impacted by the country's cultural uniqueness to the extent that influencing the population's risk aversion (Douglas and Wildavsky (1982)). To further analyze dissimilarities between a country's character and life insurance consumption, this report will examine the differences in impacts from each determinant in different country characteristics, which is religion, income, and age of the population.

This study will be divided into six sections. The next section will discuss the existing literature on the determinants of life insurance consumption. Data and data sources, the variables description, the hypotheses model, and the estimation

technique to estimate life insurance consumption determinants will be presented in Section 3. Section 4 presents the contribution of this study. Session 5 will show all references using to construct in this paper. The last session will show all appendix.

1.2 Objective

The objective of this study is to observe the determinants of life insurance consumption of countries in Asia. This study purposes to achieve the goals as follows:

1. To examine the effect of Demographic, Macroeconomic and Institutions quality variables gathering to life insurance consumption of countries in Asia.
2. To examine each determinant's different effect to life insurance consumption in different character of countries in Asia, which is, Muslim countries, High-Income countries, and High-Aged dependency ratio countries.
3. To help policymakers have an understanding about variables affect life insurance consumption to develop the life insurance business strategies.

2. Literature Reviews

2.1 Theoretical studies

The primary argumentation suggested by Yaari (1965). The study related to demand for life insurance models. The researcher settled the consumer model and inferred the purchaser's optimal consumption saving plans and concluded that consumers purchase life insurance to increase their expected lifetime utility. He developed his model from the prototype of Fisher (1930) and Marshal (1920). Subsequently, Studies of Fischer (1973) also introduced bequest function into life insurance purchase.

Lewis (1989) used Yaari's model as a framework, but he has expanded the scope by including other household members' preferences in his model. While previous studies were founded on consumers purchase life insurance to increase their expected lifetime utility, He suggested that buying life insurance should consider the benefits available to the household survivors. Lewis shows the demand equation for life insurance hereinafter:

$$(1- l\ p)F = \max\{[(1- l\ p) / l\ (1- p)]^{1/\delta}TC - W,0\}$$

where l is the policy loading factor (the ratio of the cost of the insurance to its actuarial value), p the probability of death for life insurance buyers, F the face value of all life insurance written on the life insurance buyer's life, δ a measure of the degree of risk aversion, TC the present value of consumption of each descendant until life insurance buyer leaves the household and of the spouse over life insurance buyer predicted remaining life span, and W the household's net wealth.

The utilization of life insurance is also influenced by such insurance prices. The change of Urbanization, Financial development, Rule of law, Control for corruption and Political stability has affected the competences of an insurance company to provide economical insurance. Supply-side factors in Lewis's model might be signified by the policy loading factor.

To summarize, it can be shown that purchasing life insurance has positive correlation with the probability of death for the buyers, the present value of the household consumption, and the degree of risk aversion. Nevertheless, it has a negative relationship with the policy loading factors and the net wealth of households. The next section will show the evidence from variables that were significantly impacted life insurance consumption.

2.2 Empirical studies

There have been several studies involving determinant of life insurance consumption over the years. Hence, this section will group research studies that I have scrutinized in two different characteristics: focusing only on one country in the beginning period of 1900 and extended to various countries in late 1900.

2.2.1 The researchers studied only one country impact

Hammond et al. (1967) studied the life insurance consumption in households in the United States by dividing the group of observations into high, middle and low-income. The researcher concluded that the utilization of life insurance is inelastic with the lower tier and higher tier income group. However, in the middle-income group, the study showed that the consumption is highly reactive to income changes. As can be seen from Fortune (1973), the research analyzed life insurance theory in the United States and found that wealth, incomes, discount rates, and consumer confidence greatly influence purchasing life insurance. Subsequently, Babbel (1981) studied models in Brazil and summarized that inflation is a crucial factor in the utilization of life insurance. Burnett and Palmer (1984) focused on demographic and mental characters only in the United States. They concluded that schooling, number of kids, and income were most significant in clarifying life insurance consumption.

2.2.2 The researchers studied on cross-countries impact

In the later stages, the studies began to extend into cross countries. Beenstock et al. (1986) researched 10 countries from 1970-1981 and inferred both positive and negative factors that impact life insurance consumption. Positive aspects are income, dependency ratio and life expectancy while the harmful elements are security expenditures. Supported by Outreville (1996), the study showed an analysis of 45 developing countries' statistics in 1986. The author concluded personal income, financial development, degree of inflation, and degree of competition in the insurance market has a robust relationship to life insurance consumption. Nevertheless, Muslim countries showed no consequential effect on life insurance

consumption.

During 1970 - 1988, Enz (2000) researched 90 countries, resulting in the income elasticity of the utilization of life insurance showed one unit at low and high tier of income levels, while middle-income phases showed two and more.

Subsequently, Ward and Zurbruegg (2002) was found as an aboriginal study of life insurance consumption in Asia. They studied 22 countries between 1987-1998 and found that, in Asia, income has a significant effect on life insurance consumption more than developed and OECD countries. Furthermore, the study also showed that civil rights and political stability embed a positive correlation with the utilization of life insurance in Asia.

Beck and Webb (2003) considered life insurance consumption in 68 countries globally. By looking in the period 1961 - 2000. The study was divided into four different consumption measures. The study concluded that inflation, income, and financial improvement correlate with a life insurance purchase. In contrast, life expectancy, dependency ratio, social security expenditure, and education appear to have insignificant influence on the utilization of life insurance.

Afterwards, Li et al. (2007) investigated OECD countries in 2000-2008 and discovered that life insurance consumption is grounded on a buyer's income. Moreover, life insurance demand also depends on social security expenditure, life expectancy, competition in the insurance market and economic development. It also showed similar conclusions as other studies where inflation has an unfavorable influence on life insurance demand. For instance, Chui and Kwok (2009) used 30 countries' data in 1966 – 2004 conducting research. They reported that the banking sector development, national income, and inflation rate have a relation with

people's decision in consuming life insurance. Nonetheless, Muslim beliefs presented an opposing force on such insurance consumption. On the contrary, Cristian beliefs had no relation on life insurance consumption.

Feyen et al. (2011) examined in 90 countries during 2000 - 2008. The conclusions that the number of population and concentration, religions, income, economic development, demographic structures, public pension volume and type of insurers and income distribution has a significant relationship to life insurance consumption. Moreover, they revealed that Muslims tend to have significantly lower life insurance premiums than Non-Muslim. This can be implied that religion and cultural factors also crucially affect the decision in the utilization of life insurance.

Afterwards, Dragos (2014) employed 17 countries from emerging Europe and Asia for over 10 years. Finding that, in Asia, urbanization has a more impactful effect on purchasing life insurance than Europe. Alhassan and Biekpe (2015)'s research also employed 31 African countries by using the Static and Dynamic model to examine life insurance consumption during 1996-2010. And summarized that, inflation, income, dependency ratio and life expectancy have an unfavorable effect on such consumption. In contrast, health spending, institutional quality and financial development possess a beneficial influence on life insurance consumption.

