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Determinants of Life Insurance Consumption across Countries

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Abstract

The importance of life insurance companies as part of the financial sector has significantly increased over the past decades, both as provider of important financial services to consumers and as a major investor in the capital market. However, Beck and Webb still observe a large variance in life insurance consumption across countries, which raises the question of its determinants. The authors use a greatly expanded data set on life insurance consumption to examine the determinants of the demand and supply of life insurance products across countries and over time. Using a cross-sectional sample of 63 countries averaged over 1980–96, Beck and Webb find that educational attainment, banking sector development, and inflation are the most robust predictors of life insurance consumption, while income is only a weak predictor. The results on educational attainment and inflation are confirmed in a panel of 23 countries over the period 1960–96. The results strengthen the case for promoting price stability, financial sector reform, and an efficient education system if life insurance and its many benefits are to be fully realized in an economy.

This paper—a product of Finance, Development Research Group—is part of a larger effort in the group to understand the link between financial and economic development. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Agnes Yaptenco, room MC3-446, telephone 202-473-1823, fax 202-522-1155, email address ayaptenco@worldbank.org. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at tbeck@worldbank.org or webb@iifdc.org. February 2002. (44 pages)

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1. Introduction

Life insurance companies play an increasingly important role within the financial sector. While during the period 1980-85, total assets of life insurance companies constituted only 11% of GDP for a sample of 13 countries, for which data are available, they constituted 28% for the period 1995-97 in the same countries.[1] This increased importance is also reflected in the business volume of life insurers. Whereas life insurance penetration – the ratio of premium volume to GDP – was at 1.2% during the period 1961-65, it reached 3.2% in the period 1991-96 for a sample of 19 countries, for which data are available.[2] While this increased importance of life insurance both as provider of financial services and investment funds on the capital markets is especially pronounced for developed countries, most developing countries still experience very low levels of life insurance consumption. While South Africa's penetration ratio was 7.4% over the period 1980-96, Iran's was only 0.02%. Given the large variation in indicators of life insurance consumption across countries, the question of the causes of this variation and therefore the determinants of life insurance consumption arises.

Life insurance provides individuals and the economy as a whole with a number of important financial services. In the face of increasing urbanization, mobility of the population, and formalization of economic relationships between individuals, families, and communities, life insurance has taken increasing importance as a way for individuals and families to manage income risk. Also, life insurance products encourage long-term savings and the re-investment of substantial sums in private and public sector projects. Because life

[1] The countries included are: Australia, Fiji, Italy, Japan, Korea, Malaysia, New Zealand, Norway, South Africa, Taiwan, Trinidad and Tobago, U.K. and U.S. Source for these calculations are the data provided by Beck, Demirgüç-Kunt and Levine (2000).

[2] See sample in Table 3.

insurance products offer a means of disciplined contractual saving, they have become effective as instrument for encouraging substantial amounts of savings in many countries around the world. Leveraging their role as financial intermediaries, life insurers have become a key source of long-term finance.

In spite of the increasing importance that life insurance has in managing income risk, facilitating savings, and providing term finance, we do not yet understand well what drives its demand and supply across countries and over time. A number of authors have proposed a variety of different socio-economic and institutional factors as possible determinants of life insurance consumption. Limited data samples, however, have constrained the testing of theoretical hypotheses.

This paper improves on the existing literature in several ways. We use a greatly expanded data set, combining results from panel and cross-sectional analyses, and using alternative measures of life insurance consumption. First, the new data set extends significantly the coverage of countries and time periods. Previous cross-sectional and panel studies have been limited in depth or in breadth, and were not representative of the variety of life insurance consumption across countries and over time.[3] We use both 1) a cross-sectional data set spanning 63 developed and developing countries over the period 1980-96; and, 2) a panel data set spanning 23 countries over the period 1960-96.

Second, by combining cross-sectional and panel analysis we can compare cross-country and time-series variation in our relationships. The cross-country estimations test several new hypotheses as well as previous findings on this expanded data set of developing

[3] Browne and Kim (1993) use data for 45 countries for the year 1987, and Outreville (1996) for 48 countries for the year 1986. Truett and Truett (1990) produce estimates for two countries, the U.S. and Mexico, over the period 1960 to 1982 and Beenstock, Dickinson, and Khajuria (1986) for 10 Organization for Economic Cooperation and Development (OECD) countries over the period 1970-1981.

and developed countries. By using 16-year averages, moreover, the cross-section estimations are not subject to selection year bias as are some other studies.[4] The panel analysis allows us to exploit the time series variation in life insurance consumption and its potential determinants. We can thus better assess what has driven the rapid increase in life insurance consumption over the last four decades.

Finally, using three alternative measures of life insurance consumption provides additional depth. Life insurance penetration, life insurance density, and life insurance in force measure different aspects of life insurance consumption. We identify a few specific differences we expect them to have with some of the determinants tested in this study. Life insurance in force is a stock variable, indicating the outstanding face amounts plus dividend additions of life insurance policies, while life insurance penetration and density are flow variables, indicating the amount spent on life insurance premiums, relative to GDP or per capita.

The results presented herein are expected to assist policy makers identify the institutional and demographic determinants that drive the supply and demand of life insurance. The findings may clarify new strategies for developing nascent life insurance markets and extending the reach of life insurance's many benefits to a wider population.

The remainder of the paper is organized as follows. Section 2 describes our measures of life insurance consumption. Section 3 discusses potential determinants of life insurance consumption. Section 4 describes the econometric techniques we will be using. Section 5 presents the empirical results for the cross-section of 63 countries and section 6 for a panel of 23 countries and seven 5-year periods. Section 7 concludes.

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[4] Empirical tests of demand and supply hypotheses within only one year are subject to distortion from country-specific fluctuations in premium figures or economic indicators in that year.

2. Life Insurance across Countries

The majority of life insurance policies around the world can be classified into three general categories: 1) policies providing death coverage only; 2) policies providing both a death coverage and a savings component; and, 3) policies serving primarily as saving vehicles. What are known as term policies in the U.S. fall within the first category. Premiums for these policies essentially cover the cost of mortality risk, administrative expenses and a profit loading. Policies in the second category, popularized as whole life, universal life, and variable life in the U.S., generally have higher premiums that include an explicitly or implicitly defined savings component. This additional component typically earns interest and is returned to the consumer through policy dividends, cash-values on termination of the policy, or endowment sum on maturation of the policy. Policies in the third category, which are not common in the U.S. but have been popularized in other countries, are primarily savings vehicles. While they offer little or no mortality coverage, they are often considered life insurance policies since they are marketed and sold by life insurers.

In addition to life policies, life insurers sell annuity policies. Annuities are insurance policies wherein the insurer promises to pay the insured a series of periodic payments, often over the remainder of his/her lifetime, upon payment of a lump sum at the beginning of the period. Insurers providing annuities thus often undertake risks associated with supperannuation of the insured.

As the three measures of life insurance consumption that we will be using in our empirical analysis aggregate all three categories of life insurance policies as well as annuity policies, we cannot distinguish between the demand and supply of mortality risk insurance

versus savings through life insurance. This aggregation in the data produces a bias against finding significant relationships.[5] Significant results between the variables hypothesized to affect insurance consumption and the amount consumed are therefore likely to be a sign of the added robustness of these relationships.

Life Insurance Penetration is defined as the ratio of premium volume to GDP. It measures the importance of insurance activity relative to the size of the economy. Both numerator and denominator are in local currency, with GDP numbers coming from the International Monetary Fund (IMF)'s International Financial Statistics (IFS). *Life Insurance Penetration*, however, is not a perfect measure of consumption since it is the product of quantity and price. A higher premium volume might therefore reflect a higher quantity, a higher price or a difference in the mix of mortality and savings element purchased. Lack of competition and costly regulation might increase the price of insurance without implying a higher level of insurance consumption.

Our second indicator of life insurance consumption is **Life Insurance Density,** defined as premiums per capita, expressed in international real dollars. It indicates how much each inhabitant of the country spends on average on insurance in real international dollars. To calculate these ratios, we first convert the premium volume into international dollars by multiplying it with Purchasing Power Parity (PPP) conversion factors from the World Bank's World Development Indicators (WDI).[6] We then divide the premium volume in international dollars by the population size, also obtained from the WDI and deflate the numbers by the

[5] See Browne and Kim (1993), footnote 1.

[6] The Purchasing Power Parity conversion factor is defined as the number of units of a country's currency required to buy the same amounts of goods and services in the domestic market as one U.S. dollar would buy in the United States. Using PPP conversion factors is preferable to using exchange rates, since the latter are distorted by differences in exchange rate regimes. Furthermore, PPP conversion factors take into account that the price of nontraded goods relative to traded goods increases with the income level of economies. Since the death

U.S. Consumer Price Index (CPI), obtained from the IFS, to make the indicator comparable over time. Since data on the PPP conversion factor are only available for the period 1980-96, the insurance densities in international real dollars are constrained to this period. Insurance densities using average-period exchange rates from the IFS are also calculated for the years 1960-1996 for use in the panel estimation.

