DOKUZ EYLÜL UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS (ENGLISH)
ECONOMICS (ENGLISH) PROGRAM
MASTER'S THESIS

DETERMINANTS OF INSURANCE DEMAND: CROSS-COUNTRY PANEL DATA ANALYSIS

Hasan ÇELİK

Supervisor
Prof. Dr. Evrim TURGUTLU

İZMİR - 2018

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DECLARATION

I hereby declare that this master's thesis titled as "Determinants of Insurance Demand: Cross-Country Panel Data Analysis" has been written by myself in accordance with the academic rules and ethical conduct. I also declare that all materials benefited in this thesis consist of the mentioned resources in the reference list. I verify all these with my honour.

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ABSTRACT

Master's Thesis

Determinants of Insurance Demand:

Cross-Country Panel Data Analysis

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Dokuz Eylül University

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Department of Economics (English)

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The demand of life and non-life insurance is analyzed in the study. The study covers 1996-2014 period for life insurance and 1996-2015 period for non-life insurance. Insurance premium data are utilized from Swiss Re. Data of other variables are imported from World Bank. Research question is based on "Are there any significant differences between insurance demand patterns of developed and developing countries?" Static panel data analysis method is used to analyze the effects of variables on the insurance demand. 26 developed countries and 36 developing countries, also 33 high income countries and 29 middle income countries are selected for the study. The results imply that both life and non-life insurance have positive income elasticity of demand. The findings of the study also provide evidence towards the positive impact of female labor force participation on insurance demand.

Keywords: Life Insurance Demand, Non-Life Insurance Demand, Macroeconomic and Financial Factors, Demographic Factors, Development Factors, Static Panel Data Analysis.

ÖZET

Yüksek Lisans Tezi

Sigorta Sektörünün Belirleyenleri:

Ülkeler Arası Panel Veri Analizi

Hasan ÇELİK

Dokuz Eylül Üniversitesi

Sosyal Bilimler Enstitüsü

İngilizce İktisat Anabilim Dalı

İngilizce İktisat Programı

Çalışmada hayat ve hayat dışı sigortanın talebi analiz edilmiştir. Çalışma, hayat sigortası için 1996-2014 dönemini ve hayat dışı sigorta için 1996-2015 dönemini kapsamaktadır. Sigorta primi verileri Swiss Re şirketinden, diğer değişkenlerin verileri ise Dünya Bankası'ndan alınmıştır. Araştırma sorusu "Gelişmiş ve gelişmekte olan ülkelerin sigorta talep yapısı arasında önemli farklılıklar bulunmakta mıdır?" sorusuna dayanmaktadır. Statik panel veri analizi yöntemi, değişkenlerin sigorta talebi üzerindeki etkisini analiz etmek için kullanılmıştır. Çalışma için 26 gelişmiş ülke ve 36 gelişmekte olan ülke, aynı zamanda 33 yüksek gelirli ülke ve 29 orta gelirli ülke seçilmiştir. Sonuçlar, hayat ve hayat-dışı sigorta talebinin gelir esnekliğinin pozitif olduğunu, özellikle kadın işgücüne katılımının sigorta talebi üzerinde olumlu etkiye sahip olduğunu ortaya koymaktadır.

Anahtar Kelimeler: Hayat Sigortası Talebi, Hayat Dışı Sigorta Talebi, Makroekonomik ve Finansal Faktörler, Demografik Faktörler, Kalkınma Faktörleri, Statik Panel Veri Analizi.

DETERMINANTS OF INSURANCE DEMAND:

CROSS-COUNTRY PANEL DATA ANALYSIS

CONTENTS

CHAPTER THREE

EMPIRICAL ANALYSES AND RESULTS

ABBREVIATIONS

app.	Appendix
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
IMF	International Monetary Fund
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
p.	Page Number
UNCTAD	United Nations Conference on Trade and Development
US	United States of America

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INTRODUCTION

World economy has been growing since half of the twentieth century. Insurance sector growth rate has been increasing at the same time parallel to this change. As an intermediary of financial sector, insurance is gaining importance for both risk aversion and revenue generation purposes. Insurance has a critical role for financial and reel sectors. This sector gauges economic development through supporting savings and hence investments. Moreover, provision of security against risk and uncertainty, and risk diversion facilities increase the demand for insurance by both firms and households.

Insurance demand follows a different pattern in developed and developing economies. Banking is the dominant and most widely used financial intermediation tool in many of the world economies whereas insurance demand is significantly higher in developed countries. The major financial intermediary in many of the developing economies is banking. Social, cultural and economic differences among these economies are the basic source of financial intermediation preferences. Hence, studying the differences between insurance demand of developed and developing economies and the factors that build these differences become an important research area.

Table 1: Insurance Sectors in Selected Developed and Developing Economies (2014 Year)

	Countries	Premium Density ($)		Premium Penetration (%)		GDP Per Capita ($)	GDP Growth Rate
		Life	Non-Life	Life	Non-Life		
Developed Economies	UK	3213	1041	7.51	2.43	37415	3.1
	USA	1534	2137	3.05	4.25	46775	2.6
	France	2383	1229	6.02	3.10	38161	0.9
	Spain	654	762	2.39	2.78	27167	1.4
	Japan	2648	818	7.74	2.39	42799	0.4
Developing Economies	Brazil	201	190	1.83	1.73	10930	0.5
	Russia	18	147	0.13	1.12	10586	0.7
	China	118	101	1.69	1.44	5626	7.3
	Turkey	17	119	0.15	1.08	12261	5.2
	Nigeria	2	6	0.09	0.22	2360	6.3

Source: Sigma Re and World Bank. Premium density is the life insurance premium divided by population. Premium penetration is the life insurance premium divided by GDP. All data belong to year-end. Data is inflation-adjusted with United States consumer price index base year 2010.

Table 1 provides information about insurance sectors in selected developed and developing economies. Developed countries have improved on both life and non-life insurance for many years in contrast with developing countries. Also, developed countries have comparative advantage on life insurance demand in contrast with non-life insurance demand. On other side, developing countries have comparative advantage on non-life insurance as against life insurance demand.

Economic and demographic factors have critical role in determining insurance demand. The most frequently used economic factors in the literature are GDP per capita, interest rate, and deposit money banks' assets to GDP. Demographic factors vary for life insurance demand and non-life insurance demand. Age dependency ratio, life expectancy, population growth rate, urban population, health expenditure and labor force participation rate are used only to estimate life insurance demand. Urban population and labor force participation rates are used for non-life insurance demand.

This study has basically two research questions: Are there any significant differences between life insurance and non-life insurance demand patterns of developed and developing economies? Second, are there any significant differences between life and non-life insurance demand structures of high income and middle income countries?

This study has three contributions to the existing literature: First, this study covers 26 developed and 36 developing economies and focus on 1996-2015 period. This is the largest most update data set. Moreover, following the World Bank's classification, this study focuses on the differences between the life and non-life insurance demand in high and middle income countries. To the author's bets knowledge this is the first study on insurance demand based on this distinction.

Second, many studies have used same economic and demographic variables, such as GDP per capita, interest rate, urbanization. But, rarely used variable is working woman. This variable measures the importance of female labor force participation on insurance demand. Also, global financial crisis is rarely used. This study also controls the effect of recent global financial crisis on insurance demand.

Third contribution is that different from many existing studies, this study focuses on both life and non-life insurance demand. Moreover, it employs both insurance density and insurance penetration as proxies for insurance demand.

This study is restricted with 19 years for life insurance and 20 years for non-life insurance. Many countries has been eliminated for deficient and discontinuous data and lastly 62 countries remained to estimate well econometric models. Panel data techniques are used to carry out the insurance demand analysis.

The rest of the study is organized as follows: Literature survey is presented in chapter one. Then, chapter two covers definitions, data, methodology and hypothesis. Empirical analysis and results are provided in chapter three. The last chapter is devoted to conclusion.

CHAPTER ONE
LITERATURE SURVEY

1.1. THEORETICAL FRAMEWORK

Theoretical literature in the life insurance demand was first explained by Modigliani and Brumberg (1954). After than, Friedman (1957) formulated permanent income theory, which is that consumption and saving preferences determined future expectation of long term income and also by current income. Households buy insurance for guarantee against future potential income and so they keep stable income and other events during life time.

Yaari (1965) explain life insurance demand via the life cycle hypothesis; which cycle is consisting youth, working life and retirement. Life insurance demand determined with interest rate, wealth, expected income during lifetime, life insurance price and subjective discount rate for current over future consumption according to Yaari (1965).

Pissarides (1980) extend Yaari's study and made another viewpoint to the lifetime income. Bequest and consumption smoothing have analyzed the insurance demand. Then, Karni and Zilcha (1986) add to existing model that calculation of risk aversion.

Campbell (1980), Lewis (1989) and Bernheim (1991) contribute to the theoretical literature for developing the economics of risk and uncertainty. (Sen and Madheswaran 2013:2)

The general approach for insurance demand theory is related to some variables, which are per capita income, financial market structure, interest rate, inflation, income, dependents number, death risk, saving, future and current consumption, regulatory level, religion, cultural and political many differences.

1.2. LIFE INSURANCE DEMAND

Many empirical studies examined various determinant factors of life insurance. Demographic, personal and economic factors have founded to determine this issue using various methodology, period and countries. Then, Hammond et al (1967) examined with household survey data for year 1952 and 1961, separately. They found that income, net worth holdings and stage in the life cycle of the household and education and occupation of the household head are generally determined to be significantly related to premium expenditures.

Beenstock et al (1986) examined OECD countries for 1970-1981 years. They found negative relationship between with Gini coefficient and life insurance demand. Psychographic traits and demographic traits were analyzed by Burnett and Palmer (1984). Negative relationship between insurance demand and Social Security were explained by Levis (1989). Fitzgerald (1987) found that Social Security survivor benefits of the husband are negatively significant with life insurance purchases for husband.

Truett and Truett (1990) analyzed that the relationship between the economic growth and insurance demand for Mexico and USA countries, which covers 1960-1982 and 1964-1979 years separately and respectively. Findings showed that age, education and income impact the demand for life insurance. Bernheim (1991) viewed over wealth and income to research the demand of insurance. However, he found that bequest motive and saving relationship are positive with each other.

Browne and Kim (1993) analyzed for 45 countries, 1980 and 1987 years separately. They found that life insurance positively related with income, dependency ratio, and government spending on Social Security. Inflation, and religion have significantly unfavorable effect on life insurance demand. Gandolfi and Miners (1996) examined woman and man insurance demand patterns. They found that insurance demands of husbands and wives are significantly difference from each other.

Outreville (1996) analyzed for 1986 year and 48 developing countries. There are found that positive relationship between with life insurance development and income, and level of financial development.

Chen et al (2001) researched age and cohort effects for man and woman. Results showed that men have a strong age effect and a strong negative cohort effect, while women have strong positive cohort effect. Ward and Zurbruegg (2002) analyzed the effect of civil rights and political stability on the insurance demand over 1987-1998 years. They showed that improved civil rights and political stability lead to an increase in the consumption of life insurance, both in the Asian and OECD regions.

Hwang and Gao (2003) investigated chinese people demand in terms of income and insurance relationship. The main factors which have influenced people in China to purchase life insurance products are directly associated with the successful economic reform leading people to progress to higher layers of economic security, the increase in the level of education and the change in social structure. Beck and Webb (2003) analyzed that insurance consumption for the 1961-2000 years and 68 countries. This study suggested that even if life insurance was a luxury good, the demand for life insurance would still, not be significantly in influenced by the income distribution. Zietz (2003) and Hussels et al (2005) introduced the literature review the nearly past 50 years for life and non-life insurance demand determinants.

Li et al (2007) examined the relationship with income and insurance demand for OECD countries and over 1993-2000 years. This study resulted that a significant positive income elasticity of demand for life insurance exists and demand is dependent on the number of dependents and level of education but falls with life expectancy and Social Security expenditure. Haiss and Sümegi(2008) researched insurance demand for 29 European countries. They found a larger impact for liability insurance for the New EU Member States from Central and Eastern Europe. Furthermore, findings emphasis the impact of the real interest rate and the level of economic development on the insurance-growth nexus.

Chui and Kwok (2008) researched the effect of individualism. This has significant and positive effect on life insurance consumption; whereas power distance and masculinity or femininity have significantly negative effects.

Zheng et al (2009) studied insurance growth level for 1980-2007 and 95 countries. They found that relative level of insurance growth in developed markets has decreased as compared with in developing markets.

Kakar and Shukla (2010) studied for India insurance demand. They found that both the level of education and occupation of the chief earner of a household are major determinants of life insurance participation, apart from asset-ownership. Further, households that are more optimistic about the adequacy of future income and savings show higher levels of participation.

Kjosevski (2012) researched demand of insurance for Eastern Europe. Findings showed that real interest rates, ratio of quasi-money, young dependency ratio, old dependency ratio control of corruption and government effectiveness do not appear to be robustly associated with life insurance demand.

Malaysia insurance demand were researched by Mahdzan and Victorian (2013). Findings indicated that savings motives significantly related to life insurance demand.

Lee et al (2013) analyzed risk factors on the life and non-life insurance for 1984-2009 years and 39 countries. This study showed that the income elasticity of insurance demand decreases with the diminish in economic risk in both income groups. Low income countries have elastic demand of insurance demand with increases political risk, whereas high income countries have inelastic demand.

Studies in recent years such as Sen and Madheswaran (2013), Sliwinski et al (2013), Zerriaa and Noubbigh (2016) researched effects of financial markets and instruments.

Alhassan and Biekpe (2016) researched insurance demand for African countries. They found that financial development, health expenditure and institutional quality have positive impacts on life insurance consumption while income, inflation, dependency ratio and life expectancy have negative impacts in life insurance consumption in Africa. Also, Zerriaa and Noubbigh (2016) examined the effect of life insurance demand on Middle East and North Africa countries. Results indicated that the country's level of financial development enhances life insurance sales; whereas Social Security expenditures dampen them. Life expectancy and educational attainment appear to stimulate life insurance demand, whereas young dependency tends to decrease consumption. Urbanization does not appear to influence life insurance demand.

Ondruska et al (2016) made a survey in Slovak Republic. They found that demographic indicators - such as age, education and economic indicators - savings and employment status are the most robust predictors of the life insurance consumption. The understanding of consumers who buy and do not buy private insurance is crucial also for policymakers that could easier target state programs and other forms of Social Security schemes. Lin et al (2017) analyzed Taiwan insurance demand. Study showed that people with high financial literacy are more likely to purchase life insurance and that consultations with financial advisors and conversations with family members and friends are both positively associated with the demand for life insurance.