Sanjeewa et al. (2019) using a sample of 8 countries in South Asia between 1996-2017. They summarized that factors in demographic are more significant on life insurance consumption than financial factors. The research also concluded that income, urbanization, life expectancy, dependency, and private health expenditure negatively correlate with a utilization of life insurance. At the same time, education and financial development show a correlation with life insurance consumption in a

positive way. The latest study is Sanjeewa and Ouyang (2020) investigated 18 Asian countries between 1996-2017. The conclusions showing the dependency ratio presents a negative effect on the consumption while urbanization, education, income, and average life expectancy affect the utilization of life insurance in positive view.

Determinants of life insurance consumption can be separated into two main factors: specific life insurance determinants and cross-country determinants. However, this study will consider only cross-country determinants.

Despite many supported kinds of research on life insurance consumption elements in Asia, no studies divide the country into different characteristics: Muslim, High-Income and High-Aged dependency ratio countries to estimate the different impact from each determinant. Moreover, the earlier study focus only for a short period, which made the population structure, such as the aged dependency ratio noticeably unchanged.

To fill the gap, this study chose to do new empirical research of selected countries from 26 countries in Asia and examining the differences in impacts from variables in each country characteristic by using a wider dataset than the early studies, from the period of 1980-2019.

3. Data and Methodology

3.1 Data and Data sources

This research examines life insurance determinants in countries in Asia —the life insurance consumption represented by two factors, life insurance penetration and life insurance density. From the literature review discussed above, the determinants of life insurance consumption divided into three groups: Demographic, Macroeconomic and Institutions quality. This research determined how these variables influence life insurance consumption in Asia.

1. The Demographic variables are the Life expectancy, Aged dependency ratio, Education and Urbanization.
2. The Macroeconomic variables are Income, Inflation, Real interest rate, Gross domestic saving, Financial development, Health expenditure and Human Development Index.
3. The Institutions quality variables are Rule of law, Control for corruption and Political stability.

This paper covers 40 years (1980 - 2019) in 26 countries in Asia as shown in Table 1, and the collected data are on an annual basis. All the data used in this study are publicly available. For the life insurance consumption obtained from Sigma research from Swiss Re insurance, the world's largest reinsurance company. For the determinant’s data are collected from the IMF and World Bank database.

Table 1 Lists of countries used in this study

No.	Name	No.	Name	No.	Name
1	China[3]	10	Philippines	19	Jordan[1]
2	Hong Kong[2] [3]	11	Singapore[2]	20	Kuwait[1]
3	India	12	South Korea[3]	21	Malaysia[1]
4	Indonesia	13	Sri Lanka[3]	22	Oman[1]
5	Israel[2] [3]	14	Thailand[3]	23	Pakistan[1]
6	Japan[2] [3]	15	Vietnam	24	Qatar[1] [2]
7	Kazakhstan	16	Bahrain[1]	25	Saudi Arabia[1]
8	Lebanon	17	Bangladesh[1]	26	United Arab Emirates[1] [2]
9	Macao[2]	18	Iran[1]		

Remark: [1] is Muslim countries, [2] is High-Income countries, [3] is High-Aged dependency ratio countries

3.2 Variables description

This research uses Life insurance penetration (LIFEPEN), and Life insurance density (LIFEDEN) is a proxy for life insurance consumption. Life insurance penetration represented the ratio of total life insurance premium to countries' GDP. It is a measure of life insurance consumption comparative to the magnitude of the economy. Life insurance density represented premiums per Capita. This measured the quantity of life insurance consumption per population in each country.

3.2.1 The Demographic variables

Life expectancy (LIFEEXP) A higher life expectancy usually illustrates the low probability of death; assuming the skeptically influence life insurance consumption. However, the longer life expectancy also tends to affect the need for saving money through annuity products that the part of the life insurance policy. Thus, it suggests the unclear correlation between life expectancy and life insurance consumption. Practical suggestion from Browne and Kim (1993) showed that life expectancy has a non-significant influence on the utilization of life insurance. Nevertheless, Outreville (1996) find a positive correlation, while Li et al. (2007) finds a negative correlation.

Aged dependency ratio (AD) represented the ratio of the population aged over 65 divided by population aged 15 to 64. When the country has a high-aged dependency ratio, it will increase the consumption of life insurance because older people need income replacement through annuity products. Thus, Aged dependency ratio predicted to be a positive correlation with life insurance consumption. While Truett and Truett (1990) and Browne and Kim (1993) find positive correlation, Beck and Webb (2003) concluded that the relationship between Aged dependency ratio and the consumption is not consistent across a different group of countries.

Education (EDU) defined as an average academic year for people aged 25. The higher level of education expects to positively influence life insurance consumption because it increases the understanding of mortality risk prevention. Moreover, it will increase the period of dependency, which increases the working life span, which Truett and Truett (1990) and Browne and Kim (1993) identify the correlation in positivity.

Urbanization (URB) represented the Urban population growth (Annual %). When a higher urban population is projected to increase life insurance purchase, the higher customer concentration will reduce the cost for the life insurance company—for example, a low cost of marketing, collecting the premium or claims handling. Hammond et al. (1967), Neumann (1969) and Outreville (1996) find a positive relationship.

3.2.2 The Macroeconomic variables

Income (IN) defined as GDP per Capita. It expected having a positive correlation with a life insurance purchase. First, such insurance is a luxury creation when the customer has a larger income level; it means they have more ability to purchase. Second, when people have a high-income level, they will want to protect their spending during retirement through annuity products. This relationship found by many researchers such as Fortune (1973), Lewis (1989), Outreville (1996) and Beck and Webb (2003)

Inflation (CPI) defined as the customer price index. Most researchers found an adverse impact of inflation on utilization of life insurance as the higher inflation will devastate the life insurance products' value that make it less attractive, which Browne and Kim (1993), Outreville (1996) and Beck and Webb (2003) identified having a negative correlation.

Real interest rate (REAL) reflects the real return of invested premiums of the life insurance business. When the real interest rate is high, the customer will receive high profitability from their life insurance product. On the contrary, as interest increases, the customer can choose to invest in more options, such as alternative

assets. Then, the real interest rate predicted to be an ambiguous relationship with life insurance consumption. Outreville (1996) found the relationship between real interest rates and the consumption nearly irrelevant.

Gross domestic savings (GDS) defined as proportion of gross domestic savings to GDP. Gross domestic savings is GDP minus final consumption expenditure. Hence, domestic saving can also be perceived as a choice between consumption today and consumption tomorrow as it is a way to accumulate wealth over time and raise living standards in the future. Therefore, the increase in Gross domestic savings may be due to people prefer to save money for future use rather than the present. This could be because people are more risk aversion or the economy is currently in a bad shape. Then the relationship between Gross domestic savings and life insurance consumption is unclear.

Financial development (FD) represented the ratio of broad money to GDP. It predictable to have a positive correlation. When the country has a good banking sector, it may rise consumers' confidence in financial organizations, which is life insurance companies. Moreover, it helps improve capital allocation and stimulate investment activity, which Outreville (1996) and Beck and Webb (2003) find a positive correlation.