Although both *Life Insurance Penetration* and *Life Insurance Density* use gross premiums, there remain important differences between both measures with repercussions for cross-country comparisons. *Life Insurance Penetration* measures life insurance consumption relative to the size of the economy, while *Life Insurance Density* compares life insurance consumption across countries without adjusting for the income level of the economy. Consumers that purchase life insurance policies to insure their dependents against mortality risk will potentially buy more coverage and thus a higher face value in richer countries, since the death benefit has to replace a larger income. We therefore expect *Life Insurance Density* to be more income elastic than *Life Insurance Penetration*.

Our third measure of life insurance consumption is **Life Insurance in Force to GDP.** It equals the sum of the face amounts plus dividend additions of life insurance policies outstanding as a share of GDP. It is a quantity measure of life insurance consumption, the quantity being mortality risk underwritten plus savings accumulated. Life insurance in force thus contains both the cash value of policies, associated with the savings component of life insurance policies and the net amount of risk faced by life insurers. Data on life insurance in force were obtained from the American Council of Life Insurance and GDP data from the

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benefit of life insurance policies has to cover the typical household expenditures in both traded and nontraded goods, using exchange rates would bias the insurance density of developing countries downward.

IFS.[7] Unlike *Life Insurance Penetration* and *Life Insurance Density*, *Life Insurance in Force to GDP* does not include the price and so measures only quantity.

Although all three measures of life insurance consumption contain all three types of life insurance products described above, the mortality risk and the savings components have different weights in the premium and in the stock measures. For a given structure of the insurance market, the mortality risk component, as measured by the net amount of risk, has a stronger weight in *Life Insurance in Force to GDP* than in *Life Insurance Penetration* or *Density*.

Table 1 presents summary statistics and correlations for our three measures of life insurance consumption. We observe a large variation in levels of life insurance consumption across countries. Whereas Iran had a *Life Insurance Penetration* of 0.02 % of GDP during 1980-96, South Africa's penetration ratio was 7.4 %. Iranians spent one dollar per year on life insurer services, whereas Japanese spent 1,129 dollars. Similarly, Peru's *Life Insurance in Force* constituted 1.4% of GDP, whereas Japan's superseded 320 % of GDP. There are large correlations between all three measures of life insurance consumption that are significant at the one-percent level. We also present the elasticity of the three indicators of life insurance consumption to real per capita income.[8] The positive elasticity seems to indicate that life insurance is a superior good; consumers spend a higher share of their income on life insurance products as per capita income increases. As expected, the elasticity of *Life*

[7] Since the numerator is a stock and the denominator a flow variable, both variables have to be deflated accordingly. We follow a procedure proposed by Beck, Demirgüç-Kunt, and Levine (2000) and deflate the stock variable by end-of-year consumer price indices (CPI) and the GDP by the annual CPI. Then we compute the average of the deflated stock variable in year t and t-1 and divide it by real GDP measured in year t. For the CPI numbers we use line 64 and for GDP line 99b from the IFS. The end-of-year CPI is either the value for December or, where not available, the value for the last quarter.

[8] We calculate these elasticities by looking at the correlation between the log of the three insurance indicators and the log of real per capita income. To make the correlations comparable across the three indicators, they are calculated over the 36 countries for which we have data on all three measures.

Insurance Density to real per capita income is higher than for *Life Insurance Penetration*, while the elasticities for *Life Insurance Penetration* and *Life Insurance in Force to GDP* are not significantly different from each other. Note, however, that these are simple correlations and do not control for other determinants of life insurance consumption.

3. Determinants of Life Insurance Consumption

This section describes the theoretical underpinnings of our empirical tests and different factors hypothesized to drive the demand and supply of life insurance policies. Table 2 summarizes the potential determinants of life insurance demand and supply and their hypothesized sign.[9]

3.1. Theoretical Underpinnings

Yaari (1965) and Hakansson (1969) were the first to develop a theoretical framework to explain the demand for life insurance. Within this framework, the demand for life insurance is attributed to a person's desire to bequeath funds to dependents and provide income for retirement. The consumer maximizes lifetime utility subject to a vector of interest rates and a vector of prices including insurance premium rates. This framework posits the demand for life insurance to be a function of wealth, expected income over an individual's lifetime, the level of interest rates, the cost of life insurance policies (administrative costs), and the assumed subjective discount rate for current over future consumption.

Lewis (1989) extends this framework by explicitly incorporating the preferences of the dependents and beneficiaries into the model. Specifically, he derives the demand for life insurance as a maximization problem of the beneficiaries, the spouse and the offspring of the

life insurance policyholder. Deriving utility maximization by both spouse and offspring separately and assuming no bequest by the policyholder and an isoelastic utility function, Lewis shows that total life insurance demand can be written as follows:

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

where l is the policy loading factor – the ratio of the costs of the insurance to its actuarial value -, p the probability of the primary wage earner's death, F the face value of all life insurance written on the primary wage earner's life, δ a measure of the beneficiaries' relative risk aversion, TC the present value of consumption of each offspring until he/she leaves the household and of the spouse over his/her predicted remaining life span ands W the household's net wealth. Life insurance demand increases with the probability of the primary wage earner's death, the present value of the beneficiaries' consumption and the degree of risk aversion. Life insurance demand decreases with the loading factor and the household's wealth.

Life insurance consumption, however, is not only driven by consumer demand. There are important supply-side factors which affect the availability and price of life insurance. Insurance companies need both the human and information resources to effectively measure the pricing and reserving requirements for products as well as adequate opportunities in financial markets to invest adequately. An adequate protection of property rights and an effective enforcement of contracts also facilitate the investment function of life insurers. These supply factors are expected to affect the costs of life insurance products. Within the

[9] For an excellent overview of the potential determinants of the demand and supply of life insurance products, see Skipper (2000), chapter 3.

Lewis model, described above, these supply-side factors might be represented by the policy-loading factor.

While there have been attempts to model the relation between the supply and demand of life insurance separately, data limitations have restricted the empirical testing of these hypotheses.[10] While we can observe the total amount spent on life insurance policies, using premium data, or the total face value of outstanding insurance policies, we cannot distinguish between supply and demand. Furthermore, premium data do not allow us to observe the actual amount of insurance coverage purchased, as they are a combined measure of price and level of coverage. Unless the price is constant across countries, which is unlikely, assuming that the premium is equivalent to the amount of coverage would introduce a source of noise in our estimations. On the other hand, using the variable often used to proxy price (premiums over life insurance in force) in a cross-country or panel data set requires one to make a troublesome assumption, namely, that the mix of policies remains constant across countries and time.[11]

Price, however, is undoubtedly an important determinant in the consumption of life insurance, and leaving it out may subject the empirical testing to omitted variable bias. We address this problem in two ways. First, we assume that the price is a function of several supply-side factors that are likely to affect the ability of insurers to market and distribute policies cost-effectively. Varying levels of urbanization, monetary stability, bureaucratic quality, rule of law, corruption, and banking sector development all impact the insurer's ability to provide cost-effective insurance. Including these supply-side factors within our

[10] Compare Beenstock, Dickinson, and Khajuria (1986).

[11] Browne and Kim (1993) use such a price variable, but note the bias introduced by different composition of the overall insurance portfolio across countries.

empirical model thus reduces the bias introduced by the missing price variable. Second, we use panel estimation techniques that eliminate biases due to omitted variables, such as the price variable in our model.

In the following we will describe different variables that may be linked to the demand function described by Lewis (1989) as well as several supply factors that might proxy for the policy loading factor. While the Lewis model, described above, focuses on the mortality risk component of life insurance policies, we will link the different determinants also to the savings component of life insurance policies.

3.2. Demographic Variables

A higher *ratio of young dependents to working population* is assumed to increase the demand for mortality coverage and decrease the demand for savings through life insurance. On the one hand, a larger share of dependents increases the total present value of consumption of the insured's beneficiaries, and therefore the demand for life insurance that provides dependents with payments in the event of the premature death of the primary wage earner.[12] On the other hand, a high dependency ratio indicates the extent to which the population is too young to consider saving for retirement, and therefore reduced demand for savings through life insurance products. Beenstock, Dickinson, Khajuria, (1986), Browne and Kim (1993) and Truett and Truett (1986) find that the dependency ratio is positively correlated with life insurance penetration. Given opposite effects of the dependency ratio on the mortality and savings components of life insurance, however, we predict that a higher dependency ratio is ambiguously correlated with life insurance consumption. To measure the ratio of young

[12] This would result in a higher *TC* in Eq. (1).

dependents to the working population, we use data from the WDI. The indicator is defined as the ratio of the population under 15 to the population between 15 and 65. [13]

A higher *ratio of old dependents to working population* is assumed to increase the demand for both the mortality and the savings component of life insurance policies. While the theoretical work focuses mostly on the life insurance policies held by primary wage earners, life insurance policies held by retirees have gained importance in many developed countries. Furthermore, we conjecture that in countries with a larger share of retired population, savings through life insurance policies as well as protection against superannuation gains importance. To measure the ratio of old dependents to the working population, we use data from the WDI. The indicator is defined as the ratio of the population over 65 to the population between 15 and 65.