Zerriaa et al (2017) researched insurance demand in Tunus. Life insurance demand increases with income and financial development. However, other economic variables such as inflation and interest rate do not seem to influence life insurance consumption in Tunisia. Socio-demographic variables such as dependency, life expectancy at birth and the country's level of urbanization stimulate life insurance demand, while the level of education dampens it.

Dragos et al (2017) examined the effect of government indicators on Europe Countries. They found that the sound legal environment of developed countries, where the level of the rule of law is very homogeneous and very high, makes it non-significant for life insurance demand. For developing countries the enforceability of contracts, the independence of justice and the time efficiency of the judicial process positively influence the decision of citizens to buy life insurance contracts.

Many of the existing studies and their detailed findings are summarized in Appendix 1 - 2.

1.3. NON-LIFE INSURANCE DEMAND

Non-life insurance literature is narrow extensive than life insurance demand literature. The first paper is Beenstock et al (1988). They estimated two models from different datasets, which is first apply for cross-section analysis covering 12 countries, and then apply for 45 countries and 1981 year. They estimated relationships between the property-liability insurance and gross national product, interest rate and income. They found that property-liability insurance is a superior good and is disproportionately represented in economic growth and premiums vary directly with real rates of interest.

Outreville (1990) analyzed that property-liability demand for income and M2/GDP, which samples of 1983, 1984 and cross-section of 55 countries. There are positive correlation with income. The study' result is that the economic importance of the insurance sector is still low when considering the share of total premiums generated in developing countries.

Browne et al (2000) estimated that the relationship between with motor vehicle premium density, general liability premium density and and income for OECD countries over the between 1986 and 1993 years. Economic conditions affect the demand for insurance differently across lines of coverage. In particular, income has a far greater effect on motor vehicle insurance consumption than on general liability insurance consumption. Several factors are important in explaining the purchase of both kinds of insurance. These factors include income, wealth, the percent of a country's insurance market controlled by foreign firms and the form of the legal system in the country.

Study of Esho et al (2004) analyzed 44 countries for 1984-1988 years. The study examined property-liability income and the strength of the property rights in a country. The purchase of property-liability is significantly and positively related to loss probability and income, as well as providing weaker evidence of a negative relationship with price.

Arena (2008) examined for 1976-2004 period and 55 countries. The study found that both life and non-life insurance have a positive and significant causal effect on economic growth. For life insurance, high-income countries drive the results, and for non-life insurance, both high-income and developing countries drive the results.

Zheng et al (2009) studied insurance growth level for 1980-2007 period and 95 countries. They found that relative level of insurance growth in developed markets has decreased as compared with in developing markets.

Millo and Carmeci(2011) researched Italian provinces for demand of non-life insurance. They found a significant and positive influence of income and wealth on insurance consumption, although both elasticities are much less than one. High interest rates are found to depress non-life insurance consumption, arguably by raising the cost of borrowing and thus the opportunity cost of insuring against self-insuring.

Lee et al (2013) examined country risk effects for insurance demand. This paper showed that the income elasticity of insurance demand decreases when country risks diminish. The elasticity diminishes in general when economic risk drops. When political risk is lower, the elasticity decreases in countries with high-income, common law origin, and insurance activities permitted by banks, whereas a clear pattern cannot be identified in the case of financial risk.

Millo (2016) analyzed relationship between non-life insurance demand and income for 1970-2010 years and 95 countries. The evidence of a co-integrating relationship between non-life insurance consumption and income with a coefficient not different from one. This means that world insurance markets tend, on average, to grow in line with the general economy, reacting in a less than proportional way to income shocks in the short run but then reverting to its long-run path according to an error-correction mechanism.

Many of the existing studies and their detailed findings are summarized in Appendix 3.

CHAPTER TWO
DEFINITIONS, DATA, METHODOLOGY AND HYPOTHESIS

2.1. DEFINITIONS AND DATA

The study takes in 1996-2014 period for life insurance demand analysis and 1996-2015 period for non-life insurance demand analysis. Insurance premium data are utilized from *Swiss Re* [1]. Data of other variables are imported from World Bank.

Dependent variables are logarithm of life insurance density, logarithm of non-life insurance density, logarithm of life insurance penetration and logarithm of non-life insurance penetration which are estimated separately for measure different effects of independent variables. Different factors which effect the insurance demand are used as independent variables. Macroeconomic, financial, demographic and development factors are selected according to insurance type. However, global financial crisis dummy used to measure that the effect of 2008 and after years on insurance demand.

Independent variables which used to estimate life insurance demand are as follows: GDP per capita and interest rate as macroeconomic variables; deposit money banks' assets to GDP as a financial variable; age dependency ratio, population growth rate and life expectancy as demographic variables; urbanization, labor force participation rate and health expenditure as development variables.

Independent variables which used to estimate non-life insurance demand are as follows: GDP per capita and interest rate as macroeconomic variables; deposit money banks' assets to GDP as a financial variable; urbanization and labor force participation rate as development variables. Age dependency ratio, population growth rate, life expectancy and health expenditure are not used to the estimation of non-life insurance. These are not entirely relevant with non-life insurance demand.

Definitions of variables are as follows:

- Life insurance density is the life insurance premium divided by population. In similar way, non-life insurance density is the non-life insurance premium divided by population. Data is inflation-adjusted with United States consumer price index

[1] "Source: Swiss Re, sigma database. All rights reserved."

base year 2010.

- Life insurance penetration is the life insurance premium divided by GDP. Similarly, non-life insurance penetration is the the non-life insurance premium divided by GDP.
- GDP per capita is gross domestic product divided by midyear population. Data is inflation-adjusted with United States consumer price index base year 2010.
- Four different interest rates are used in the study. Definitions of these interest rates are as follows: *Government bond interest rate* is the borrowing rate issued 10 years debt with government securities by the government. *Real interest rate* is the lending interest rate adjusted for inflation as measured by the GDP deflator. *Lending rate* is the bank rate that usually meets the short- and medium-term financing needs of the private sector. *Monetary policy interest rate* is the rate of buying or selling government bonds by the monetary authority of country. Government bond interest rate is used for developed countries apart from Bulgaria, Croatia, Czech Republic, Estonia, Hungary and Romania; whereas real interest rate is used for these except countries. Lending interest rate are used for developing countries except that Turkey. Monetary policy interest rate is used for Turkey.
- Deposit money banks' assets to GDP are claims on domestic real non-financial sector by deposit money banks as a share of GDP.
- Urban population refers to people living in urban areas as defined by national statistical offices.
- Labor force participation rate is the proportion of the female population ages 15 and older that is economically active to all female who supply labor for the production of goods and services during a specified period.
- Health expenditure is the sum of public and private health expenditure. It covers the provision of health services (preventive and curative), family planning activities, nutrition activities and emergency aid designated for health but does not include provision of water and sanitation.
- Age dependency ratio is the ratio of dependents (people younger than 15 or older than 64) to the working-age population (those ages 15-64).

- Population growth rate (annual) for year t is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage.
- Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.
- Global financial crisis dummy is numerated with 1 for 2007 and after years, 0 for other years.

Two different classifications are applied for compare that results of groups. First classification is United Nations country classification 2017 year. Other classification is World Bank analytical classification by income 2018 fiscal year. United Nations classification separates countries to developed countries and developing countries. Russian Federation, normally classed in transition countries, classed in developing countries for adapt only two groups in the study. World Bank classification collects countries to four groups, which are low income countries, lower-middle income countries, upper-middle income countries and high income countries. High income countries (GDP per capita 12236 US$ and more) and middle income countries (GDP per capita between 1006 US$ and 12235 US$) are selected to adjust data. Lower-middle income countries and upper-middle income countries are linked together middle income countries to make easier the results.

26 developed countries and 36 developing countries, also 33 high income countries and 29 middle income countries are selected for the study.

In the study, four models are estimated separately for life insurance demand and non-life insurance demand. Therefore, logarithm of life insurance density and logarithm of life insurance penetration are used separately as a dependent variable for estimate life insurance demand. Likewise, logarithm of non-life insurance density and logarithm of non-life insurance penetration are used separately as a dependent variable for estimate non-life insurance demand.

Life insurance density, non-life insurance density, life insurance penetration, non-life insurance penetration and GDP per capita are used with own logarithm in the all models. These logarithms make linearity in the data. So that, dynamics variables ensure for the estimation of elasticities. Past effects of parameters can be observe in future.

Four models are used to estimate both life insurance demand and non-life insurance demand, separately. *Logarithm of life insurance density* and *logarithm of non-life insurance density* are employed as a dependent variable for life insurance demand and non-life insurance demand, respectively.

First model includes just *loggdppc* for life and non-life insurance demand. Second model contains *loggdppc* and *int* for life and non-life insurance demand. Third model contains *loggdppc*, *int*, *bankgdp*, *urb*, *femlab* for life and non-life insurance demand; however third model contains *health*, *depen*, *pop*, *lifeexp* for only life insurance demand. Fourth model comprise third model plus *crisis* for life and non-life insurance demand.

Description of variables which are used in econometric models are as follows:

logprempc: Logarithm of life or non-life insurance density (Logarithm of life or non-life insurance premium / population) (constant 2010 US$)

logpremgdp: Logarithm of life or non-life insurance penetration (Logarithm of life or non-life insurance premium / GDP) (%)

loggdppc: Logarithm of GDP per capita (constant 2010 US$)

int: Interest rate (Government bonds interest rate, Lending interest rate, Real interest rate, Monetary policy interest rate)

bankgdp: Deposit money banks' assets (% of GDP)

urb: Urban population ratio (% of total population)

femlab: Labor force participation rate of female (% of female population ages 15+)

health: Health expenditure (% of GDP)

depen: Age dependency ratio (% of working-age population)

pop: Population growth rate (annual %)

lifeexp: Life expectancy (years)

crisis: Global financial crisis dummy (2007 and later years=1, other years=0)

2.2. METHODOLOGY

Static panel data method are used to analyze the effects of variables on the insurance demand. "That is why, examine within-country differences to determine whether there are any transitory or persistence effects within the life market from previous life insurance consumption" (Ward and Zurbruegg 2002: 11).

$$y_{i,t} = \alpha_i + \beta_{i,t} x_{i,t} + u_{i,t} \tag{1}$$

where *yit* is a dependent variable, *a t* represents the time-specific intercept, *xit* is a vector of independent variables, *uit* is a scalar disturbance term, *i* indexes country in a cross section and *t* indexes time measured in years (Kjosevski 2012: 6).

The econometric software Stata - 14 used for calculations. Both fixed-effects model and random-effects model are used for estimation. Then, the Hausman test employed to choose between the fixed effects and random effects. Null hypothesis is that accept the random-effects model in Hausman test. Alternative hypothesis is that accept the fixed-effects model in Hausman specification test. The econometric model which is decided hypothesis is used in result tables.

2.3. HYPOTHESIS

Ten hypothesis are tested in the study.

Hypothesis 1: GDP per capita has a positive and significant effect on both life and non-life insurance demand.

Hypothesis 2: Interest rate has a negative impact on insurance demand.

Hypothesis 3: Bank based economies have greater effect on insurance demand.

Hypothesis 4: Urbanization has a positive impact on insurance demand.

Hypothesis 5: Labor force participation rate of female has a positive effect on insurance demand.

Hypothesis 6: There is a trade-off between life insurance demand and health expenditure.

Hypothesis 7: Dependency ratio effects negatively life insurance demand.

Hypothesis 8: Population growth has a negative impact on insurance demand.

Hypothesis 9: Life expectancy has a positive effect on life insurance demand.

Hypothesis 10: The insurance demand had raised after global financial crisis.

CHAPTER THREE
EMPIRICAL ANALYSIS AND RESULTS

Tables 3 - 10 present the empirical results. Eight models are estimated separately for two insurance types and four country groups in tables 3 - 10. In tables, eight models are estimated separately for the logarithm of life and non-life insurance density and the logarithm of life and non-life insurance penetration as dependent variable. Each model includes one or more independent variables that explore the relationship with insurance demand.

Table 2: Estimated Econometric Models

Insurance Demand Type	Dependent Variable	Developed Countries	Developing Countries	High-Income Countries	Middle-Income Countries
Life Insurance Demand	logprempc	Table 3	Table 4	Table 5	Table 6
	logpremgdp	Table 3	Table 4	Table 5	Table 6
Non-Life Insurance Demand	logprempc	Table 7	Table 8	Table 9	Table 10
	logpremgdp	Table 7	Table 8	Table 9	Table 10

Note: loprempc: Logarithm of per capita insurance premium,
lopremgdp: Logarithm of ratio that insurance premium to GDP.

3.1. LIFE INSURANCE DEMAND

3.1.1. Life Insurance Demand for Developed Countries

Table 3: Econometric Models of Life Insurance Demand for Developed Countries

	logprempc				logpremgdp			
	1	2	3	4	1	2	3	4
loggdppc	1.21*	1.19*	2.9*	3.1*	.6*	.75*	1.2*	1.1*
	(4.67)	(4.59)	(14)	(15)	(3.81)	(5.77)	(8.3)	(7.4)
int		.003**	.004*	.004*		.004*	.004*	.004*
		(1.99)	(4.5)	(4.6)		(4.16)	(5.5)	(5.5)
bankgdp			.0009*	.0008*			.0005*	.0006*
			(4)	(3.5)			(2.6)	(2.9)
urb			-.003	-.005			-.007**	-.006***
			(-.81)	(-1.2)			(-2.1)	(-1.8)
femlab			.0009	.003			.006	.005
			(.13)	(.52)			(1.1)	(.84)
health			.01***	.01			.002	.003
			(1.8)	(1.6)			(.33)	(.45)
depen			-.002	-.002			-.0005	-.0008
			(-.73)	(-.59)			(-.18)	(-.28)
pop			-.001	-.002			-.01	-.01
			(-.14)	(-.19)			(-1)	(-.98)
lifeexp			.11*	.09*			.04*	.05*
			(16)	(12)			(8.1)	(7.7)
crisis				.06*				-.03***
				(2.8)				(-1.9)
cons	-2.71**	-2.62**	-19*	-19*	-2.37*	-3.09*	-8.7*	-8.9*
	(-2.3)	(-2.23)	(-17)	(-16)	(-3.32)	(-5.18)	(-10)	(-11)
N	494	494	494	494	494	494	494	494
R-square	0.7386	0.7379	0.7887	0.7926	0.4834	0.4831	0.5379	0.5355
F-statistics	21.77	12.94	119.48	109.99	14.55			
F-stat d.f.	1,467	2,466	9,459	10,458	1,467			
Hausman	0.0017	0.0061	0.0022	0.0120	0.0330	0.0827	0.9897	0.9923

Note: "*" , "**" and "***" indicate statistical significance at the 1%, 5% and 10% levels, respectively. t-values are given in parentheses. Model which has F-Statistic value and also Hausman coefficient is smaller than one is fixed-effects model. Model which has not F-Statistic value and also Hausman coefficient is bigger than one is a random-effects model.

