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Beyond the S-curve

Insurance Penetration, Institutional Quality and Financial Market Development

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Abstract

This paper provides new evidence of factors, other than GDP per capita, that correlate with the development of insurance markets. Based on 20 years of insurance premium data from 180 countries, and a similar wealth of data on institutions and financial market development, the paper presents important correlates of insurance market development. Although the analysis cannot identify which factors directly cause insurance market growth, the results suggest that interventions aimed at stimulating insurance supply and demand should take enabling factors, such as the quality of institutional governance and the degree of financial market development, into consideration.

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Beyond the S-curve: Insurance Penetration, Institutional Quality and Financial Market Development[*]

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1. Introduction

The benefits of a well-functioning insurance sector to households, firms and the public sector are widely acknowledged (Lester, 2014; Bennett et al., 2018; Mall, 2017; Camargo, Chamberlain and Coetze, 2017; Hagmayr et al., 2007; Webb, 2006). By reducing the risk to which humans and their activities are exposed, insurance prevents adversity from leading to immiseration, and reduces the related anxiety. Related, it allows putting to better use buffer capital stocks that individuals saved up in case of unlikely but devastating hardships. Insurance also allows economic actors to engage in activities that promise greater expected returns but are subject to uncertainty, and it allows them to access financing, be it small-scale farmers, multinational conglomerates or governments. Insurance quantifies risk and incentivizes informed risk reduction, as risk-taking individuals such as smokers and aggressive automobile drivers, for example, face higher insurance prices and thus increased incentives to modify their behavior leading to fewer road traffic accidents and less smoking. Insurance also creates markets by increasing the supply of organ donors for individuals that need organ transplants. Without insurance there would be too few individuals that could afford the health care costs making the market too thin. More generally, insurance plays an important role of financial intermediation by mobilizing and pooling capital and making it available efficiently and at scale, often for the long durations required by infrastructure projects (Levine and Zervos, 1996 and 1998; Arestis and Demetriades, 1997). As institutional investors, insurers can contribute to good governance of their investees, and hence to positive business confidence. Even where insurers play a minor role in accumulating the pension assets that aging populations increasingly require, annuities offered by insurance companies are the only hedge there is against the longevity risk.

Given these benefits, why do we observe such low levels of insurance in some countries? The median of worldwide Insurance Penetration, defined as a country's insurance premium as percentage of GDP, was under 2% in 2016,[1] but this masks the fact that national differences are huge, ranging from close to 20% at one end of the spectrum to 0.06% at the other. Media coverage of every natural disaster highlights the often large difference between the economic and the insured losses, a gap that has been widening over the last decades.[2] The same is true for shortfalls in pension levels compared to living standards that citizens expect around the world.

The early literature on finance and growth, started by the work of Goldsmith (1969), McKinnon (1973), and Shaw (1973), notes that it is difficult to establish "with confidence the direction of the causal mechanism, i.e., of deciding whether financial factors were responsible for the acceleration of economic development or whether financial development reflected economic growth whose mainsprings must be sought elsewhere" (Goldsmith, 1969 pg. 48). Jung (1986) provides postwar econometric evidence for a group of 56 countries that causality (in the Granger sense) runs in either and both ways.

Greenwood and Jovanovic (1990) develop a model that highlights how financial intermediation and growth are inextricably linked in accordance with the Goldsmith-McKinnon-Shaw view on economic development. Financial intermediation promotes growth because it allows a higher rate of return to be earned on capital, and growth in turn provides the means to implement costly financial structures.

[1] Source: AXCO Insurance Information Services global statistics.

[2] Edwards (2012) presented a methodology to quantify this so-called insurance protection gap for non-life insurance, and found that 17 of the 42 countries they analyzed are underinsured, with the gap adding to 168bn USD.

The dynamics of the development process in the Greenwood and Jovanovic (1990) model resemble the Kuznets (1955) hypothesis. In the early stages of development, an economy's financial markets are virtually nonexistent and grow slowly. Financial markets begin to form as the economy approaches the intermediate stage of the growth cycle. Here the economy's growth and savings rates both increase, and income disparities between poor and rich widen. By maturity, the economy has developed an extensive structure for financial intermediation. In the fourth stage of development the distribution of income across agents stabilizes, the savings rate falls, and the economy's growth rate converges to a higher level than that prevailing during its infancy.