We expect that a higher level of *education* in a population will be positively correlated with the demand for any type of life insurance product. The level of a person's education may determine his/her ability to understand the benefits of risk management and savings. A higher level of education might therefore increase an individual's level of risk aversion.[14] Education may also increase the demand for pure death protection by lengthening the period of dependency, as well as increasing the human capital of, and so the value to be protected in, the primary wage earner.[15] Truett and Truett (1990) and Browne and Kim (1993) find a positive relationship between life insurance consumption and the level of education. As an indicator of the level of education across countries we use the average years of schooling in the population over 25, obtained from Barro and Lee (1996).

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[13] We also use an alternative dependency measure, the overall dependency ratio, which is the sum of young and old dependency ratios.
[14] This would be reflected by a lower δ in Eq. (1).
[15] This would be reflected by a higher TC in Eq. (1).

The *religious inclination* of a population may affect its risk aversion and its attitude towards the institutional arrangements of insurance.[16] Religious opposition against life insurance, while stronger in European countries before the 19th century, still persists in several Islamic countries today.[17] Followers of Islam are known to disapprove of life insurance because it is considered a hedge against the will of Allah. Unsurprisingly, Browne and Kim (1993), and Meng (1994), find a dummy variable for Islamic countries to be negatively correlated with life insurance demand. This study employs a broader measure of religious inclination by including Protestantism, Catholicism and a composite of other religions. The religion variables are defined as the ratio of adherents of one religion over the entire population. While we expect the Muslim share of the population to be negatively related to life insurance demand, we do not have prior expectations about the signs on the other religion variables. We use data from La Porta, Lopez-de-Silanes, Shleifer and Vishny (1999).

Economies with a higher *share of urban to total population* are expected to have higher levels of life insurance consumption. The concentration of consumers in a geographic area simplifies the distribution of life insurance products, as costs related to marketing, premium collection, underwriting and claim handling are reduced. Lower costs, in turn, should encourage a greater supply.[18] The variable used is from the WDI, measuring the share of urban population in the total population.

Societies with longer *life expectancies* should have lower mortality coverage costs, lower perceived need for mortality coverage, but higher savings through life insurance

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[16] This would be reflected by cross-country variation in δ in Eq. (1).
[17] Zelizer (1979) discusses the role that religions have in creating a cultural opposition to life insurance.
[18] While we describe the close relationship certain variables are likely to have with the price of life insurance, and so its supply, we recognize that there may be demand-side relationship with these variables as well. For example, a higher share of urban population is often correlated with less reliance on informal insurance agreements and therefore may induce a higher demand for formal insurance products.

vehicles.[19] This would imply an ambiguous correlation with the demand for life insurance products.[20] Previous authors [Beenstock, Dickinson, Khajuria (1986), and Outreville (1996)] have found life expectancy positively related to *Life Insurance Penetration*. We use data on life expectancy from the WDI.

3.3. Economic Variables

Life insurance consumption should rise with the level of *income*, for several reasons. First, an individual's consumption and human capital typically increase along with income. This can create a greater demand for insurance (mortality coverage) to safeguard the income potential of the insured and the expected consumption of his/her dependents.[21] Second, life insurance may be a superior good, inasmuch as increasing income may explain an increasing ability to direct a higher share of income towards retirement and investment-related life insurance products. Finally, the overhead costs associated with administrating and marketing insurance make larger size policies less expensive per dollar of insurance in force, which lowers the price of life insurance policies. Campbell (1980), Lewis (1989), Beenstock, Dickinson, Khajuria (1986), Truett and Truett (1990), Browne and Kim (1993), and Outreville (1996) have all shown that the demand for life insurance is positively related to income, using both aggregate national account data and individual household data. To measure the income level of countries, we employ real GDP per capita, using data from the WDI.[22]

We expect *inflation* to have a negative relationship with life insurance consumption. As life insurance savings products typically provide monetary benefits over the long term, monetary uncertainty has a substantial negative impact on these products' expected returns.

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[19] A higher life expectancy would be reflected by a lower p in Eq. (1).
[20] Compare Beenstock, Dickinson, Khajuria, (1986).
[21] This would be reflected by a higher TC in Eq. (1).

Inflation can also have a disruptive effect on the life insurance industry when interest rate cycles spur disintermediation. Fixed interest rates and loan options imbedded in some life insurance policies, for example, spurred disintermediation in the U.S. life insurance market during the inflationary 1970's and 1980's. These dynamics make inflation an additional encumbrance to the product pricing decisions of life insurers, thus possibly reducing supply in times of high inflation.[23] We measure inflation as the log difference of the Consumer Price Index (CPI), using data from the IMF's International Financial Statistics.

We expect *banking sector development* to be positively correlated with life insurance consumption. Well-functioning banks may increase the confidence consumers have in other financial institutions, e.g. life insurers. They also provide life insurers with an efficient payment system. The efficient development of the entire financial system - as might be reflected in the absence of interest rate ceilings and other distortionary policies – is thought to help life insurers invest more efficiently. This in turn may translate into a better value, or price, offered to consumers for their life insurance. Outreville (1996) finds a significantly positive relationship between financial development and life insurance penetration. We use a measure of banking sector development provided by Beck, Demirgüç-Kunt and Levine (2000). Specifically, we measure the total claims of deposit money banks on domestic nonfinancial sectors as share of GDP.

We expect the size of a country's *social security system* to be negatively correlated with the demand for life insurance products. Kim (1988) and Meng (1994) postulate that social security displaces private insurance. If a greater amount of retirement savings is being channeled through the government, or if the public sector provides substantial benefits to

[22] Previous cross-country studies have used both Gross National Product (GNP) and Gross Domestic Product (GDP), and GNP minus depreciation and indirect business taxes [Browne and Kim (1993).]

families of prematurely deceased wage earners, then ceteris paribus there should be less demand for life insurance savings products. This public-private sector substitution may apply similarly to benefits provided to families of prematurely deceased wage earners.[24] This study uses the share of public expenditures on social security and welfare as a share of GDP as an indicator of the size of the social security system, with data coming from the WDI.

The expected correlation of the *income distribution* of a country with life insurance consumption is ambiguous. Beenstock, Dickinson, Khajuria (1986) reason that wealthy sections of the population do not need insurance protection while poorer sections have a limited demand because they operate under income budget constraints.[25] A more equal income distribution resulting in a larger middle class might therefore result in a higher demand for life insurance policies. On the other hand, one can argue that the very rich can (and do in the U.S. and other countries) use life insurance to pass on wealth to their descendants. Furthermore, while the middle-class may have the greatest demand for life insurance savings products and may also be able to afford the minimum administrative costs associated with any type of life insurance policy, there may be a minimum level of income at which these policies become affordable. Accordingly, a large middle class in a poor country may result in less individuals being able to purchase life insurance than a less equal distribution with a larger and/or wealthier upper class. The resulting relationship of income distribution with life insurance consumption is therefore ambiguous. Beenstock, Dickinson, Khajuria (1986) find that the less equal is the distribution of income, the lower the penetration

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[23] Cargill and Troxel (1979) discuss the various impacts that inflation can have on the market for life insurance.
[24] This would be reflected in a higher W in Eq. (1).
[25] The possibility of declining risk aversion with greater wealth, and the replacement of life insurance coverage with surplus assets in an individual's portfolio is expected to reduce the demand for life insurance among the wealthy.

of life insurance. We use the Gini coefficient to measure income distribution. Our data come from Deininger and Squire (1996).

3.4. Institutional Determinants

The tenability of a vibrant life insurance market depends to a large extent on the institutional framework of a country. An inclination to fraud may induce individuals to file duplicitous claims or claims arising from intentionally induced death of insured. If fraud is common in claim reporting, then the insurance mechanism will become prohibitively costly for a large part of the population, or simply break down entirely. Moreover, highly inefficient government bureaucracies tend to go hand in hand with inefficient judiciaries. The inability to appeal the breach of life insurance contracts by insurers reduces the value of an insurance contract to consumers and may deter them from committing large sums of money into these products. Finally, the lack of property protection and contract enforcement impedes life insurers' ability to invest efficiently and control the price of their products.