Health expenditure (HEXP) is represented as the ratio of health expenditure to the country's GDP. It expected to have an adverse correlation with life insurance consumption. Since, when health expenditure is high, it will displace private insurance. Then the life insurance consumption will decrease. This relationship found by Kim (1988) and Meng (1994)

Human Development Index (HDI) is composite index determining average achievement in three basic dimensions of human development—a long and healthy life (Life expectancy), knowledge (Education) and a decent standard of living (Income) as created by the United Nations Development Programme (UNDP). It suggests the unclear correlation because Human Development Index is affected by life expectancy that have ambiguous relationship with life insurance consumption. Which Outreville (1996) finds no significant relationship between the human development index and life insurance consumption.

3.2.3 The Institutions quality variables

Rule of law (RUL), Control for corruption (CC), Political stability (POL) is a proxy of Institutions quality. Life insurance contract is a lifelong agreement between the customers and the insurance institutions. If the company's reputation and quality is satisfactory, it will improve the insurance company's reliability and stability. Ward and Zurbruegg (2002), Li et al. (2007) and Alhassan and Biekpe (2015) find this relationship.

3.2.4 The countries characteristic variables

Muslim countries (MUS) is a dummy variable for countries that Islam is the national religion. For Muslim countries, life insurance is usually disapproved of in some countries because it is non-compliant with Shariah law. Life insurance is considered a hedge against the will of God. Therefore, Islamic countries expect to have a smaller impact from each determinant to the utilization of life insurance. Browne and Kim (2003), Beck and Webb (2003) and Feyen et al. (2011) find that in

Muslim country have significantly lower life insurance consumption than other countries.

High-Income countries (HIGHIN) is a dummy variable for countries that have a higher income. High-income is measured by 25 top percentile of the dataset. When people have higher income, they will have access to more products that can replace life insurance such as stock options and mutual funds. Moreover, wealthy people might see life insurance as unnecessary products since they have enough assets to cover the risk of death, while others will have to take this risk. Therefore, High-income countries expect to have a smaller impact from each determinant to life insurance consumption. Simultaneously, Hammond et al. (1967) and Enz (2000) find that, in high-income people, income less impact on life insurance consumption than middle-income groups.

High-Aged dependency ratio country (HIGHAD) is a dummy variable for countries that have higher Aged dependency ratio. High-aged dependency ratio is measured by the top 25 percentile of the dataset. When countries have a higher aged dependency ratio, countries will have to bear more pension expenses for the elderly and health expenditure. Moreover, the government is also getting a lower tax on working-age people. Therefore, as a government, it should help push people to make more life insurance. For example, people can bring life insurance premiums to reduce income taxes. Therefore, High-aged dependency ratio countries expect to have a larger impact from determinants to life insurance consumption.

3.3 Hypothesis development

In this study use four objectives to study the cause of life insurance consumption in countries in Asia. For instance,

3.3.1 The Demographic, Macroeconomic and Institutions quality variables has an impact on life insurance consumption

The variables from these perspectives will be gathered to study the impact of life insurance consumption.

Model 1; $LIFEPEN_{i,t} = a_0 + a_1D_{i,t} + a_2M_{i,t} + a_3I_{i,t} + \mu_{i,t}$

Model 2; $LIFEDEN_{i,t} = b_0 + b_1D_{i,t} + b_2M_{i,t} + b_3I_{i,t} + \mu_{i,t}$

Where $D_{i,t}$ is vector of Demographic variables, $M_{i,t}$ is vector of Macroeconomic variables and $I_{i,t}$ is vector of Institutions quality variables.

3.3.2 The impact from Demographic, Macroeconomic and Institutions quality variables in Muslim countries is smaller than other countries

Life insurance is still a question of Islamic culture because life insurance is typically rejected in some countries because it is non-compliant with Shariah law. Thus this study will study the determinant of life insurance consumption across countries in Asia that a diverse religious and beliefs about death by dividing the country into Muslims and Non-Muslims to look at the differences in determinant on life insurance consumption.

Model 3; $LIFEPEN_{i,t} = a_0 + a_1 D_{i,t} + a_2 M_{i,t} + a_3 I_{i,t} + \gamma_1 MUS_i\ LIFEEXP_{i,t} + \gamma_2 MUS_i\ AD_{i,t} + \gamma_3 MUS_i\ IN_{i,t} + \gamma_4 MUS_i\ CPI_{i,t} + \gamma_5 MUS_i\ HEXP_{i,t} + \gamma_6 MUS_i\ POL_{i,t} + \mu_{i,t}$

Model 4; $LIFEDEN_{i,t} = b_0 + b_1 D_{i,t} + b_2 M_{i,t} + b_3 I_{i,t} + \gamma_1 MUS_i\ LIFEEXP_{i,t} + \gamma_2 MUS_i\ AD_{i,t} + \gamma_3 MUS_i\ IN_{i,t} + \gamma_4 MUS_i\ CPI_{i,t} + \gamma_5 MUS_i\ HEXP_{i,t} + \gamma_6 MUS_i\ POL_{i,t} + \mu_{i,t}$

Where MUS_i is the dummy variable for Muslim countries.

3.3.3 The impact from Demographic, Macroeconomic and Institutions quality variables in High-income countries is smaller than other countries

The character of each country will affect the consumption of life insurance. For that high-income country, it will look like spending money differently than other countries. This model will study the impact of each variable to life insurance consumption in high-income countries in Asia.

Model 5; $LIFEPEN_{i,t} = a_0 + a_1D_{i,t} + a_2M_{i,t} + a_3I_{i,t} + \gamma_1 HIGHIN_i\ LIFEEXP_{i,t} + \gamma_2 HIGHIN_i\ AD_{i,t} + \gamma_3 HIGHIN_i\ IN_{i,t} + \gamma_4 HIGHIN_i\ CPI_{i,t} + \gamma_5 HIGHIN_i\ HEXP_{i,t} + \gamma_6 HIGHIN_i\ POL_{i,t} + \mu_{i,t}$

Model 6; $LIFEDEN_{i,t} = a_0 + a_1D_{i,t} + a_2M_{i,t} + a_3I_{i,t} + \gamma_1 HIGHIN_i\ LIFEEXP_{i,t} + \gamma_2 HIGHIN_i\ AD_{i,t} + \gamma_3 HIGHIN_i\ IN_{i,t} + \gamma_4 HIGHIN_i\ CPI_{i,t} + \gamma_5 HIGHIN_i\ HEXP_{i,t} + \gamma_6 HIGHIN_i\ POL_{i,t} + \mu_{i,t}$

Where $HIGHIN_i$ is the dummy variable for High income countries.

3.3.4 The impact from Demographic, Macroeconomic and Institutions quality variables in High-aged dependency ratio countries is larger than other countries

High-aged dependency ratio means the working-age population will have to bear the burden in supporting the aging population. This shows that the country will have to allocate a lot of money for elderly care. And there is a possibility that the elderly is not able to receive thorough care. Then life insurance products become more important. Thus, to see each variable's impact, this hypothesis will examine using dummy variables to capture the different implications in High-aged dependency ratio countries.