Developed countries consist Australia, Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, Portugal, Romania, Spain, Sweden, Switzerland, United Kingdom, and United States.

Dependent variable: Logarithm of life insurance density

Left side of table 3 shows econometric models which are estimated for logarithm of life insurance density as dependent variable for developed countries.

The effect of GDP per capita is positive on life insurance density. These coefficients are also significant and bigger than one in the overall analysis as expected in hypothesis. This suggest that a higher GDP per capita causes rising life insurance density. Developed countries have income elastic life insurance demand. This means that life insurance is a luxury good for developed countries. Life insurance demand changes a lot when GDP per capita changes. Contrary to expectations, interest rate has positive effect on life insurance density. Meanwhile, the coefficient of interest rate is significant and smaller than one in every regression. This positive coefficient effects investment of insurance companies. They make profit and thereby favorably impact the insurance demand because of higher profit. In the literature, Kjosevski (2012) and Zerriaa et al (2017) found that interest rate positively effects the insurance demand. The coefficient of assets of deposit money banks significantly positive and smaller than one on life insurance density.

Urbanization and labor force participation rate of female are statistically insignificant. These variables have no favorable impact on life insurance density. Also, health expenditure is significantly positive on life insurance density in one regression by which coefficient is bigger than one; whereas it is insignificant in another one regression.

Effects of age dependency ratio, and population growth rate are statistically insignificant on life insurance density. As expected in hypothesis, life expectancy has significantly positive impact on life insurance density. These coefficients are bigger than one.

As it is expected in hypothesis, global financial crisis has significantly positive impact on life insurance density. This suggests that the life insurance density increased after global financial crisis.

Dependent variable: Logarithm of life insurance penetration

Right side of table 3 shows econometric models which are estimated for logarithm of life insurance penetration as dependent variable for developed countries.

GDP per capita has significantly positive impact on life insurance penetration in the overall analysis as expected in hypothesis. Coefficients are smaller than one in two regressions and bigger than one in other two regressions. There are no accurate income elasticity of life insurance demand for developed countries. Life insurance demand may change more or less when GDP per capita changes. Interest rate has significantly positive effect on life insurance penetration. Also, the coefficient of interest rate is significant and smaller than one in every regression. This is not confirm the hypothesis. But, interest rate effects insurance demand by implicitly. Insurance firms invest with collected money and gain profit. So, high profit rates reflect to insurance purchasing behavior of people. Kjosevski (2012) and Zerriaa et al (2017) found same effect on insurance demand. The coefficient of assets of deposit money banks is significantly positive and bigger than one on life insurance penetration which it is expected.

As it is expected in hypothesis, urbanization has significantly positive effect on life insurance penetration by which coefficients are smaller than one. On the other hand, health expenditure and labor force participation rate of female are statistically insignificant.

Effects of age dependency ratio and population growth rate are negatively insignificant on life insurance penetration. However, life expectancy has a significantly positive impact on life insurance penetration as it is expected in hypothesis. Suggest that higher life expectancy raises the life insurance penetration by which coefficient is bigger than one.

Global financial crisis has significantly negative impact on life insurance penetration. This suggests that the life insurance penetration decreased after global financial crisis. This is not support the hypothesis.

3.1.2. Life Insurance Demand for Developing Countries

Table 4: Econometric Models of Life Insurance Demand for Developing Countries

	logprempc				logpremgdp			
	1	2	3	4	1	2	3	4
loggdppc	1.57*	1.64*	1.1*	1.1*	.14	.12	-.41*	-.33*
	(11.4)	(10.2)	(9.1)	(8.6)	(1.27)	(1.11)	(-3.2)	(-2.6)
int		-.004*	-.0003	-.0002		-.001**	.0008	.0006
		(-7.25)	(-.6)	(-.41)		(-2.2)	(1.6)	(1.3)
bankgdp			-.001**	-.001**			-.0004	-.0004
			(-2.3)	(-2.4)			(-.91)	(-.82)
urb			.01*	.01*			.01*	.01*
			(6.9)	(6.6)			(6.6)	(7)
femlab			.01*	.01**			.005	.009**
			(3.1)	(2.4)			(1.3)	(2.1)
health			-.01***	-.01***			-.02*	-.02*
			(-1.7)	(-1.7)			(-2.9)	(-2.9)
depen			-.01*	-.01*			-.001	-.004**
			(-7.7)	(-6.2)			(-.93)	(-2.2)
pop			-.01**	-.01*			-.03*	-.03*
			(-2.5)	(-2.6)			(-4.9)	(-4.9)
lifeexp			.03*	.02*			.01*	.02*
			(6.5)	(5.2)			(2.9)	(4)
crisis				.05*				-.07*
				(3.1)				(-3.9)
cons	-4.51*	-4.69*	-5.6*	-5.1*	-.735***	-.648	-.66	-1.4**
	(-8.33)	(-7.52)	(-10)	(-8.8)	(-1.66)	(-1.47)	(-1.2)	(-2.4)
N	684	684	684	684	684	684	684	684
R-square	.409	.431	.39	.38	.0274	.0466	.00085	.0036
F-statistics		84.8	123	113			21	21
F-stat d.f.		2,646	9,639	10,638			9,639	10,638
Hausman	0.0779	0.0010	0.0000	0.0019	0.6477	0.0764	0.0000	0.0003

Note: "*" , "**" and "***" indicate statistical significance at the 1%, 5% and 10% levels, respectively. t-values are given in parentheses. Model which has F-Statistic value and also Hausman coefficient is smaller than one is fixed-effects model. Model which has not F-Statistic value and also Hausman coefficient is bigger than one is a random-effects model.

Developing countries comprise Algeria, Argentina, Bahamas, Bahrain, Bangladesh, Brazil, Chile, China, Colombia, Costa Rica, Dominican Republic, Egypt, Guatemala, India, Indonesia, Israel, Kenya, Korea Republic, Kuwait, Lebanon, Malaysia, Mauritius, Mexico, Nigeria, Oman, Panama, Peru, Philippines, Russian Federation, Singapore, South Africa, Thailand, Trinidad and Tobago, Turkey, Uruguay, Venezuela.

Dependent variable: Logarithm of life insurance density

Left side of table 4 shows econometric models which are estimated for logarithm of life insurance density as dependent variable for developing countries.

As with hypothesis, GDP per capita has significantly positive impact on life insurance density by which coefficient is bigger than one in all regressions. Developing countries have income elastic life insurance demand. This implies that life insurance is a luxury good for developing countries. Life insurance demand changes a lot when GDP per capita changes. However, the effect of interest rate is significantly negative on life insurance density in one regression; whereas it is insignificant in other two regressions. The interest rate coefficient is smaller than one. In the meantime, the coefficient of assets of deposit money banks is significantly negative and smaller than one on life insurance density. This variable is not same with the hypothesis.

Coefficients of urbanization and labor force participation rate of female are significantly positive and bigger than one on life insurance density as such in hypothesis. On the other hand, health expenditure is significantly negative on life insurance density by which coefficients are bigger than one in common with hypothesis.

Just like hypothesis, effects of age dependency ratio and population growth rate are significantly negative on life insurance density. Also, life expectancy has favorable effect on life insurance density as in hypothesis. These coefficients are statistically significance and bigger than one.

Global financial crisis has significantly positive impact on life insurance density as expected in hypothesis. This suggests that the life insurance density increased after global financial crisis.

Dependent variable: Logarithm of life insurance penetration

Right side of table 4 shows econometric models which are estimated for logarithm of life insurance penetration as dependent variable for developing countries.

The coefficient of GDP per capita is significantly negative and smaller than one on life insurance penetration in two regressions; whereas it has no significant effect in other two regressions. The income elasticity of life insurance demand is not certain for developing countries. Contrary to hypothesis, the negative coefficient of GDP per capita implies that higher GDP per capita decreases the life insurance penetration. Also, interest rate is both significantly negative in one regression and insignificant in other two regressions. These coefficients are smaller than one and contrary to expectations. However, the coefficient of assets of deposit money banks is statistically insignificant on life insurance penetration.

Urbanization has significantly positive effect on life insurance penetration by which coefficients are bigger than one as with hypothesis. Also as expected in hypothesis, health expenditure is significantly negative and bigger than one on life insurance penetration. However, the coefficient of labor force participation rate of female is significantly positive and smaller than one on life insurance penetration as expected in hypothesis; whereas it is statistically insignificant in another one regression.

As it is in hypothesis, the coefficient of population growth rate is significantly negative and bigger than one on life insurance penetration. The coefficient of age dependency is significantly negative and smaller than one on life insurance penetration in one regression as expected in hypothesis; whereas it has no significant effect in another one regression. Meanwhile, life expectancy has significant effect on life insurance penetration by which coefficient is bigger than one as with hypothesis.

Contrary to hypothesis, global financial crisis has significantly negative impact on life insurance penetration. This suggests that the life insurance penetration decreased after global financial crisis.

3.1.3. Life Insurance Demand for High Income Countries

Table 5: Econometric Models of Life Insurance Demand for High-Income Countries

	logprempc				logpremgdp			
	1	2	3	4	1	2	3	4
loggdppc	.21	.22	1.2*	1.3*	.06	.13	.33*	.21***
	(1.28)	(1.36)	(10)	(10)	(1.27)	(1.27)	(3.1)	(1.9)
int		-.005*	-.001***	-.001		-.0007	-.001***	-.001**
		(-4.65)	(3.1)	(1.9)		(-2.21)	(-1.7)	(-2.1)
bankgdp			.001*	.001*			.0009*	.0009*
			(4.9)	(4.6)			(4.4)	(4.9)
urb			-.004	-.004			-.002	-.002
			(-1.5)	(-1.5)			(-1)	(-.87)
femlab			.02*	.02*			.008***	.01**
			(4.6)	(4.4)			(2)	(2.4)
health			-.03*	-.03*			-.02*	-.02*
			(-3.8)	(-3.9)			(-3.9)	(-3.7)
depen			-.002	-.001			.003**	.003**
			(-1.3)	(-1.1)			(2.6)	(2.3)
pop			.01***	.01***			-.003	-.002
			(1.9)	(1.8)			(-.6)	(-.4)
lifeexp			.06*	.06*			.02*	.03*
			(11)	(8.8)			(4.3)	(5.7)
crisis				.03**				-.06*
				(2.1)				(-3.9)
cons	1.82**	1.81**	-8.6*	-8.3*	.0618	-.254	-3.1*	-3.6*
	(2.41)	(2.44)	(-12)	(-11)	(.124)	(-.527)	(-4.8)	(-5.5)
N	627	627	627	627	627	627	627	627
R-square	.439	.397	.66	.66	.153	.168	.38	.41
F-statistics	1.65	11.7			.309			
F-stat d.f.	1,593	2,592			1,593			
Hausman	0.0000	0.0001	0.7091	0.7375	0.0239	0.1150	0.4998	0.0805

Note: "*" , "**" and "***" indicate statistical significance at the 1%, 5% and 10% levels, respectively. t-values are given in parentheses. Model which has F-Statistic value and also Hausman coefficient is smaller than one is fixed-effects model. Model which has not F-Statistic value and also Hausman coefficient is bigger than one is a random-effects model.

High income countries include Australia, Austria, Bahamas, Bahrain, Belgium, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea Republic, Kuwait, Luxembourg, Netherlands, Oman, Portugal, Singapore, Spain, Sweden, Switzerland, Trinidad and Tobago, United Kingdom, United States, Uruguay.

Dependent variable: Logarithm of life insurance density

Left side of table 5 shows econometric models which are estimated for logarithm of life insurance density as dependent variable for high income countries.

The coefficient of GDP per capita is significantly positive and bigger than one on life insurance density in two regressions as expected in hypothesis; whereas it has insignificant impact in two regressions. The income elasticity of life insurance demand is not clear for high income countries. These significant coefficients are bigger than one. However, the effect of interest rate is both significantly negative on life insurance density in two regressions by which coefficients are smaller than one and statistically insignificant in another one regression. Just like hypothesis, interest rate has negative effect on life insurance density. Also, the effect of assets of deposit money banks is significantly positive on life insurance density by which coefficients are smaller than one as with hypothesis.

The coefficient of labor force participation rate of female is significantly positive and bigger than one on life insurance density as expected in hypothesis. However, health expenditure is significantly negative and bigger than one such in hypothesis. Yet, urbanization has no effect on life insurance density.

As it is in hypothesis, the coefficient of population growth rate is significantly positive and bigger than one on life insurance density. Also, life expectancy has significantly positive effect on life insurance density by which coefficients are bigger than one. This positive effect is same with hypothesis. Yet, age dependency ratio has statistically insignificant effect on life insurance density.

Global financial crisis has significantly positive impact on life insurance density just like hypothesis. This suggests that the life insurance density increased after global financial crisis.

Dependent variable: Logarithm of life insurance penetration

Right side of table 5 shows econometric models which are estimated for logarithm of life insurance penetration as dependent variable for high income countries.

As expected in hypothesis, the coefficient of GDP per capita is significantly positive and smaller than one on life insurance penetration in two regressions; whereas it has no significant effect in other two regressions. The income elasticity of life insurance demand is uncertain for high income countries. Also, interest rate is both significantly negative on life insurance penetration in two regressions by which coefficients are smaller than one and statistically insignificant in another one regression. In the meantime, the coefficient of assets of deposit money banks is significantly positive and smaller than one on life insurance penetration as in hypothesis.

Labor force participation rate of female has significantly positive effect on life insurance penetration as expected in hypothesis. These coefficients are both smaller than one in one regression and bigger than one in another one regression. As with hypothesis, health expenditure has significantly negative effect on life insurance penetration which by coefficient is bigger than one. On the other hand, urbanization has insignificant effect on life insurance penetration.

Like hypothesis, the coefficient of age dependency ratio is significantly positive and smaller than one on life insurance penetration. However, life expectancy has significantly positive impact on life insurance penetration with coefficients are bigger than one as with hypothesis. Yet, population growth rate has insignificant effect on life insurance penetration.

Contrary to hypothesis, global financial crisis has significantly negative impact on life insurance penetration. This suggests that the life insurance penetration decreased after global financial crisis.