Greenwood and Jovanovic (1990) would suggest that some countries do not have a developed insurance market because they are still in early stages of development. Enz (2000) proposed a logistic function to explain Insurance Penetration from GDP per capita, introducing an S-curve as explanation for the size of a country's insurance market. The author associates an income threshold at which insurance penetration may start growing. The idea, similar to Greenwood and Jovanovic (1990) is that insurance growth would take off once the country's income per capita reached a certain point, but that policies to encourage the insurance market before would be largely ineffective.

This paper shows that while the correlation between income per capita and insurance premium is undeniable, there are various other factors that also correlate with insurance market development, often as strongly as economic growth.

One such factor is other existing risk transfer mechanisms in the economy, as formal insurance contracts will be less beneficial when other risk control or transfer mechanisms are functioning well. In societies that are more indifferent to risk, or alternative risk transfer mechanisms such as friends and kin are important, the characteristics of the social fabric of a given society will reduce the potential benefits from formal insurance. While the social fabric can evolve over time as the insurance sector develops, Fukuyama (1995) links these differences to the culturally determined levels of trust. Some countries are seen as high-trust economies, enabling economic transactions to be undertaken beyond the boundaries of the extended family. In contrast, in so-called low-trust societies, individuals find it difficult to transact with unknown individuals (Guiso et al. 2004; 2006; 2008 and 2009). Hofstede (1995) develops a similar taxonomy to characterize countries as low- or high-group societies. Low-group societies put an emphasis on the individual and will tend to support market-based solutions to deal with risk such as insurance. High-group societies put an emphasis on collective mechanisms, and will tend to emphasize the role of families and government to manage risk.

Another factor is the role of regulation in protecting policyholder interests which may vary from country to country (Angerer, 1993). In the U.K., for example, the market is allowed to determine the price of insurance. Until recently, Japan took the opposite approach by having the regulator set rates at a level that enabled the weakest company to remain solvent. However, according to Hayakawa et al. (2000), such a regulatory structure provided few incentives to innovate or be cost effective. Indeed, the loss ratios for the Japanese automobile insurance sector have been persistently below 60 percent for the last 20 years, whereas they are around upwards of 70 percent in the U.K., France and the U.S. Related, Feyen et al. (2011) and Beck and Webb (2003) argue that insurance is less attractive to consumers when the rule of law is weak and their outlook to be able to enforce their contractual rights is uncertain. Erbas and Sayers (2006) show how institutional quality is a more significant determinant of non-life insurance penetration than income per capita.

Finally, the regulation of business activities is also likely to influence the functioning of the financial market. LaPorta, Lopez-de-Silanes, Scheifer, and Vishny (1997,1998) have shown that the character and origin of the legal system within an economy substantially affect laws relating to bank credit, the enforcement of credit contracts, and the standards for corporate information disclosure. Not surprisingly, therefore, Browne, Chung, and Frees (2000) show that a country's legal system is a significant determinant of the demand for automobile and general liability insurance.

We find that the development of a country's economic institutions and financial sector (measured by indicators such as credit to the private sector, bank account ownership rates, or the financial reform index) are important to insurance market development. In addition, financial reform seems to matter to insurance, even when the reforms are not meant to directly address insurance markets.

We show that the important relationship between insurance penetration on the one hand, and rule of law and institutional quality on the other hand, established previously for non-life insurance, also holds for life insurance, even when controlling for differences in income per capita, to address the fact that governance in higher income countries tends to be better. There are therefore other correlates besides growth of GDP per capita that explain insurance market development.

We further show that correlations are stronger in life insurance than in non-life insurance. A plausible explanation for this is that the purchase of life insurance is more often a voluntary decision than the purchase of non-life insurance. Especially in economies where insurance markets are incipient and large parts of the population are excluded for one reason or another, mandatory insurance such as third-party motor insurance is the dominant line of non-life insurance, along with industrial and commercial insurance. Low trust in the rule of law can dampen compliance with mandatory insurance and make commercial buyers of insurance want to purchase abroad, but it will not suppress non-life insurance demand completely. Life insurance, by contrast, is rarely mandated by law, even if lenders often require it as a condition to a loan and employees may get it as part of their formal work contracts. Another particularity of life insurance is that contract durations regularly go well beyond one year. Consumers can usually cancel the insurance before maturity, but this often carries substantial penalties, especially for life insurance with elements of asset accumulation, so the risk of regretting a purchase of life insurance is more pronounced than that for non-life insurance, especially in an environment where consumers feel unprotected. Therefore, life insurance markets rarely embark on a growth path in places where consumers mistrust institutional quality.

