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Determinants of demand for life insurance in European countries

Abstract

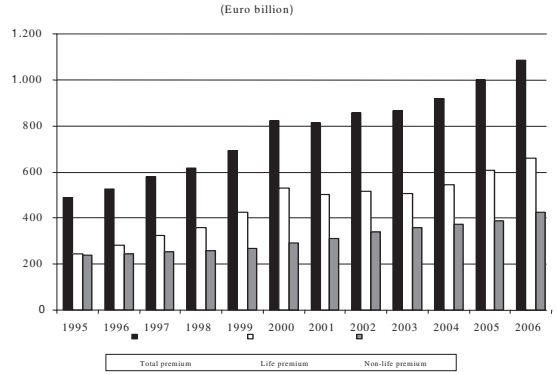
In this study, we investigate the determinants of demand for life insurance in cross section of 31 European countries. As a result, we find that income is the central variable which affects life insurance consumption. In addition, while the impact of population and income on demand for life insurance is positive, education level and inflation affect life insurance consumption in negative way.

Keywords: life insurance demand, cross section, European countries.
JEL Classification: G22, C21.

Introduction

One of the most important decisions the individuals or families make is whether to purchase life insurance or not. The rationale behind considering such a decision is to hedge against possible loss of income after the person who earns it dies. However, the process of making a decision regarding the purchase of life insurance and the choice of the most appropriate plan for the consumers' needs is a little bit complicated. Many consumers may avoid such a decision as they lack information about this process. That is why it is crucial to identify the factors that may have an effect on the consumers' demand for life insurance so that policy makers can help consumers in choosing life plans that best suit to their personal needs.

Due to social, demographic and economic changes, life insurance sector has witnessed substantial growth in recent years. Figure 1 presents the share of life insurance premiums in total premiums in Europe. As can be seen, share of life insurance premiums in total premiums increases lately. While life insurance premiums are 300 billion euro in 1995, it is almost 650 billion euro in 2006. Life insurance and non-life insurance premiums are about equal in 1995. Until 2006, we observe that life insurance premiums grow much more than non-life insurance premiums.



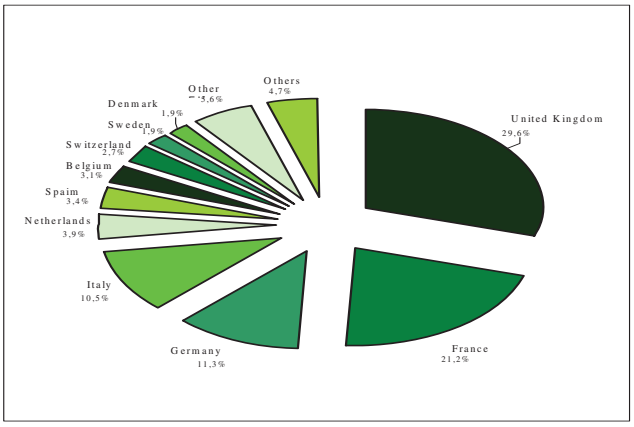
Source: European Insurance and Reinsurance Federation.

Fig. 1. Share of life insurance premiums

In Figure 2, share of total life premium is presented in terms of European countries. In this context, United Kingdom has the biggest share of 29.6%. France follows United Kingdom with the share of 21.2%. Germany has the share of 11.3% and the share of Italy is 10.5%.

In this study, we investigate the determinants of demand for life insurance in European countries. In this respect, this study is the first which investigates life insurance demand in 31 European countries by using recent observations. From this perspective, this paper will contribute to finance literature.

This paper is organized as follows: section 1 presents the specific literature of earlier studies, section 2 describes researched hypotheses, section 3 describes data and methodology, section 4 presents empirical evidence and the last section provides summary and conclusion.



Source: European Insurance and Reinsurance Federation.

Fig. 2. Share of total life premium in 2006

In terms of life premium/GDP ratio, Luxembourg is the first country with the share of 35.3%, United Kingdom is the second with the share of 10.3% and France is third with the share of 7.9%.

