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What Drives the Development of the Insurance Sector?

An Empirical Analysis Based on a Panel of Developed and Developing Countries

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Abstract

The insurance sector can play a critical role in financial and economic development. By reducing uncertainty and the impact of large losses, the sector can encourage new investments, innovation, and competition. As financial intermediaries with long investment horizons, insurance companies can contribute to the provision of long-term instruments to finance corporate investment and housing. There is evidence of a causal relationship between insurance sector development and economic growth. However, there have been few studies examining the factors that drive the development of the insurance industry. This paper contributes to the literature by examining the determinants of insurance premiums (both life and non-life premiums) and total assets for a panel of about 90 countries during the period 2000-08. The results show that life sector premiums are driven by per capita income, population size and density, demographic structures, income distribution, the size of the public pension system, state ownership of insurance companies, the availability of private credit, and religion. The non-life sector is affected by these and other variables. While some of these drivers are structural, the results also show that the development of the insurance sector can be influenced by a number of policy variables.

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1. Introduction

The insurance sector plays a critical role in financial and economic development. By introducing risk pooling and reducing the impact of large losses on firms and households, the sector reduces the amount of capital that would be needed to cover these losses individually, encouraging additional output, investment, innovation, and competition. By introducing risk-based pricing for insurance protection, the sector can change the behavior of economic agents, contributing inter alia to the prevention of accidents, improved health outcomes, and efficiency gains. As financial intermediaries with long investment horizons, life insurance companies can contribute to the provision of long-term finance and more effective risk management. Finally, the sector can also improve the efficiency of other segments of the financial sector, such as banking and bond markets (e.g., by enhancing the value of collateral through property insurance, and reducing losses at default through credit guarantees and enhancements).

Empirical research generally finds evidence of a causal relationship between insurance sector development and economic growth, although some of the studies report mixed results. Ward and Zurbruegg (2000) find evidence of causation in some OECD countries. Webb et al (2002) find that measures of banking and life insurance predict economic growth, although these individual measures lose power in the presence of interaction terms, suggesting complementarities between these two sectors. Kugler and Ofoghi (2006) find evidence of long-run causality from insurance to GDP growth for eight insurance categories in the UK. Arena (2008) finds evidence of a causal relationship of insurance development on economic growth in a large panel of 56 countries and 28 years (1976 to 2004). In the case of life insurance, the results are driven by developed countries, while in the case of non-life insurance the results are driven both by developed and developing countries. Haiss and Sumegi (2008) build a panel of 29 EU countries from 1992 to 2005 and conclude that the life sector had a positive impact on growth in the EU-15 countries, while the non-life sector had a larger impact in Central and Eastern Europe. Finally, Ćurak, Lončar and Poposki (2009) examine the relationship between insurance sector development and growth in the 10 new EU member states during 1992-2007 and conclude that the sector has promoted economic growth in these countries.

Despite the critical role that the insurance sector may play for financial and economic development and reasonable evidence that the sector has promoted economic growth, there have been few studies examining the factors that drive the development of the insurance sector. Moreover, the bulk of the existing empirical research focuses on the growth of the life sector, as measured by life insurance premiums. This paper contributes to the body of research in several ways. First, it builds a large and recent database comprising 90 developed and developing countries over the 2000-08 period. Second, it examines the factors that drive the development of both the life and non-life sectors. Third, it explores the impact of a broad set of potential determinants, including new variables that have not yet been tested. Finally, it measures the development of the life and non-life sectors using both premiums and assets.

The paper is structured as follows. Section 2 provides a review of the empirical research on the determinants of the insurance sector's development, with focus on the more recent studies. Section 3 discusses the data and the methodology used in the paper. Section 4 presents and discusses the main results, including univariate, two-group comparison tests and regression results. Finally, section 5 summarizes the main findings and identifies the major policy implications for the development of the insurance sector.

2. A Review of the Empirical Literature on the Insurance Sector

The empirical research on the determinants of the insurance sector has essentially focused on the life sector. Early contributions to the empirical literature were mostly focused on the US, and explored the role of education, income, religion, and cultural factors, as well as prices. By way of illustration, Hammond, Houston and Melander (1967) stress the importance of the occupation of the main wage earner. Headen and Lee (1974) show that the demand for life insurance depends on savings and interest rates. Burnett and Palmer (1984) show that education, income and religion are key determinants of the demand for life insurance. Babbel (1985) shows that prices have a negative effect on the demand for life insurance. Beenstock, Dickinson, and Khajuria (1986) provided one of the first empirical studies exploring cross-country data. Using a dataset of 10 developed countries, the authors conclude that income, life expectancy, and the

dependency ratio have a positive impact on life insurance demand, while social security expenditures have a negative impact.

More recent empirical studies include Browne and Kim (1993), Outreville (1996), Beck and Webb (2003), and Li et al (2007). These studies rely on larger cross-country datasets, especially the latter two. Browne and Kim (1993) use data from 1987 for a cross-section of 45 developed and developing countries, while Outreville (1996) bases his analysis on a cross-section of 48 developing countries for the year 1986. Beck and Webb (2003) use a large dataset of 68 developed and developing countries over the 1961-2000 period, while Li et al (1997) rely on a panel of 30 OECD countries over the 1993-2000 period. These studies use life premiums as the dependent variable (usually expressed as ratios to GDP or the population). Browne and Kim (2003) and Li et al (2007) define the estimated equation as the demand for life insurance. Outreville (1996) specifies briefly the demand and supply for life insurance and defines the estimated equation as a reduced form. Beck and Webb (2003) also indicate that the life premium reflects both demand and supply factors, while stressing the difficulties of distinguishing between the demand and supply sides.

Table 1 summarizes the main variables that should drive the development of the life insurance sector. Most of these variables have been explored in empirical research. The variables are clustered into four major groups: (1) economic variables (income level, income inequality, inflation, and interest rates); (2) demographic variables (population, population density, age dependency, and life expectancy); (3) social/cultural variables (education, religion); and (4) institutional/market structure variables (size/scope of the social security system, the level of financial development, the share of state and foreign insurers, market concentration., and the quality of the legal/regulatory framework). The second column indicates the expected impact of the variable on the life insurance sector, and the four following columns show the signs of the estimated coefficients in recent studies: positive (+), negative (-), or not significant (N/S). Shaded cells indicate that the variable was not included in the particular study.

Income is a central variable in insurance demand models. Higher income should increase the demand for life insurance for several reasons, including the greater affordability of life

insurance products, the stronger need to safeguard the potential income and expected consumption of the dependents (which increase with the level of income) against the premature death of the wage earner, and the reduced unit price of larger life policies. As shown in Table 1, all recent studies conclude that income (measured by per capita income) has a positive and significant effect on life insurance premiums.

The expected impact of income inequality on life insurance demand, on the other hand, is ambiguous. While demand should generally increase with income, very wealthy groups may not need life insurance because they have surplus/excess assets, while the very poor do not have the means to buy life products. As argued by Beck and Webb (2003), life insurance should generally prove more attractive to the middle classes, but in lower income countries life products may still be unaffordable to the middle classes. In these cases, the presence of a wealthier upper class could drive the demand for insurance. In sum, life insurance demand would depend on the interactions between the level of income and the shape of the income distribution, which could make the effect of income inequality on insurance demand ambiguous. Beck and Webb (2003) find that higher inequality (measured by the Gini coefficient) does not have any significant effect on the demand for life insurance, while the other studies do not include this variable.[2]

Inflation is expected to have a negative effect on the demand for life insurance, as it erodes the value of insurance policies and makes them less attractive. All the studies surveyed find a negative and significant relationship between inflation and the life insurance premiums, as shown in Table 1.[3] On the other hand, the effect of higher real interest rates on life premiums is ambiguous, because the effects on supply and demand could prove complex. Beck and Webb (2003) argue that higher real interest rates would increase the investment return of providers which would be able to offer more attractive returns to consumers. However, the impact of the real interest rate on insurance premiums reflects more complex interactions between supply and demand, and the net effect is ultimately determined by the term structure of interest rates, the composition of business lines, and the composition of insurers' portfolios. For example, in a

[2] The early study by Beenstock et al (1986) finds a negative relationship between the Gini coefficient and life insurance penetration.

[3] Babbel (1981) shows that even the introduction of price-indexed life products in Brazil was not able to increase the overall demand for life insurance.

detailed study of the Chilean annuities market, Rocha and Thorburn (2007) and Rocha et al (2008) show that an increase in real interest rates has a positive effect on real annuity rates, but an ambiguous effect on the number of new annuity policies and the annuity premium (a large component of the overall life insurance premium in Chile). Therefore, it is not surprising to find different results across different empirical studies. Browne and Kim (2003) neglect this variable, Outreville (1996) does not find a significant effect, Beck and Webb (2003) find a positive and significant effect, but Li et al (2007) find exactly the opposite result.[4]

The size of the population should have a positive effect on the demand for life insurance. For given levels of per capita income and other relevant variables, a larger population not only implies a larger clientele for insurance companies, but also larger risk pools, which reduce risks for insurers and allow them to reduce fees per dollar of coverage. Therefore, it is rather surprising that this variable has not been included in most empirical research. Population density should also have a positive effect on life insurance, by reducing marketing and distribution costs and the price of insurance. This variable has also been generally neglected in empirical research. Outreville (1996) tests the effect of the share of the urban population, which should be correlated with population density, and finds that the effect is not significant. However, urbanization may be defined differently in different countries, and for this reason may not be a perfect proxy for population density. In addition most research shows significant differences in income levels according to size of the city (Ferre, 2010).