Model 7; $$LIFEPEN_{i,t} = a_0 + a_1 D_{i,t} + a_2 M_{i,t} + a_3 I_{i,t} + \gamma_1 HIGHAD_i\ LIFEEXP_{i,t} + \gamma_2 HIGHAD_i\ AD_{i,t} + \gamma_3 HIGHAD_i\ IN_{i,t} + \gamma_4 HIGHAD_i\ CPI_{i,t} + \gamma_5 HIGHAD_i\ HEXP_{i,t} + \gamma_6 HIGHAD_i\ POL_{i,t} + \mu_{i,t}$$

Model 8; $$LIFEDEN_{i,t} = b_0 + b_1 D_{i,t} + b_2 M_{i,t} + b_3 I_{i,t} + \gamma_1 HIGHAD_i\ LIFEEXP_{i,t} + \gamma_2 HIGHAD_i\ AD_{i,t} + \gamma_3 HIGHAD_i\ IN_{i,t} + \gamma_4 HIGHAD_i\ CPI_{i,t} + \gamma_5 HIGHAD_i\ HEXP_{i,t} + \gamma_6 HIGHAD_i\ POL_{i,t} + \mu_{i,t}$$

Where $HIGHAD_i$ is the dummy variable for High-aged dependency ratio countries.

3.4 Estimation technique

This study looked at consumption as a proxy for demand and supply of life insurance. Then at Equilibrium causes $Q_s = Q_d$, resulting in a Simultaneous equation causing Endogeneity problem. Past studies are looking at the relationship of life insurance's demand and supply, Outreville (1996), who show an association between demand and supply of life insurance consumption as follow:

Q_d = Q_d[GDP(+), PI(-), LIFEXP(+), PA(-), RB(?)]

Q_s = Q_s[PI(+), RB(+), MFD(+), Country structural variables]

Where GDP is GDP per Capita, PI is the commercial price for life insurance, LIFEXP is life expectancy at birth, PA is Anticipated inflation, RB is Interest rates, MFD is level of financial development of the country and Country structural variables, for example, the level of dependency ratio and level of education.

At equilibrium $Q^* = Q_d = Q_s$

Then the volume of premium written is equal to the price of life insurance (PI) multiplied by the quantity of life insurance protection (Q), then the following reduced-form model is presented:

Insurance consumption = Total Premiums

= PI * Q

= F(GDP, RB, PA, LIFEXP, MFD, Country structural variables)

Or $Y_{i,t} = a_0 + a_1 D_{i,t} + a_2 M_{i,t} + a_3 I_{i,t} + u_{it}$

Where $Y_{i,t}$ is Indicator of the life insurance consumption

Therefore, it can be concluded that life insurance consumption equation depends on these three determinants: Demographic, Macroeconomic and Institutional Determinants without Endogeneity problem.

In this study, the key outcomes are based on the unbalanced panel of 26 countries in 40 years. The panel will help control the differences across countries and not account for any of the explanatory variables that make omitted variables a problem, such as insurance sector compliance and regulation, taxation, and the insurance price. This study will use the Hausman test (Hausman (1978)) to decide between using fixed effect estimation or random effect estimation to run the models. The results suggest to use the fixed effect estimation (The results show in Table 10 in Appendix.). Then in the model add a country fixed effect to solve the Endogeneity problem from unobserved characteristics of individual country. As for time fixed effect, there is no need for control because in each year, different countries have different economies and characteristics. Therefore, it is not necessary to control for time fixed effect.

This study run the model in four variants: the first includes all variables in the model, the second add the Muslim countries as the dummy variables, the third add the High-income countries as the dummy variables and the forth add the High-aged dependency ratio countries as the dummy variables. The result of the estimation of both penetration and density model.

3.5 Descriptive Statistics and Correlations

The descriptive statistics in the all variables as shown in Table 2. And the descriptive statistics of the data classified by country type are shown in Appendix Table 7 – Table 9. Correlations are shown in Table 3. It was found that some of the data were quite correlated, which will cause multicollinearity problems. Therefore, in order to solve this problem, it is necessary to divide Model 1 and 2 into 8 sub models as shown in the Table 4. Because there are some variables that cannot be combined with some variables for example life expectancy and education were highly correlated as 0.8055 which will cause multicollinearity problems. Kennedy (2008) asserts that 0.70 is the level above which multicollinearity exists. In addition, Variance Inflation Factor (VIF) is used to check multicollinearity problems in another way for more reliability.

Table 2 Descriptive Statistics (Full Sample)

Variables	Unit	Obs.	Mean	SD	Min	Max
Life insurance penetration	%	887	172.05	258.12	0.01	1,825.87
Life insurance density	USD/Capita	887	718.09	4,497.53	0.00	112,843.00
Life expectancy	Years	1,014	72.03	6.30	52.90	84.93
Aged dependency ratio	%	1,037	8.52	5.71	0.80	47.12
Education	Years	725	8.13	2.48	2.30	13.00
Urbanization	%	1,036	3.23	2.30	-3.09	17.76
Income	USD/Capita	1,009	54,307	500,247	375	13,600,000
Inflation	%	880	6.84	19.19	-4.86	373.22
Real interest rate	%	665	4.50	7.15	-28.99	43.34
Gross domestic savings	%	968	29.50	16.52	-69.23	75.55
Financial development	%	972	85.34	61.48	8.57	400.41
Health expenditure	%	456	4.49	2.09	1.60	10.95
Human Development index	-	725	0.72	0.12	0.39	0.95
Rule of law	-	546	0.20	0.75	-1.19	1.88
Control for corruption	-	546	0.10	0.86	-1.50	2.33
Political stability	-	546	-0.21	0.98	-2.81	1.62

Source: Appendix Table 6.

Table 3 Correlations

	LIFEEXP	AD	EDU	URB	IN	CPI	REAL	GDS	FD	HEXP	HDI	RUL	CC	POL
LIFEEXP	1.0000													
AD	0.4751	1.0000												
EDU	0.8055	0.4706	1.0000											
URB	-0.0399	-0.4857	-0.2151	1.0000										
IN	0.6378	0.0611	0.4080	0.3187	1.0000									
CPI	-0.3526	-0.2143	-0.2368	0.0535	-0.1777	1.0000								
REAL	-0.0314	-0.0257	0.0038	-0.0459	-0.1120	-0.2984	1.0000							
GDS	0.3102	-0. 2046	0.0519	0.3195	0.6467	-0.0293	-0.1666	1.0000						
FD	0.5420	0.6178	0.3719	-0.1979	0.0872	-0.3888	0.0412	-0.1692	1.0000					
HEXP	0.4572	0.6162	0.5443	-0.2792	-0.0132	-0.1188	0.0331	-0.4560	0.6589	1.0000				
HDI	0.9273	0.3405	0.8540	-0.0261	0.6963	-0.3492	-0.0416	0.3877	0.3953	0.3674	1.0000			
RUL	0.7226	0.3474	0.6618	-0.0411	0.6719	-0.4746	-0.0020	0.3614	0.3054	0.2171	0.8032	1.0000		
CC	0.7335	0.3121	0.6351	-0.0012	0.7274	-0.4215	-0.0237	0.4207	0.2956	0.2007	0.7982	0.9456	1.0000	
POL	0.6932	0.1957	0.4859	0.1538	0.6507	-0.3838	-0.0383	0.5608	0.2578	0.1213	0.7031	0.7850	0.7982	1.0000

4. Empirical Results

This section discusses the empirical results on the determinants of life insurance consumption in Asia. The results consist of 1) Determinants has an impact on life insurance consumption are shown in Table 4 and 2) Determinants has an impact on life insurance consumption in different country characteristic are shown in Table 5. This study will study the impact on life insurance consumption in 2 aspects: penetration and density. For penetration, it measures the need for life insurance consumption compared to the economy. In terms of density, it measures the individual's need for life insurance.