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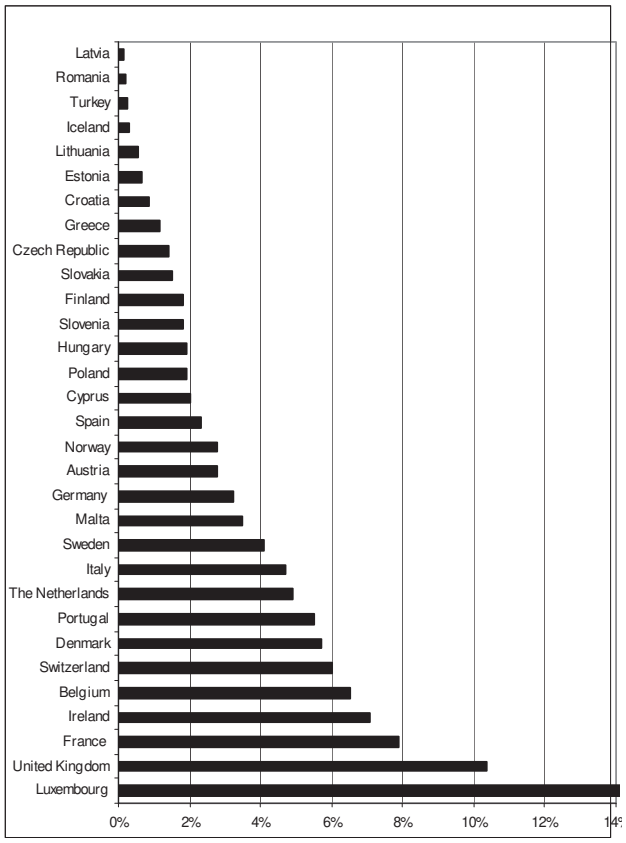

Source: European Insurance and Reinsurance Federation.

Fig. 3. Life premium/GDP

1. Literature

The subject of factors affecting life insurance consumption is one of the most researched areas in finance literature for many years. Researchers use various social, demographic and economic variables in their analysis to reveal determinants of demand for life insurance.

Hammond et al. (1967) make a study on the impact of economic and demographic factors of demand for life insurance by using regression analysis. They find that income, net worth holdings, stage in the life cycle, education, occupation significantly affect life insurance consumption.

Neumann (1969) investigates the impact of inflation on life insurance consumption by using time series regression for the period of 1946-1964. However, other explanatory variables such as income, number of marriages, births and urban households are used to prevent spurious correlation. As a result, it is found that inflation has no significant effect on life insurance consumption.

Berekson (1972) analyzes the impact of age, marital status, number of children financially responsible, gross income, birth order among siblings and parent's divorced on life insurance consumption by using regression analysis in 1969. They find that while age, number of children and birth order variables have significant effects on demand for life insurance, income is not significant for one survey and significant for another.

Fortune (1973) studies the determinants of life insurance consumption by using multiple regression analysis for the period between 1964 and 1971. As a result of multiple regression analysis, non human wealth held, wages, discount rate and consumer confidence variables are found significant. While non human wealth held affects life insurance consumption in negative way, wages and discount rate affect in positive way.

Anderson and Nevin (1975) investigate life insurance purchasing behavior of young newly married couples by conducting survey of young married couples for the period of 1968-1971. They use twenty independent variables and three different dependent variables (life premium expenditures, amount of life insurance purchased, type of life insurance purchased). They find that following six independent variables are statistically significant in explaining the amount of life insurance purchased; education, current household income, expected household income, net worth of household, husband's insurance before marriage and wife's insurance before marriage. Three of the independent variables are significant in explaining type of life insurance purchased; net worth, wife's insurance portfolio before marriage, influence of insurance agent.

Burnett and Palmer (1984) analyze the impact of demographic and psychographic variables on demand for life insurance. They observe that in psychographic variables work ethic, fatalism, socialization preference, religion salience, and assertiveness are the most important factors that affect life insurance consumption. In addition, education, number of children and income are the best demographic factors.

Truett and Truett (1990) compare the demand for life insurance in Mexico with that in the United States by applying time series regression. As a result, they find that age, education and level of income are the significant factors positively related with life insurance consumption. In addition, they stress that income elasticity of demand for life insurance is much higher in Mexico.

Browne and Kim (1993) investigate the factors that lead to variations in the demand for life insurance across countries by using regression analysis in 1980 and 1987. They observe that while the impact of dependency ratio, income and government spending

on social security on life insurance consumption are positive, the impact of inflation, the price of insurance and religion are negative. However, education and life expectancy variables have not widespread significance.

Beck and Webb (2003) study the determinants of demand for life insurance in 68 economies by using panel data for the period of 1961-2000. As a result, they find that while economic indicators such as inflation, income per capita, banking sector development and religious and institutional indicators are the most important variables in life insurance consumption; education, life expectancy, the young dependency ratio, the size of the social security system do not affect it.

Hwang and Greenford (2005) examine determinants of life insurance consumption in China, Hong Kong and Taiwan. They find that income, education and economic development have positive effect on demand for life insurance. Social structure and one child policy have negative impact on life insurance consumption. However, social security and price have no significant effect on demand for life insurance.