The age dependency ratio (defined as the ratio of people under 15 and above 65 years of age over the working age population) is traditionally assumed to have a positive effect on life insurance demand, on the grounds that wage earners buy life insurance primarily to protect their dependents against mortality risk. However, Beck and Webb (2003) argue persuasively that the effect is rather ambiguous, because dependency ratios can have different effects across different business lines (mortality risk, savings, and annuities). Moreover, they also show the importance of breaking the age dependency ratio between the young and the old dependency ratios. As shown in Table 1, Browne and Kim (1993) and Li et al (2007) find a positive and significant coefficient, and Beck and Webb also find a positive and significant coefficient, but only for the

[4] Li et al (2007) also point out that the result may depend on the particular interest rate selected.

old dependency ratio. Outreville (1996) does not find significant effects, and Beck and Webb (2003) do not find significant effects for the young ratio. It is possible that these mixed results reflect different compositions of the business lines of insurers across the different samples.

Most researchers expect life expectancy to have a negative impact on the demand for life insurance, on the grounds that a longer life expectancy is associated with a lower probability of premature death and lower need for life insurance. However, Beck and Webb (2003) show that the effect of life expectancy on life insurance demand is ambiguous, considering the other business lines provided by insurers (savings for retirement, annuities). Therefore, it is not surprising to find very mixed results in the empirical literature. Browne and Kim (1993) and Beck and Webb (2003) do not find significant effects, Outreville (1996) find a positive and significant coefficient, but Li et al (2007) find exactly the opposite result. Again, this may be due to different compositions of the business lines of insurers across the different samples.

Education should increase the demand for life insurance, not only because it increases the level of awareness of the relevant risks and the degree of risk aversion, but also because it increases the period of dependency. Surprisingly, only Li et al (2007) find a positive and significant effect. Religious/cultural factors could also influence the demand for life insurance. In this regard, empirical studies have focused primarily on Islamic countries, as life insurance is frequently disapproved of in some countries on the grounds that it is non compliant with Shariah law (insurance is considered by some to be a hedge against the will of God).[5] Outreville (1996) does not find a significant effect, but Browne and Kim (2003) and Beck and Webb (2003) find a negative and significant coefficient for this variable. The low demand for life insurance in many Muslim countries has prompted the emergence of Takaful insurance, which is structured in compliance with Shariah law (see e.g. Redzuan et al 2009).

Most researchers consider that social security schemes provide protection against mortality risk and therefore should affect life insurance demand negatively. However, Browne and Kim (1993) argue that the effect could be ambiguous, considering that social security also

[5] Zelitzer (1979) notes that until the 19th century European nations also condemned life insurance on religious grounds.

provides protection against disability and old age, and the provision of these benefits could produce a positive income effect on life insurance. Therefore, it is not surprising to find very mixed results across different studies, as shown in Table 1. This pattern could reflect the different composition of social security programs across the different countries in different samples. Ideally, the effect of social security should be tested by disaggregating social security expenditures, but this information is not easily available in many countries.

Financial development should have a positive effect on the life insurance sector, and this effect could operate both from the demand and supply sides. For example, commercial banks expanding into mortgages and other personal loans (e.g. cars) could require the purchase of life insurance to approve these loans. Likewise, the greater availability of private fixed income instruments allowing higher spreads for insurers could motivate them to offer life policies at more attractive terms and increase sales of life products.[6] It is not surprising, therefore, that most studies show a positive and significant effect of financial development, even after controlling for causality and endogeneity bias.

The structure of the insurance market could have significant effects on the growth of the market, but there have been few attempts to test these effects. For example, the presence of state insurers could stifle market development, but this factor was not tested in any of the existing studies. The presence of foreign insurers would be expected to contribute to market development through product innovation and marketing techniques, but has produced mixed results, as shown in Table 1. Regarding market structure, only Outreville (1996) tested the impact of oligopolistic markets on market development, finding a negative and significant effect.

Finally, the quality of the legal and regulatory environment could also have a significant effect on market development, inter alia by enhancing the credibility of insurance contracts. It is surprising that few studies have tested this type of factor, but this may have been due to the lack of good indicators when the studies were conducted. Beck and Webb (2003) use the rule of law

[6] Rocha and Thorburn (2007), and Rocha et al (2008) show that the increase in the participation of higher yield corporate bonds in the portfolios of Chilean annuities providers had a positive impact on the real annuity rate.

index and find a positive and significant effect. Since then, other indicators have become available, enabling researchers to test this critical factor.

In contrast to the literature on life insurance, there have been very few attempts to explore the determinants of the non-life sector. Nakata and Sawada (2007) test a semi-parametric model including per capita income, population, the Gini coefficient, financial development, and contract enforceability. The coefficients usually have the expected signs but only the contract enforceability variable is significant.

3. Data and Empirical Methodology

In this study we empirically explore the relationship between various measures of insurance activity and a set of potential drivers. We consider three main dependent variables that capture insurance industry development: 1) the ratio of gross life insurance premiums to GDP (LIFE); 2) the ratio of gross non-life insurance premiums to GDP (NON-LIFE), and 3) the ratio of total assets of insurance companies to GDP (ASSETS).[7] The first two are insurance penetration variables that capture the extent of risk management, but life insurance premiums can also reflect a savings motive. The third variable captures the size of both the life and non-life sectors, but especially the former, as the life sector operates with longer term contracts and needs to accumulate a larger volume of assets to honor future disbursements.[8]

Regarding the potential drivers of the insurance sector, we obtained data for most of the variables listed in Table 1. These variables have been primarily used for empirical studies of the life sector, but several of them are in principle relevant for the non-life sector as well. However, we also obtained economic variables that are more closely related to the non-life sector, such as the size of the fleet of cars and the volume of external trade. To examine the drivers of insurance assets, we combined the variables used for both the life and non-life sectors.

[7] Separately identified health insurance is not included in the premiums. While health insurance can be a significant component of total premium in some countries, research has shown that its penetration tends to be very weakly correlated to GDP per capita and to be largely driven by idiosyncratic factors.
[8] As shown in Table 3, ASSET is more strongly correlated to LIFE than NON-LIFE.

We use annual, country-level data for the period 2000-08 which cover about 90 countries. The insurance variables were mostly taken from the insurance data provider AXCO, although asset data were also taken from national sources. The independent variables were obtained from a variety of sources including AXCO, the *International Financial Statistics* (IMF), the *World Development Indicators* (World Bank), and national sources. Table 2 shows the definitions, sources and descriptive statistics of the variables. Table 3 shows the correlations between the dependent and explanatory variables.

As shown in Table 2, there is substantial variation in the insurance variables. NON-LIFE, the most ubiquitous form of insurance, ranges from virtually 0 percent (e.g. Angola, Bangladesh, Myanmar) to over 3.5 percent of GDP (e.g. USA, UK). LIFE, a form of insurance which emerges at more advanced stages of development, ranges from virtually 0 percent (e.g. Kazakhstan, Syria, Vietnam) to over 10 percent of GDP (e.g. South Africa, Portugal). ASSETS range from virtually 0 percent (e.g. Tanzania, Kenya, Saudi Arabia) to over 90 percent of GDP (e.g. Sweden, UK, France).

In line with the previous section, we group our explanatory variables in four categories. First, we consider *economic variables.* Our main income level variable is GDP per capita (GDPPC). Our measure of income inequality is the fraction of income held by the richest 20 percent of the population (INCOMETOP20) and we use annual inflation (INFLATION) as a proxy for inflationary expectations. As mentioned before, we add two additional economic variables to examine the non-life sector. We include the number of passenger vehicles per 1,000 inhabitants (CARS) because most countries require at least third party liability insurance (comprehensive car insurance is usually voluntary but also common in many countries). We also consider trade activity, the sum of import and export activities as a fraction to GDP (TRADE), since trade often relies on the availability of marine, cargo, and liability insurance.

Second, we explore the impact of *demographic variables* such as population size (POP), population density (POP_DENSITY), and average life expectancy (LIFE_EXP). The first two variables have been neglected in empirical research, but could prove relevant for both the life and non-life sector, especially the former. We also include the overall age dependency ratio

(AGE_DEP), defined as the ratio of the non-working (<=15 and >=65 years) to the working population (>15 and <65 years). To disentangle the effects of a relatively young vs. an old population, we also study the young (AGE) and old age dependency ratios, respectively.

Third, we examine the effects of *social and cultural variables*. They include the number of schooling years (SCHOOLING) and an indicator variable that captures whether the country is predominantly Muslim (MUSLIM). These variables are probably more relevant for the life sector, as they capture primarily the motivations and incentives of individuals to look for insurance coverage. However, we tested the impact of MUSLIM in the non-life sector as well, as the cultural environment could also have an effect on the decision of businesses to look for insurance protection.

Finally, we investigate a set of *institutional and market structure variables*. We include the mandatory contribution rate for social security as a proxy for the size of the social security system (CONTRIB_RATE). As mentioned in the previous section, a generous social security system could reduce the incentives and the need to buy retirement products from the life sector. We also include an indicator that measures the share of the private sector in total assets (PRIVATE) to test whether insurance flourishes when the private sector plays a dominant role in the industry. To assess the impact of market concentration (CONCENTR), we create a variable that assumes a value of 1 if the largest market player covers ≥ 50% of life-insurance industry assets and/or, the top 2 largest players cover ≥ 60% of life-insurance industry assets and/or, the top 3 cover ≥ 70% and/or, the top 5 cover ≥ 80%. The indicator is 0 otherwise. Finally, we study the impact of financial development, proxied both by the ratio of private credit to GDP (PC) and the ratio of private bonds to GDP (PR_BOND).