3.1.4. Life Insurance Demand for Middle Income Countries

Table 6: Econometric Models of Life Insurance Demand for Middle-Income Countries

	logprempc				logpremgdp			
	1	2	3	4	1	2	3	4
loggdppc	2.82*	2.76*	1.1*	1.2*	.34**	.34**	-.42**	-.37**
	(13.1)	(12.9)	(6.4)	(6.8)	(2.34)	(2.35)	(-2.5)	(-2.1)
int		-.002*	.001**	.001*		.00009	.002*	.002*
		(-3.48)	(2.4)	(3)		(.161)	(4.7)	(4.6)
bankgdp			.002*	.001**			.001**	.001**
			(3.9)	(2.4)			(2.2)	(2.4)
urb			.008*	.01*			.01*	.01*
			(2.6)	(3.3)			(3.8)	(3.9)
femlab			.007	-.0004			.001	.002
			(1.3)	(-.066)			(.18)	(.37)
health			.02**	.02*			-.001	-.002
			(2.5)	(2.6)			(-.19)	(-.23)
depen			-.01*	-.008*			-.005**	-.006**
			(-5.2)	(-3.1)			(-2.2)	(-2.5)
pop			-.01	-.01			-.04*	-.04*
			(-.81)	(-.73)			(-2.8)	(-2.8)
lifeexp			.04*	.03*			.02*	.02*
			(6.9)	(5.7)			(4.1)	(4.3)
crisis				.12*				-.03
				(5.1)				(-1.4)
cons	-9.18*	-8.88*	-5.8*	-6*	-1.57*	-1.58*	-.8	-1.2
	(-11.5)	(-11.2)	(-7.3)	(-6.9)	(-2.85)	(-2.85)	(-1)	(-1.4)
N	551	551	551	551	551	551	551	551
R-square	.215	.221	.29	.25	.00004	.00006	.002	.0031
F-statistics	171	93.5		99			23	21
F-stat d.f.	1,521	2,520		10,512			9,513	10,512
Hausman	0.0000	0.0000	0.3109	0.0000	0.1848	0.2532	0.0000	0.0004

Note: "*" , "**" and "***" indicate statistical significance at the 1%, 5% and 10% levels, respectively. t-values are given in parentheses. Model which has F-Statistic value and also Hausman coefficient is smaller than one is fixed-effects model. Model which has not F-Statistic value and also Hausman coefficient is bigger than one is a random-effects model.

Middle income countries comprise Algeria, Argentina, Bangladesh, Brazil, Bulgaria, China, Colombia, Costa Rica, Croatia, Dominican Republic, Egypt, Guatemala, India, Indonesia, Kenya, Lebanon, Malaysia, Mauritius, Mexico, Nigeria, Panama, Peru, Philippines, Romania, Russian Federation, South Africa, Thailand, Turkey, Venezuela.

Dependent variable: Logarithm of life insurance density

Left side of table 6 shows econometric models which are estimated for logarithm of life insurance density as dependent variable for middle income countries.

GDP per capita has significantly positive impact on life insurance density with coefficients are bigger than one as expected in hypothesis. Middle income countries have income elastic life insurance demand. This means that life insurance is a luxury good for middle income countries. Life insurance demand changes more when GDP per capita changes. However, the effect of interest rate is significantly negative on life insurance density in one regression as with hypothesis; whereas it is significantly positive in other two regressions contrary to hypothesis. These coefficients are smaller than one. This positive coefficient effects investment of insurance companies. They make profit and thereby positively impact the insurance demand because of higher profit. In the meantime, the coefficient of assets of deposit money banks has significantly positive and smaller than one on life insurance density as in hypothesis.

Age dependency ratio has significantly negative effect on life insurance density as in hypothesis. These coefficients are both bigger than one in one regression and smaller than one in another one regression. Contrary to hypothesis, health expenditure is significantly positive and bigger than one on life insurance density.Yet, labor force participation rate of female has statistically insignificant effect on life insurance density.

As expected in hypothesis, the effect of life expectancy has significantly positive on life insurance density by which coefficients are bigger than one. Also, age dependency ratio has significantly positive impact on life insurance density as with hypothesis. These coefficients are both smaller than one in one regression and bigger than one in another one regression. Yet, population growth rate is statistically insignificant on life insurance density.

Just like hypothesis, global financial crisis has significantly positive impact on life insurance density. This suggests that the life insurance density increased after global financial crisis.

Dependent variable: Logarithm of life insurance penetration

Right side of table 6 shows econometric models which are estimated for logarithm of life insurance penetration as dependent variable for middle income countries.

GDP per capita is significantly positive on life insurance penetration in two regressions as in hypothesis; whereas it is significantly negative in other two regressions contrary to hypothesis. These coefficients are smaller than one. Middle income countries have not certain the income elasticity of insurance demand. Life insurance maybe normal good or inferior good for middle income countries. Meanwhile, interest rate is both significantly positive on life insurance penetration in two regressions by which coefficients are smaller than one and statistically insignificant in another one regression. This significant effect of interest rate is not same with hypothesis. But, interest rate impacts insurance demand by implicitly. Insurance firms invest with collected money and gain profit. So, high profit rates reflect to insurance purchasing behavior of people. However, the effect of assets of deposit money banks has significantly positive on life insurance penetration as expected in hypothesis. These coefficients are smaller than one.

As with hypothesis, the coefficient of urbanization is significantly positive and bigger than one on life insurance penetration. Yet, health expenditure and labor force participation rate of female have insignificant effects on life insurance penetration.

The coefficient of age dependency ratio is significantly negative and smaller than one on life insurance penetration as in hypothesis. However, the effect of population growth rate is significantly negative and bigger than one on life insurance penetration as expected in hypothesis. Meanwhile, life expectancy is significantly positive on life insurance penetration by which coefficients are bigger than one as such in hypothesis.

The effect of global financial crisis is negatively insignificant on life insurance penetration. This suggests that the life insurance penetration did not change after global financial crisis.

3.2. NON-LIFE INSURANCE DEMAND

3.2.1. Non-Life Insurance Demand for Developed Countries

Table 7: Econometric Models of Non-Life Insurance Demand for Developed Countries

	logprempc				logpremgdp			
	1	2	3	4	1	2	3	4
loggdppc	.75*	.74*	2.1*	2.4*	.10	.19*	.33*	.33*
	(4.35)	(4.3)	(13)	(17)	(1.49)	(3.35)	(3.9)	(3.9)
int		.0007	.001	.001**		.001*	.001*	.001*
		(.645)	(1.4)	(2.2)		(3.42)	(4)	(4)
bankgdp			.001*	.0008*			.0002*	.0002**
			(9.5)	(4.5)			(2.6)	(2.4)
urb			.02*	.01*			.01*	.01*
			(8.2)	(4.5)			(6.9)	(6.5)
femlab			.02*	.01**			-.004	-.005
			(4.3)	(2)			(-1.6)	(-1.6)
crisis				.18*				.0007
				(14)				(.1)
cons	-.603	-.576	-10*	-9.8*	-.123	-.521**	-1.8*	-1.8*
	(-.768)	(-.732)	(-11)	(-12)	(-.373)	(-1.97)	(-3.9)	(-3.8)
N	520	520	520	520	520	520	520	520
R-square	.812	.812	.79	.84	.346	.342	.26	.26
F-statistics	18.9	9.66	71	112	2.21		17	14
F-stat d.f.	1,493	2,492	5,489	6,488	1,493		5,489	6,488
Hausman	0.0003	0.0012	0.0000	0.0000	0.0254	0.0611	0.0103	0.0371

Note: "*" , "**" and "***" indicate statistical significance at the 1%, 5% and 10% levels, respectively. t-values are given in parentheses. Model which has F-Statistic value and also Hausman coefficient is smaller than one is fixed-effects model. Model which has not F-Statistic value and also Hausman coefficient is bigger than one is a random-effects model.

Developed countries: Australia, Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, Portugal, Romania, Spain, Sweden, Switzerland, United Kingdom, United States.

Dependent variable: Logarithm of non-life insurance density

Left side of table 7 shows econometric models which are estimated for logarithm of non-life insurance density as dependent variable for developed countries.

As with hypothesis, GDP per capita has significantly positive impact on the non-life insurance density. These coefficients are bigger than one in two regressions and smaller than one in other two regressions. Developed countries have not accurate income elasticity of non-life insurance demand. Non-life insurance maybe luxury good or inferior good for developed countries. Meanwhile, the effect of interest rate is significantly positive on the non-life insurance density in one regression by which the coefficient is smaller than one; whereas it is statistically insignificant in other two regressions. This significant effect of interest rate contrast with hypothesis. But, interest rate impacts insurance demand by implicitly. Insurance firms invest with collected premiums and make profit. So, high profit rates reflect to insurance purchasing behavior of people. However, the effect of assets of deposit money banks is significantly positive on the non-life insurance density such in hypothesis. These coefficients are smaller than one.

Also, coefficients of urbanization and labor force participation rate of female are significantly positive and bigger than one on the non-life insurance density. Effects of variables confirm hypothesis.

Global financial crisis has significantly positive impact on the non-life insurance density as in hypothesis. This suggests that the non-life insurance density increased after global financial crisis.

Dependent variable: Logarithm of non-life insurance penetration

Right side of table 7 shows econometric models which are estimated for logarithm of non-life insurance penetration as dependent variable for developed countries.

The coefficient of GDP per capita is significantly positive and smaller than one on the non-life insurance penetration in three regressions; whereas it has no significant effect in another one regression. The income elasticity of non-life insurance demand is unclear for developed countries. This significant effect of GDP per capita is same with hypothesis. However, coefficients of interest rate and assets of deposit money banks are significantly positive and smaller than one on the non-life insurance penetration as expected in hypothesis.

As in hypothesis, urbanization is significantly positive on the non-life insurance penetration by which coefficients are bigger than one. Yet, labor force participation rate of female is statistically insignificant on the non-life insurance penetration.

The effect of global financial crisis is positively insignificant on the non-life insurance penetration. This suggests that the non-life insurance penetration did not change after global financial crisis.

3.2.2. Non-Life Insurance Demand for Developing Countries

Table 8: Econometric Models of Non-Life Insurance Demand for Developing Countries

	logprempc				logpremgdp			
	1	2	3	4	1	2	3	4
loggdppc	1.49*	1.45*	1.1*	1.1*	.05	.02	-.1***	-.1***
	(19.4)	(19.3)	(10)	(12)	(.89)	(.344)	(-1.7)	(-1.7)
int		-.005*	-.003*	-.002*		-.001*	-.001*	-.0009*
		(-11)	(-6.6)	(-5.1)		(-6.48)	(-3.9)	(-3.4)
bankgdp			.003*	.002*			.002*	.002*
			(8.5)	(6)			(11)	(10)
urb			.01*	.005*			.003*	.001
			(10)	(3)			(3.2)	(1.5)
femlab			.01*	-.001			-.001	-.003
			(4.5)	(-.59)			(-.65)	(-1.6)
crisis				.2*				.02*
				(18)				(3.1)
cons	-3.95*	-3.71*	-4.2*	-2.7*	-.157	.00712	.14	.32
	(-13.1)	(-12.6)	(-11)	(-8.1)	(-.638)	(.0296)	(.6)	(1.4)
N	720	720	720	720	720	720	720	720
R-square	.807	.813	.78	.82	.325	.0547	.085	.0078
F-statistics			153	241	.792	21.4	41	36
F-stat d.f.			5,679	6,678	1,683	2,682	5,679	6,678
Hausman	0.0806	0.3080	0.000	0.0462	0.0019	0.0034	0.0001	0.0000

Note: "*" , "**" and "***" indicate statistical significance at the 1%, 5% and 10% levels, respectively. t-values are given in parentheses. Model which has F-Statistic value and also Hausman coefficient is smaller than one is fixed-effects model. Model which has not F-Statistic value and also Hausman coefficient is bigger than one is a random-effects model.

Developing countries: Algeria, Argentina, Bahamas, Bahrain, Bangladesh, Brazil, Chile, China, Colombia, Costa Rica, Dominican Republic, Egypt, Guatemala, India, Indonesia, Israel, Kenya, Korea Republic, Kuwait, Lebanon, Malaysia, Mauritius, Mexico, Nigeria, Oman, Panama, Peru, Philippines, Russian Federation, Singapore, South Africa, Thailand, Trinidad and Tobago, Turkey, Uruguay, Venezuela.

Dependent variable: Logarithm of non-life insurance density

Left side of table 8 shows econometric models which are estimated for logarithm of non-life insurance density as dependent variable for developing countries.

The coefficient of GDP per capita is significantly positive and bigger than one on the non-life insurance density as in hypothesis. Developing countries have income elastic non-life insurance demand. This shows that non-life insurance is a luxury good for developing countries. Non-life insurance demand changes a lot when GDP per capita changes. Meanwhile, interest rate is significantly negative on the non-life insurance density as expected in hypothesis. These coefficients are smaller than one. Also, the effect of assets of deposit money banks is significantly positive on the non-life insurance density by which coefficients are smaller than one. This variable effect is same with hypothesis.

As expected in hypothesis, the coefficient of labor force participation rate of female is significantly positive and bigger than one on the non-life insurance density in one regression; whereas it is statistically insignificant in another one regression. Also, urbanization has significantly positive impact on the non-life insurance density as in hypothesis. These coefficients are both smaller than one in one regression and bigger than one in another one regression.

Just like hypothesis, global financial crisis has significantly positive impact on the non-life insurance density. This suggests that the non-life insurance density increased after global financial crisis.

Dependent variable: Logarithm of non-life insurance penetration

Right side of table 8 shows econometric models which are estimated for logarithm of non-life insurance penetration as dependent variable for developing countries.

As with hypothesis, the coefficient of GDP per capita is significantly negative and smaller than one on the non-life insurance penetration in two regressions; whereas it has no significant effect in other two regressions. The income elasticity of non-life insurance demand is not certain for developing countries. However, the coefficient of interest rate is significantly negative and smaller than one on the non-life insurance penetration as expected in hypothesis. The coefficient of assets of deposit money banks is significantly positive and smaller than one on the non-life insurance penetration such in hypothesis.

Urbanization is significantly positive and smaller than one on the non-life insurance penetration in one regression; whereas it is statistically insignificant in another one regression. This variable effect is same with hypothesis. Yet, labor force participation rate of female has no significantly effect on the non-life insurance penetration.

Global financial crisis has significantly positive impact on the non-life insurance penetration as expected in hypothesis. This suggests that the non-life insurance penetration increased after global financial crisis.