Li et al. (2007) analyze life insurance consumption by using cross section data for 30 OECD countries for the period between 1993 and 2000. They indicate that income, number of dependents, level of education, financial development and degree of competition are positively related to life insurance consumption. However, life expectancy, social security expenditure, inflation, real interest rates decrease life insurance consumption in OECD countries.

2. Research hypotheses

Based on existing literature, we determine four social and economic variables which may affect demand for life insurance.

Income: The level of income is the prominent variable which affects the demand for life insurance. Previous studies mostly show that there is significant and positive relationship between level of income and demand for life insurance (Mantis and Farmer, 1968; Fortune, 1973; Browne and Kim, 1993). Following the previous studies we form hypothesis I as;

H1: There is positive and statistically significant relationship between income level and demand for life insurance.

Education: In previous studies, it is found that there is statistically significant and positive relationship between level of education and demand for life insurance (Burnett and Palmer, 1984; Truett and Truett, 1990). Truett and Truett (1990) explain that if education level is high, people are aware of types of life insurance and they try to protect themselves and dependents by using them. So, our hypothesis regarding education level is as follows:

H2: There is positive and statistically significant relationship between education level and demand for life insurance.

Population: Mantis and Farmer (1968) indicate that the larger the population, the more demand will be for life insurance. They find that there is significant and positive relationship between population and demand for life insurance. Our hypothesis is as follows:

H3: There is positive and statistically significant relationship between population and demand for life insurance.

Inflation: In the literature, it is observed that inflation affects demand for life insurance in negative way (Babbel, 1981; Browne and Kim, 1993; Li et al., 2007). Our hypothesis is as follows:

H4: There is negative and statistically significant relationship between inflation and demand for life insurance.

3. Data and research method

In this study, we use averaged cross section data for 31 European countries for the period of 2000-2006. Our sample includes following countries: Austria, Belgium, Switzerland, Cyprus, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Iceland, Italy, Lithuania, Luxembourg, Latvia, Malta, The Netherlands, Norway, Poland, Portugal, Romania, Sweden, Slovenia, Slovakia and Turkey[1].

Data for life insurance premiums are obtained from European Insurance and Reinsurance Federation. Life insurance premiums are obtained in million euros, however, we convert them into U.S dollars by using annual euro/dollar parity between 2000-2006. Data for income per capita, education, population and inflation are obtained from World Bank.

We estimate the following model with OLS to investigate the impact of income, education, population and inflation on demand for life insurance. Inflation is not specified in log form following Li et al. (2007).

$$\log(LIP) = \beta_0 + \beta_1 \log(IPC) + \beta_3 \log(E) + \beta_4 \log(P) + \beta_5 I + \varepsilon_t . \quad (1)$$

We present description of variables in Table 1.

[1] In this study, only data for 31 European countries are used to determine factors affecting demand for life insurance. Thus, the empirical results may not generalize in other countries.

Table 1. Description of variables

Variable	Definition
LIP	Life Insurance Premium Per Capita (in U.S. dollars)
IPC	Income Per Capita (GDP per capita, in current U.S. dollars)
E	Education (Tertiary Gross Enrollment Ratio (%)
P	Population, total
I	Inflation, GDP Deflator (annual, %)

4. Empirical results

Table 2 presents descriptive statistics for variables. In European countries, average per capita income is 22.968 U.S. dollars. However, average life insurance premium per capita is 0.0014 U.S. dollars. This means that life insurance consumption has little share in income. All variables show very large dispersion, for example, while inflation is 0.67 for one country, it is 27.36 for another. Similarly, while per capita income is 3126 U.S. dollars for one country, and 64652 U.S. dollars for another. From five series, only income per capita and education variables have normal distribution.

Table 2. Descriptive statistics

Variable	Mean	Minimum	Maximum	Std. deviation	Skewness	Kurtosis
LIP	0.0014	0.0000	0.0188	0.0033	4.6886	24.8366
IPC	22968.22	3126.954	64652.71	15491.20	0.5936	2.8071
E	54.0019	11.0000	87.7100	17.1119	-0.4820	2.9411
P	18234737	290882.3	82422014	23682212	1.4668	3.7448
I	4.6580	0,6700	27.3600	5.7950	3.1974	12.2375

Since we observe heteroskedasticity problems by applying White test, we correct this problem and present White heteroskedasticity-consistent estimations in Table 3.