We note that this research establishes correlations, not causations, given the available data. Nevertheless, it hopes to help overcome the inertia implied by the S-curve, showing that income growth alone will not close the insurance gap. It also cautions against overly optimistic expectations regarding interventions focused on strengthening insurance regulation or supervision in countries where the environment is not particularly enabling. Insurance supervisors alone cannot establish the levels of governance, accountability and financial inclusion that see insurance thrive.

The rest of the paper is organized as follows. Section 2 describes the literature on insurance penetration and economic growth. In Section 3 we describe the data collected to perform the cross-country analysis, while in Section 4 we explain our methodology. In Section 5 we present the results and Section 6 concludes.

2. Literature Review

Many of the recent studies documenting the relationship between insurance penetration and economic growth (e.g. Wardand and Zurbruegg, 2000) neglect the direction of causality. A set of studies suggest that the development of an insurance sector is a necessary pre-condition for economic growth. They maintain that development of the insurance sector may induce higher economic growth by facilitating savings in the form of financial assets, thereby promoting capital formation and hence, promoting economic growth (see, for example, Alhassan and Fiador, 2014; Lee et al., 2013; Haiss and Sumegi, 2008; Lee, 2011 and 2012; Ward and Zurbruegg, 2000; and Webb et al., 2002). Another set of studies suggest in contrast that the development of the insurance sector only plays a minor role in economic growth, and that the development of the insurance sector is merely an outcome or result of economic growth in the real side of the economy. As an economy grows, the argument goes, additional insurance coverage may emerge in the market in response to a higher demand for financial services (e.g. Catalan et al., 2000; Pan and Wei, 2012; and Ward and Zurbruegg 2000). Yet another line of thought suggests that economic growth and development of the insurance sector can complement and reinforce each other, making development of the insurance sector and real economic growth mutually causal. The argument in favor of this bidirectional causality is that development of the insurance sector is indispensable to economic growth, as economic growth inevitably requires a developed insurance market. This is the core idea in Greenwood and Jovanovic's (1990) model and empirically this has been tested by Beck and Webb (2003), Nejad and Kermani (2012), and Pradhan et al. (2016). Finally, one last set of papers argues that development of the insurance sector and economic growth are independent from each other (Pan and Wei, 2012).

From the point of view of an individual, several factors may drive demand for insurance. These include utility maximization and risk aversion (Yaari 1965; and Hakansson, 1969), income and wealth, subjective discount factors, insurance premium rates (Outreville, 1985), human capital endowment (Szpiro and Outreville, 1988), and religion (Browne and Kim, 1993). These theories usually assume perfect capital markets, intergenerational distribution of income in the presence of population growth, and universal access to savings products. Despite the perhaps limited applicability of these theories to developing countries, Outreville (1990, 1996) tries to identify the link between an economy's financial development and insurance market development. Using insurance premium income data from 48 developing countries compiled by UNCTAD, Outreville (1996) sets up an empirical model of life insurance demand that depends on GDP per capita, anticipated inflation, real interest rates, and life expectancy at birth as a proxy for the price of insurance. Demand for insurance also depends on whether the market is monopolistic, whether foreign insurance companies are present, and on the level of financial development.[3] He finds an income elasticity of insurance demand that is positive and provides regression coefficients for a number of other explanatory variables, which are not straightforward to generalize given the limited amount of insurance premium data available.

Outreville's results are similar to those of Browne and Kim (1993) who conclude saying that "As more data become available, an analysis of insurance consumption in a wider sample of countries would likely lead to a greater understanding of insurance demand. Further, a time series study of demand could potentially lead to a greater knowledge of the growth and maturation of insurance markets." In addition, empirical and theoretical evidence suggests that the role of insurance in the economy may be varied across countries. Beenstock, Dickinson, and Khajuria (1986) and Browne and Kim (1993) found that the role of the state in providing insurance services was a determinant of the demand for life insurance,

[3] Measured by the ratio of quasi-money (M2-M1) to the broad definition of money (M2).

as well as the level of education and the age dependency ratio, all of which are likely to differ across countries. Indeed, Beenstock, Dickinson and Khajuria (1986) develop a theoretical model for life insurance supply and demand, which is tested with 1970-1981 insurance premium data of 10 industrialized countries from Swiss Re's Sigma publication. They argue that life insurance demand varies with income because higher income allows to buy more of it, but also because higher income increases the insurable interest, that is the financial loss of the dependents of a deceased income earner. Estimating the parameters of their mathematical model on the data of the 10 countries, they find income elasticity of insurance demand to be positive for all countries but to vary considerably from country to country.