For our baseline results, we employ multivariate regression analysis on pooled country-year data because of some correlation between the variables. We drop very small economies from the sample (countries with GDP less than 5 billion US constant 2000 dollars) because they tend to have idiosyncratic insurance industries due, for example, to their offshore nature. We adopt Ordinary Least Square (OLS) regressions since most of our explanatory variables are arguably exogenous. All OLS regressions are estimated with and year-fixed effects to address

worldwide trends and omitted variables such as the global cycle. To account for heterogeneity in our sample we always report Huber-White's heteroskedasticity-consistent standard errors. In addition, we report regression results with and without error clustering on the country level. Note that most of our regressions include time-invariant factors and we are not able to include country-fixed effects to address omitted variable bias. However, to mitigate this problem, we include a set of baseline variables in all the regressions – GDPPC, POP, POP_DENSITY, and INFLATION.

A reverse causality problem could be present for at least two variables: CARS and PC. Clearly, a developed non-life insurance sector makes car ownership more affordable and attractive, thus increasing the demand for cars. Similarly, a developed insurance sector can also mitigate loan collateral problems and reduce risks for lenders (mortality risk and credit risk), thus promoting private credit intermediation (e.g. Levine et al (2000)).

To address the issue of reverse causality we adopt the system generalized method of moments (GMM) dynamic panel methodology á la Arrelano and Bover (1995). In short, this methodology allows the insurance variables to depend on their own past realizations, adds country-fixed effects to the model to address omitted variable bias, and uses lagged values of explanatory variables as internal instruments to deal with reverse causality. For this, we need to assume that the explanatory variables can be affected by past and current realizations of insurance development, but are uncorrelated with the future error term ("weak exogeneity"). Appropriateness of the instruments can be formally tested with a Sargan or Hansen test of over-identifying restrictions with the null that instruments are valid. Since the methodology uses a system of equations —the first in levels, the second in first differences— to fully exploit the instruments and boost estimate precision, we also need to assume that the differences of explanatory variables are uncorrelated with the error term. Moreover, the methodology requires the assumption that the error term is not serially correlated, which can be tested by a correlation test with the null that the errors in the difference equation are uncorrelated. In addition to the lags of explanatory variables, we also use religious and legal origin indicator variables as instruments.

Lastly, it is important to recognize that our regressions results reflect *average* effects in our sample. For instance, although we find a negative coefficient for the contribution rate in our regressions, it does not imply that the association is positive in all countries. Rather, depending on its design, individual social security systems can act as a complement or a substitute for life insurance. Similarly, the impact of our drivers can be different between countries because they differ in the development of their business lines such as annuities and mortality risk products.

4. Empirical Results

This section discusses the empirical results on the drivers of insurance market development. The results consist of 1) parametric and non-parametric group comparison tests and 2) pooled OLS and dynamic panel regression results. The OLS results for each insurance variable are presented in individual sections.

4.1. Group comparison test results

Table 4 shows the results of univariate, two-group comparison tests to identify strong correlates with our three main insurance variables. The tests are constructed as follows. All country-year observations in the period 2000-08 for each of the three insurance variables are divided into two groups based on the median values of the explanatory variables described in Section 3. For nominal variables, we simply construct "above-the-period median" and "below-the-period median" groups. For binary variables the groups are determined according to whether the variable takes a value of one or zero. We then conduct simple T-tests (with unequal variance) and Wilcoxon-Mann-Whitney tests to assess whether the insurance variables differ significantly between the groups. The T-test tests for a difference between means of the two groups. The non-parametric Wilcoxon-Mann-Whitney test tests whether the two groups are drawn from the same population or distribution and is more robust in the presence of outliers.

As expected, the three insurance variables usually display high values in favorable income, demographic, social, and institutional/policy environments. In contrast, insurance activity is significantly lower in less benevolent environments. These initial results suggest that

insurance market development is sensitive to the existence of proper conditions, including those that are within the reach of policy-makers. Below we will discuss a few highlights and relegate a comprehensive discussion of all factors to the regression results.

First, we discuss *economic variables*. We find that the three insurance variables are all significantly higher in the high income group, as expected. For example, the average non-life premium is 1.9% of GDP in the high income group compared to 0.9% of GDP in the low group. The differences are even more pronounced in the case of the life sector, suggesting that this sector starts growing at a much faster speed in high middle countries. Not surprisingly, the same sharp differences are observed in the case of assets – the average ratio of assets to GDP is 32.1% average in the high group compared to 4.9% in the low group, suggesting again that life insurance companies only start developing rapidly in high middle income countries (as the volume of assets derives predominantly from the life sector). Finally, the tests also suggest that the fleet of cars is a relevant driver of the non-life sector. For example, the average non-life premium is 1.1% of GDP in the group with a low ratio of cars to the population, versus 1.6% of GDP in the high group. The non-life sector also seems to be positively and significantly affected by the volume of external trade.

We also find that insurance activities are significantly hampered in high inflation countries, especially in the life sector. This is not surprising, as the value of life policies is significantly eroded by high inflation, triggering a contraction in demand. For example, the average life premium in the low inflation group is 2.7% of GDP compared to 0.9% in the high inflation group. Similarly, the average ratio of assets to GDP is 30.7% in the low inflation group compared to only 7.1% in the high group. The tests for the inequality variable show that insurance activity tends to flourish in more equal societies (i.e. lower INCOMETOP20), which may reflect the presence of a broader middle class driving demand, particularly for life insurance. However, this result should be seen as preliminary, because of the correlation of this variable with other variables such as GDP per capita and schooling.

Next, we turn to the *demographic variables*. Life premiums are larger in countries with larger populations, as expected. Intriguingly, the opposite is true in the case of the non-life

sector. This may be capturing the presence of small and open economies with large non-life business due to external trade.[9] The ratio of assets to GDP is not significantly different in the two groups, reflecting these conflicting results. On the other hand, higher population density tends to facilitate insurance activity in the two sectors, as indicated by larger premiums and assets. The impact of a higher age dependency ratio is positive in the life sector, and this is also reflected in the ratio of assets to GDP, although the Wilcoxon tests are not significant. Higher life expectancies have a positive impact on the two sectors, but this result needs to be interpreted with care due to the strong correlation between this variable and GDP per capita (Table 3).

The tests suggest *social and cultural factors* also matter. Countries with a higher level of schooling tend to have larger premiums, especially in the case of the life sector. Not surprisingly, this is also reflected in a much higher average volume of assets. However, this result also needs to be interpreted with care, due to the strong correlation between schooling and GDP per capita (Table 3). Countries with predominant Muslim populations have significantly lower life premiums and assets, indicating religion plays a role in life insurance markets. The same result holds for the non-life sector.

Institutional and market factors matter as well. Countries with larger social security schemes (reflected in high mandatory contribution rates) have more insurance development, although this result is somewhat surprising, as social security can reduce the space and incentives for private life insurance and private pensions. On the other hand, the tests suggest that countries with private sector dominance (i.e. PRIVATE=1) in the insurance sector exhibit significantly more insurance activity, both in the non-life and the life sectors. We also find strong results across all insurance indicators for market concentration. For example, in concentrated markets (i.e. CONCENTRATION=1), insurance assets are 8.8% of GDP, vs. 25.4% in non-concentrated markets. Although our proxy for legal rights (LEGAL_RIGHTS) is imperfect for insurance since it is tailored to creditor rights, the differences between the groups are large and statistically significant. For example, life insurance premiums to GDP are almost twice as large in the high creditor rights group (2.03% vs. 1.14%). However, this result could also partly be driven by the fact that financial development is key to insurance sector development. Indeed, we also find that

[9] The correlation coefficient of POP and TRADE is negative and significant, as shown in Table 3.

financially more developed countries exhibit significantly more insurance activity. For example, the ratio of insurance assets to GDP is only 3.5% in the group with low ratios of credit to GDP, versus 31.5% in the group with developed credit markets. However, the results are weaker and even puzzling for the private bond variable.

These tests produce suggestive evidence and provide insights into how conditions affect insurance activities, but they could be driven by confounding factors. In particular, the test results could be driven by the fact that some of the grouping variables are correlated with general economic development, thus leading to erroneous conclusions about environmental factors that drive insurance market development. To address these concerns we turn to regression analysis next.

Life premium regression results

We consecutively present the regression results for each of the three dependent insurance variables. The regressions aim to explore the robustness of the group comparison tests by assessing the individual and joint significance of the factors identified in section 3: economic, demographic, social/cultural, and institutional/market structure factors. Given their overall structural relevance for the sector, we include a core set of both economic and demographic variables in all regressions as baseline controls: economic development, population size and density, and inflation (LGDPPC, LPOP, LPOP_DENSITY, INFLATION). We employ pooled OLS regressions on annual country-level data for the period 2000-08. We substitute sample averages for each year in the dataset for factors for which only a few observations per country are available: LLIFE_EXP, LINCOME20, and LCONTRIB_RATE. Thus, these variables are time-invariant. We report robust standard errors in two variations: unclustered, and clustered at the country level. Year-fixed effects and a constant were estimated but are not reported.

Table 5 displays the results for life insurance. The dependent variable is log of life insurance premiums to GDP (LLIFE). Depending on the explanatory variables included in the models, the sample size varies from 181 (56 countries) to 767 (86 countries) annual country-level observations.

Model (1) explores the demographic variables life expectancy and age dependency (LLIFE_EXP, LAGEDEP) in addition to the baseline variables. LGDPPC is positively and significantly associated with LLIFE at the 1-percent confidence level, in line with the findings of previous research. Similarly, we also find that LPOP and LPOP_DENSITY are positively associated with LLIFE on the 1-percent confidence level. These results persist virtually throughout all specifications, also when standard errors are clustered. As mentioned before, these results are expected, reflecting the positive effects of larger clienteles, deeper risk pools and scale economies, as well as good distribution opportunities. Indeed, it is surprising that these variables were not explored in previous research.