4.1 Determinants has an impact on life insurance consumption in Asia

As shown in Table 4, in the Model 1 will show the results of analysis on penetration and divide into 4 sub models. In the Model 2 will show the results of analysis on density and divide into 4 sub models. For penetration, the adjusted R-squared of 0.03 but for density is 0.30, implies that the variables are better able to describe density than penetration.

As for the Demographic variables, this study shows the following. Life expectation positively impacts the purchase of life insurance at 1% for density and 5% for penetration. Because when people live longer, spending after retirement is undoubtedly a top concern. It is a very important reason for people to purchase life insurance, with the findings of Outreville (1996). Contrary to expectations, the aged dependency ratio has a negative impact on life insurance penetration at 5%, which is caused by the fact that most people need to get life insurance to protect their risks when they get older. Then most people do life insurance start from working-age because it will make the insurance premiums lower. When the working-age rate decreases, the demand for life insurance decreases as well. And one more reason is that the number of older people increases while fewer working-age people, resulting

in a poor economy causing no growth of the insurance business. And supports the empirical findings of Alhassan and Biekpe (2015) and Sanjeewa and Ouyang (2020). For Education, it changes only slightly per year. Therefore, a clear relationship cannot be seen. Even if education gives people more insight into the risks but on the other hand, the more people are involved in the education process, and the less labor force is presented on the market, therefore reducing the overall GDP of the country. Beck and Webb (2002) show education to be insignificant. For urbanization, found no clear relationship caused by the fact that, most countries in Asia are developing countries. Therefore, the population increase in urban areas may be due to the relocation of the rural poor to the urban centers. This will not affect the purchase of life insurance, with the findings of Alhassan and Biekpe (2015).

For the Financial variable, as expected, Income had a positive effect on life insurance consumption in terms of density at 1%, but for penetration did not find a clear correlation. When people have high-income, the economy is going well affect GDP growth as well. So when measuring the demand for life insurance against GDP, there is no significant increase. In accordance with the study of Beenstock et al. (1986) and Beck and Webb (2003). Inflation and Real interest rate were not found to significantly affect the consumption of life insurance for people in Asia. Real interest affects life insurance, both positively and negatively. Therefore, not seeing a clear relationship with life insurance consumption. Which has the same results as Outreville (1996). For Gross domestic savings have negative affects to life insurance consumption in terms of density at 1% because the increase in Gross domestic savings may be due to people prefer to save money for future use rather than the present during a bad economy. As the overall consumption of the country decreases, the consumption of life insurance is also likely to decline. During the period of high saving rates, people appear to invest a lot in other investment products and even in direct business to benefit more if expected returns are high. At the same time, life insurance is a product that has to bear the mortality risk, so the

return is not as high as other investment products, so people are less interested in buying life insurance. Financial development was not found to have any significant effect on life insurance consumption. For health expenditure, it was found to have a positive impact on life insurance density at 1%. As the proportion of health expenditure to the country's GDP increased, the population had more expenses on health. Therefore, people will need more life insurance as well to protect the risk from their health. This result is line with the findings of Li et al. (2007) and Alhassan and Biekpe (2015). The Human Development Index was found to be a positive correlation with life insurance density at 1%. As the population was well-off, then they would have access to do more life insurance.

For the Institutions quality variables, it was found to have no significant correlation to life insurance consumption. Because most Asian countries are developing countries, so the government has not affected purchasing life insurance products. A life insurance product is an item that has a cost. Therefore, it requires a lot of strength and internal decision-making within the individual more than the stability of the system.

4.2 Determinants has an impact on life insurance consumption in different country characteristic

As shown in Table 5, for Models 3-4 show information of Muslim countries, Model 5-6 show information of High-income countries and Model 7-8 show information of High-aged dependency ratio countries.

The countries characteristic started at Muslim countries. From Model 3-4, it was found that Life expectancy, Income and Health expenditure had a lower impact on demand for life insurance than other countries, but the Aged dependency ratio was found to affect demand more than other countries. But the impact on the demand for life insurance affects only one aspect. There was no obvious effect on

both penetration and density. Because nowadays, there are life insurance products that are specifically designed for Muslims. To be able to do so without being wrong with the principles of religion, such as Takaful, often referred to as 'Islamic insurance', is a way for businesses to mitigate the financial risk of unforeseen events. Takaful is based on social solidarity and cooperation; it is a pact among people who agree to jointly indemnify loss or damage from a fund they donate to collectively.

For High-income country in Model 5-6, found that the Aged dependency ratio had less impact than other countries at 1%. Moreover, the Health expenditure and Political stability had more impact on life insurance purchase decision than other countries at 1% and 5% respectively. As a result of when the population has a higher income, health has been a priority. It is an essential factor in making life insurance decisions. Politics is also a priority in high-income countries. Therefore, the stability of the system has a relatively high impact on decision making. On the other hand, Income influence life insurance purchase decisions than in any other country in term density at 1% because when income is higher, people can buy more life insurance.

The last one is a country with many elderly people or a high-aged dependency ratio in Model 7-8. When the number of older people is already high, the increase of the elderly is less effective than in other countries at 1%. Moreover, Inflation has a lower impact on decision-making than in other countries at 5%. On the other hand, Life expectancy and Income influence life insurance purchase decisions in this group more than in any other country in term of penetration and density respectively.

Table 4 Determinants of Life Insurance in a Panel, 1980–2019: Full Sample, Fixed Effects