To measure these institutional factors, we use three different indicators compiled by the International Country Risk Guide (ICRG). *Rule of Law* measures the degree to which citizens of a country are able to use the legal systems to mediate disputes and enforce contracts. *Bureaucratic Quality* measures the autonomy from political pressures, the strength and expertise to govern without drastic changes in policy or interruptions in government services, and the existence of an established mechanism for recruiting and training. *Corruption*, finally, measures the degree of corruption in an economy. These indicators are constructed so that higher values represent better institutional environments.

3.5. Regional and Time Dummies

In addition to the explanatory variables described up to now, we include regional dummy variables and, in the panel regressions, time dummy variables. We include regional dummy variables to capture any other potential determinants that are not proxied for by other explanatory variables. Among these might be cultural or historic differences that are not captured by the religious composition or any of the other variables. We include dummy variables for Latin America, Africa and Asia, with European and North American countries captured in the constant. We include time dummy variables in the panel estimations to test whether there is a secular increase in life insurance consumption across countries that cannot be explained by any of the other explanatory variables.

4. Econometric Methodology

We use both cross-sectional and panel estimation techniques to explore the empirical relation between life insurance consumption and the potential determinants identified by theory and described in the previous section. This section describes the rationale behind the cross-country regressions and then the panel techniques that we are using.

The cross-sectional analysis uses data for 60 countries in the case of *Life Insurance Penetration* and *Density* and 39 countries in the case of *Life Insurance in Force to GDP*.[26] We include the dependent and several independent variables in logs, so that the coefficients on the explanatory variables can be interpreted as elasticities. Data are averaged over the period 1980-96, so that there is one observation per country.[27] By averaging data over several

[26] Table 3 lists the countries in the sample.

[27] The two samples for life insurance penetration/density and life insurance in force only partly overlap. The life insurance in force sample contains 36 of the same countries within the life insurance penetration/density sample and three more new countries: Fiji, Honduras and Zambia

years we eliminate selection year bias that arises when life insurance consumption and its determinants are measured only in one year.

The panel analysis uses data for 19 mostly developed countries, with data averaged over seven 5-year periods between 1960 and 1996.[28] Using a panel allows us to not only exploit the cross-country variation but also the variation over time in life insurance consumption and its potential determinants. Since most of our countries in the panel sample are high-income countries in Europe and North America, however, we lose cross-country variation, while gaining additional time series variation.

We use the random-effects and the fixed-effects model to estimate the panel regressions. This allows us to control for differences across countries that are otherwise not accounted for.[29] While the fixed-effects model introduces country-specific intercepts, the random effects model introduces a country-specific error term. We will use a Hausman test to test for the appropriateness of the fixed- or the random-effects model.[30] We will use the fixed-effects results, whenever the Hausman test shows a p-value of less than 10%.

5. Determinants of Life Insurance across Countries, 1980 - 1996

This section presents the results of cross-country regressions for our three life insurance consumption indicators on different determinants over the period 1980-96. The baseline

[28] The samples for Life Insurance Penetration and Density, on the one hand, and Life Insurance in Force, on the other hand, are not identical. Specifically, Belgium, Brazil, Great Britain, and Mexico are only in the sample of Life Insurance Penetration and Density, while Netherlands, Peru, Philippines, and Taiwan are only in the sample of Life Insurance in Force.

[29] The latter can be variables that are not included in our estimation since they are not varying over time or other underlying country characteristics that are not captured in any of our variables. Among these omitted variables might be the price variable, for which we use proxy variables such as the supply determinants described above, but do not have any direct measure.

[30] The null hypothesis of the Hausman test is that random- and fixed effects estimates are not statistically different under the assumption that both estimators are consistent. In this case, however, the fixed effects model

regression contains real per capita GDP, the young dependency ratio, the average years of schooling, the life expectancy, the inflation rate and the indicator of banking sector development. These variables can be linked directly to Lewis' model of life insurance demand, with the latter two conjectured to impact the policy-loading factor. In subsequent regressions we include a larger set of potential determinants of life insurance consumption. Given that we have different samples for our three measures, we also test the robustness of the results by using the joint sample of 36 countries.[31] While not presenting the results, we will discuss differences between the larger samples and the joint sample.

Tables 4, 5 and 6 report the results for the cross-sectional regressions for *Life Insurance Penetration, Life Insurance Density, and Life Insurance in Force to GDP,* respectively. P-values, calculated from heteroskedasticity robust t-statistics are reported in parentheses. The R^2 of our regressions indicate that the included variables explain more than half of the variation of life insurance consumption across countries. The first column reports the results of our baseline regression; columns 2-10 report the results when including additional determinants.

5.1. Life Insurance Penetration

The results in Table 4 show that the variation of *Life Insurance Penetration* across countries can be explained by variation in income level, average years of schooling, life expectancy, inflation and banking sector development. These five variables show significant coefficients in our baseline regression. Whereas the results for average years of schooling, inflation and banking sector development are robust to including other potential explanatory variables, the results for income level and life expectancy are less robust.

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is inefficient. Under the alternative hypothesis that both estimates are statistically different only the fixed-effects model gives consistent coefficients.

The results of our baseline regression in column 1 indicate that a 10% increase in real per capita income increases *Life Insurance Penetration* by 3.5%, thus confirming that life insurance is a superior good.[32] When we include the Gini coefficient, regional dummies or bureaucratic efficiency, however, the coefficient on income level turns insignificant. This might indicate that the correlation between income level and *Life Insurance Penetration* is a spurious one proxying for other determinants of life insurance consumption. Furthermore, once we restrict the sample to the 36 countries for which we have data for all three measures of life insurance consumption, the coefficient on income level turns insignificant.

The results underline the importance of a high level of education for life insurance consumption. The coefficient on average years of schooling is significant in all regressions. The result is also economically large. If Algeria's population had had 5.94 years of education in 1980, as did the median country, instead of the actual 1.48, its *Life Insurance Penetration* would have been 0.66% of GDP, instead of the actual 0.08%. This result is robust to the use of the smaller sample of 36 countries.

Macroeconomic stability, especially price stability, seems to be an important predictor of life insurance consumption. The coefficient on the inflation rate is significantly negative in all specifications. The effect of a stable macroeconomic environment is also economically large. If Brazil - the country with the highest average inflation rate in our sample - had achieved an average inflation rate over the period 1980-96 of the sample median 8.92%

[31] See footnote 25.

[32] The fact that the elasticity found in the regression analysis is lower than the simple correlation reported in Table 1 can be explained by the fact that here we control for other determinants of life insurance consumption.

instead of the actual 159%, *Life Insurance Penetration* would have been 1.16% of GDP instead of 0.20%.[33] This result is robust to the use of the smaller sample of 36 countries.

Banking sector development is positively correlated with *Life Insurance Penetration,* while a higher life expectancy seems to reduce *Life Insurance Penetration.* The coefficient on the indicator of banking sector development is significantly positive in all specifications.[34] However, this result is not completely robust to the use of the smaller 36-country sample. The result on life expectancy, on the other hand, is not robust, once we include regional dummy variables or bureaucratic efficiency. This confirms the theory that predicts an ambiguous sign on life expectancy.

Variation in the share of young population cannot explain variation in *Life Insurance Penetration* across countries. This result confirms the hypothesis of two offsetting effects of the dependency ratio on gross premiums, a positive effect on mortality risk and a negative effect on the saving component.[35]

Turning to our additional explanatory variables, the religious composition and income distribution can explain variation in *Life Insurance Penetration* across countries. The results in column 3 indicate that – as hypothesized - a higher share of Muslim population decreases *Life Insurance Penetration* significantly. The results in column 5 indicate that societies with less equal income distribution have a higher level of *Life Insurance Penetration.* This result can be interpreted as additional evidence that life insurance is a superior good and that there

[33] This result matches the findings by Babbel (1981) that even the demand for inflation-indexed life insurance policies decreases during inflationary periods in Brazil.
[34] The positive coefficient does not imply a causal impact of banking sector development on life insurance penetration. It shows that countries with well-developed banks also have higher levels of life insurance consumption.
[35] This result is robust to the use of the overall dependency ratio.

may be an income budget constraint. This is contrary to the findings by Beenstock, Dickinson and Khajuria (1986).[36]

The results in columns 2, 4 and 6 indicate that neither the old dependency ratio, nor the share of urban population, nor the social expenditures by government can explain cross-country variation in *Life Insurance Penetration*, as hypothesized above. The coefficient on neither variable is significant in the respective regression.

The results in columns 7 through 9 indicate that out of our three indicators of institutional quality only the quality of bureaucracy is positively correlated with *Life Insurance Penetration*, although only at the 10% level. The coefficients on both the rule of law and corruption are insignificant. While this can be interpreted as lack of evidence that these supply side determinants are important, it can also be concluded that our indicator of banking sector development captures some of these supply side factors.