INFLATION has a coefficient of -2.90, with significance on the 1-percent confidence level which clearly indicates that inflationary environments are detrimental to life insurance development since it inhibits effective asset management, makes product pricing more difficult, and produces uncertainty around the long-term value of the insurance. Again, these results continue to hold across most specifications and confirm previous research findings. LLIFE_EXP has a negative impact on LLIFE, suggesting that a lower probability of premature death is a dominant factor and lowers the demand for life insurance. Finally, AGEDEP, the general age dependency ratio does not enter significantly, a result that is not surprising, given the different effects of age dependency on different business lines, and the possible different effects of the young and old dependency ratios.

In order to examine further the effects of age dependency, Model (2) splits up AGEDEP into the young and old dependency ratios (AGEDEP_YNG, AGEDEP_OLD) as there is a negative correlation between these ratios (rho=-0.68) that could render LAGEDEP insignificant. In fact, the correlation between LAGEDEP and LAGEDEP_YNG is positive and larger in magnitude (rho=0.76) as opposed to the correlation with LAGEDEP_OLD (rho=-0.13). Indeed, the results show that both factors are significant and exert a positive effect, although the effect is larger and more robust for AGEDEP_OLD, consistent with the empirical literature. The positive effect of the young dependency ratio suggests that insuring for mortality risk to protect

dependents (including saving for education) is an important demand driver, while the positive effect of the old dependency ratio is motivated by the demand for savings and annuity products.

Model (3) includes economic and societal factors: expected years of schooling, income inequality, and religion (LSCHOOLING, LINCOMETOP20, MUSLIM). LSCHOOLING is insignificant which is not surprising given its high correlation with LGDPPC (rho=0.75). In the presence of LGDPPC, the coefficient of the log proportion of total income by the top quintile (LINCOMETOP20) is positive and statistically significant at the 1-percent level.[10] This finding suggests that life insurance can be thought of as a relative luxury good. We also confirm that Muslim countries have significantly lower levels of LIFE, suggesting religion plays an important role in the sector's development. The MUSLIM coefficient is highly significant and negative, and suggests that LIFE levels of Muslim countries are at about 52% of the expected value of non-Muslim countries (exp(-0.66)), all else equal. These lower insurance levels cannot be explained by differences in economic development, since LGDPPC has been controlled for.

Models (4), (5), and (6) study institutional and market factors: social security schemes, market concentration, private sector dominance, legal rights, and financial development (LCONTRIB_RATE, CONCENTR., PRIVATE, LEGAL_RIGHTS, LPC, LPR_BOND). Model (4) shows that the size of social security systems (proxied by the contribution rate, LCONTRIB_RATE) is negatively associated with LIFE and significant (but in unclustered regressions only). This finding suggests that social security systems can reduce the demand for life insurance, by providing income replacement against death and old age and reducing net disposable income. We also find that higher industry concentration (CONCENTR.) is associated with higher premium volume, a somewhat surprising result, suggesting that large risk pools and scale economies may be critical to the sector's development. At the same time, Model (4) also shows that private sector dominance of the sector (PRIVATE) is positively associated with LLIFE on the 1-percent confidence level. This result remains when standard errors are clustered at the country level, and suggests that private sector dominance is associated with more product innovation and more effective distribution, which are also critical to the sector's development.

[10] In unreported results, we included an LGDPPC squared term which is positive and highly significant. This result indeed suggests that life insurance consumption increases exponentially for higher levels of income and in that sense can be considered mostly a luxury good.

Finally, the legal rights index from Doing Business (LEGAL_RIGHTS), is positive and very significant (although in an unclustered regression only), suggesting that the life sector develops faster under a supportive legal framework.[11]

Models (5) and (6) show that financial development is strongly associated with LLIFE even when LGDPPC is controlled for. A 1-percent increase in the log of private credit to GDP (LPC) is associated with a 1.12 percent increase of LIFE. This finding implies that deeper credit markets spur personal loans, which often requires life insurance as collateral. Additionally, financial development in general can help insurance companies conduct better risk and asset and liability management which can increase the supply of insurance. Interestingly, the inclusion of LPC renders INFLATION insignificant in Model (5). This could be driven by the fact that inflation is detrimental to financial development. Indeed, INFLATION and LPC are negatively correlated (rho=-0.4). Together, these findings suggest that inflation exerts influence over life insurance activity in part via its strong impact on credit market development. In addition, Model (6) suggests that deeper private bond markets help insurance companies manage their assets more efficiently. Note, however that the number of countries in the sample falls significantly since bond market data are typically only available for more developed countries.

Lastly, Model (7) displays regression results that test for the statistical significance of individual factors in all categories to address a potential confounding variable problem. Although the sample size decreases significantly, the regression shows that the main results continue to hold with coefficients of the same order of magnitude. Interestingly, LINCOMETOP20 and MUSLIM have now become statistically significant in clustered regressions as well.

Non-life premium regression results

Next, we turn to a regression analysis of non-life insurance development in Table 6. The dependent variable is the log of non-life premiums to GDP (LNONLIFE). Depending on the

[11] Admittedly, none of the legal indicators from Doing Business captures with accuracy the quality of the legal framework in the insurance sector. However, it can be argued that countries that have stronger creditor rights also tend to have a more supportive legal and regulatory framework in the insurance sector.

explanatory variables included in the models, the sample size varies from 89 (49 countries) to 766 (87 countries) annual country-level observations.

Model (1) shows the result for the baseline controls in addition to two non-life market-specific economic factors: personal cars penetration and trade activities (LCARS, LTRADE). As expected, LGDPPC is positively and statistically significantly associated with LNONLIFE at the 1-percent confidence level. The coefficient implies that a 1-percent increase in GDPPC is associated with a 0.14 percent increase of NONLIFE, which is significantly lower than for LIFE. Interestingly, LPOP is not significant in this model, and is negative and significant in most other regressions. As discussed in the previous section, an explanation for this finding could be that smaller countries are more dependent on trade which increases demand for marine, cargo and liability insurance. This could also explain why LTRADE does not enter significantly. Indeed, LTRADE is significant and positively associated with LNONLIFE when LPOP is not controlled for (unreported result: the coefficient is 0.145 and P-value is 0.092). This finding further supports that LPOP (negatively) proxies for relatively higher trade activities (the correlation coefficient is -0.42, as shown in Table 3). We also find that LPOP_DENSITY is statistically significant and positive in this regression, but this result is not robust in all specifications.

Interestingly, INFLATION is positive in all models. It is not significant in model (1), but it is highly significant in most other models. In theory, this result could reflect the portfolio shifts from financial to real assets and the anticipation of consumption in very high inflationary environments, resulting in additional demand for non-life insurance. However, this is not a likely explanation in our sample. Indeed, in unreported regressions we find that the inclusion of a high inflation dummy (i.e. an indicator variable that assumes value 1 if annual inflation is larger than 10% and 0 otherwise) does not render INFLATION insignificant. Another explanation could be that inflationary asset bubbles boost insurable economic activity, particularly in the real estate sector. We also confirm that LCARS is positive and highly statistically significant. The coefficient implies that a 1-percent increase in CARS is associated with a 0.19 percent increase of NONLIFE.

Model (2) shows the results for a relevant societal factor: religion (MUSLIM). The regression confirms that MUSLIM is negatively associated with non-life activities as well. Indeed the coefficient is statistically highly significant and suggests that NONLIFE levels of Muslim countries are at 57% of the expected value of non-Muslim countries, all else equal (exp(-0.56)). Moreover, clustering does not influence the significance of this result.

Model (3) covers institutional and market factors: market concentration, private sector dominance, and contract protection (CONCENTR., PRIVATE, LEGAL_RIGHTS). We find that CONCENTR is not significant for non-life premiums, in contrast to life, although it is weakly significant and negative in Model (6). We also document that private sector dominance (PRIVATE) is positively associated with LNONLIFE on the 1-percent confidence level, although the result does not withstand clustering. The coefficients suggest non-life insurance levels of countries with private sector dominance are at 116% of the expected value of countries that do not, all else equal (exp(0.15)). Finally, we confirm that our measure of the quality of the legal framework (LEGAL_RIGHTS) is highly significant for non-life activity as well.

Model (4) shows the result of another relevant market factor: financial development (LPC). We find that credit market development (LPC) is also strongly associated with LNONLIFE. Country level cluster does not affect these results. Indeed, personal loans become available as credit markets develop and are used to acquire goods that need insurance, including cars and houses.

Finally, Models (5) and (6) put all relevant factors together. Model (6) replicates Model (5) but drops LCARS, since it reduces the sample size significantly. The MUSLIM, LEGAL_RIGHTS, and LPC results continue to be very strong, while the somewhat weaker PRIVATE result also remains. Interestingly, market concentration (CONCENTR.) is now also slightly significant and negative which supports research finding that that after a certain optimal point a concentrated market structure does impede non-life development (Fenn et al (2008)). Overall, these results suggest that the non-life sector is driven positively by income, private sector dominance, a strong legal framework, and a deep credit market. Population size has a negative effect, but this could be capturing the positive effect of trade volumes on the non-life

sector. A relatively large fleet of cars also contributes to the sector's development. Surprisingly, inflation seems to contribute positively to the development of the non-life sector, but this effect is dominated by the negative effect on the life sector, and could reflect a shift from financial to real assets in inflationary environments.

Insurance assets regression results

Next, we conduct a regression analysis on the overall size of the insurance sector measured by total assets. The results are presented in Tables 7 and 8. The dependent variable is the log of insurance sector total assets to GDP (LASSETS). Overall, the result for ASSETS resembles those for LIFE, since the life sector accumulates a larger pool of assets compared to the non-life sector. In particular, the baseline variables are significant in most of the regressions and with the same signs as those obtained for LIFE. In other words the results generally confirm the importance of income levels, population, population density, and inflation as important drivers of insurance assets. Depending on the other explanatory variables included in the models, the sample size varies from 538 (76 countries) to 61 (35 countries) annual country-level observations.