VARIABLES	Model 1: Penetration				Model 2: Density			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LIFEEXP	10.52***			10.52***	26.14***			26.52***
	(2.028)			(2.027)	(8.976)			(8.955)
AD	-3.550**	-1.560	-2.412	-3.614**	-17.25**	-11.68	-13.51*	-15.82**
	(1.638)	(1.648)	(1.608)	(1.651)	(7.251)	(7.121)	(7.144)	(7.292)
EDU		7.753*				2.776		
		(4.591)				(19.84)		
URB	-1.603	-2.172	-2.253	-1.555	-6.900	-7.750	-7.790	-7.521
	(1.413)	(1.475)	(1.423)	(1.417)	(6.255)	(6.372)	(6.320)	(6.260)
IN	-0.000308	-0.000191	-0.000488	-0.000350	0.0233***	0.0241***	0.0225***	0.0229***
	(0.000502)	(0.000532)	(0.000488)	(0.000481)	(0.00222)	(0.00230)	(0.00217)	(0.00213)
CPI	-0.815	-0.795	-0.919	-0.789	-3.282	-2.970	-3.045	-3.556
	(0.677)	(0.707)	(0.682)	(0.679)	(2.998)	(3.053)	(3.031)	(3.000)
REAL	-0.253	-0.134	-0.142	-0.242	-0.592	-0.174	-0.159	-0.747
	(0.342)	(0.356)	(0.343)	(0.344)	(1.516)	(1.536)	(1.525)	(1.517)
GDS	0.214	0.697	0.481	0.274	-9.620***	-8.587***	-8.212***	-10.21***
	(0.637)	(0.659)	(0.629)	(0.647)	(2.821)	(2.846)	(2.792)	(2.858)
FD	-0.0319	0.232	-0.150	-0.0410	-0.143	0.842	-0.191	-0.363
	(0.205)	(0.216)	(0.216)	(0.199)	(0.906)	(0.933)	(0.961)	(0.880)
HEXP	-0.569	-0.629	-0.370	-0.365	83.84***	86.60***	86.85***	80.68***
	(5.027)	(5.277)	(5.058)	(5.056)	(22.25)	(22.80)	(22.47)	(22.33)
HDI			438.7***				679.6	
			(95.34)				(423.5)	
RUL	-2.724	-3.545			-101.4	-104.8		
	(17.48)	(18.16)			(77.39)	(78.46)		
CC				3.494				-98.91*
				(12.64)				(55.82)
POL	2.754	5.132	0.150	1.598	50.59	54.24	30.02	51.10
	(7.825)	(8.146)	(7.242)	(7.552)	(34.64)	(35.20)	(32.17)	(33.35)

Table 4 Determinants of Life Insurance in a Panel, 1980–2019: Full Sample, Fixed Effects (Cont.)

VARIABLES	Model 1: Penetration				Model 2: Density			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	-542.2***	115.9***	-86.49	-543.8***	-1,721***	-4.727	-370.0	-1,709***
	(137.0)	(36.42)	(59.09)	(137.0)	(606.3)	(157.4)	(262.5)	(605.0)
Observations	336	336	336	336	336	336	336	336
Number of Country	21	21	21	21	21	21	21	21
R^2 within	0.1115	0.0418	0.0954	0.1116	0.3822	0.3650	0.3666	0.3851
R^2 between	0.0234	0.2206	0.0348	0.0347	0.2259	0.2479	0.2806	0.2275
R^2 overall	0.0328	0.2185	0.0414	0.0449	0.2560	0.2787	0.3048	0.2569
Hausman test (p-value)	0.0000	0.0000	0.0006	0.0000	0.0000	0.0000	0.0000	0.0000

*Significant at the 10 percent level.
**Significant at the 5 percent level.
***Significant at the 1 percent level.
Note: The numbers in parentheses are Standard errors.
Source: Authors' calculations.

Table 5 Determinants of Life Insurance in a Panel, 1980–2019: Different character of countries in Asia, Fixed Effects

VARIABLES	Muslim Country		High-Income Country		High-Aged Dependency Ratio	
	Model 3: Penetration	Model 4: Density	Model 5: Penetration	Model 6: Density	Model 7: Penetration	Model 8: Density
LIFEEXP	15.64***	26.60***	9.225***	4.158	2.113	-17.60**
	(2.623)	(9.422)	(2.196)	(8.257)	(2.296)	(7.863)
AD	-3.810**	-35.51***	3.692	35.64***	14.04***	171.4***
	(1.822)	(6.543)	(2.658)	(9.996)	(4.436)	(15.19)
URB	-1.599	-3.277	-2.631*	13.36**	-0.787	2.329
	(1.502)	(5.395)	(1.533)	(5.764)	(1.340)	(4.591)
IN	-0.00112*	0.0420***	-0.000467	0.00641***	-0.00122**	0.0110***
	(0.000650)	(0.00233)	(0.000650)	(0.00244)	(0.000520)	(0.00178)
CPI	-1.556**	-2.515	-0.480	-1.052	0.172	0.315
	(0.783)	(2.814)	(0.660)	(2.481)	(0.689)	(2.360)
REAL	-0.127	0.477	-0.190	-1.468	0.0496	1.517
	(0.348)	(1.249)	(0.326)	(1.226)	(0.326)	(1.116)
GDS	-0.0462	-4.408*	0.265	-3.566	0.647	-1.275
	(0.679)	(2.437)	(0.618)	(2.324)	(0.615)	(2.107)
FD	-0.0546	-1.699**	-0.0437	-1.027	-0.0542	0.406
	(0.209)	(0.750)	(0.192)	(0.720)	(0.205)	(0.701)
HEXP	-6.539	139.6***	-4.995	48.43***	0.157	37.24**
	(6.270)	(22.52)	(4.922)	(18.51)	(5.354)	(18.34)
RUL	12.25	-73.31	24.98	10.42	24.94	-7.742
	(18.58)	(66.73)	(17.04)	(64.10)	(17.94)	(61.46)
POL	-7.969	33.12	-7.480	-35.15	2.795	-17.36
	(10.10)	(36.29)	(7.658)	(28.80)	(8.786)	(30.09)
MUS*LIFEEXP	-13.14***	-16.11				
	(4.314)	(15.49)				
MUS*AD	8.286	44.56				
	(8.319)	(29.88)				
MUS*IN	0.00140	-0.0386***				
	(0.000857)	(0.00308)				
MUS*CPI	1.554	3.438				
	(1.405)	(5.046)				
MUS* HEXP	11.65	-137.5***				
	(9.344)	(33.56)				
MUS*POL	2.637	-36.77				
	(15.43)	(55.42)				
HIGHIN*LIFEEXP			-33.53***	132.7***		
			(7.227)	(27.18)		
HIGHIN*AD			-15.92***	-171.7***		
			(4.315)	(16.23)		
HIGHIN*IN			0.000940	0.0195***		

VARIABLES	Muslim Country		High-Income Country		High-Aged Dependency Ratio	
	Model 3: Penetration	Model 4: Density	Model 5: Penetration	Model 6: Density	Model 7: Penetration	Model 8: Density
			(0.000912)	(0.00343)		
HIGHIN*CPI			-0.757	-15.43**		
			(1.858)	(6.988)		
HIGHIN* HEXP			52.93***	466.9***		
			(13.34)	(50.18)		
HIGHIN*POL			116.8***	254.8*		
			(39.72)	(149.4)		
HIGHAD*LIFEEXP					19.61***	1.515
					(4.792)	(16.41)
HIGHAD*AD					-21.37***	-208.2***
					(5.359)	(18.35)
HIGHAD*IN					0.00279	0.0621***
					(0.00178)	(0.00611)
HIGHAD*CPI					-4.198**	-11.79*
					(1.928)	(6.602)
HIGHAD* HEXP					-8.745	38.75
					(12.54)	(42.94)
HIGHAD*POL					-32.86*	-0.0938
					(16.92)	(57.96)
Constant	-540.2***	-1,300**	-73.55	-2,303***	-409.1***	361.4
	(144.6)	(519.4)	(151.6)	(570.1)	(141.9)	(486.1)
Observations	336	336	336	336	336	336
Number of	21	21	21	21	21	21
R^2 within	0.1491	0.6106	0.2570	0.6272	0.2412	0.6841
R^2 between	0.2174	0.4209	0.2008	0.4230	0.3084	0.3054
R^2 overall	0.2253	0.4667	0.2166	0.4435	0.3043	0.3427

*Significant at the 10 percent level.
**Significant at the 5 percent level.
***Significant at the 1 percent level.
Note: The numbers in parentheses are Standard errors.
Source: Authors' calculations.