In a longer term perspective, and in line with theorical insights from Kuznets (1955) and Greenwood and Jovanovic (1990), Enz (2000) postulates that "Researchers usually assume a constant income elasticity which, together with an income elasticity greater than one, implies that there are no limits to insurance penetration" (without naming or quoting any particular researcher), and argues that this assumption leads to unreasonable levels of insurance penetration if GDP grows constantly (even at moderate rates). This criticism motivates him to explain the relation between insurance premium and GPD with a logistic function that has additional parameters - minimum and maximum insurance penetration – resulting in variable income elasticity and an inflection point at which the increase in insurance penetration slows. He then introduces the term "S-curve" for this function. His theory proposes to explain non-life insurance as well as life insurance, and he estimates the parameters of the S-curve with 90 countries' life and non-life premium data from the years 1970 to 1998 (sourced again from Swiss Re's Sigma publication). As a result, he can quantify the inflection points quoted above and points of maximum income elasticity for life (15,000 USD) and non-life (10,000 USD) insurance and estimate a maximum life insurance penetration parameter of 3.8% (a level surpassed by 16 countries in 2017, including Namibia and Thailand). Enz (2000) does observe that some countries deviate significantly from the international average and points out that "other factors in addition to income must account for the demand of life insurance", providing some explanations that include changes in age structure, challenges of social security systems, religious considerations and changes in tax treatment (as well as some interesting explanations for non-life). In closing, the paper acknowledges the limitations of the S-curve as a one-factor model that neglects drivers other than income but recommends it for long term forecasting (as done by some large reinsurance companies).

Going beyond GDP per capita, Beck and Webb (2003) look at a considerable number of demographic, economic and institutional variables to explain life insurance consumption in addition to countries' different per capita income levels. They confirm some earlier researchers' findings, e.g. Enz's statement about the role of religious beliefs and Outreville's findings regarding financial sector development. Their theoretical model is found in the above (and other) publications, but they use much larger data sets to validate it, looking at 68 economies over the period 1961–2000, and are thus able to better control for various geographic and time effects. Their interest in insurance's role in the financial sector especially as a source of capital market investment guide a more differentiated analysis that yields other results beyond explaining the growth of insurance penetration. They argue that beyond Beenstock's explanation for the importance of income to life insurance premium, additional reasons are that people can put increasing shares of their increasing income into retirement and investment, and that economies of scale make insurance more cost-efficient and attractive as the sums insured grow. These authors are the first to link institutional determinants such as the rule of law and absence of revolutions to life insurance development, motivations including that excessive fraud dampens the supply of insurance and the inability to enforce consumer rights against insurers dampens the demand for it.

Without reference to Beck and Webb (2003), Erbas and Sayers (2006) focus their research on the link between non-life insurance development and institutional quality. Based on experimental findings by other authors, they argue that institutional quality is a good indicator of uninsurable uncertainty, which is detrimental to insurance demand. This is because a country's institutional framework determines the reliability of norms, which in turn determine the subjective evaluation of economic risks, for example the risk that a legitimate insurance claim will be denied without recourse. With 1994-2003 data from 70 countries and the World Bank Governance indicators, they find that institutional quality, and the levels of transparency and uncertainty it entails, explains insurability (which they measure as insurance penetration) better than income level for non-life insurance, and suggest that "an examination of life insurance penetration across countries along the lines of the present paper is left for future research."

This is the point of departure for the present paper, which establishes correlations of the different drivers of insurance market development discussed in the literature with insurance penetration for both life and non-life insurance based on a data set that is much more extensive in terms of countries and years of observation.

3. Data

We use 4 main sets of cross-country data in our analysis: income per capita, insurance market data, national governance indices and financial market development measures. All the data are available yearly and most of the variables span roughly 180 countries for a period of 20 years. Two of the three measures of financial market development are more limited in terms of geographical and time coverage, as described below. Summary statistics are presented in Table 1. Online Appendix Table 1 shows summary statistics for low and lower-middle income countries and higher-middle and high income countries separately.

Income. The income measure used is annual GDP per capita provided by the World Bank for 194 countries for the period of 1996-2016. The values are in U.S. dollars of 2011 in PPP terms to allow for comparisons across countries. The average GDP per capita in our sample is almost USD 18,000 and the median is around USD 10,500. When splitting the sample between low and lower-middle income countries and higher-middle and high income countries, we use the World Bank income categories.

Insurance markets. The measure of insurance market development, that is, the main dependent variable, is life and non-life insurance written premiums as percent of GDP, or insurance penetration (IP). The data are collected by AXCO, a British company that provides extensive and detailed information on insurance markets across the globe. AXCO gets the data from the insurance supervisor in each country, or from the insurance association in situations where the supervisor does not provide data, or the data are outdated. Non-life insurance includes motor, machinery, bonds and health insurance, among others. See Section OA1 of the Online Appendix for the all the insurance classes available in the AXCO data.