We first discuss Table 7. Model (1) documents the results for the baseline variables and economic factors specific to the non-life sector: cars penetration and trade activity (LCARS, LTRADE). As expected, LGDPPC remains positive and highly significant, and so does LPOP. POP_DENSITY is not significant in this regression but is significant in other specifications. Also INFLATION exhibits a negative and statistically significant association. Interestingly, LCARS is negative, which could point to a substitution effect between life and non-life activities – in the presence of unusually high car penetration insurance companies might forgo fully developing the non-life industry and accumulate less assets. We also find that LTRADE is very significant, suggesting that more open countries accumulate more insurance assets. Since the correlation between these two factors is low, and LCARS is controlled for as well, this suggests that some forms of trade-related insurance are more asset intensive than car-related insurance.

Models (2) and (3) investigate other relevant demographic factors: life expectancy and age dependency (LLIFE_EXP, LAGEDEP). The results confirm our previous findings in the life regressions. LLIFE_EXP enters negatively and statistically as very significant, although this result does not hold when additional variables are included, as in the case of LIFE. Interestingly, LAGEDEP is now significant as well. The coefficients of LAGEDEP_OLD and LAGEDEP_YNG are both positive and significant, as in the case of LIFE. This finding confirms that young and old dependency ratios are important drivers of insurance development, operating through different channels. A high LAGEDP_YNG induces the accumulation of assets to ensure protection against mortality risk, while a high LAGEDEP_OLD induces the accumulation of assets for retirement (both in the accumulation and payout phases). Model (4) studies additional economic and cultural factors: expected years of schooling, income inequality, and religion (LSCHOOLING, LINCOMETOP20, MUSLIM). We do not find statistical significance of LSCHOOLING and LINCOMETOP20. However, MUSLIM is negative and statistically significant in an unclustered regression implying that religion not only matters for premiums, but also reduces asset accumulation.

Next we turn to Table 8. Model (1) presents the results for institutional and market factors: social security, market concentration, private sector dominance, and legal rights. (LCONTRIB_RATE, CONCENTR., PRIVATE, LEGAL_RIGHTS). The results are very similar to those obtained for LIFE. The baseline variables are all significant and with the same signs as those obtained for LIFE. In addition, we also observe that larger social security systems are associated with lower levels of asset accumulation. Market concentration (CONCENTR.) enters positively and significantly in line with LIFE as well. Finally, private sector dominance (PRIVATE) and legal rights (LEGAL_RIGHTS) exert a positive and significant influence on asset accumulation. Models (2) and (3) show the result for financial development (LPC, LPR_BOND). We find that financial development is key for asset accumulation, and that private credit (LPC) seems to exert a larger impact than private bond markets (LPR_BOND).

Finally, Models (4) and (5) present results for all relevant factors. Model (6) is identical to Model (5) but excludes LCARS to avoid a large reduction in sample size. Model (6) also reconfirms most of previous findings. In the presence of other factors, we find that most baseline

variables remain significant and with the expected signs. Additionally, we document the robust positive association with LAGEDEP, CONCENTR., PRIVATE, and LPC. However, in these full models, LEGAL_RIGHTS and LCONTRIB_RATE lose statistical significance.

Dynamic panel regression results

Most of the factors we analyzed are arguably exogenous, thus reducing the problem of determining the direction of causality. However, two factors in particular could be endogenous: PC and CARS. Therefore, we adopt an instrumental variable approach á la Arrelano and Bover (1995) using the same sample of annual country-level data for the period 2000-08. This method controls for country-fixed effects which capture time invariant characteristics of the country such as the average level of economic development. It also uses internal and external instruments for PC and CARS to address causality. Note that since the models include a 1-period lag of the insurance variables, the interpretation of the coefficients is slightly different because they effectively capture the effect on insurance activity *growth*.

Following previous sections, in each of our regressions, we include the baseline variables LPOP, LPOP_DENSITY, LINFLATION. For consistency with previous regressions, we show results with and without LGDPPC. However, we find that it is difficult to fully disentangle the contemporaneous effects of LGDPPC and our drivers, particularly in the presence of country-fixed effects.

As exogenous (internal) instruments, we use the following set: LPOP, LPOP_DENSITY, (French and British) legal origin and religion dummies. In our specifications, we consider LGDPPC and INFLATION to be (possibly) endogenous. We include 2- to 4-period lags as internal instruments for the endogenous variables. Depending on the specification, the regressions pertain to 71 up to 82 countries.

Table 9 presents the results. Models (1) and (2) confirm the causal effect of LPC on LLIFE, although the inclusion of LGDPPC produces a p-value for LPC of 0.145. Model (1) also finds consistent results for LPOP and LPOP_DENSITY and shows the causal effect of LGDPPC

on LLIFE, consistent with previous research showing that LGDPPC and insurance activities have a causal effect on one another. Similarly, Models (3) and (4) confirm that LPC causes NONLIFE but controlling for LGDPPC produces a p-value of 0.21 for LPC. Not surprisingly, we find that LGDPPC exerts a causal effect on LNON-LIFE. Consistent with earlier findings, the LPC coefficient is smaller for non-life than life, which suggests that financial development is more important for life insurance growth. Models (5) and (6) show that LPC causes ASSETS growth, even in the presence of LGDPPC. We also reconfirm the relevance of population size. Finally, Models (7) and (8) confirms the causal effect of LCARS for NONLIFE. This finding confirms car penetration as a driver of insurance development and not merely a result of it. However, again LGDPPC absorbs the significance of LCARS (p-value=0.2).

5. Conclusions and Policy Implications

In this paper we explored the main factors that drive the development of the insurance sector, including both the life and the non-life sectors. The paper contributes to the body of empirical research by covering both sectors, measuring their development by premiums and assets, and introducing a number of additional explanatory variables. We believe that this more integrated and comprehensive approach provides additional insights over those provided by previous research.

The life insurance regressions confirm some of the findings of previous empirical research on life insurance and add some additional findings. We find that income is an important driver of life insurance, but that population and population density are also important drivers. These two variables were surprisingly overlooked in previous multi-country research efforts, but show the importance of larger clienteles, deeper risk pools and scale economies, as well as easier distribution channels. Inflation hinders the life sector's development, in line with previous research results.

Life expectancy has a negative and significant influence in some of the specifications, suggesting that higher life expectancy reduces demand for life insurance by reducing the

probability of a premature death. Age dependency proves to be an important driver of life insurance when the young and old dependency ratios enter separately. The results confirm that a high young age dependency ratio drives the demand for insurance against mortality risk, while a high old dependency ratio drives the demand for insurance against loss of income at old age. Schooling does not seem to be an important driver of life insurance, in line with previous research, but the share of the richest 20 percent of the population has a positive effect, suggesting that some life insurance products may be regarded as luxury goods, all else constant. The predominance of a Muslim population tends to hinder the development of the life sector, in line with previous research.

The results show that a large social security system (measured by the contribution rate) hinders the development of the life sector, by partly reducing the need for insurance but also by reducing the level of disposable income net of taxes and contributions. The predominance of private ownership in the life industry and a strong legal framework promote the development of the life sector, and so do developed credit and bond markets. Interestingly, more concentrated markets tend to promote faster industry development. This somewhat surprising result may indicate the importance of large risk pools and scale economies.[12]

The regressions for the non-life sector show that income is an important driver and that the predominance of Muslims in the population slows the sector's development. The results also show the importance of institutional and market structure variables. As in the case of life insurance, private ownership of the industry, a strong legal framework and developed credit markets promote the development of the non-life sector. Curiously, market concentration slows the development of the sector, a result that is in principle more intuitive than the one obtained for life insurance, although the result is not very robust across specifications.

The regressions for the non-life sector also show that the fleet of cars and the volume of trade are important drivers of the sector's development. Interestingly, the impact of trade seems to be captured by the size of population, reflecting the importance of external trade in small and

[12] However, Rocha et al (2008) find that the low concentration of the annuities market in Chile contributed to more competition and a higher annuity rate offered to annuitants, probably contributing to a higher demand for annuities and increasing premiums and assets.

open economies. Surprisingly, inflation seems to promote larger non-life premiums, but this result could be the secondary effect of the shifts from financial to real assets that are observed in high inflation environments.

The results for insurance assets essentially mirror those obtained for the life sector. The baseline variables are significant in most regressions and the coefficients have the same signs as those obtained for the life regressions. The Muslim variable enters negatively and significantly, in line with the results for both sectors. Reassuringly, we confirm that the combined effect of high inflation on the two sectors is negative, reflecting the much stronger and negative impact on the life sector. We also confirm the positive and significant impact of private ownership and of deep credit and bond markets on the development of the insurance sector. Finally, a strong legal framework also promotes the development of the insurance sector, although this result is not robust across all specifications.

These results have a number of important policy implications. Some of the drivers of the insurance sector are not within the reach of policy-makers or can only be influenced over long period of time, but the results indicate that supportive policies can contribute to the acceleration of the sector's development. They show, for example, the importance of a stable macroeconomic framework and low inflation for the sector's development. The positive impact of private ownership on the sector's growth is another important finding, as the state still plays a predominant role in many countries. The insurance sector flourishes under a supportive legal framework, and also benefits significantly from developed credit and bond markets. Religion plays a role, suggesting the need for more progress in introducing insurance institutions and products more harmonized with religious beliefs, such as the case of Takaful arrangements in Muslim countries.