The results in column 10, finally, indicate that there are still additional factors determining *Life Insurance Penetration* not captured by any of the variables in the baseline regression. The three regional dummies that we include are jointly significant at the 1% level.

5.2. Life Insurance Density

The results in Table 5 indicate that the income level, average years of schooling, inflation and banking sector development explain the variation in *Life Insurance Density* across countries. The young dependency ratio and life expectancy cannot explain variance in *Life Insurance Density*. These results are very similar to the ones obtained for *Life Insurance Penetration*, so that in the following we will concentrate on the differences.

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[36] We also considered interaction terms between several of the explanatory variables, so for example between the urbanization ratio and income distribution. However, we did not find any significant effect.

Life Insurance Density increases with real per capita GDP. A 10% higher income level increases *Life Insurance Density* by 8.2%. This result is larger than for *Life Insurance Penetration* and also more robust to including other variables in the regression. Even when we restrict the sample to 36 countries, we find that the income level enters most times at least at the 10% significance level. This finding is consistent with the differences between the two indicators of life insurance consumption, as explained in section 2. The income elasticity of 0.82 is significantly higher than in other studies.[37]

As in the case of *Life Insurance Penetration*, the religious composition, the income distribution and the quality of bureaucracy can explain variation in *Life Insurance Density* across countries. Countries with less Muslim population, less equal income distribution and more effective bureaucracies spend more on life insurance than other countries. The old dependency ratio, the share of urban population, the share of social expenditures by government in GDP, the rule of law or corruption cannot explain variation of *Life Insurance Density* across countries. The regional dummies can explain part of the variation, but unlike the case of *Life Insurance Penetration* do not decrease the significance level of the other variables in the baseline regression.

5.3. Life Insurance in Force to GDP

The results in Table 6 indicate that the share of young population, average years of schooling and the inflation rate can explain variation in Life Insurance in Force to GDP across countries. These three variables show significant coefficients in the baseline regression and the results are mostly robust to including additional variables.

[37] Browne and Kim (1993) find an income elasticity of 0.58, Beenstock, Dickinson and Khajuria (1986) 0.57 and Outreville (1991) 0.52.

Countries with a higher share of young population have higher *Life Insurance in Force to GDP*. A 10% increase in the share of the population under 15 relative to the working population results in a 24.6% higher *Life Insurance in Force to GDP*.[38] This result is generally robust to including other variables, except when we include the Gini coefficient. The latter result, however, is due to the smaller sample.[39] Why do we find a positive correlation of the young dependency ratio with *Life Insurance in Force to GDP*, while not with *Life Insurance Penetration* and *Density*? While a higher share of dependents increases the mortality component of all life insurance measures, the corresponding decrease in the savings component might offset this in the case of the premium-based measures. But since mortality risk insurance constitutes a larger share of *Life Insurance in Force to GDP* than in *Life Insurance Penetration* and *Density*, the positive effect on the mortality risk component might dominate in the case of *Life Insurance in Force to GDP*.

As in the case of *Life Insurance Penetration* and *Density*, price instability has a negative impact on *Life Insurance in Force to GDP*, while higher levels of education result in higher *Life Insurance in Force to GDP*. Both variables show significant coefficients in all regressions.

There does not seem to be an independent effect of the income level or life expectancy on *Life Insurance in Force to GDP*. Banking sector development shows a significant coefficient on *Life Insurance in Force to GDP* only in the baseline regression, when controlling for corruption or the old dependency ratio or when including the regional dummies.

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[38] This result is confirmed when we use the overall dependency ratio, although only at the 10%-significance level.

[39] We confirm this by running the baseline regression on the sample for which we have data on income distribution. The young dependency ratio enters insignificantly.

Turning to the additional explanatory variables, societies with larger shares of urban population and more efficient bureaucracies have higher levels of *Life Insurance in Force to GDP*. Both variables show significantly positive coefficients. The religious composition of the population cannot explain variation in *Life Insurance in Force to GDP* across countries. The Gini-coefficient, the share of social expenditures by government in GDP, the rule of law or the level of corruption do not seem to be determinants of *Life Insurance in Force to GDP*.

The results of column 10, finally, show that there is still some variation in *Life Insurance in Force to GDP*, which cannot be explained by any of our variables in the baseline regressions and which is picked up by the regional dummies. Including these dummies, however, does not change the results of our baseline regression.

6. Determinants of Life Insurance in a Panel of Countries

This section complements the previous cross-sectional estimations by considering the determinants of life insurance consumption in a panel of 23 countries for *Life Insurance Penetration* and *Density* and *Life Insurance in Force to GDP* over a period of 36 years. While the sample for the period 1980-96 comprises a broad cross-section of developed and developing countries, the sample for the period 1960-96 comprises mostly Organization of Economic Cooperation and Development (OECD) countries. This limits the comparability of the results across the two samples. Using this longer sample, however, allows us to test how changes in the determinants over time within the countries affect life insurance consumption.

We report the results of either fixed- or the random-effects estimations, depending on the Hausman test, as described in section 4.[40] Tables 7, 8 and 9 report the results.[41]

The results in Table 7 indicate that the income level and average years of schooling are robust predictors of *Life Insurance Penetration* variation across countries and over time, while there is a negative and weakly significant link between inflation and life insurance consumption. The coefficient on the log of real per capita GDP is significant at the 1% level in all regressions, except when we control for the old dependency ratio. Average years of schooling have a significantly positive coefficient in all regressions. Inflation enters significantly negative at the 10% level in all regressions, except when controlling for the old dependency ratio. The young dependency ratio, life expectancy and banking sector development, on the other hand, are not robust predictors of life insurance penetration in our sample of high- and middle-income countries. Turning to the other explanatory variables, we note that the old dependency ratio enters significantly positive, implying that countries with a higher share of population in retirement age experience higher levels of *Life Insurance Penetration*. This result contradicts our findings in the broader cross-country sample for the period 1980-96. Furthermore, we find that the religious composition of the population predicts life insurance penetration, while none of the other explanatory variables enters significantly. The time dummies, however, enter jointly significant in all regressions, indicating that not all of the increase in life insurance consumption over the period 1960-96

[40] We use a p-value of 10% as cut-off point. However, for regressions with time-invariant variables we report the random-effects results, independent of the Hausman test.

[41] Unlike in the panel regressions for the period 1980-96, we treat the three indicators of institutional quality, Rule of Law, Bureaucratic Quality and Corruption, as time-invariant, since the data start in 1982. We do not include the share of public expenditures on social security and welfare as share of GDP in these regressions, since data start only in 1970.

can be explained by the determinants included in our empirical analysis. The Hausman tests indicate the appropriateness of the random effects model for all regressions.

The results in Table 8 indicate that variation in *Life Insurance Density* across countries and time can be explained by differences in the income level, the average years of schooling and inflation. The income level and the inflation rate enter significantly in all regressions, while the average years of schooling enters significantly in all regressions except for column (5) where we control for the income distribution and use the fixed-effects model. As in the cross-country estimations, we find that the coefficient on the income level is higher for *Life Insurance Density* than for *Penetration*. We also note that the coefficients on the income level are higher in the panel estimations for the period 1960-96 than for the cross-country estimations for the period 1980-96, both in the case of *Life Insurance Penetration* as *Density*. This might indicate that life insurance consumption is even more income elastic over time within a country than indicated by simple cross-country regressions. As it is the case for *Life Insurance Penetration*, the old dependency ratio enters significantly positive, while none of the other explanatory variables enters significantly at the 5% level. Again, the time dummies enter jointly significant in all regressions.

The results in Table 9 show that the income level, the average years of schooling and the young dependency ratio are weakly correlated with *Life Insurance in Force to GDP*, while the inflation rate and banking sector development are robust indicators of *Life Insurance in Force to GDP*. Whereas the significance of the income level depends on the set of the explanatory variables, the average years of schooling and the young dependency ratio enter significantly positive only in the random-effects regressions. Inflation and banking sector development enter significantly at the 5% level in all regressions, except for banking sector

development in the regression with the Gini coefficient. None of the other explanatory variables enters significantly at the 5% level. Unlike in the regressions of *Life Insurance Penetration* and *Density*, the time dummies do not enter significantly.

Why do the panel regressions yield different results than the cross-country regression? First, the sample for the panel regressions is much more homogenous than the cross-country sample, comprising mostly OECD countries that had similar macro-economic performances and demographic structures over the last 40 years. Second, the relation between life insurance consumption and its potential determinants might be different across countries as opposed to over time within a country. Overall, we confirm that educational attainment, as measured by the average years of schooling, and macroeconomic stability, as measured by the inflation rate, continue to be robust predictors of life insurance consumption, across all three indicators of life insurance consumption.