3.2.3. Non-Life Insurance Demand for High Income Countries

Table 9: Econometric Models of Non-Life Insurance Demand for High-Income Countries

	logprempc				logpremgdp			
	1	2	3	4	1	2	3	4
loggdppc	-.13	-.12	.57*	1*	-.34*	-.34*	-.17**	-.16**
	(-1.08)	(-1)	(4.9)	(13)	(-5.11)	(-5.1)	(-2.2)	(-2.1)
int		-.004*	-.17**	-.16**		-.0001	.0001	.0001
		(-4.51)	(-2.4)	(-.33)		(-.344)	(.3)	(.32)
bankgdp			.001*	.0008*			.0004*	.0004*
			(8.2)	(4.7)			(3.9)	(3.7)
urb			.01*	.0007			.005*	.005*
			(3.4)	(.49)			(2.8)	(2.7)
femlab			.03*	.01*			.0009	.0008
			(9)	(5.8)			(.37)	(.29)
crisis				.16*				.001
				(14)				(.12)
cons	3.4*	3.37*	-2.3*	-2.8*	1.89*	1.89*	.56	.56
	(5.99)	(6.03)	(-3.5)	(-7)	(6.22)	(6.21)	(1.3)	(1.3)
N	660	660	660	660	660	660	660	660
R-square	.615	.099	.55	.78	.129	.129	.0064	.0072
F-statistics	1.17	10.8	63		26.1	13.1	12	10
F-stat d.f.	1,626	2,625	5,622		1,626	2,625	5,622	6,621
Hausman	0.0000	0.0000	0.0000	0.5819	0.0000	0.0000	0.0002	0.0005

Note: "*" , "**" and "***" indicate statistical significance at the 1%, 5% and 10% levels, respectively. t-values are given in parentheses. Model which has F-Statistic value and also Hausman coefficient is smaller than one is fixed-effects model. Model which has not F-Statistic value and also Hausman coefficient is bigger than one is a random-effects model.

High income countries: Australia, Austria, Bahamas, Bahrain, Belgium, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea Republic, Kuwait, Luxembourg, Netherlands, Oman, Portugal, Singapore, Spain, Sweden, Switzerland, Trinidad and Tobago, United Kingdom, United States, Uruguay.

Dependent variable: Logarithm of non-life insurance density

Left side of table 9 shows econometric models which are estimated for logarithm of non-life insurance density as dependent variable for high income countries.

As expected in hypothesis, the coefficient of GDP per capita is significantly positive and smaller than one on the non-life insurance density in one regression;

whereas it is significantly positive and equal to one in another one regression. Also, it is statistically insignificant in other two regressions. The income elasticity of non-life insurance demand is unclear for high income countries. However, interest rate has significantly negative impact on the non-life insurance density as such in hypothesis. These significant coefficients are both bigger than one in two regressions and smaller than one in another one regression. As expected in hypothesis, the effect of assets of deposit money banks are significantly positive on the non-life insurance density by which coefficients are smaller than one.

The coefficient of urbanization is significantly positive and bigger than one on the non-life insurance density in one regression; whereas it is statistically insignificant in another one regression. This significant urbanization variable connected with hypothesis. Meanwhile, labor force participation rate of female is significantly positive on the non-life insurance density by which coefficients are bigger than one as in hypothesis.

Just like hypothesis, global financial crisis has significantly positive impact on the non-life insurance density. This suggests that the non-life insurance density increased after global financial crisis.

Dependent variable: Logarithm of non-life insurance penetration

Right side of table 9 shows econometric models which are estimated for logarithm of non-life insurance penetration as dependent variable for high income countries.

Such in hypothesis, the coefficient of GDP per capita is significantly negative and smaller than one on the non-life insurance penetration. The income elasticity of non-life insurance demand is negatively inelastic. Non-life insurance is an inferior good for high income countries. Meanwhile, as in hypothesis, the effect of assets of deposit money banks is significantly positive on the non-life insurance penetration by which coefficients are smaller than one. On the other hand, interest rate is statistically insignificant on the non-life insurance penetration.

The coefficient of urbanization is significantly positive and smaller than one on the non-life insurance penetration as such in hypothesis. Yet, interest rate and labor force participation rate of female has no significant effect on the non-life insurance penetration.

Contrary to expectations in hypothesis, the effect of global financial crisis is negatively insignificant on the non-life insurance penetration. This suggests that the non-life insurance penetration did not change after global financial crisis.

3.2.4. Non-Life Insurance Demand for Middle Income Countries

Table 10: Econometric Models of Non-Life Insurance Demand for Middle-Income Countries

	logprempc				logpremgdp			
	1	2	3	4	1	2	3	4
loggdppc	2.75*	2.65*	1.9*	1.6*	.48*	.46*	.23*	.21*
	(20.1)	(20.5)	(14)	(18)	(8.51)	(8.2)	(3.2)	(2.9)
int		-.004*	-.002*	-.001*		-.001*	-.0009*	-.0009*
		(-8.48)	(-5.4)	(-4.5)		(-5.19)	(-3.8)	(-3.6)
bankgdp			.003*	.002*			.001*	.001*
			(8)	(5.3)			(6.2)	(5.5)
urb			.01*	.0006			.002***	.001
			(7.5)	(.38)			(1.9)	(.82)
femlab			.003	-.001			-.003	-.004***
			(.86)	(-.66)			(-1.3)	(-1.7)
crisis				.2*				.01***
				(16)				(1.9)
cons	-8.59*	-8.14*	-6.6*	-4.5*	-1.76*	-1.66*	-.91*	-.73**
	(-17)	(-17)	(-13)	(-14)	(-8.26)	(-7.84)	(-3.3)	(-2.5)
N	580	580	580	580	580	580	580	580
R-square	.799	.811	.82	.86	.486	.496	.39	.32
F-statistics	405	264	168				25	21
F-stat d.f.	1,550	2,549	5,546				5,546	6,545
Hausman	0.0000	0.0000	0.0000	0.0547	0.2040	0.2619	0.0274	0.0175

Note: "*" , "**" and "***" indicate statistical significance at the 1%, 5% and 10% levels, respectively. t-values are given in parentheses. Model which has F-Statistic value and also Hausman coefficient is smaller than one is fixed-effects model. Model which has not F-Statistic value and also Hausman coefficient is bigger than one is a random-effects model.

Middle income countries: Algeria, Argentina, Bangladesh, Brazil, Bulgaria, China, Colombia, Costa Rica, Croatia, Dominican Republic, Egypt, Guatemala, India, Indonesia, Kenya, Lebanon, Malaysia, Mauritius, Mexico, Nigeria, Panama, Peru, Philippines, Romania, Russian Federation, South Africa, Thailand, Turkey, Venezuela.

Dependent variable: Logarithm of non-life insurance density

Left side of table 10 shows econometric models which are estimated for logarithm of non-life insurance density as dependent variable for middle income countries.

As expected in hypothesis, the coefficient of GDP per capita is significantly positive and bigger than one on the non-life insurance density. Middle income countries have income elastic non-life insurance demand. This means that non-life insurance is a luxury good for middle income countries. Non-life insurance demand changes a lot when GDP per capita changes. Meanwhile, the effect of interest rate is significantly negative on the non-life insurance density by which coefficients are smaller than one as such in hypothesis. However, the coefficient of assets of deposit money banks is significantly positive and smaller than one on the non-life insurance density as in hypothesis.

The coefficient of urbanization is significantly positive and bigger than one on the non-life insurance density in one regression as in hypothesis; whereas it is statistically insignificant in another one regression. Yet, labor force participation rate of female has no significant effect on the non-life insurance density.

Just like in hypothesis, global financial crisis has significantly positive impact on the non-life insurance density. This suggests that the non-life insurance density increased after global financial crisis.

Dependent variable: Logarithm of non-life insurance penetration

Right side of table 10 shows econometric models which are estimated for logarithm of non-life insurance penetration as dependent variable for middle income countries.

As with hypothesis, GDP per capita has significantly positive impact on the non-life insurance penetration by which coefficients are smaller than one. Middle income countries have income inelastic non-life insurance demand. This implies that non-life insurance is a necessary good for middle income countries. Non-life insurance demand changes more when GDP per capita changes. Also, interest rate has significantly negative effect on the non-life insurance penetration as expected in hypothesis. These coefficients are smaller than one. However, the coefficient of assets of deposit money banks is significantly positive and smaller than one on the non-life insurance penetration as such in hypothesis.

The coefficient of urbanization is significantly positive and smaller than one on the non-life insurance penetration in one regression as in hypothesis; whereas it is statistically insignificant in another one regression. However, labor force participation rate of female has significantly negative effect on the non-life insurance penetration by which the coefficient is smaller than one in one regression; whereas it has no significant effect in another one regression. This variable effect contrary to expected in hypothesis.

Global financial crisis has significantly positive impact on the non-life insurance penetration such in hypothesis. This suggests that the non-life insurance penetration increased after global financial crisis.

CONCLUSION

Country groups have different insurance demand patterns. These discrepancies are analyzed in this study for life and non-life insurance demand. The empirical findings of this study with regard to *premium density* are summarized as follows:

There are difference effects on life insurance demand between developed and developing countries. GDP per capita, life expectancy and global financial crisis are significantly positive variables for both developed and developing countries. Positive effect of GDP per capita shows that people protect living standards during lifetime. Life expectancy has positive effect for that higher life expectancy decreases the price of life insurance. Therefore, people tend to stimulate life insurance demand. Positive effect of global financial crisis indicates that people want to be protected from crises and hedge risks. Interest rate has significantly positive effect on developed countries but it has significantly negative effect on developing countries. Negative coefficient of interest rate is related to insurance companies' investment returns. Insurance companies' profits reflect on purchasing life insurance for that people expect higher returns. Positive effect of interest rate indicates that people hold alternative assets seeking for higher returns. Assets of deposit money banks and health expenditure are significantly positive for developed countries while they are significantly negative for developing countries. Positive effect of assets of deposit money banks on insurance indicates that well-functioning banking system enhances confidence of people to buy life insurance. Negative effect of assets of deposit money banks indicates that people will not securitization of cash flows. Therefore, insurance consumption decreases. Health expenditure has negative effect on life insurance for that health expenditure can be seen sufficient and people feel reassured. Therefore, insurance demand decreases. Positive effect of health expenditure on life insurance demand indicates complementary hypothesis which is health expenditure and life insurance annuities can be accept as a complementary. Urbanization and labor force participation rate of female have insignificant impacts on developed countries while they have significantly positive impacts on developing countries. Urbanization has positive effect on life insurance for facilitate insurance distribution, reducing the cost of marketing and premium collection. Positive effect of labor force participation rate of female indicates that female' income is important to buy life insurance. Age dependency ratio and population growth rate are insignificant on developed countries but they are significantly negative on developing countries. Age dependency ratio has negative effect on life insurance for that working or active people save money to protect living standards of dependents. Negative effect of population growth rate shows that insurance consumption decreases because of inadequate potential buyer of life insurance.

Also, there are difference effects on life insurance demand between high income and middle income countries. GDP per capita, assets of deposit money banks, life expectancy and global financial crisis are significantly positive for high income and middle income countries. Positive effect of GDP per capita shows that people protect living standards during lifetime. Positive effect of assets of deposit money banks on insurance indicates that well-functioning banking system enhances confidence of people to buy life insurance. Life expectancy has positive effect for that higher life expectancy decreases the price of life insurance. Therefore, people tend to stimulate life insurance demand. Positive effect of global financial crisis indicates that people want to be protected from crises and hedge risks. Interest rate has significantly negative effect on high income countries but it has both significantly positive and negative effects on middle income countries. Negative coefficient of interest rate is related to insurance companies' investment returns. Insurance companies' profits reflect on purchasing life insurance for that people expect higher returns. Positive effect of interest rate indicates that people hold alternative assets seeking for higher returns. Urbanization has insignificant effect on high income countries while it has significantly positive impact on middle income countries. Urbanization has positive effect on life insurance for facilitate insurance distribution, reducing the cost of marketing and premium collection. Labor force participation rate of female and population growth rate are significantly negative for high income countries but they are insignificant for middle income countries. Positive effect of labor force participation rate of female indicates that female' income is important to buy life insurance. Population growth rate has positive effect on life insurance for increasing potential buyer of life insurance. Health expenditure has significantly negative effect on high income countries while it has significantly positive effect on middle income countries. Health expenditure has negative effect on life insurance for that health expenditure can be seen sufficient and people feel reassured. Therefore, insurance demand decreases. Positive effect of health expenditure on life insurance demand indicates complementary hypothesis which is health expenditure and life insurance annuities can be accept as a complementary. Age dependency ratio is insignificant on high income countries but it is significantly negative on middle income countries. Age dependency ratio has negative effect on life insurance for that working or active people save money to protect living standards of dependents.

There are difference effects on non-life insurance demand between developed and developing countries. GDP per capita, assets of deposit money banks, urbanization, labor force participation rate of female, and global financial crisis are significantly positive variables for both developed and developing countries. Positive effect of GDP per capita shows that people protect living standards during lifetime. Positive effect of assets of deposit money banks on insurance indicates that well-functioning banking system enhances confidence of people to buy non-life insurance. Urbanization has positive effect on non-life insurance for facilitate insurance distribution, reducing the cost of marketing and premium collection. Positive effect of labor force participation rate of female indicates that female' income is important to buy non-life insurance. Positive effect of global financial crisis indicates that people want to be protected from crises and hedge risks. Interest rate has significantly positive effect on developed countries while it has significantly negative effect on developing countries. Negative coefficient of interest rate is related to insurance companies' investment returns. Insurance companies' profits reflect on purchasing non-life insurance for that people expect higher returns. Positive effect of interest rate indicates that people hold alternative assets seeking for higher returns.

Also, there are difference effects on non-life insurance demand between high income and middle income countries. GDP per capita, assets of deposit money banks, urbanization and global financial crisis are significantly positive for both high income and middle income countries. Positive effect of GDP per capita shows that people protect living standards during lifetime. Positive effect of assets of deposit money banks on insurance indicates that well-functioning banking system enhances confidence of people to buy non-life insurance. Urbanization has positive effect on non-life insurance for facilitate insurance distribution, reducing the cost of marketing and premium collection. Positive effect of global financial crisis indicates that people want to be protected from crises and hedge risks. Labor force participation rate of female has significantly positive impact for high income countries but it has insignificant impact for middle income countries. Positive effect of labor force participation rate of female indicates that female' income is important to buy non-life insurance.