Despite a number of additional findings, our research was not able to capture all the factors that may influence the development of the insurance sector, such as recent severe perturbations (conflict, financial crisis), the regulation of the rapidly growing bancassurance channel, the differential taxation of insurance products, and regulations that enhance consumer protection (and thus support greater levels of trust in the sector). Thus, after controlling for the

main drivers identified in this paper it is important to make a more detailed analysis to identify and understand the additional factors that accelerate or hinder the development of the insurance sector in a specific country. For example, Lester (2010) shows that Middle East and North African countries have generated much smaller revenues from car insurance than would be expected by their fleet of cars, due to several problems in the regulation and enforcement of motor third party liability insurance (Figure 1). However, our results provide a number of additional insights into the main drivers of the insurance sector and also highlight areas for future research on this important area.

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Table 1: Main Determinants of the Life Insurance Sector: Expected and Actual Results

Variable	Expected Effect	Browne and Kim (1993)	Outreville (1996)	Beck and Webb (2003)	Donghui et al (2007)
Income	Positive	+	+	+	+
Income Inequality	Ambiguous			N/S	
Inflation rate	Negative	-	-	-	-
Real interest rate	Ambiguous		N/S	+	-
Population	Positive				
Population Density	Positive		N/S [2]		
Age Dependency Ratio	Ambiguous	+	N/S	Young ratio: N/S Old ratio: +	+
Life Expectancy	Ambiguous	N/S	+	N/S	-
Education	Positive	N/S	N/S	N/S	+
Religion (muslim)	Negative	-	N/S	-	
Social Security	Ambiguous	+	N/S	N/S	-
Financial Development	Positive		+	+	+
Share of State Insurers	Negative				
Share of Foreign Insurers	Positive		N/S		Mixed [3]
Market Concentration.	Negative		-		
Legal Environment	Positive			+	

Notes: 1) N/S = Not significant; 2) Share of rural population; 3) Negative for first term, positive for quadratic term

Table 2: Definitions and descriptive statistics

The sample consists of country-level, annual data for the period 2000-08. (L)SCHOOLING, (L)LIFE_EXP, (L)INCOMETOP20, and (L)CONTRIB_RATE are sample period averages.

Panel A

	Variable	Description	Source
Dependent variables	(L)NONLIFE	(Log) Gross volume of non-life premiums to GDP (%)	Axco
	(L)LIFE	(Log) Gross volume of life premiums to GDP (%)	Axco
	(L)INSURANCE_AS.	(Log) Insurance assets to GDP (%)	Axco
Economic variables	(L)GDPPC	(Log) GDP per capita (constant US Dollars)	World Bank World Development Indicators (WDI)
	(L)INFLATION	(Log) Inflation (%, year on year)	WDI
	(L)INCOMETOP20	(Log) Fraction of income held by richest quintile (%)	WDI
Demographic variables	(L)POP	(Log) Population size (mln.)	WDI
	(L)POP_DENSITY	(Log) Population density (people / square kilometer)	WDI
	(L)LAGEDEP_OLD	(Log) Age dependency (%).Percentage population >=65 yr of working population (>15 yr and < 65 yr).	WDI
	(L)LAGEDEP_YNG	(Log) Age dependency (%).Percentage population <=15 yr of working population (>15 yr and < 65 yr).	WDI
	(L)LAGEDEP	(Log) Age dependency (%). Percentage population <=15 yr and >=65 yr of working population (>15 yr and < 65 yr).	WDI
	(L)LIFE_EXP	(Log) Life expectancy (yr.)	WDI
Social/cultural variables	(L)SCHOOLING	(Log) Expected number of years of schooling (yr.)	WDI
	MUSLIM	Dummy whether majority of population is Muslim	CIA Factbook
Institutional/market structure variables	PRIVATE	Dummy whether sector is mainly private	Axco Insurance Information Services
	(L)CONTRIB_RATE	(Log) Contribution rate (%)	Various World Bank financial sector specialists
	CONCENTR.	Proxy for market concentration. Dummy that take on a value of 1 if the largest market player covers >=50% of life-insurance industry assets and/or, the top 2 largest players cover >=60% of life-insurance industry assets and/or, the top 3 cover >=70% and/or, the top 5 cover >=80%. The indicator is 0 otherwise.	Axco
	(L)PC	(Log) Private credit to GDP (%)	IMF International Financial Statistics
	(L)PR_BOND	Private domestic bond market capitalization to GDP (%)	Bank for International Settlements
	LEGAL_RIGHTS	Creditor protection rights (1-10; higher is better rights)	Doing Business
	(L)CARS	(Log) Number of passenger cars per 1,000 people	WDI
	(L)TRADE	(Log) Sum imports and exports to GDP (%)	WDI

Panel B (Not in logs)

	Variable	Country-year obs	Mean	Std. Dev.	Min	Max
Dependent variables	NONLIFE	827	1.44	1.13	0.04	18.49
	LIFE	809	1.82	2.70	0.00	30.17
	INSURANCE_ASSETS	558	19.69	24.78	0.02	100.84
Economic variables	GDPPC	801	9698.18	11096.78	266.01	42683.58
	INFLATION	837	1.08	0.17	0.90	4.25
	INCOMETOP20	702	45.56	7.52	33.07	62.94
	CARS	393	244.89	190.02	1.00	632.00
	TRADE	764	81.06	37.89	0.31	220.41
Demographic variables	POP	837	61.69	175.23	0.08	1325.64
	POP_DENSITY	837	124.74	164.14	2.49	1229.16
	LAGEDEP_OLD	810	13.82	7.88	1.26	32.85
	LAGEDEP_YNG	810	42.02	18.91	19.36	97.76
	LAGEDEP	810	53.41	13.52	20.89	91.38
	LIFE_EXP	830	71.84	7.94	43.55	82.59
Social/cultural variables	SCHOOLING	530	13.94	2.74	4.37	20.65
	MUSLIM	756	0.26	0.44	0.00	1.00
Institutional/market structure variables	PRIVATE	783	0.80	0.40	0.00	1.00
	CONTRIB_RATE	756	19.43	10.41	3.93	65.40
	CONCENTR.	359	0.36	0.48	0	1
	PC	812	57.40	45.64	1.97	319.71
	PR_BOND	360	33.57	43.24	0.00	374.07
	LEGAL_RIGHTS	447	5.39	2.28	1	10

Table 3: Correlations

The sample consists of country-level, annual data for the period 2000-08. All variables are expressed as natural logarithms (with the exception of dummy variables). LSCHOOLING, LLIFE_EXP, LINCOMETOP20, and LCONTRIB_RATE are sample period averages.

	NONLIFE	LIFE	INSURANCE_AS.	GDPPC	INFLATION	INCOMETOP20	POP	POP_DENSITY	LAGEDEP_OLD	LAGEDEP_YNG	LAGEDEP	LIFE_EXP	SCHOOLING	MUSLIM	PRIVATE	CONTRIB_RATE	CONCENTR.	PC	PR_BOND	CARS
NONLIFE	1.00																			
LIFE	0.63	1.00																		
INSURANCE_AS.	0.64	0.88	1.00																	
GDPPC	0.67	0.56	0.74	1.00																
INFLATION	-0.17	-0.36	-0.24	-0.30	1.00															
INCOMETOP20	-0.22	-0.19	-0.40	-0.39	0.21	1.00														
POP	-0.32	0.07	0.10	-0.37	0.03	0.16	1.00													
POP_DENSITY	0.03	0.33	0.16	-0.06	-0.08	-0.22	0.18	1.00												
LAGEDEP_OLD	0.59	0.49	0.53	0.52	-0.14	-0.63	-0.06	0.08	1.00											
LAGEDEP_YNG	-0.56	-0.43	-0.50	-0.67	0.19	0.66	0.15	-0.09	-0.68	1.00										
LAGEDEP	-0.24	-0.19	-0.23	-0.48	0.14	0.45	0.14	-0.02	-0.13	0.76	1.00									
LIFE_EXP	0.47	0.42	0.48	0.76	-0.35	-0.40	-0.23	0.08	0.49	-0.68	-0.59	1.00								
SCHOOLING	0.65	0.42	0.56	0.75	-0.23	-0.39	-0.30	-0.22	0.65	-0.69	-0.37	0.73	1.00							
MUSLIM	-0.58	-0.51	-0.42	-0.39	0.03	0.00	0.09	-0.04	-0.63	0.43	0.11	-0.29	-0.49	1.00						
PRIVATE	0.39	0.44	0.29	0.29	-0.21	-0.05	-0.11	0.10	0.21	-0.24	-0.11	0.20	0.23	-0.16	1.00					
CONTRIB_RATE	0.23	0.16	0.18	0.17	-0.07	-0.26	0.02	-0.04	0.35	-0.38	-0.20	0.25	0.35	-0.13	-0.01	1.00				
CONCENTR.	-0.32	-0.35	-0.27	-0.25	0.18	-0.04	-0.22	-0.17	-0.19	0.12	0.00	-0.14	-0.27	0.09	-0.32	-0.03	1.00			
PC	0.63	0.75	0.75	0.68	-0.39	-0.33	-0.11	0.21	0.48	-0.59	-0.40	0.63	0.58	-0.30	0.38	0.17	-0.22	1.00		
PR_BOND	0.59	0.57	0.70	0.64	-0.57	-0.41	-0.25	-0.09	0.54	-0.51	-0.22	0.46	0.67	-0.34	0.29	0.15	-0.10	0.65	1.00	
CARS	0.68	0.45	0.55	0.86	-0.22	-0.52	-0.43	-0.10	0.67	-0.77	-0.48	0.70	0.83	-0.39	0.40	0.35	-0.16	0.58	0.59	1.00
TRADE	0.38	0.17	0.05	0.15	-0.03	-0.26	-0.42	0.09	0.10	-0.25	-0.21	0.18	0.25	-0.05	0.12	0.14	0.04	0.25	0.20	0.31

Table 4: Parametric and Non-parametric Two-group Comparison Tests

This table reports the results of the two-group t-test and non-parametric Wilcoxon-Mann-Whitney ranksum test, performed on annual data for the period 2000-08 (not in logs). The insurance variables (Column 1) are divided in two groups using the median of the corresponding grouping variable (Column 2) as a cut-off, except when the grouping variable is a dummy. Columns 3 and 4 display the averages of the variable in Column 1 in each group respectively. Column 5 shows the p-value of a t-test which tests for the equality of means of the groups (allowing for inequality in variance). Column 6 shows the p-value of the ranksum test which tests whether the groups are samples from populations with the same distribution. LSCHOOLING, LLIFE_EXP, LINCOMETOP20, and LCONTRIB_RATE are sample period averages.