5. Conclusion

As a result of many past studies, there is significant evidence that the determinant factors can explain the need for life insurance consumption. To the best of information, this study is the first to discover the impact of determinants by dividing the types of the country into 3 groups. Most of the findings are consistent with the literature. Life expectancy affecting both aspects of life insurance penetration and density. Income, Gross domestic saving, Health expenditure and Human development index affect only life insurance density. And Aged dependency ratio affect only life insurance penetration.

In the meantime, the study results of the three types of country characteristics were as follows. For Muslim countries, it was found the determinants have impact on the demand for life insurance that different from other countries only one aspect. There was no obvious effect on both penetration and density. Because nowadays, there are life insurance products designed explicitly for Muslims to not conflict with religious principles. Hence, the variables that affect Muslim countries not much different from other countries. For high-income country, found that the Aged dependency ratio had less impact than other countries. On the contrary, Health expenditure and Political stability affect life insurance purchase decisions more than any other country. Based on when people have higher incomes, they could increase the ability to consume additional life insurance. At the same time, high-income people are more concerned with the health and confidence of the system than any other group. The last group is the high-aged dependency ratio countries. When the elderly group is already large, the increase in the number of the elderly has less impact than other countries. Moreover, Inflation has a lower impact on decision-making than in other countries.

6. Research Contribution

This study will help to understand the variables affecting life insurance consumption in Asia, which is unique and unlike any other continents in the world. Asia has a wide variety of faiths and cultures, which inevitably affect a risk aversion on purchasing life insurance. Therefore, variables influencing life insurance purchasing decisions in Asian countries may differ from the rest of the world.

As countries characteristic is interested in this study and new for life insurance determinants, this study can suggest that life expectancy is found to positively impact on life insurance consumption in Asia. Moreover, High-income countries place greater emphasis on health and system reliability than any other country. And when the country already has a large number of elderly people, the increase in the elderly will less effective than in other countries. In addition, inflation has less impact on purchasing decisions in life insurance in countries with high numbers of elderly people. The analysis results can also help design government policies to develop their own country's purchasing life insurance to alleviate the government's burden on the elderly. For example, the government should improve health care for the people. People must have access to good treatment and the costs are reasonable to increase the quality of life and increase the longevity of the people. This will increase the life insurance consumption.

7. Appendix

Table 6 Data definition and sources

Variables	Description	Unit	Source	Expected Sign
Dependent variables				
Life insurance penetration	The ratio of Life insurance premiums to GDP	%	Swiss Re	
Life insurance density	The ratio of Life insurance premiums to Capita	USD/Capita	Swiss Re	
Independent variables				
Life expectancy	Average life expectancy	Years	World Bank	+,-
Aged dependency ratio	The ratio of the number of people aged 65 and over to a number of people aged 15 to 64	%	World Bank	+
Education	Mean years of schooling	Years	UNDP	+
Urbanization	Urban population growth	%	World Bank	+
Income	GDP per capita	USD/Capita	World Bank	+
Inflation	Consumer price index	%	World Bank	-
Real interest rate	Real interest rate	%	World Bank	+,-
Gross domestic savings	The ratio of gross domestic savings to GDP	%	World Bank	+,-
Financial development	The ratio of broad money to GDP	%	World Bank	+
Health expenditure	The ratio of health expenditure to GDP	%	World Bank	-
Human Development Index	Country scores for Human Development Index	-	UNDP	+,-
Rule of law	Country scores for Rule of Law	-	World Bank	+
Control for corruption	Country scores for corruption control	-	World Bank	+
Political stability	Country scores for political stability	-	World Bank	+

Table 7 Descriptive Statistics (Muslim Country)

Variables	Unit	Obs.	Mean	SD	Min	Max
Life insurance penetration	%	320	48.43	77.10	0.30	361.53
Life insurance density	USD/Capita	320	58.71	85.14	0.38	412.50
Life expectancy	Years	390	70.93	5.52	52.90	80.10
Aged dependency ratio	%	397	4.50	2.17	0.80	9.97
Education	Years	290	7.35	2.18	2.30	12.10
Urbanization	%	396	4.24	2.88	-3.09	17.76
Income	USD/Capita	397	21,024	21,625	1,162	122,223
Inflation	%	344	3.76	3.86	-4.86	25.71
Real interest rate	%	226	5.15	9.69	-20.13	43.34
Gross domestic savings	%	363	29.80	19.61	-69.23	75.55
Financial development	%	389	65.44	33.09	14.06	192.24
Health expenditure	%	190	3.69	1.83	1.60	9.89
Human Development index	-	290	0.72	0.13	0.39	0.89
Rule of law	-	210	0.18	0.54	-1.05	0.96
Control for corruption	-	210	0.10	0.67	-1.50	1.57
Political stability	-	210	-0.14	0.98	-2.81	1.22

Table 8 Descriptive Statistics (High-Income Country)

Variables	Unit	Obs.	Mean	SD	Min	Max
Life insurance penetration	%	241	346.28	364.23	1.58	1825.87
Life insurance density	USD/Capita	241	2,290.48	8,421.17	10.47	112,843.00
Life expectancy	Years	273	78.25	3.55	68.21	84.93
Aged dependency ratio	%	280	11.53	9.26	0.80	47.12
Education	Years	180	10.03	1.99	5.40	13.00
Urbanization	%	280	3.13	3.22	-1.47	17.76
Income	USD/Capita	278	130,446	922,336	9,757	13,600,000
Inflation	%	240	8.34	35.04	-4.86	373.22
Real interest rate	%	152	3.38	6.28	-18.30	43.34
Gross domestic savings	%	242	38.92	15.81	10.91	75.55
Financial development	%	265	120.30	79.47	14.56	400.41
Health expenditure	%	95	5.06	2.74	1.60	10.95
Human Development index	-	180	0.85	0.05	0.72	0.95
Rule of law	-	147	1.06	0.46	-0.04	1.88
Control for corruption	-	147	1.22	0.58	-0.06	2.33
Political stability	-	147	0.67	0.80	-1.63	1.62

Table 9 Descriptive Statistics (High-Aged Dependency Ratio Country)

Variables	Unit	Obs.	Mean	SD	Min	Max
Life insurance penetration	%	253	394.05	356.04	0.03	1825.87
Life insurance density	USD/Capita	253	2,026.64	8,235.95	0.00	112,843.00
Life expectancy	Years	273	75.61	5.05	64.43	84.93
Aged dependency ratio	%	280	14.24	7.37	6.51	47.12
Education	Years	210	9.70	2.30	4.60	13.00
Urbanization	%	280	1.93	1.35	-0.20	6.13
Income	USD/Capita	280	108,129	921,088	899	13,600,000
Inflation	%	271	9.40	33.01	-4.01	373.22
Real interest rate	%	183	3.71	3.59	-10.25	15.12
Gross domestic saving	%	279	29.28	8.63	10.91	51.09
Financial development	%	268	120.83	82.13	19.58	400.41
Health expenditure	%	114	5.60	2.15	3.03	10.95
Human Development index	-	210	0.78	0.11	0.50	0.95
Rule of law	-	147	0.64	0.72	-0.64	1.86
Control for corruption	-	147	0.51	0.82	-0.61	1.96
Political stability	-	147	-0.13	0.92	-1.90	1.34