The empirical findings of life and non-life insurance demand with regard to *premium penetration* are summarized as follows:

There are difference effects on life insurance demand between developed and developing countries. GDP per capita and interest rate have significantly positive effects on developed countries while these variables have significantly negative effects on developing countries. Positive effect of GDP per capita shows that people protect living standards during lifetime. Negative coefficient of interest rate is related to insurance companies' investment returns. Insurance companies' profits reflect on purchasing life insurance for that people expect higher returns. Positive effect of interest rate indicates that people hold alternative assets seeking for higher returns. The effect of assets of deposit money banks is significantly positive on developed countries while it is significantly negative on developing countries. Positive effect of assets of deposit money banks on insurance indicates that well-functioning banking system enhances confidence of people to buy life insurance. Negative effect of assets of deposit money banks indicates that people will not securitization of cash flows. Therefore, insurance consumption decreases. Urbanization has significantly negative effect for developed countries while it has significantly positive effect for developing countries. Urbanization has positive effect on life insurance for facilitate insurance distribution, reducing the cost of marketing and premium collection. Labor force participation rate of female is statistically insignificant for developed countries while it has significantly positive effect on developing countries. Positive effect of labor force participation rate of female indicates that female' income is important to buy life insurance. Health expenditure, age dependency ratio and population growth rate are statistically insignificant for developed countries but they are significantly negative for developing countries. Health expenditure has negative effect on life insurance for that health expenditure can be seen sufficient and people feel reassured. Therefore, insurance demand decreases. Age dependency ratio has negative effect on life insurance for that working or active people save money to protect living standards of dependents. Negative effect of population growth rate shows that insurance consumption decreases because of inadequate potential buyer of life insurance. Life expectancy has significantly positive effect on developed and developing countries. Life expectancy has positive effect for that higher life expectancy decreases the price of life insurance. Therefore, people tend to stimulate life insurance demand. Global financial crisis has significantly negative impact for developed and developing countries. Negative effect of global financial crisis result from loss on people' purchasing power.

Also, there are difference effects on life insurance demand between high income and middle income countries. GDP per capita is significantly positive for high income countries while it is both significantly negative and significantly positive for middle income countries. Positive effect of GDP per capita shows that people protect living standards during lifetime. Interest rate is significantly negative for high income countries while it is significantly positive for middle income countries. Negative coefficient of interest rate is related to insurance companies' investment returns. Insurance companies' profits reflect on purchasing life insurance for that people expect higher returns. Positive effect of interest rate indicates that people hold alternative assets seeking for higher returns. Assets of deposit money banks and life expectancy have significantly positive effects for both high income and middle income countries. Positive effect of assets of deposit money banks on insurance indicates that well-functioning banking system enhances confidence of people to buy life insurance. Urbanization is statistically insignificant for high income countries but it is significantly positive for middle income countries. Urbanization has positive effect on life insurance for facilitate insurance distribution, reducing the cost of marketing and premium collection. Labor force participation rate of female has significantly positive impact for high income countries but it has insignificant impact for middle income countries. Positive effect of labor force participation rate of female indicates that female' income is important to buy life insurance. Health expenditure and global financial crisis have significantly negative effects for high income countries but they have statistically insignificant effects for middle income countries. Health expenditure has negative effect on life insurance for that health expenditure can be seen sufficient and people feel reassured. Therefore, insurance demand decreases. Negative effect of global financial crisis result from loss on people' purchasing power. Age dependency ratio is significantly positive for high income countries while it is significantly negative for middle income countries. Positive effect of age dependency ratio indicates that working or active people want to protect dependents against financial difficulties. Population growth rate is statistically insignificant for high income countries while it is significantly negative for middle income countries. Negative effect of population growth rate shows that insurance consumption decreases because of inadequate potential buyer of life insurance. Life expectancy has significantly positive effect on developed and developing countries. Life expectancy has positive effect for that higher life expectancy decreases the price of life insurance. Therefore, people tend to stimulate life insurance demand.

There are difference effects on non-life insurance demand between developed and developing countries. GDP per capita and interest rate are significantly positive for developed countries while they are significantly negative for developing countries. Positive effect of GDP per capita shows that people protect living standards during lifetime. Interest rate is significantly negative for high income countries while it is significantly positive for middle income countries. Negative coefficient of interest rate is related to insurance companies' investment returns. Insurance companies' profits reflect on purchasing life insurance for that people expect higher returns. Positive effect of interest rate indicates that people hold alternative assets seeking for higher returns. Assets of deposit money banks and urbanization are significantly positive for developed and developing countries. Positive effect of assets of deposit money banks on insurance indicates that well-functioning banking system enhances confidence of people to buy life insurance. Urbanization has positive effect on life insurance for facilitate insurance distribution, reducing the cost of marketing and premium collection. Labor force participation rate of female is statistically insignificant for developed and developing countries. Global financial crisis is statistically insignificant for developed countries while it is significantly positive for developing countries. Positive effect of global financial crisis indicates that people want to be protected from crises and hedge risks.

Also, there are difference effects on non-life insurance demand between high income and middle income countries. GDP per capita has significantly negative effect for high income countries and it has significantly positive effect for middle income countries. Positive effect of GDP per capita shows that people protect living standards during lifetime. Interest rate and labor force participation rate of female are statistically insignificant for high income countries while they are significantly negative for middle income countries. Negative coefficient of interest rate is related to insurance companies' investment returns. Insurance companies' profits reflect on purchasing life insurance for that people expect higher returns. Assets of deposit money banks and urbanization are significantly positive for high income and middle income countries. Positive effect of assets of deposit money banks on insurance indicates that well-functioning banking system enhances confidence of people to buy life insurance. Urbanization has positive effect on life insurance for facilitate insurance distribution, reducing the cost of marketing and premium collection. Global financial crisis is statistically insignificant for high income countries while it is significantly positive for middle income countries. Positive effect of global financial crisis indicates that people want to be protected from crises and hedge risks.

These results indicate some inference on country groups as follows:

GDP per capita is important and positive variable for life and non-life insurance demand. Positive effect of GDP per capita shows that people protect living standards during lifetime. Life insurance is a luxury good but non-life insurance is both luxury and necessary good for developed countries and high income countries. Life and non-life insurance are luxury goods for developing countries and middle income countries. Outreville (1996), Kjosevski (2012), Lee and Chiu (2012) found similar elasticities.

Interest rate raises life and non-life insurance demand for developed countries. The effect of interest rate decreases life and non-life insurance demand for developing countries and high income countries. Interest rate both decreases and increases life insurance demand for middle income countries but it decreases non-life insurance demand for middle income countries. Negative effect of interest rate is related to insurance companies' investment returns. Insurance companies' profits reflect on purchasing life and non-life insurance for that people expect higher returns. Positive effect of interest rate indicates that people hold alternative assets seeking for higher returns. Kjosevski (2012), Sen and Madheswaran (2013) found that interest rate has negative effect on life insurance.

The more is the deposit to GDP ratio, the more demand is for life and non-life insurance for developed countries, high income and middle income countries. However, deposit to GDP ratio is significantly negative on life insurance demand while it is significantly positive on non-life insurance demand for developing economies. Positive effect of assets of deposit money banks on insurance shows that well-functioning banking system enhances confidence of people to buy life and non-life insurance. Negative effect of assets of deposit money banks indicates that people will not securitization of cash flows. Therefore, insurance consumption decreases.

Urbanization increases life and non-life insurance demand for developing countries and middle income countries. For developed countries and high income countries, urbanization increases non-life insurance demand but it is not important on life insurance demand. Urbanization has positive effect on life and non-life insurance for facilitate insurance distribution, reducing the cost of marketing and premium collection. Dragos (2014) found similar results.

More labor force participation of female more life and non-life insurance demand for developing countries and high income countries. But labor force participation of female is not important on life and non-life insurance demand for middle income countries. For developed countries, labor force participation of female is not important on life insurance demand while it increases non-life insurance demand. Positive effect of labor force participation rate of female indicates that female' income is important to buy life and non-life insurance.

Increasing health expenditure rises life insurance demand for developed countries and middle income countries; whereas it decreases life insurance demand for developing countries and upper income countries. Health expenditure has negative effect on life insurance for that health expenditure can be seen sufficient and people feel reassured. Therefore, insurance demand decreases. Positive effect of health expenditure on life insurance demand indicates complementary hypothesis which is health expenditure and life insurance annuities can be accept as a complementary. Kjosevski (2012) found same results.

Age dependency ratio has no impact on life insurance demand for developed countries and high income countries but it has negative impact on life insurance demand for developing countries and middle income countries. Age dependency ratio has negative effect on life insurance for that working or active people save money to protect living standards of dependents. Results are same with Sen and Madheswaran (2013), Yuan and Jiang (2015).

Population growth is not important on life insurance demand for developed countries and middle income countries. Population growth decreases life insurance demand for developing countries; whereas it increases life insurance demand for high income countries. Negative effect of population growth rate shows that insurance consumption decreases because of inadequate potential buyer of life insurance. Positive effect of population growth rate on life insurance indicates that potential buyer of life insurance will increase.

More life expectancy more life insurance demand for all county groups. Life expectancy has positive effect for that higher life expectancy decreases the price of life insurance. Therefore, people tend to stimulate life insurance demand.

Life and non-life insurance demand increased after global financial crisis at all county groups. Positive effect of global financial crisis indicates that people want to be protected from crises and hedge risks. Also, people will protect the living standards after crisis.

The possible policy implications comprising developed countries and high income countries are as follows: To increase the life and non-life insurance, these countries should increase GDP per capita, urbanization rate, the deposit to GDP ratio and female labor participation rate. However, developed countries should increase interest rate and health expenditure; whereas high income countries should decrease interest rate.

The possible policy implications comprising developing countries and middle income countries are as follows: To increase the life and non-life insurance, these countries should increase GDP per capita and urbanization rate. On the other hand these countries should decrease interest rate, age dependency ratio and population growth rate. Developing countries should decrease health expenditure and the deposit to GDP ratio; whereas middle income countries should increase health expenditure and deposit money. Also, developing countries should increase female labor force participation.

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APPENDICES

Appendix 1: Determinants of Life Insurance Demand

Variables	Positive Significant Finding	Negative Significant Finding	Non-Significant Finding
1. Age	1.Berekson (1972) 2.Showers and Shotick (1994) 3.Truett and Truett (1990)	1.Ferber and Lee (1980) 2.Auerback and Kotlikoff (1989) 3. Bernheim (1991) 4.Chen et al (2001)	1.Hammond et al (1967) 2.Duker (1969) 3. Anderson and Nevin (1975) 4.Burnett and Palmer (1984) 5.Fitzgerald (1987)
2.Bequest motive	1.Bernheim (1991)		1.Gandolfi and Miners (1996)
3.Birth order	1.Berekson (1972)	1.Berekson (1972)	
4.Brand loyalty		1.Burnett and Palmer (1984)	
5.Budget	1. Ferber and Lee (1980)		
6.Cohort	1.Chen et al (2001)	1.Chen et al (2001)	
7.Community involvement	1.Burnett and Palmer (1984)		
8.Consumer sentiment	1.Headen and Lee (1974)		
9.Credit cards	1.Ferber and Lee (1980)		
10.Dependency ratio/Life stage	1.Ferber and Lee (1980) 2.Burnett and Palmer (1984) 3.Lewis (1989) 4.Bernheim (1991) 5.Browne and Kim (1993) 6.Showers and Shotick (1994) 7. Beck and Webb (2003) 8. Zerriaa et al (2017)	1.Mantis and Farmer (1968) 2. Auerbach and Kotlikoff (1989)	1.Anderson and Nevin (1975)
11.Education	1.Hammond et al (1967) 2.Ferber and Lee (1980) 3.Burnett and Palmer (1984) 4.Truett and Truett (1990)	1. Duker (1969) 2.Anderson and Nevin (1975) 3.Auerbach and Kotlikoff (1989) 4. Zerriaa et al (2017)	

Appendix 1: Determinants of Life Insurance Demand (Continued)

Variables	Positive Significant Finding	Negative Significant Finding	Non-Significant Finding
	5.Browne and Kim (1993) 6. Gandolfi and Miners (1996)		
12.Employment	1.Mantis and Farmer (1968)		
13.Expected prices	1.Williams (1986)	1.Babbel (1981)	
14.Family size/No. of children	1.Berekson (1972)	1.Hammond et al (1967)	1.Duker (1969)
15.Gender	1.Gandolfi and Miners (1996)	2. Chui and Kwok (2008)	
16.Geographic mobility	1.Burnett and Palmer (1984)		
17.Homeownership/ Type of housing	1. Anderson and Nevin (1975) 2.Ferber and Lee (1980) 3.Gandolfi and Miners (1996)		
18.Husband's and wife's earnings	1.Fitzgerald (1987)		
19.Information seeking		1.Burnett and Palmer (1984)	
20.Insurance on husband before marriage		1.Anderson and Nevin (1975)	
21.Income	1.Hammond et al (1967) 2. Mantis and Farmer (1968) 3. Duker (1969) 4.Neumann (1969) 5.Berekson (1972) 6. Fortune (1973) 7.Anderson and Nevin (1975) 8.Ferber and Lee (1980) 9.Burnett and Palmer (1984) 10.Truett and Truett (1990)	1. Anderson and Nevin (1975)	1. Berekson (1972)

Appendix 1: Determinants of Life Insurance Demand (Continued)

Variables	Positive Significant Finding	Negative Significant Finding	Non-Significant Finding
	11. Browne and Kim (1993) 12. Showers and Shotick (1994) 13. Gandolfi and Miners (1996) 14. Beck and Webb (2003) 15. Li et al (2007) 16. Arena (2008) 17. Haiss and Sümegi (2008) 18. Feyen et al (2011) 19. Lee and Chiu (2012) 20. Kjosevski (2012) 21. Sliwinski et al (2013) 22. Yuan and Jiang (2015) 23. Zerriaa et al (2017)		
22. Insurance on wife before marriage	1.Anderson and Nevin (1975)		
23.Life expectancy	1.Williams (1986) 2. Beenstock et al (1986) 3. Outreville (1996) 4. Ward and Zurbruegg (2002) 5. Beck and Webb (2003) 6. Zerriaa et al (2017)	1.Browne and Kim (1993) 2. Alhassan and Biekpe (2016) 3. Feyen et al (2011)	
24.Marital status/Times		1.Hammond et al (1968) 2.Mantis and Farmer (1968)	1.Berekson (1972) 2.Burnett and Palmer (1984)
25.Net worth/ Wealth/ Savings	1.Hammond et al (1967) 2.Duker (1969) 3. Headen and Lee (1974)	1.Fortune (1973)	1. Fitzgerald (1987) 2.Auerbach and Kotlikoff (1989)

Appendix 1: Determinants of Life Insurance Demand (Continued)