Test variable (1)	Grouping variable (2)	Average of explanatory variable, given value of "grouped by" variable is 0 for a dummy variable or smaller than its median otherwise (3)	Average of explanatory variable, given value of "grouped by" variable is 1 for a dummy variable or larger than or equal to its median otherwise (4)	P-value of t-test with unequal variance (5)	P-value of Wilcoxon Mann-Whitney test (6)
NONLIFE	GDPPC	0.96	1.89	0.00	0.00
LIFE	GDPPC	0.81	2.80	0.00	0.00
ASSETS	GDPPC	4.89	32.13	0.00	0.00
NONLIFE	INFLATION	1.75	1.13	0.00	0.00
LIFE	INFLATION	2.71	0.93	0.00	0.00
ASSETS	INFLATION	30.72	7.19	0.00	0.00
NONLIFE	INCOMETOP20	1.75	1.22	0.00	0.00
LIFE	INCOMETOP20	2.64	1.24	0.00	0.00
ASSETS	INCOMETOP20	31.18	8.85	0.00	0.00
NONLIFE	CARS	1.06	1.56	0.00	0.00
LIFE	CARS	1.21	2.04	0.00	0.00
ASSETS	CARS	7.49	22.84	0.00	0.00
NONLIFE	TRADE	1.30	1.56	0.00	0.00
LIFE	TRADE	1.80	1.87	0.73	0.36
ASSETS	TRADE	17.26	22.36	0.02	0.01
NONLIFE	POP	1.65	1.24	0.00	0.00
LIFE	POP	1.61	2.07	0.02	0.33
ASSETS	POP	19.04	20.82	0.40	0.04
NONLIFE	POP_DENSITY	1.25	1.64	0.00	0.00
LIFE	POP_DENSITY	1.27	2.40	0.00	0.00
ASSETS	POP_DENSITY	14.39	25.15	0.00	0.00
NONLIFE	AGEDEP	1.58	1.31	0.00	0.00
LIFE	AGEDEP	1.67	2.00	0.08	0.86
ASSETS	AGEDEP	16.71	23.23	0.00	0.52
NONLIFE	LIFEEXP	0.91	1.95	0.00	0.00
LIFE	LIFEEXP	0.78	2.85	0.00	0.00
ASSETS	LIFEEXP	5.01	31.34	0.00	0.00

Test variable (1)	Grouping variable (2)	Average of explanatory variable, given value of "grouped by" variable is smaller than its median (3)	Average of explanatory variable, given value of "grouped by" variable is larger than or equal to its median (4)	P-value of t-test with unequal variance (5)	P-value of Wilcoxon Mann-Whitney test (6)
NONLIFE	SCHOOLING	1.02	1.63	0.00	0.00
LIFE	SCHOOLING	0.63	2.35	0.00	0.00
ASSETS	SCHOOLING	5.01	26.01	0.00	0.00
NONLIFE	MUSLIM	1.67	0.72	0.00	0.00
LIFE	MUSLIM	2.51	0.39	0.00	0.00
ASSETS	MUSLIM	24.80	4.06	0.00	0.00
NONLIFE	PRIVATE	0.82	1.52	0.00	0.00
LIFE	PRIVATE	0.43	2.07	0.00	0.00
ASSETS	PRIVATE	4.06	20.87	0.00	0.00
NONLIFE	CONTRIB_RATE	1.37	1.50	0.11	0.00
LIFE	CONTRIB_RATE	1.54	2.06	0.00	0.01
ASSETS	CONTRIB_RATE	17.17	21.81	0.03	0.03
NONLIFE	CONCENTR.	1.66	1.10	0.00	0.00
LIFE	CONCENTR.	2.57	0.87	0.00	0.00
ASSETS	CONCENTR.	25.36	8.80	0.00	0.00
NONLIFE	LEGAL_RIGHTS	1.02	1.57	0.00	0.00
LIFE	LEGAL_RIGHTS	1.14	2.04	0.00	0.00
ASSETS	LEGAL_RIGHTS	10.20	23.04	0.00	0.00
NONLIFE	PC	0.95	1.90	0.00	0.00
LIFE	PC	0.42	3.15	0.00	0.00
ASSETS	PC	3.53	31.48	0.00	0.00
NONLIFE	PR_BOND	1.38	1.46	0.50	0.16
LIFE	PR_BOND	2.64	1.60	0.00	0.00
ASSETS	PR_BOND	17.74	20.60	0.25	0.13

Table 5: Development Drivers of the Life Insurance Industry

The dependent variable is the logarithm of the volume of life insurance premiums as a fraction of GDP. The sample consists of annual data for the period 2000-08. All regressions are estimated using pooled Ordinary Least Squares. Year-fixed effects and a constant were estimated but are not reported. LSCHOOLING, LLIFE_EXP, LINCOMETOP20, and LCONTRIB_RATE are sample period averages. In all regressions, White's heteroskedasticity-consistent (clustered) t-values are given in parentheses (brackets). ***, ** and * represent significance at 1, 5 and 10% level respectively.

	1	2	3	4	5	6	7
LGDPPC	1.06 (16.9)*** [6.04]***	0.96 (14.4)*** [5.32]***	0.92 (12.8)*** [5.56]***	0.61 (12.5)*** [6.52]***	0.37 (9.03)*** [3.31]***	0.29 (4.99)*** [2.07]**	0.43 (3.63)*** [2.03]**
LPOP	0.32 (11.5)*** [4.21]***	0.32 (12.6)*** [4.65]***	0.24 (7.32)*** [2.94]***	0.21 (6.11)*** [3.02]***	0.31 (12.0)*** [4.63]***	0.12 (3.30)*** [1.15]	0.23 (5.82)*** [3.23]***
LPOP_DENSITY	0.48 (10.5)*** [3.78]***	0.45 (10.7)*** [3.98]***	0.39 (7.48)*** [3.24]***	0.38 (7.27)*** [3.94]***	0.25 (6.19)*** [2.30]**	0.27 (8.81)*** [3.15]***	0.45 (6.05)*** [4.20]***
INFLATION	-2.90 (-5.84)*** [-3.25]***	-3.20 (-5.96)*** [-3.51]***	-6.10 (-5.23)*** [-5.35]***	-8.89 (-5.81)*** [-4.15]***	-0.79 (-1.23) [-0.66]	-5.81 (-3.24)*** [-1.64]	-8.15 (-5.71)*** [-5.00]***
LLIFE_EXP	-3.00 (-3.33)*** [-1.18]	-3.71 (-4.62)*** [-1.64]					-0.14 (-0.15) [-0.11]
LAGEDEP	0.17 (0.55) [0.20]						0.072 (0.13) [0.084]
LAGEDEP_OLD		0.94 (10.4)*** [3.76]***					
LAGEDEP_YNG		0.53 (3.11)*** [1.20]					
LSCHOOLING			-0.58 (-1.48) [-0.68]				0.87 (1.35) [0.81]
LINCOMETOP20			1.19 (3.61)*** [1.56]				1.79 (3.69)*** [2.12]**
MUSLIM			-0.66 (-3.66)*** [-1.64]				-0.56 (-2.97)*** [-1.82]*
LCONTRIB_RATE				-0.15 (-1.71)* [-0.87]			-0.20 (-2.05)** [-1.15]
CONCENTR.				0.23 (1.88)* [1.01]			0.29 (1.87)* [1.24]
PRIVATE				0.63 (4.00)*** [2.09]**			0.36 (2.34)** [1.42]
LEGAL_RIGHTS				0.085 (2.79)*** [1.47]			0.072 (2.37)** [1.59]
LPC					1.12 (14.1)*** [5.42]***		0.46 (4.39)*** [2.62]**
LPR_BOND						0.19 (5.50)*** [2.59]**	
Observations	767	767	455	296	760	359	181
R-squared	0.546	0.591	0.720	0.702	0.646	0.568	0.822
Countries	86	86	69	69	86	42	56

Table 6: Development Drivers of the Non-Life Insurance Industry

The dependent variable is the logarithm of the volume of non-life insurance premiums as a fraction of GDP. The sample consists of annual data for the period 2000-08. All regressions are estimated using pooled Ordinary Least Squares. Year-fixed effects and a constant were estimated but are not reported. LSCHOOLING, LLIFE_EXP, LINCOMETOP20, and LCONTRIB_RATE are sample period averages. In all regressions, White's heteroskedasticity-consistent (clustered) t-values are given in parentheses (brackets). ***, ** and * represent significance at 1, 5 and 10% level respectively.