7. Concluding Remarks

This paper analyzed the determinants of life insurance consumption in a cross-country sample of 63 countries over the period 1980-96 and in a panel of 23 countries over the period 1960-96. We used three different indicators of life insurance, *Life Insurance Penetration*, *Life Insurance Density,* and *Life Insurance in Force to GDP.*

Our cross-country regression results indicate that *Life Insurance Penetration* and *Density* increase with the income level, whereas there is no independent effect of real per capita income on *Life Insurance in Force to GDP.* Education is strongly correlated with all three indicators of life insurance consumption. Countries with higher inflation rates experience lower life insurance consumption, a result that is again consistent across the three

indicators. Countries with a higher share of young population have higher *Life Insurance in Force to GDP*, but not higher *Life Insurance Penetration* or *Density*. Countries with higher levels of banking sector development and higher levels of bureaucratic quality experience higher levels of life insurance consumption.

The results from the panel regressions 1960-96 underline the importance of education and inflation in explaining life insurance consumption across countries and over time. We find a weak correlation between income level and life insurance consumption in the panel. While we do not find a relationship between banking sector development and *Life Insurance Penetration* and *Density*, we find a robust correlation of banking sector development with *Life Insurance in Force to GDP* in the panel. Unlike in the cross-section, we find that countries with a larger share of old population experience higher levels of *Life Insurance Penetration* and *Density*. We find evidence for a secular increase in *Life Insurance Penetration* and *Density* that cannot be explained by other determinants, but not for *Life Insurance in Force to GDP*.

In summary, the level of education and price stability are the most robust predictors of life insurance consumption across countries and over time. While the bi-variate correlation analysis suggests a high income elasticity of life insurance consumption, the regression results indicate only a weak predicting power of income. Finally, banking sector development seems to be a weak predictor of life insurance consumption. While we often find positive and significant coefficients, these results are not robust across the different measures of life insurance consumption and across cross-section and panel analysis.

The results of this paper constitute not only a useful test of hypotheses of the demand and supply of life insurance consumption, but have also implications for policy makers that

want to promote the life insurance sector and life insurers assessing the potential of a new market. A stable monetary environment enhances the supply and demand of life insurance policies. Higher levels of education promote the demand for life insurance policies. Finally, although our results do not establish a causal impact of banking sector development on life insurance consumption, the positive correlation we often find underlines the importance of a sound financial system. All three policy areas have positive effects on economic development and growth independent of their positive effect on the development of the insurance sector. Further, price stability has a positive impact on bank and stock market development.[42] Our results strengthen the case for promoting price stability, financial sector reform and an efficient education system if life insurance and its many benefits are to be fully realized in an economy.

[42] See Boyd, Levine, and Smith (2001).

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Table 1: Descriptive Statistics and Correlations

Descriptive Statistics 1980 - 96

	Life Insurance Penetration	Life Insurance Density	Life Insurance in Force to GDP
Mean	1.57	202.61	65.91
Median	0.81	52.56	54.10
Standard Deviation	1.79	266.95	67.88
Maximum	7.40	1128.72	320.06
Minimum	0.02	1.07	1.37
Observations	60	60	39

Correlations

	Life Insurance Penetration	Life Insurance Density	Life Insurance in Force to GDP
Life Insurance Penetration	1		
Life Insurance Density	0.89	1	
	(0.001)		
Life Insurance in Force	0.78	0.81	1
	(0.001)	*(0.001)*	
Income Elasticity	0.571	0.818	0.550
	(0.001)	*(0.001)*	*(0.001)*

p-values are reported in parentheses

Life Insurance Penetration = ratio of premium volume to Gross Domestic Product (GDP)
Life Insurance Density = premiums per capita, expressed in international real dollars
Life Insurance in Force to GDP = ratio of the sum of the face amounts plus dividend additions to GDP

Table 2: Determinants of Life Insurance Consumption Across Countries: Expected Results

		Savings Component	Mortality Risk Component	Combined Effect
Demographic	Young Dependency Ratio	-	+	ambiguous
	Education	+	+	+
	Urbanization ratio	+	+	+
	Religion	-muslim	-muslim	-muslim
	Life expectancy	+	-	ambiguous
Economic	Income	+	+	+
	Inflation	-	-	-
	Banking sector development	+	+	+
	Social Security	-	-	-
	Gini coefficient	ambiguous	ambiguous	ambiguous
Institutional	Rule of Law	+	+	+
	Bureaucratic Efficiency	+	+	+
	Corruption	+	+	+

This table assumes the division of life insurance consumption into a savings and a mortality risk component. The first column describes the expected effects on the savings component, the second column on the mortality risk component. The third column presents the combined predicted effect in our regression analysis.

Table 3: Countries in the Sample

	Cross-section estimations		Panel estimations	
	Life Insurance Penetration / Density	Life Insurance in Force to GDP	Life Insurance Penetration / Density	Life Insurance in Force to GDP
Algeria	*			
Argentina	*			
Australia	*	*	*	*
Austria	*	*	*	*
Belgium	*		*	
Brazil	*		*	
Bulgaria	*			
Cameroon	*			
Canada	*	*	*	*
Chile	*	*		
China	*			
Colombia	*			
Costa Rica	*	*		
Denmark	*	*	*	*
Dominican Republic	*			
Ecuador	*			
Egypt	*	*		
Fiji		*		
Finland	*	*	*	*
France	*	*	*	*
Germany	*	*	*	*
Great Britain	*	*	*	
Greece	*			
Guatemala	*	*		
Honduras		*		
Hong Kong	*			
Hungary	*			
Iceland	*	*		
India	*	*		
Indonesia	*	*		
Iran	*			
Ireland	*	*		
Israel	*	*	*	*
Italy	*	*	*	*
Japan	*	*	*	*
Kenya	*			
Korea	*	*		
Malaysia	*	*		
Mexico	*	*	*	
Netherland	*	*		*
New Zealand	*			
Norway	*	*	*	*
Pakistan	*	*		
Panama	*			
Peru	*	*		*
Philippines	*	*		*
Poland	*	*		
Portugal	*	*		
Romania	*			
Singapore	*			
South Africa	*	*		
Spain	*	*	*	*
Sweden	*	*	*	*
Switzerland	*		*	*
Taiwan	*	*		*
Thailand	*	*		
Tunisia	*	*		
Turkey	*			
Uruguay	*			
USA	*	*	*	*
Venezuela	*			
Zambia		*		
Zimbabawe	*			

Table 4: The Determinants of Life Insurance Penetration in a Cross-Section 1980 - 96

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	-2.718	0.600	-2.788	-2.811	-3.181	-4.805	-3.037	-5.118	-3.503	-1.872
	(0.490)	*(0.906)*	*(0.504)*	*(0.469)*	*(0.508)*	*(0.299)*	*(0.471)*	*(0.202)*	*(0.350)*	*(0.696)*
Income level[1]	0.348	0.390	0.578	0.482	0.222	0.367	0.408	0.144	0.326	0.135
	(0.029)	*(0.013)*	*(0.001)*	*(0.018)*	*(0.160)*	*(0.088)*	*(0.008)*	*(0.369)*	*(0.030)*	*(0.446)*
Young Dependency Ratio[1]	0.204	-0.383	0.514	0.383	-1.176	0.323	0.183	0.528	0.370	-0.374
	(0.666)	*(0.596)*	*(0.303)*	*(0.423)*	*(0.193)*	*(0.583)*	*(0.749)*	*(0.272)*	*(0.421)*	*(0.533)*
Average years of schooling 1980[2]	2.075	2.180	1.385	2.121	2.132	2.306	1.926	1.727	1.836	1.725
	(0.001)	*(0.001)*	*(0.002)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*
Life expectancy	-0.107	-0.108	-0.121	-0.097	-0.117	-0.090	-0.097	-0.069	-0.099	-0.072
	(0.015)	*(0.013)*	*(0.015)*	*(0.022)*	*(0.004)*	*(0.072)*	*(0.020)*	*(0.119)*	*(0.020)*	*(0.165)*
Inflation[2]	-2.025	-1.935	-2.260	-1.696	-2.201	-1.526	-2.175	-1.699	-2.028	-1.518
	(0.005)	*(0.004)*	*(0.001)*	*(0.022)*	*(0.002)*	*(0.048)*	*(0.006)*	*(0.004)*	*(0.002)*	*(0.010)*
Banking sector development[1]	0.783	0.788	0.757	0.763	0.772	0.817	0.775	0.732	0.745	0.854
	(0.001)	*(0.001)*	*(0.005)*	*(0.001)*	*(0.002)*	*(0.003)*	*(0.001)*	*(0.001)*	*(0.002)*	*(0.003)*
Old Dependency Ratio[1]		-0.651								
		(0.165)								
Muslim			-0.021							
			(0.001)							
Catholic			-0.005							
			(0.103)							
Protestant			-0.010							
			(0.139)							
Urbanization ratio[1]				-0.625						
				(0.147)						
Gini coefficient[1]					2.060					
					(0.005)					
Social security[1]						-0.216				
						(0.174)				
Rule of Law							-0.115			
							(0.439)			
Bureaucratic efficiency								0.227		
								(0.058)		
Corruption									0.086	
									(0.594)	
Latin America										1.120
										(0.010)
Asia										0.939
										(0.001)
Africa										2.029
										(0.002)
F-test religion			5.13							
			(0.004)							
F-test regions										7.85
										(0.001)
Number of observations	60	60	60	60	54	49	59	59	59	60
R^2	0.682	0.693	0.775	0.692	0.755	0.666	0.684	0.701	0.682	0.773