Variables	Positive Significant Finding	Negative Significant Finding	Non-Significant Finding
	4.Anderson and Nevin (1975) 5.Ferber and Lee (1980) 6.Lewis (1989) 7.Bernheim (1991) 8.Hau (2000)		
26.Occupation/ Employment	1. Hammond et al (1967) 2.Mantis and Farmer (1968) 3. Duker (1969) 4. Ferber and Lee (1980) 5. Miller (1985) 6.Fitzgerald (1987) 7.Auerbach and Kotlikoff (1989)		1. Anderson and Nevin (1975)
27. Other prices/ Inflation/ Interest rates	1.Mantis and Farmer (1968) 2.Fortune (1973) 3. Hwang and Gao(2003) 4. Haiss and Sümegi (2008)	1. Browne and Kim (1993) 2. Kjosevski (2012) 3. Zerriaa et al (2017)	1.Neumann (1969)
28. Parental divorce			1.Berekson (1972)
29.Population	1.Mantis and Farmer (1968)		
30.Price conscious		1.Burnett and Palmer (1984)	
31.Prices of insurance		1.Babbel (1985) 2. Browne and Kim (1993)	
32.Psychographic traits	1.Burnett and Palmer (1984)		
33.Race			1.Hammond et al (1967)
34.Region	1.Truett and Truett (1990)		
35.Religion		1.Burnett and Palmer (1984)	2.Browne and Kim (1993)

Appendix 1: Determinants of Life Insurance Demand (Continued)

Variables	Positive Significant Finding	Negative Significant Finding	Non-Significant Finding
36.Self esteem		1.Burnett and Palmer (1984)	
37.Social Security/ Health Expenditure	1.Bernheim (1991)	1.Fitzgerald (1987)	1.Fitzgerald (1987)
	2.Browne and Kim (1993)	2.Rejda et al (1987)	
		3.Lewis (1989)	
	4. Alhassan Biekpe (2016)		
38.Stock market price index	1.Headen and Lee (1974)		
39.Wife working outside of home/ No. of earners	1.Ferber and Lee (1980)	1.Duker (1969)	1.Burnett and Palmer (1984)
	2.Showers and Shotick (1994)	2.Goldsmith (1983)	
	3.Auerbach and Kotlikoff (1989)	3.Gandolfi and Miners (1996)	
40.Work ethic		1.Burnett and Palmer (1984)	

Appendix 2: Life Insurance Demand Studies

Author(s) (Year)	Data	Period and Countries	Dependent Variable	Method	Findings
1.Hammond et al (1967)	Household survey data	1952 and 1961 The United States of America	Premium expenditures	General regression model	Income, net worth, household life cycle stage, occupation, and education have significant effects on life insurance demand.
2.Mantis and Farmer (1968)	American Council of Life Insurance Fact Book	1929 -1964 The United States of America	Total sales of life insurance per year	Regression model	Life insurance is effected by population, insurance prices relative to other consumer prices, personal income, employment, number of marriages and of births.
3.Duker (1969)	The Bureau of Labor Statistics survey	1958 -1961 The United States of America	Premium expenditures	Linear multiple regression	Working-wife family market is growing and unused. Housewife families are buy more life insurance than working-wife families.
4.Neumann (1969)	Statistical Abstracts and U.S. Commerce data	1946 - 1964 The United States of America	Purchases of ordinary whole life and term insurance	Multiple linear regression model	Life insurance is affected insignificantly price expectation on saving through for the post-war years.
5.Lee and Whitaker (1971)	American Council of Life Insurance Fact Book	1946 - 1969 The United States of America	The degree of product-line competition	Simultaneous equation model	There is no a competition between ordinary, group, and industrial life markets. These markets apart from each other arising from their different growth policies.
6.Berekson (1972)	Two surveys of college students	1969 The United States of America	Total premiums; Total premiums for individual		Income, birth order, number of children, and age effect life insurance demand.
7.Fortune (1972)	Department of Commerce, Survey of Current Business	1953 - 1967 The United States of America	Per dollar of insurance	Ordinary least squares	Inflation has a positive effect to the life insurance sector. Households' per dollar of insurance is positively related to the level of expected future prices and so life insurance products.

Appendix 2: Life Insurance Demand Studies (Continued)

Author(s) (Year)	Data	Period and Countries	Dependent Variable	Method	Findings
8.Fortune (1973)	American Council of Life Insurance Fact Book	1964 - 1971 The United States of America	Optimal amount of life insurance	Multiple regression analysis	The amount of wage and salary income, the amount of nonhuman wealth, the discount rate, and consumer confidence designate the optimal level of life insurance.
9.Headen and Lee (1974)	Federal Reserve Flow of Funds data; A. M. Best Company data	1957 - 1971 The United States of America	The household portfolio effect on ordinary life insurance demand	Ordinary least square estimation	Price conditions in financial markets, interest rate, savings and consumer sentiment are important on life insurance demand.
10.Anderson and Nevin (1975)	University of Illinois survey of young married couples	1968 - 1971 The United States of America	Amount of life insurance purchased	Multiple classification analysis	Term life insurance purchases in households are related to the wife's insurance before marriage, couples have greater net worth and also the agent that has no influence the buying decision.
11.Zultowski (1979)	Literature review	1928 - 1978			The extent of buyer-initiated sales effect consumers due to the result of pride in having made cautious buying.
12.Ferber and Lee (1980)	Interview of married couples	1968 - 1976 The United States of America	Decision to purchase insurance	Two multiple regression	Financial assets, education, satisfied with life, spending and savings habits, number of children, and working-wife families are important to buy life insurance.
13.Babbel (1981)	The Statistical Annual of Brazil	1951 - 1967 Brazil and also 1968 - 1976	Per capita life insurance	Multivariate regression model	Inflation is negatively significant on life insurance demand in Brazil.

Appendix 2: Life Insurance Demand Studies (Continued)

Author(s) (Year)	Data	Period and Countries	Dependent Variable	Method	Findings
14.Burnett and Palmer (1984)	Consumer surveys	Early 1980s	Life insurance ownership levels	Multiple classification analysis - A variant of dummy variable multiple regression	Psychographic traits of traditional belief and demographic traits are most strongly explain the life insurance demand.
15.Babbel (1985)	Best's Life Reports	1953 - 1979 The United States of America	The real amount of new insurance in force written during year t	Regression model	Life insurance demand is negatively related to the created cost index. Price changes are critically important for consumers in terms of purchasing life insurance.
16.Miller (1985)	The Bureau of Labor Statistics survey	1984 The United States of America			Active workers have significantly more life insurance than peer retired individuals.
17.Williams (1986)	Survey of 20 industrial relations graduate students	1986 The United States of America			Longer life expectancies and higher interest rates decrease life insurance demand.
18.Beenstock et al (1986)	Swiss Re	1970 - 1981 10 OECD countries	Life premiums	Ordinary least squares	Interest rate is insignificantly positive on premium income. There is negative relationship between Social Security and life insurance demand.
19.Fitzgerald (1987)	Wisconsin Assets and Income Survey	1946 - 1964 The United States of America	Face value of insurance on husband	Ordinary least squares	Husband's future earnings, wife's expected earnings and Social Security benefits are significantly positive on life insurance purchases with regard to husband.

Appendix 2: Life Insurance Demand Studies (Continued)

Author(s) (Year)	Data	Period and Countries	Dependent Variable	Method	Findings
20.Auerbach and Kotlikoff (1989)	Survey of Consumer Financial Decisions	1980, 1982 and 1984 The United States of America	The wife's annuity ratio	Ordinary least squares and probit regressions	Wives tend to buy more life insurance than their husbands. More Social Security survivor benefits and employer-provided group life protect against poverty among elderly widows.
21.Lewis (1989)	Life Insurance Marketing and Research Association survey	1976 The United States of America	Holding of life insurance	The log of the likelihood	Social Security reduces the holding of supplied life insurance. There is adverse effect between net worth and life insurance demand.
22.Truett and Truett (1990)	Several economic sources in the U.S. and Mexico	1960- 1982 The United States of America, also 1964-1979 Mexico	The quantity demanded of insurance	Regression analysis	Age, education and income effect the life insurance demand for America. Income elasticity of demand for life insurance in Mexico is relatively bigger than in the U.S.
23.Bernheim (1991)	Longitudinal Retirement History Survey	1975 The United States of America	The level of annuities demanded	Tobit model	There are positive relationships between insurance purchases and total wealth and also Social Security annuity income. The bequest motive effects total savings behavior.
24.Browne and Kim (1993)	Swiss Re; World Bank; United Nations	1980 and also 1987 19 Countries	Logarithmic life insurance per capita	Ordinary least squares model	Dependency ratio, national income and government spending on Social Security are positively significant on life insurance demand for 1980.
25.Showers and Shotick (1994)	Consumer Expenditure Survey	1987 The United States of America	Actual expenditure on premiums for insurance	Tobit model	Income and number of earners are significantly positive effect on insurance demand. Although, family size and age are negatively related with demand.

Appendix 2: Life Insurance Demand Studies (Continued)

Author(s) (Year)	Data	Period and Countries	Dependent Variable	Method	Findings
26.Outreville (1996)	IMF; United Nations	1986 45 developing economies	The quantity of insurance protection needed in life insurance	Ordinary least squares	Personal disposable income and level of financial development significantly relate to insurance development.
27.Gandolfi and Miners (1996)	American Counsel of Life Insurance, and National Family Opinion Inc.	1984 The United States of America	Life insurance ownership	Tobit models using the method of maximum likelihood	Contributions to household production, home ownership, and money income have favorable impacts on life insurance demand. There are adverse relationship between education of the wife and insurance on the husband.
28.Hau (2000)	U.S. Survey of Consumer Finances	1989 The United States of America	Life insurance holding	Tobit regression	Net worth, annuity wealth and charitable motives are positively related to life insurance purchases. Demographic and personal characteristics less important than financial and wealth variables with regard to life insurance demand by retired singles.
29.Chen et al (2001)	Life Insurance Marketing and Research Association	1940 - 1996 The United States of America	The purchase rate with respect to each age group	The constrained multiple regression	Baby boomers buy less life insurance than earlier generations, so that purchasing decrease in life insurance in the U.S.
30.Ward and Zurbruegg (2002)	Swiss Re	1987-1998 37 Countries	The logarithm of life insurance density	Pooled OLS, fixed-effect model and System GMM	Showed that improved civil rights and political stability lead to an increase in the consumption of life insurance, both in the Asian and OECD regions.
31.Beck and Webb (2003)	Swiss Re; World Bank; IMF	1961-2000 68 Countries	Life insurance consumption	Fixed and random effect model	Suggested that even if life insurance was a luxury good, the demand for life insurance would still, not be significantly influenced by the income distribution.

Appendix 2: Life Insurance Demand Studies (Continued)

Author(s) (Year)	Data	Period and Countries	Dependent Variable	Method	Findings
32.Hwang and Gao (2003)	Swiss Re	1986-1996 Chinese	Life insurance premium expenditure	Multiple regression model	Research has not found a negative effect of inflation on life insurance consumption, even China experienced high inflation in the mid-1990s.
33.Ziets (2003)	Literature reviews				Documented most of the studies that have attempted to explain consumer behavior concerning the purchase of life insurance over the past 50 years.
34.Hussels et al (2005)	Literature reviews				Documented most of the studies that have attempted to explain consumer behavior concerning the purchase of life insurance over the past 50 years.
35.Baek and DeVaney (2005)	Survey of Consumer Finances	2001 442 Households; The United States of America	Individual term policy and cash value life policy	Double hurdle model; Probit model, Truncated regression model	Household head was employed, married and with more liquid assets or in a higher income tax bracket were more likely to own cash value life insurance and they had a larger amount of cash value life insurance.
36.Lin and Grace (2007)	Survey of Consumer Finances; Federal Reserve	1992-2001 (triennial) The United States of America	Net amount at risk; and Face value of term life insurance	Ordinary least squares	There is a relationship between financial vulnerability and the amount of term life or total life insurance purchased. Also,it finds that older consumers use less life insurance to protect a certain level of financial vulnerability than younger consumers.
37.Li et al (2007)	OECD; IMF; European Central Bank	1993-2000 OECD Economies	Life insurance sales per capita	Generalized Method of Moments and also Ordinary least square estimate	Results showed that a significant positive income elasticity of demand for life insurance exists and demand is dependent on the number of dependents and level of education but falls with life expectancy and Social Security expenditure.

Appendix 2: Life Insurance Demand Studies (Continued)

Author(s) (Year)	Data	Period and Countries	Dependent Variable	Method	Findings
38.Gutter and Hatcher (2008)	Survey of Consumer Finances data from Federal Reserve (triennial)	2004 The United States of America	The ratio of life insurance coverage to the present value of human capital	Tobit analysis, Ordinary least squares regression, Probit analysis for the likelihood	There is little difference in life insurance ownership between black and white households but that white households insure a larger proportion of their human capital than black households.
39.Chui and Kwok (2008)	World Bank; IMF	1976-2001 41 countries.	Life insurance density	The pooled generalized least squares technique	Individualism indeed has a significant, positive effect on life insurance consumption, whereas power distance and masculinity/femininity have significant, negative effects.
40.Sen (2008)	Swiss Re; World Bank	1994 - 2004 12 Asian countries or regions	Insurance penetration and Insurance density	Two separate panel data regression models	Results support the fact that demographic variables like life expectancy, young and old dependency ratio, adult literacy rate and rate of urbanization are significant determinants of life insurance demand.
41.Arena(2008)	World Bank	1976-2004 55 Countries	Economic growth	GMM dynamic models	Both life and non-life insurance have a positive and significant causal effect on economic growth. For life insurance, high-income countries drive the results and for non-life insurance, both high-income and developing countries drive the results.
42.Haiss and Sümegi(2008)	European Insurance and Reinsurance Federation	1992-2005 29 European countries	Real GDP	Cross-country panel data analysis	There are a positive impact of life insurance on GDP growth in the EU-15 countries, Switzerland, Norway and Iceland.
43.Zheng et al(2009)	National Statistical Bureau; United Nations; Swiss Re	1980-2007 95 countries and regions	Benchmark ratio of insurance penetration	Insurance growth model	The relative growth level of the insurance industry in developed markets is still higher than that in developing markets, but in emerging markets and BRIC countries are undergoing rapid development.