VARIABLES	1	2	3	4	5	6
LGDPPC	0.14	0.26	0.30	0.20	-0.056	0.20
	(3.48)***	(18.4)***	(14.6)***	(10.1)***	(-0.46)	(7.84)***
	[1.81]*	[6.61]***	[7.26]***	[3.59]***	[-0.38]	[3.91]***
LPOP	-0.0017	-0.035	-0.073	-0.034	-0.020	-0.069
	(-0.081)	(-3.40)***	(-5.38)***	(-2.94)***	(-0.61)	(-5.17)***
	[-0.041]	[-1.22]	[-2.65]***	[-1.05]	[-0.47]	[-2.61]**
LPOP_DENSITY	0.091	0.0042	-0.022	0.0015	0.031	-0.046
	(3.81)***	(0.32)	(-1.20)	(0.11)	(1.01)	(-2.64)***
	[1.90]*	[0.13]	[-0.60]	[0.039]	[0.78]	[-1.33]
INFLATION	0.059	0.22	0.98	1.23	1.32	1.23
	(0.14)	(1.41)	(2.19)**	(5.32)***	(2.52)**	(3.11)***
	[0.098]	[0.85]	[1.22]	[4.03]***	[1.91]*	[1.71]*
MUSLIM		-0.56			-0.57	-0.28
		(-11.3)***			(-4.47)***	(-4.53)***
		[-4.02]***			[-3.57]***	[-2.23]**
CONCENTR.			-0.060		-0.23	-0.11
			(-1.15)		(-2.06)**	(-1.92)*
			[-0.58]		[-1.59]	[-0.97]
PRIVATE			0.15		-0.091	0.12
			(2.64)***		(-0.75)	(1.97)**
			[1.33]		[-0.62]	[0.99]
LEGAL_RIGHTS			0.055		0.048	0.041
			(5.53)***		(2.17)**	(4.20)***
			[2.76]***		[1.50]	[2.09]**
LPC				0.30	0.14	0.16
				(10.2)***	(1.60)	(4.80)***
				[4.02]***	[1.09]	[2.35]**
LCARS	0.19				0.24	
	(4.62)***				(2.44)**	
	[2.44]**				[2.04]**	
LTRADE	0.057					
	(1.02)					
	[0.54]					
Observations	384	740	321	766	89	308
R-squared	0.509	0.604	0.668	0.535	0.711	0.708
Countries	83	83	76	87	49	73

Table 7: Development Drivers of the Insurance Industry's Total Assets

The dependent variable is the logarithm of total insurance assets as a fraction of GDP. The sample consists of annual data for the period 2000-08. All regressions are estimated using pooled Ordinary Least Squares. Year-fixed effects and a constant were estimated but are not reported. LSCHOOLING, LLIFE_EXP, LINCOMETOP20, and LCONTRIB_RATE are sample period averages. In all regressions, White's heteroskedasticity-consistent (clustered) t-values are given in parentheses (brackets). ***, ** and * represent significance at 1, 5 and 10% level respectively.

	1	2	3	4
LGDPPC	1.34	1.10	1.08	0.87
	(21.0)***	(23.6)***	(22.3)***	(13.4)***
	[11.2]***	[10.2]***	[9.72]***	[6.37]***
LPOP	0.35	0.25	0.26	0.25
	(7.39)***	(10.5)***	(11.1)***	(7.01)***
	[3.76]***	[4.25]***	[4.46]***	[3.11]***
LPOP_DENSITY	0.050	0.18	0.18	0.11
	(1.16)	(6.53)***	(6.47)***	(3.32)***
	[0.58]	[2.52]**	[2.50]**	[1.40]
INFLATION	-4.55	-0.73	-0.70	-5.28
	(-4.04)***	(-0.90)	(-0.88)	(-4.34)***
	[-3.25]***	[-0.66]	[-0.64]	[-2.79]***
LCARS	-0.50			
	(-7.87)***			
	[-4.42]***			
LTRADE	0.72			
	(6.05)***			
	[3.23]***			
LLIFE_EXP		-3.01	-3.46	
		(-4.52)***	(-5.66)***	
		[-1.93]*	[-2.32]**	
LAGEDEP		0.49		
		(1.98)**		
		[0.90]		
LAGEDEP_OLD			0.41	
			(3.78)***	
			[1.87]*	
LAGEDEP_YNG			0.46	
			(2.68)***	
			[1.18]	
LSCHOOLING				-0.38
				(-0.81)
				[-0.42]
LINCOMETOP20				-0.39
				(-1.28)
				[-0.56]
MUSLIM				-0.49
				(-2.44)**
				[-1.12]
Observations	266	538	538	343
R-squared	0.699	0.677	0.681	0.699
Countries	65	76	76	60

Table 8: Development Drivers of the Insurance Industry's Total Assets

The dependent variable is the logarithm of total insurance assets as a fraction of GDP. The sample consists of annual data for the period 2000-08. All regressions are estimated using pooled Ordinary Least Squares. Year-fixed effects and a constant were estimated but are not reported. LSCHOOLING, LLIFE_EXP, LINCOMETOP20, and LCONTRIB_RATE are sample period averages. In all regressions, White's heteroskedasticity-consistent (clustered) t-values are given in parentheses (brackets). ***, ** and * represent significance at 1, 5 and 10% level respectively.

	1	2	4	5	6
LGDPPC	0.72 (15.8)*** [7.83]***	0.52 (13.4)*** [5.33]***	0.45 (6.64)*** [3.08]***	0.57 (2.64)** [2.05]**	0.70 (6.03)*** [4.19]***
LPOP	0.27 (8.15)*** [4.16]***	0.27 (12.8)*** [5.56]***	0.070 (2.54)** [0.95]	0.53 (5.79)*** [3.96]***	0.52 (7.51)*** [4.74]***
LPOP_DENSITY	0.24 (5.68)*** [2.94]***	0.045 (1.88)* [0.77]	0.18 (7.91)*** [2.92]***	-0.18 (-1.88)* [-1.41]	-0.017 (-0.27) [-0.19]
INFLATION	-4.98 (-3.44)*** [-2.14]**	1.44 (1.79)* [1.25]	-7.76 (-3.06)*** [-1.85]*	-0.32 (-0.29) [-0.21]	-3.95 (-2.62)*** [-2.06]**
LLIFE_EXP				4.39 (2.43)** [1.96]*	-0.79 (-0.61) [-0.46]
LAGEDEP				2.47 (4.07)*** [3.00]***	1.33 (2.36)** [1.55]
LSCHOOLING				1.33 (1.52) [1.17]	-0.60 (-0.66) [-0.48]
LINCOMETOP20				-1.00 (-1.58) [-1.12]	-0.024 (-0.046) [-0.030]
MUSLIM				-0.62 (-2.01)* [-1.65]	-0.61 (-2.95)*** [-1.75]*
LCONTRIB_RATE	-0.20 (-2.32)** [-1.20]			0.074 (0.53) [0.35]	0.026 (0.31) [0.20]
CONCENTR.	0.36 (2.98)*** [1.60]			-0.38 (-2.00)* [-1.58]	0.29 (1.82)* [1.07]
PRIVATE	0.46 (3.00)*** [1.57]			0.85 (3.64)*** [3.23]***	0.54 (2.46)** [1.54]
LEGAL_RIGHTS	0.13 (4.67)*** [2.28]**			0.13 (2.55)** [1.77]*	0.031 (1.01) [0.66]
LPC		0.83 (13.3)*** [5.76]***		0.72 (3.96)*** [2.66]**	0.73 (6.05)*** [3.58]***
LPR_BOND			0.28 (3.70)*** [2.36]**		
LCARS				-0.46 (-3.36)*** [-2.41]**	
LTRADE				1.17 (4.80)*** [3.43]***	0.82 (4.09)*** [2.59]**
Observations	255	534	301	61	157
R-squared	0.723	0.724	0.671	0.929	0.840
Countries	62	76	39	35	53

Table 9: GMM Dynamic System Panel Estimates of Impact of Private Credit and Passenger Cars Penetration on Insurance Development

The dependent variables are the logarithms of life premiums, non-life premiums and insurance total assets as a fraction of GDP, respectively. The sample consists of annual data for the period 2000-08. Dynamic system GMM panel regressions are estimated á la Arellano and Bover (1995) with robust standard errors and the Windemeijer small-sample correction. Robust t-statistics are given in parentheses. A constant was estimated but not reported. ***, ** and * represent significance at 1, 5 and 10% level respectively.

	1 Log Life Premiums to GDP	2 Log Life Premiums to GDP	3 Log Non-Life Premiums to GDP	4 Log Non-Life Premiums to GDP	5 Log Insurance total assets to GDP	6 Log Insurance total assets to GDP	7 Log Non-Life Premiums to GDP	8 Log Non-Life Premiums to GDP
LGDPPC	1.110***		0.403***		0.575***		0.259	
	(3.675)		(4.043)		(2.756)		(1.240)	
LPOP	0.487***	0.296***	0.0105	-0.0552	0.286***	0.254***	0.0597	0.0816
	(3.862)	(2.900)	(0.253)	(-1.078)	(4.254)	(2.946)	(1.067)	(1.551)
LPOP_DENSITY	0.260*	-0.0158	-0.0124	-0.114*	-0.0197	-0.170*	0.0902*	0.103**
	(1.728)	(-0.134)	(-0.253)	(-1.923)	(-0.226)	(-1.789)	(1.813)	(2.106)
INFLATION	-0.214	1.268	0.379	0.910*	3.182***	3.008	-0.349	-1.168*
	(-0.161)	(0.860)	(0.844)	(1.910)	(2.817)	(1.450)	(-0.683)	(-1.702)
LPC	0.779	2.447***	0.199	0.807***	1.198***	2.246***		
	(1.471)	(7.077)	(1.279)	(6.350)	(3.077)	(6.689)		
LCARS							0.282	0.504***
							(1.268)	(5.000)
Observations	717	723	717	723	508	513	368	368
Countries	81	81	81	81	71	72	79	79
AR(2) correlation (p-value)[a]	0.09	0.01	0.84	0.16	0.60	0.06	0.07	0.51
Hansen test (p-value) [b]	0.11	0.06	0.01	0.04	0.07	0.03	0.11	0.17

[a] The null hypothesis is that the errors in the difference equation do not exhibit second-order autocorrelation.
[b] The null hypothesis is that the instrumental variables are not correlated with the residuals.

Figure 1: Motor premium penetration vs. personnel car density