Table 10 Result of Hausman test

Model 1 (1)

	Coefficients (b) ModelP1	(B) ModelP1re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
LIFEEXP	**10.52364**	**8.91755**	**1.606092**	**.605192**
AD	**-3.549729**	**.6185014**	**-4.16823**	**.6770801**
URB	**-1.602943**	**-1.914255**	**.3113125**	**.2005224**
IN	**-.000308**	**-.00059**	**.000282**	**.0001514**
CPI	**-.8151676**	**-.5942665**	**-.2209011**	**.0776372**
REAL	**-.2533714**	**-.1311691**	**-.1222023**	**.0497714**
GDS	**.2140678**	**.2411284**	**-.0270606**	**.2004571**
FD	**-.0318869**	**.1630697**	**-.1949566**	**.0814825**
HEXP	**-.5693313**	**-7.527283**	**6.957951**	**1.586152**
RUL	**-2.7238**	**28.96465**	**-31.68845**	**7.157764**
POL	**2.754279**	**1.554734**	**1.199544**	**1.797104**

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(**10**) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= **88.08**
Prob>chi2 = **0.0000**

Model 1 (2)

	Coefficients (b) ModelP2	(B) ModelP2re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
AD	**-1.559559**	**1.870022**	**-3.42958**	**.6460306**
EDU	**7.752984**	**8.318497**	**-.5655127**	**1.747836**
URB	**-2.1724**	**-2.413098**	**.2406973**	**.2347541**
IN	**-.0001908**	**-.0004454**	**.0002546**	**.0001737**
CPI	**-.7952295**	**-.6239612**	**-.1712683**	**.0760876**
REAL	**-.1344074**	**-.0502772**	**-.0841301**	**.0479436**
GDS	**.6973278**	**.6594276**	**.0379002**	**.2118492**
FD	**.2315772**	**.3558427**	**-.1242656**	**.0969928**
HEXP	**-.6285004**	**-7.214529**	**6.586029**	**1.590811**
RUL	**-3.544734**	**28.96623**	**-32.51097**	**7.28093**
POL	**5.131955**	**4.437545**	**.6944101**	**1.821288**

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(**10**) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= **72.35**
Prob>chi2 = **0.0000**

Model 1 (3)

	Coefficients (b) ModelP3	(B) ModelP3re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
AD	-2.411579	.5398047	-2.951383	.
URB	-2.252587	-2.43727	.1846829	.
IN	-.0004884	-.0004232	-.0000652	.
CPI	-.9192982	-.820931	-.0983672	.
REAL	-.1422783	-.0958431	-.0464351	.
GDS	.4813903	.2849365	.1964538	.
FD	-.1498738	.0873347	-.2372085	.0098958
HEXP	-.3699251	-5.917071	5.547146	.
HDI	438.7178	388.4807	50.23703	.
POL	.1497833	4.310176	-4.160393	.

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(9) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 29.17
Prob>chi2 = 0.0006

Model 1 (4)

	Coefficients (b) ModelP4	(B) ModelP4re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
LIFEEXP	10.52206	9.248749	1.273306	.5243346
AD	-3.613548	-.4581506	-3.155397	.6151989
URB	-1.555056	-1.776582	.2215259	.175531
IN	-.0003495	-.0004102	.0000606	.0001268
CPI	-.7887662	-.6273571	-.1614091	.0698423
REAL	-.241991	-.1405875	-.1014035	.0449966
GDS	.2739103	.2692189	.0046914	.18313
FD	-.0410257	.1627042	-.2037299	.0659244
HEXP	-.3645302	-5.705272	5.340742	1.425689
CC	3.493703	14.99873	-11.50503	4.132294
POL	1.59833	2.883315	-1.284985	1.336301

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(10) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 65.00
Prob>chi2 = 0.0000

Model 2 (5)

	Coefficients (b) ModelD1	(B) ModelD1re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
LIFEEXP	26.1359	20.45531	5.68059	.
AD	-17.24578	.7340022	-17.97978	1.617228
URB	-6.900158	-9.374403	2.474245	.
IN	.0233198	.0211335	.0021863	.
CPI	-3.28151	-2.081101	-1.200409	.
REAL	-.5917206	.1016442	-.6933649	.
GDS	-9.620477	-9.028528	-.5919491	.
FD	-.1428461	.2440262	-.3868723	.1689514
HEXP	83.83908	52.0787	31.76038	.
RUL	-101.3628	14.10433	-115.4671	16.4346
POL	50.59442	43.51483	7.079591	.

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(10) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 110.51
Prob>chi2 = 0.0000

Model 2 (6)

	Coefficients (b) ModelD2	(B) ModelD2re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
AD	-11.67584	4.571248	-16.24708	1.518455
EDU	2.775649	10.71866	-7.943008	3.555906
URB	-7.750251	-10.40014	2.649892	.
IN	.0240602	.0215964	.0024638	.
CPI	-2.969706	-1.946815	-1.022891	.
REAL	-.1744979	.388898	-.5633959	.
GDS	-8.587492	-8.094679	-.4928129	.
FD	.8416255	.8286601	.0129655	.3028142
HEXP	86.60354	53.44273	33.16081	.
RUL	-104.8077	22.62876	-127.4364	17.89648
POL	54.23833	48.52328	5.715053	.

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(10) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 201.38
Prob>chi2 = 0.0000

Model 2 (7)

	Coefficients (b) ModelD3	(B) ModelD3re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
AD	-13.51479	3.414725	-16.92952	2.986935
URB	-7.790384	-10.32613	2.535746	1.031911
IN	.0224707	.0215221	.0009486	.0007219
CPI	-3.045099	-2.15739	-.8877097	.3717615
REAL	-.1593842	.3367947	-.4961789	.2136039
GDS	-8.212077	-8.563245	.3511684	.8943224
FD	-.19143	.511277	-.702707	.426962
HEXP	86.85114	54.14331	32.70784	7.247287
HDI	679.6493	498.1554	181.4939	163.9174
POL	30.01878	46.38145	-16.36267	8.9404

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(9) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 54.24
Prob>chi2 = 0.0000

Model 2 (8)

	Coefficients (b) ModelD4	(B) ModelD4re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
LIFEEXP	26.51906	19.22991	7.289154	.
AD	-15.8158	6.570918	-22.38672	1.791026
URB	-7.521258	-10.83188	3.310617	.
IN	.0228979	.0210805	.0018174	.
CPI	-3.55584	-1.899738	-1.656102	.
REAL	-.7465396	.259003	-1.005543	.
GDS	-10.21171	-9.31474	-.8969682	.
FD	-.3631804	.4691703	-.8323508	.065458
HEXP	80.67654	40.95968	39.71686	.
CC	-98.90906	-16.51589	-82.39317	.
POL	51.10044	56.35488	-5.254435	.

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(10) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 1023.02
Prob>chi2 = 0.0000

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