1 variable included in logs
2 variable included as log(1+variable)
p-values are reported in parentheses

Table 5: The Determinants of Life Insurance Density in a Cross-Section 1980 - 96

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	-6.516	-2.408	-6.630	-6.587	-7.178	-8.125	-6.636	-8.819	-7.142	-5.541
	(0.101)	*(0.626)*	*(0.113)*	*(0.094)*	*(0.134)*	*(0.092)*	*(0.123)*	*(0.033)*	*(0.068)*	*(0.243)*
Income level[1]	0.819	0.871	1.069	0.922	0.676	0.846	0.879	0.605	0.789	0.604
	(0.001)	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*
Young Dependency Ratio[1]	0.535	-0.191	0.874	0.671	-0.995	0.649	0.475	0.841	0.679	-0.085
	(0.262)	*(0.781)*	*(0.089)*	*(0.166)*	*(0.257)*	*(0.285)*	*(0.409)*	*(0.095)*	*(0.151)*	*(0.883)*
Average years of schooling 1980[2]	2.089	2.219	1.347	2.125	2.170	2.409	1.970	1.763	1.871	1.738
	(0.001)	*(0.001)*	*(0.003)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*
Life expectancy	-0.073	-0.074	-0.087	-0.065	-0.084	-0.063	-0.064	-0.034	-0.065	-0.038
	(0.113)	*(0.103)*	*(0.079)*	*(0.142)*	*(0.036)*	*(0.236)*	*(0.145)*	*(0.442)*	*(0.139)*	*(0.469)*
Inflation[2]	-2.135	-2.023	-2.391	-1.885	-2.253	-1.677	-2.292	-1.794	-2.131	-1.666
	(0.003)	*(0.002)*	*(0.001)*	*(0.013)*	*(0.001)*	*(0.034)*	*(0.005)*	*(0.002)*	*(0.002)*	*(0.006)*
Banking sector development[1]	0.855	0.861	0.815	0.840	0.863	0.853	0.849	0.805	0.816	0.940
	(0.001)	*(0.001)*	*(0.003)*	*(0.001)*	*(0.001)*	*(0.003)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*
Old Dependency Ratio[1]		-0.806								
		(0.070)								
Muslim			-0.022							
			(0.001)							
Catholic			-0.006							
			(0.081)							
Protestant			-0.011							
			(0.103)							
Urbanization ratio[1]				-0.477						
				(0.288)						
Gini coefficient[1]					2.307					
					(0.001)					
Social security[1]						-0.226				
						(0.169)				
Rule of Law							-0.125			
							(0.399)			
Bureaucratic efficiency								0.233		
								(0.052)		
Corruption									0.095	
									(0.573)	
Latin America										1.157
										(0.006)
Asia										0.906
										(0.001)
Africa										2.099
										(0.004)
F-test religion			6.55							
			(0.001)							
F-test regions										9.15
										(0.001)
Number of observations	60	60	60	60	54	49	59	59	59	60
R^2	0.841	0.849	0.893	0.844	0.887	0.821	0.845	0.853	0.843	0.888

1 variable included in logs
2 variable included as log(1+variable)
p-values are reported in parentheses

Table 6: The Determinants of Life Insurance in Force in a Cross-Section 1980 - 96

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	-16.078	-16.466	-14.991	-16.097	-18.854	-20.419	-15.337	-17.027	-15.999	-14.028
	(0.003)	*(0.008)*	*(0.006)*	*(0.002)*	*(0.032)*	*(0.001)*	*(0.006)*	*(0.001)*	*(0.003)*	*(0.004)*
Income level[1]	0.049	0.032	0.301	-0.232	0.040	0.122	0.060	-0.338	-0.072	-0.177
	(0.873)	*(0.923)*	*(0.381)*	*(0.489)*	*(0.914)*	*(0.740)*	*(0.853)*	*(0.190)*	*(0.801)*	*(0.441)*
Young Dependency Ratio[1]	2.460	2.540	2.536	2.094	2.368	3.193	2.176	2.681	2.523	1.785
	(0.002)	*(0.015)*	*(0.004)*	*(0.008)*	*(0.103)*	*(0.002)*	*(0.009)*	*(0.001)*	*(0.001)*	*(0.008)*
Average years of schooling 1980[2]	2.170	2.187	1.935	1.898	2.217	2.511	2.366	1.877	2.179	2.403
	(0.001)	*(0.001)*	*(0.009)*	*(0.006)*	*(0.003)*	*(0.001)*	*(0.002)*	*(0.001)*	*(0.002)*	*(0.001)*
Life expectancy	0.057	0.057	0.036	0.052	0.061	0.064	0.073	0.096	0.062	0.053
	(0.188)	*(0.198)*	*(0.459)*	*(0.192)*	*(0.130)*	*(0.178)*	*(0.084)*	*(0.016)*	*(0.173)*	*(0.240)*
Inflation[2]	-4.681	-4.721	-5.352	-5.554	-4.380	-5.287	-5.307	-3.956	-4.817	-5.190
	(0.001)	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*
Banking sector development[1]	0.573	0.566	0.338	0.507	0.711	0.555	0.512	0.435	0.555	1.030
	(0.043)	*(0.048)*	*(0.502)*	*(0.072)*	*(0.114)*	*(0.137)*	*(0.091)*	*(0.091)*	*(0.049)*	*(0.003)*
Old Dependency Ratio[1]		0.097								
		(0.901)								
Muslim			-0.011							
			(0.228)							
Catholic			-0.004							
			(0.478)							
Protestant			-0.012							
			(0.136)							
Urbanization ratio[1]				1.256						
				(0.026)						
Gini coefficient[1]					0.645					
					(0.559)					
Social security[1]						0.000				
						(0.999)				
Rule of Law							-0.233			
							(0.330)			
Bureaucratic efficiency								0.384		
								(0.033)		
Corruption									0.118	
									(0.634)	
Latin America										1.569
										(0.001)
Asia										0.368
										(0.300)
Africa										1.648
										(0.016)
F-test religion			1.26							
			(0.306)							
F-test regions										6.68
										(0.001)
Number of observations	39	39	39	39	35	32	38	38	38	39
R^2	0.685	0.686	0.729	0.728	0.712	0.673	0.700	0.731	0.694	0.761

1 variable included in logs
2 variable included as log(1+variable)
p-values are reported in parentheses

Table 7: The Determinants of Life Insurance Penetration in a Panel 1960-96

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	-6.184	-5.703	-4.867	-8.833	-6.065	-6.185	-5.457	-6.187	-7.876
	(0.007)	*(0.012)*	*(0.029)*	*(0.003)*	*(0.064)*	*(0.008)*	*(0.021)*	*(0.011)*	*(0.014)*
Income level[1]	0.702	0.057	0.682	0.695	0.593	0.712	0.527	0.698	0.770
	(0.005)	*(0.849)*	*(0.005)*	*(0.006)*	*(0.037)*	*(0.011)*	*(0.079)*	*(0.020)*	*(0.005)*
Young Dependency Ratio[1]	0.249	0.306	0.336	0.260	0.499	0.251	0.346	0.245	0.174
	(0.468)	*(0.350)*	*(0.321)*	*(0.450)*	*(0.279)*	*(0.481)*	*(0.328)*	*(0.482)*	*(0.623)*
Average years of schooling[2]	1.413	1.608	1.227	1.283	1.684	1.447	1.300	1.394	1.498
	(0.001)	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*
Life expectancy	-0.045	-0.022	-0.040	-0.052	-0.045	-0.045	-0.042	-0.045	-0.038
	(0.137)	*(0.470)*	*(0.175)*	*(0.091)*	*(0.215)*	*(0.137)*	*(0.175)*	*(0.141)*	*(0.231)*
Inflation[2]	-0.673	-0.608	-0.692	-0.796	-1.332	-0.685	-0.718	-0.670	-0.766
	(0.085)	*(0.105)*	*(0.061)*	*(0.048)*	*(0.021)*	*(0.078)*	*(0.064)*	*(0.090)*	*(0.060)*
Banking sector development[1]	0.214	0.296	0.172	0.255	0.243	0.206	0.224	0.218	0.229
	(0.100)	*(0.018)*	*(0.182)*	*(0.054)*	*(0.181)*	*(0.114)*	*(0.087)*	*(0.099)*	*(0.089)*
Old Dependency Ratio[1]		1.120							
		(0.001)							
Muslim			-0.105						
			(0.066)						
Catholic			-0.011						
			(0.004)						
Protestant			-0.009						
			(0.023)						
Urbanization ratio[1]				0.780					
				(0.162)					
Gini coefficient[1]					0.127				
					(0.765)				
Rule of Law						-0.024			
						(0.886)			
Bureaucratic efficiency							0.192		
							(0.342)		
Corruption								0.013	
								(0.953)	
Latin America									0.604
									(0.387)
Asia									0.547
									(0.290)
F-test religion			8.92						
			(0.030)						
F-test regions									2.00
									(0.368)
F-Test time dummies	20.25	21.48	22.92	20.07	8.00	19.24	21.24	19.81	17.36
	(0.003)	*(0.002)*	*(0.001)*	*(0.003)*	*(0.238)*	*(0.004)*	*(0.002)*	*(0.003)*	*(0.008)*
Hausmantest	1.92	14.33	7.02	2.74	5.69	2.34	4.89	1.93	2.29
	(1.000)	*(0.351)*	*(0.857)*	*(0.999)*	*(0.957)*	*(0.999)*	*(0.962)*	*(1.000)*	*(0.999)*
Number of observations	123	123	123	123	80	123	123	123	123
Countries	19	19	19	19	15	19	19	19	19
R^2	0.713	0.637	0.799	0.700	0.732	0.714	0.741	0.712	0.742