Appendix 2: Life Insurance Demand Studies (Continued)

Author(s) (Year)	Data	Period and Countries	Dependent Variable	Method	Findings
44.Kakar and Shukla (2010)	Counsil of India; India Financial Protection Index	2004-2005 63,016 Households	Life insurance participants	Logistic regression	Insured households tend to be more prosperous, more educated and more optimistic about future security than non-insured households.
45.Feyen et al(2011)	AXCO; IMF; World Bank	2000-2008 90 Countries	ratio of total assets of insurance companies to GDP	Pooled OLS and Dynamic panel regression	Life sector premiums are driven by income, population size, demographic structures, income distribution, the size of the public pension system, state ownership of insurance companies, the availability of private credit and religion.
46.Lee and Chiu(2012)	Swiss Re; World Bank	1979-2007 36 countries	Log-transformed real insurance premium	Panel smooth transition regression model	The life and non-life insurance premiums are inelastic and elastic with respect to real income, suggesting that they are a necessary good and luxury good respectively.
47.Kjosevski (2012)	Swiss Re; World Bank	1998-2010 14 Countries in Eastern Europe	Life insurance penetration and Life insurance density	Fixed-effects panel model	Higher, GDP per capita, inflation, health expenditure, level of education and rule of law are the most robust predictors of the use of life insurance.
48.Liebenberg et al (2012)	Triennial survey of consumer finance	1983 - 1989 The United States of America	Purchase new term and new whole life insurance	Tobit regression	There are significant relationship between life events, such as new parenthood and the demand for life insurance.
49.Mahdzan and Victorian (2013)	Sample of 259 life insurance policy holders in Kuala Lumpur	Malaysia	Life Insurance Demand	Multiple regression	Demographic variables and saving motives were significantly related to life insurance demand. Financial literacy, however, was found to be insignificant in determining life insurance demand.

Appendix 2: Life Insurance Demand Studies (Continued)

Author(s) (Year)	Data	Period and Countries	Dependent Variable	Method	Findings
50.Ćurak et al (2013)	Survey; 95 respondents	Croatia	The purchase of life insurance	Chi-Square test	Age, education and employment impact life insurance demand of household in Croatia while gender, marital status and number of family members do not have statistically significant influence.
51.Sliwinski et al (2013)	Statistical Office of Poland	1991 - 2005 Poland	Gross written premiums	Linear regression model	Factors of an economic and financial nature strongly stimulate the demand for life insurance.However, some results contradict the factor that includes variables such as education level and social benefits.
52.Sen and Madheswaran (2013)	Swiss Re publications; IMF; World Bank	1994 - 2008 12 selected Asian economies	Insurance penetration, and Insurance density	Two separate panel data regression models	The results suggest that income, financial depth, inflation, the real interest rate and the youth dependency ratio are significant determinants of life insurance consumption.
53.Lee et al (2013)	Swiss Re; World Bank	1984 - 2009 39 countries	Insurance demand	Panel smooth transition regression model	When political risk is lower, the elasticity decreases in countries with high-income, common law origin, and insurance activities permitted by banks, whereas a clear pattern cannot be identified in the case of financial risk.
54.Dragos (2014)	World Bank; Swiss Re	2001-2011 17 Emerging economies from Asia and Europe	Insurance density	Fixed and random effects model	Showed that urbanization influenced significantly the life insurance demand in Asia, but not in Europe. Also, education was found to be significant only for the non-life sector in both regions and income was non significant in Asia for non-life sector.
55.Yuan and Jiang (2015)	China Statistical Yearbook	2000-2012 31 provinces in Mainland China	Insurance density	Panel data model	Level of income, level of education, dependency ratio and inflation mainly affect the demand for life and non-life insurance.

Appendix 2: Life Insurance Demand Studies (Continued)

Author(s) (Year)	Data	Period and Countries	Dependent Variable	Method	Findings
56.Millo and Carmeci (2015)	Isvap; Eurostat	1996 - 2001 103 Italian provinces	Life insurance density in euro per capita	Two-step maximum likelihood	The ratio of young dependents to people of working age captures the need for life protection, while the substitution effect of Social Security payments, although showing the expected sign is not significant.
57.Alhassan and Biekpe (2016)	World Bank	1996 - 2010 31 African countries	Life insurance penetration	GMM instrumental variables s	Demographic factors better explain life insurance consumption compared to financial factors.
58.Zerriaa and Noubigh (2016)	Swiss Re; World Bank; IMF	2000-2012 17 Middle East and North Africa countries	Insurance density and Insurance penetration	Panel data regression models; Log-linear models	Life insurance demand is lower in predominantly Islamic countries.
59.Ondruska et al (2016)	The survey involved 870 respondents	Slovak Republic	The ownership of the particular insurance policy	Classification tree method	Age, education,savings and employment status are the most robust predictors of the life insurance consumption.
60.Luciano et al (2016)	Bank of Italy and Survey	2012 6,973 Individual observations	The willingness to buy an insurance contract	Probit model	Women are less likely to pay for an insurance contract than men, and financial proximity is a highly significant factor explaining demand.
61.Zerriaa et al (2017)	Swiss Re; World Bank; Tunis insurance companies	1990 - 2014 Tunisia	Life insurance density and Life insurance penetration	Multiple regression log-linear model	Pension expenditures have a negative effect on life insurance consumption confirming the substitution by Social Security system for private insurance.
62.Dragos et al (2017)	World Bank; Eurostat; European Central Bank	2002-2012 32 European countries	Life insurance density	Panel data analysis; Log normal model	Government indicators are not effective on developed countries for life insurance buying demand while these indicators are positively influence developing countries.

Appendix 2: Life Insurance Demand Studies (Continued)

Author(s) (Year)	Data	Period and Countries	Dependent Variable	Method	Findings
63.Lin et al (2017)	Taiwan Financial Supervisory Commission	2010 22 cities in Taiwan 2472 respondents	Purchased life insurance	Logistic regression model	Participant characteristics, such as age, gender, marital status, working status and personal income are also major factors affecting the demand for life insurance.

Appendix 3: Non-Life Insurance Demand Studies

Author(s) (Year)	Data	Period and Countries	Dependent Variable	Method	Findings
1.Beenstock et al (1988)	Swiss Re; World Bank	1970-1981 12 countries also 1981 45 countries	Life insurance demand	Ordinary least squares; Demand and supply system	Property-liability insurance is a superior good and is disproportionately represented in economic growth and premiums vary directly with real rates of interest.
2.Outreville (1990)	UNCTAD	1983 and 1984 55 Countries	The demand for property-liability insurance density	Ordinary least squares	The economic importance of the insurance sector is still low when considering the share of total premiums generated in developing countries.The external debt situation of the developing countries is likely to slow the pace of growth.
3.Outreville (1992)	Swiss Re; UNCTAD	1986 50 Countries	The property-liability insurance density	Ordinary least squares	The existence of local reinsurance services seems to play a positive and significant role in the retention capacity of the market.
4.Browne et al(2000)	OECD; World Bank; IMF	1987-1993 OECD Countries	Motor vehicle premium density; General liability premium density	Fixed-effects model and Pooled cross-sectional model	Income, wealth, the per- cent of a country's insurance market controlled by foreign firms and the form of the legal system in the country are significant on demand.
5.Esho et al(2004)	Swiss Re; World Bank	1984-1988 44 Countries	Real per capita property-liability insurance	GMM dynamic system	There are strong positive relationship between the protection of property rights and insurance consumption, which is robust to various model specifications and estimation techniques.
6.Nakata and Sawada(2007)	Swiss Re; Penn World Table	1994	Aggregate insurance demand premium	Linear regression model	Wealth elasticity of insurance demand is smaller than unity for the upper, middle and high wealth countries. In low wealth countries, the wealth elasticity of insurance demand is greater than unity.

Appendix 3: Non-Life Insurance Demand Studies(Continued)

Author(s) (Year)	Data	Period and Countries	Dependent Variable	Method	Findings
7.Arena(2008)	World Bank	1976-2004 55 Countries	Economic growth	GMM dynamic models	Both life and non-life insurance have a positive and significant causal effect on economic growth. Non-life insurance has a larger effect in high income countries than in the developing ones.
8.Haiss and Sümegi(2008)	European Insurance Federation	1992-2005 29 European countries	Real GDP	Cross-country panel data analysis	Findings emphasis the impact of the real interest rate and the level of economic development on the insurance-growth nexus.
9.Guo et al(2009)	The U.S. Bureau of Economic	1990 - 2007 The USA	Insurance premiums	Multivariate structural vector error correction model	Financial market shocks are the main driving force behind the recent increasing volatility in insurance premiums in the U.S. market, although real shocks originating from oil price and aggregate supply explain the behavior of insurance premiums well.
10.Zheng et al(2009)	United Nations; Swiss Re	1980-2007 95 countries and regions	Benchmark ratio of insurance penetration	Insurance growth model	The relative growth level of the insurance industry in developed markets is still higher than that in developing markets, but in emerging markets and BRIC Countries are undergoing rapid development and has achieved a relatively high level.
11.Millo and Carmeci(2011)	Italian Insurance Authority	1998-2003 103 Italian provinces	Insurance penetration	Maximum likelihood, Random-effect model	It finds a significant and positive influence of income and wealth on insurance consumption, although both elasticities are much less than one.
12.Feyen et al(2011)	AXCO; IMF; World Bank	2000-2008 90 Countries	Life and non-life insurance penetration	Pooled OLS and Dynamic panel regression	Non-life sector is affected by per capita income, population size, demographic structures, income distribution, the availability of private credit and religion.
13.Lee and Chiu(2012)	Swiss Re; World Bank	1979-2007 36 countries	Log-transformed real insurance premium	Panel smooth transition regression model	The life and non-life insurance premiums are inelastic and elastic with respect to real income, suggesting that they are a necessary good and luxury good respectively.

Appendix 3: Non-Life Insurance Demand Studies(Continued)

Author(s) (Year)	Data	Period and Countries	Dependent Variable	Method	Findings
14.Lee et al (2013)	Swiss Re; World Bank	1984 - 2009 39 countries	Insurance demand	Panel smooth transition regression	The relationship between the income elasticity of insurance demand and country risks is negatively same direction.
15.Dragos (2014)	World Bank; Swiss Re	2001- 2011 17 Asia and Europe Emerging economies	Insurance density	Fixed and random effects model	Showed that urbanization influenced significantly the life insurance demand in Asia, but not in Europe. Also, education was found to be significant only for the non-life sector in both regions and income was non-significant in Asia for non-life sector.
16.Millo (2016)	Swiss Re; Penn World Tables; IMF	1970-2010 95 Countries	Real per capita insurance consumption	Fixed effects model	World non-life insurance markets growth rate same with the general economy.

Appendix 4: Descriptive Statistics of Life and Non-life Insurance Demand for Developed and Developing Countries

	Life Insurance Demand									
	Developed Countries					Developing Countries				
Variables	N	Mean	Std. Dev.	Min	Max	N	Mean	Std. Dev.	Min	Max
logprempc	494	2.792	.807	-.168	3.860	684	1.557	.844	-.351	3.435
logpremgdp	494	.349	.518	-1.502	1.140	684	-.187	.617	-1.653	1.160
loggdppc	494	4.537	.301	3.696	5.073	684	3.859	.439	2.802	4.757
int	494	4.309	6.044	-70.432	93.937	684	15.517	15.114	1.630	183.2
bankgdp	494	102.302	47.453	10.85	263.13	684	60.369	35.765	10.11	179.09
urb	494	75.509	11.255	51.77	97.818	684	64.639	23.441	8.55	100
femlab	494	44.664	2.583	36.762	49.644	684	36.258	9.014	13.093	49.563
health	494	8.680	2.126	3.214	17.140	684	5.357	1.969	1.925	13.437
depen	494	49.394	3.241	40.400	62.383	684	55.462	13.425	28.851	96.113
pop	494	.383	.743	-3.820	2.890	684	1.694	1.263	-1.474	7.773
lifeexp	494	78.212	3.195	69.004	83.587	684	71.382	6.670	45.877	82.495

	Non-Life Insurance Demand									
	Developed Countries					Developing Countries				
Variables	N	Mean	Std. Dev.	Min	Max	N	Mean	Std. Dev.	Min	Max
logprempc	520	2.811	.491	.995	3.668	720	1.814	.678	-.103	3.225
logpremgdp	520	.367	.189	-.363	.944	720	.062	.306	-.845	.849
loggdppc	520	4.535	.300	3.696	5.073	720	3.860	.437	2.802	4.757
int	520	4.205	5.931	-70.432	93.937	720	15.365	15.042	1.630	183.2
bankgdp	520	102.758	47.034	10.85	263.13	720	61.167	36.200	10.11	179.09
urb	520	75.627	11.271	51.77	97.858	720	64.828	23.405	8.445	100
femlab	520	44.729	2.562	36.762	49.644	720	36.327	9.020	13.093	49.563
health										
depen										
pop										
lifeexp										

Appendix 5: Descriptive Statistics of Life and Non-life Insurance Demand for High-Income and Middle-Income Countries

	Life Insurance Demand										Non-Life Insurance Demand									
	High-Income Countries					Middle-Income Countries					High-Income Countries					Middle-Income Countries				
Variables	N	Mean	Std. Dev.	Min	Max	N	Mean	Std. Dev.	Min	Max	N	Mean	Std. Dev.	Min	Max	N	Mean	Std. Dev.	Min	Max
logprempc	627	2.787	.690	.720	3.860	551	1.265	.698	-.351	2.894	660	2.786	.423	1.77	3.668	580	1.601	.595	-.103	2.531
logpremgdp	627	.3385	.524	-1.099	1.140	551	-.304	.576	-1.653	1.160	660	.336	.224	-.434	.944	580	.023	.295	-.845	.691
loggdppc	627	4.532	.244	3.978	5.073	551	3.697	.343	2.802	4.239	660	4.534	.243	3.978	5.073	580	3.699	.342	2.802	4.239
int	627	6.164	8.049	-7.848	118.37	551	16.112	15.984	-70.432	183.2	660	6.009	7.906	-7.848	118.379	580	16.005	15.907	-70.432	183.2
bankgdp	627	97.176	44.673	18.68	263.13	551	56.081	36.769	10.11	179.09	660	97.780	44.401	18.68	263.13	580	56.794	37.052	10.11	179.09
urb	627	78.404	16.102	8.55	100	551	58.721	18.864	18.579	91.604	660	78.503	16.118	8.445	100	580	58.948	18.853	18.579	91.751
femlab	627	41.973	7.270	13.180	49.644	551	37.290	8.478	13.093	49.563	660	42.044	7.288	13.180	49.644	580	37.354	8.459	13.093	49.563
health	627	7.882	2.639	1.931	17.140	551	5.463	1.892	1.925	13.431										
depen	627	48.744	6.356	28.851	70.536	551	57.666	12.806	35.590	96.113										
pop	627	.980	1.383	-1.853	7.773	551	1.330	1.061	-3.820	7.061										
lifeexp	627	77.901	3.297	68.430	83.587	551	70.087	6.618	45.877	79.416										