Table 3. Regression results

	Dependent variable
Independent variables	Life premium
Intercept	-25.81973*** (1.6780)
IPC	1.914667*** (0.159)
E	-1.360317*** (0.300)
P	0.311456*** (0.122)
I	-0.096129*** (0.026)
R^2	0.919
Adjusted R-squared	0.907
DW	2.03
F-statistic	74.40662
Prob (F-statistic)	0.00000

Note: At first, the regression model comprises following independent variables which may affect the demand for life insurance: Income, Education, Dependency Ratio (population under 15 and over 64/ between 15 and 64), Life Expectancy (in years), Urban Population (% of total population), Financial Development (Market capitalization of listed companies), Population, Inflation, Dummy Variable (1 if country is dominantly Islamic or 0 visa versa). Data for Dependency Ratio, Life Expectancy, Urban Population and Financial Development are obtained from World Bank database. Repeating regression analysis, the most insignificant variable is subtracted from regression model until only significant variables exist, and the regression model is formed as equation 1. *** indicates significance at the 0.01 level. Standartd errors are in parentheses.

As indicated in Hypothesis 1, income per capita has positive and significant effect on demand for life insurance. 1% increase in income per capita causes 1.91% increase in demand for life insurance. This result is consistent with Mantis and Farmer (1968), Fortune (1973), Truett and Truett (1990), Browne and Kim (1993). By contrast with income variable, education is not consistent with Hypothesis 2. The sign of education is negative meaning that higher education level decreases life insurance demand. However, this result confirms the study of Anderson and Nevin (1975) who find less educated husband tends to consume more life insurance. We can explain this result as the higher educated people analyze their consumption more critically and they decide against consuming life insurance between years 2000-2006 (Anderson and Nevin, 1975). As suggested in Hypothesis 3, the sign of population variable is positive and significant indicating an increase in population increases life insurance consumption. This result is consistent with Mantis and Farmer (1968). The sign of inflation is negative and significant supporting Hypothesis 4. This result is consistent with Babbel (1981) and Outreville (1996). Babbel (1981) explains that inflation with constraining regulations can lead to higher perceived real costs of life insurance. So, life insurance demand decreases in inflationary periods.

Adjusted R^2 is 90 percent indicating good-fit of regression. Besides, DW statistic is almost 2 supporting there is no serial correlation between residuals. We also apply Wald test to investigate whether coefficients are statistically different from zero or not. Wald test results indicate that coefficients are statistically different from zero. In addition, the residuals have normal distribution.

Summary and conclusion

In this study, we investigate the determinants of demand for life insurance on cross section of 31 European countries. Consistent with previous studies, we find that income is the most important variable which affects consumption of life insurance. However, the results related to education level are surprising. While previous studies find that there is positive relationship between education and demand for life insurance, the sign of education variable is negative in our results. We explain this as more educated people analyze their consumption more critically between years 2000 and 2006, they decide not to consume life insurance (Anderson and Nevin, 1975). In addition, the demand for life insurance decreases in inflationary periods confirming common literature. Furthermore, population is positively related with life insurance consumption confirming the study of Mantis and Farmer (1968).

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Appendix

Table 4. Wald test results

Wald test:			
Test statistic	Value	df	Probability
F-statistic	104.0496	(4, 26)	0.0000
Chi-square	416.1985	4	0.0000
Null hypothesis summary:			
Normalized restriction (= 0)		Value	Std. err.
C(1)		1.914667	0.159812
C(2)		0.311456	0.122712
C(3)		-1.360317	0.300259
C(4)		-0.096129	0.026693
Restrictions are linear in coefficients			
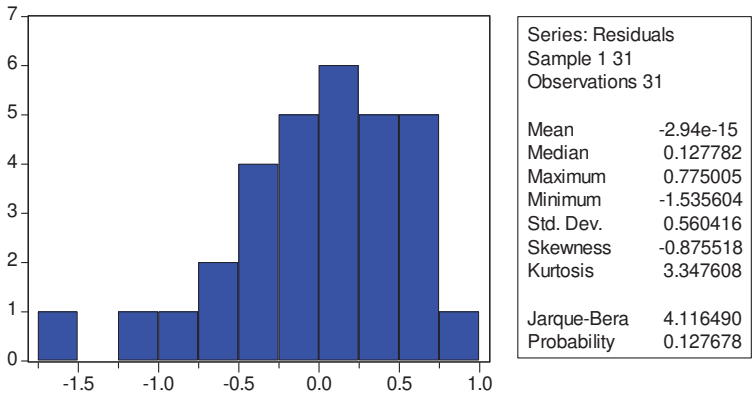
Table 5. Jarque-Bera test results