1 variable included in logs
2 variable included as log(1+variable)
p-values are reported in parentheses

All regressions are random-effect's

Table 8: The Determinants of Life Insurance Density in a Panel 1960-96

	(1)**	(2)**	(3)**	(4)**	(5)*	(6)**	(7)**	(8)**	(9)**
Constant	-12.012	-11.870	-10.366	-15.504	-20.643	-12.426	-11.350	-12.283	-15.920
	(0.001)	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*
Income level[1]	1.847	1.200	1.777	1.847	2.399	1.957	1.726	1.906	2.049
	(0.001)	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*
Young Dependency Ratio[1]	0.379	0.394	0.487	0.383	0.385	0.313	0.474	0.357	0.209
	(0.303)	*(0.260)*	*(0.186)*	*(0.294)*	*(0.403)*	*(0.410)*	*(0.212)*	*(0.337)*	*(0.579)*
Average years of schooling[2]	1.620	1.788	1.486	1.448	0.244	1.693	1.626	1.657	1.737
	(0.001)	*(0.001)*	*(0.001)*	*(0.001)*	*(0.747)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*
Life expectancy	-0.034	-0.009	-0.029	-0.043	0.051	-0.035	-0.032	-0.035	-0.021
	(0.292)	*(0.785)*	*(0.367)*	*(0.187)*	*(0.256)*	*(0.289)*	*(0.335)*	*(0.290)*	*(0.539)*
Inflation[2]	-0.930	-0.860	-0.969	-1.087	-2.579	-0.945	-0.981	-0.918	-1.116
	(0.026)	*(0.032)*	*(0.017)*	*(0.011)*	*(0.002)*	*(0.023)*	*(0.018)*	*(0.029)*	*(0.010)*
Banking sector development[1]	-0.136	-0.042	-0.177	-0.083	0.028	-0.147	-0.143	-0.141	-0.082
	(0.325)	*(0.755)*	*(0.205)*	*(0.555)*	*(0.879)*	*(0.289)*	*(0.309)*	*(0.316)*	*(0.566)*
Old Dependency Ratio[1]		1.178							
		(0.001)							
Muslim			-0.078						
			(0.232)						
Catholic			-0.010						
			(0.017)						
Protestant			-0.009						
			(0.061)						
Urbanization ratio[1]				1.006					
				(0.090)					
Gini coefficient[1]					-0.337				
					(0.455)				
Rule of Law						-0.159			
						(0.393)			
Bureaucratic efficiency							0.086		
							(0.685)		
Corruption								-0.072	
								(0.752)	
Latin America									1.253
									(0.101)
Asia									0.210
									(0.720)
F-test religion			5.930						
			(0.115)						
F-test regions									2.90
									(0.234)
F-Test time dummies	40.22	37.87	46.90	38.03	2.56	33.58	38.70	35.65	27.17
	(0.001)	*(0.001)*	*(0.001)*	*(0.001)*	*(0.030)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*
Hausmantest	9.30	19.27	53.10	8.75	25.34	9.55	44.29	9.56	7.18
	(0.677)	*(0.115)*	*(0.001)*	*(0.792)*	*(0.021)*	*(0.656)*	*(0.001)*	*(0.654)*	*(0.846)*
Number of observations	123	123	123	123	80	123	123	123	123
Countries	19	19	19	19	15	19	19	19	19
R^2	0.865	0.836	0.899	0.860	0.788	0.862	0.875	0.862	0.867

1 variable included in logs
2 variable included as log(1+variable)
p-values are reported in parentheses

* Fixed effects estimations, ** random effects estimations

Table 9: The Determinants of Life Insurance in Force in a Panel 1960-96

	(1)*	(2)*	(3)**	(4)*	(5)**	(6)**	(7)**	(8)**	(9)**
Constant	-9.899	-10.552	-4.676	-6.113	-5.853	-5.664	-3.013	-4.778	-6.650
	(0.062)	*(0.050)*	*(0.027)*	*(0.274)*	*(0.237)*	*(0.040)*	*(0.321)*	*(0.078)*	*(0.013)*
Income level[1]	1.200	1.453	0.520	1.242	0.553	0.575	0.233	0.452	0.844
	(0.010)	*(0.011)*	*(0.040)*	*(0.007)*	*(0.118)*	*(0.057)*	*(0.514)*	*(0.209)*	*(0.003)*
Young Dependency Ratio[1]	0.723	0.769	1.218	0.789	1.247	1.200	1.367	1.202	1.307
	(0.159)	*(0.138)*	*(0.022)*	*(0.120)*	*(0.067)*	*(0.019)*	*(0.006)*	*(0.015)*	*(0.008)*
Average years of schooling[2]	0.376	0.266	1.459	0.404	1.666	1.348	1.218	1.274	1.314
	(0.578)	*(0.701)*	*(0.006)*	*(0.544)*	*(0.035)*	*(0.008)*	*(0.020)*	*(0.014)*	*(0.007)*
Life expectancy	-0.005	-0.006	0.007	0.023	0.016	0.000	-0.006	-0.003	-0.009
	(0.911)	*(0.895)*	*(0.834)*	*(0.628)*	*(0.761)*	*(0.993)*	*(0.864)*	*(0.935)*	*(0.816)*
Inflation[2]	-1.392	-1.314	-2.396	-1.401*	-2.969	-2.051	-2.095	-2.055	-1.848
	(0.015)	*(0.024)*	*(0.001)*	*(0.013)*	*(0.003)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.001)*
Banking sector development[1]	0.637	0.626	0.488	0.609	0.460	0.618	0.659	0.648	0.437
	(0.005)	*(0.006)*	*(0.013)*	*(0.006)*	*(0.136)*	*(0.001)*	*(0.001)*	*(0.001)*	*(0.033)*
Old Dependency Ratio[1]		-0.485							
		(0.427)							
Muslim			-0.001						
			(0.986)						
Catholic			-0.008						
			(0.058)						
Protestant			-0.008						
			(0.074)						
Urbanization ratio[1]				-1.452					
				(0.073)					
Gini coefficient[1]					-0.191				
					(0.784)				
Rule of Law						0.007			
						(0.973)			
Bureaucratic efficiency							0.302		
							(0.220)		
Corruption								0.129	
								(0.601)	
Latin America									-0.423
									(0.619)
Asia									0.859
									(0.039)
F-test religion			5.33						
			(0.149)						
F-test regions									5.39
									(0.068)
F-Test time dummies	*0.21*	*0.28*	3.61	*0.22*	1.62	2.65	5.18	3.64	3.18
	(0.972)	*(0.944)*	*(0.730)*	*(0.969)*	*(0.951)*	*(0.852)*	*(0.521)*	*(0.726)*	*(0.786)*
Hausmantest	53.32	118.91	12.77	20.78	16.62	10.18	14.33	11.85	30.08
	(0.001)	*(0.001)*	*(0.386)*	*(0.077)*	*(0.217)*	*(0.600)*	*(0.280)*	*(0.458)*	*(0.003)*
Number of observations	106	106	106	106	69	106	106	106	106
Countries	19	19	19	19	15	19	19	19	19
R^2	0.417	0.433	0.688	0.358	0.639	0.614	0.657	0.622	0.669

1 variable included in logs
2 variable included as log(1+variable)
p-values are reported in parentheses

* Fixed effects estimations, ** random effects estimations

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