Insurance penetration data are available for 180 countries, spanning the years of 1996 to 2016. Insurance premiums add up to a relatively small fraction of the GDP. As seen in Table 1, the mean of total (i.e. adding life and non-life) insurance penetration is 2.9% of GDP and most of the countries in our sample have IP lower than 5% of GDP (75^{th} percentile is 4.1%). Total insurance penetration in higher-middle and high income countries is almost 4 times higher than total IP in low and lower-middle income countries (see OA Table 1).

Governance. The main measure of institutional quality is a standardized index that summarizes 6 other (also standardized) indices from the Worldwide Governance Indicators, produced by the World Bank (see Kaufmann, Kraay and Mastruzzi, 2010 for methodological details). The indices, namely Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence/Terrorism, Rule of Law, Regulatory Quality and Voice and Accountability, aim to capture different dimensions of institutions. To construct the governance index, we standardize the sum of the 6 standardized indices above. The data are available for 174 countries from 1996 to 2016.

The indices are built based on surveys conducted with a number of respondents worldwide, as well as expert assessments. Following the original definitions in Kaufmann, Kraay and Mastruzzi (2010), Control of Corruption reflects perceptions of the "extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests." Government Effectiveness measures the "perception of quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies". Political Stability and Absence of Violence/Terrorism summarizes the perceived "likelihood of political instability and/or politically-motivated violence, including terrorism". Rule of Law reflects "the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence". Regulatory Quality captures the "ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development". And lastly, Voice and Accountability summarizes the "extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media". Countries that score high in those indices are perceived to perform better in each of those dimensions of institutional quality.

Financial markets. We use 3 measures of financial market development. First, we gathered data on the total domestic credit to the private sector as a percentage of GDP, collected by the World Bank. The data span 182 countries again for the period of 1996 to 2016. As seen in Table 1, the average in our sample is 49% (median = 35%) and there is considerable variation across time and countries. Higher-middle and high income countries have an average of credit to the private sector as percentage of GDP almost 3 times higher than low and lower-middle income countries (67% and 23%, respectively, as seen in OA Table 1). Similarly to insurance penetration, a few countries have a very high share of domestic credit to GDP.

The other two measures of financial market development are more limited in terms of time and geographical coverage. The second set of data reflects the level of a country's financial liberalization. The data were put together by Abiad, Detragiache and Tressel (2010) and capture seven dimensions of financial market development: credit controls and reserve requirements, interest rate controls, entry barriers, state ownership, policies on securities markets, banking regulations and restriction on the financial account. In our analysis we use the standardized index (Financial Reform Index) also produced by the authors that summarizes all the seven dimensions. Higher values of the index correspond to higher levels of financial liberalization. Finally, we have data from the Global Findex database, produced by the World Bank (Demirgüç-Kunt et al. 2018), on the share of the adult population that has an account in a formal financial institution. The data come from the 2011 and 2014 rounds of the Findex report and cover 150 countries. In the average country in our sample, around half (51%) of the population holds an account (median = 46%). We use this variable as a proxy for access to the formal

financial markets, through which people can also access financial instruments such as life, health and auto insurance, for example.

4. Methodology

In order to assess the correlation between insurance penetration and our measures of institutional quality and financial market development taking into account GDP per capita, we estimate the following regression using a panel of 180 countries from year 1996 to 2016:

$$Y_{irt} = \alpha + \beta_1 GDPPC_{it-1} + \beta_2 GDPPC^2_{it-1} + \beta_3 X_{it-1} + \gamma_r + \lambda_t + t\theta_i + \epsilon_{irt} \qquad (1)$$

where *i* indexes the country, *r* indexes the country region and *t* indexes the year. As our dependent variable, we use insurance penetration as a percentage of GDP. In the main analysis, we only report the results using life and non-life insurance penetration, but we also report the results using total (life and non-life) insurance penetration in the Online Appendix.

Since we want to estimate partial correlations controlling for GDP per capita, we always include GDP per capita on the right-hand side of our equation. Inspired by the model developed by Greenwood and Jovanovic (1990) and previous work by Enz (2000), among others, we include both a linear ($GDPPC$) and a quadratic term ($GDPPC^2$) to partially capture the non-linear correlation between insurance penetration and GDP per capita. All variables on the right-hand side are lagged by one year to mitigate concerns of endogeneity. We also include region fixed effects (γ_r) and year fixed effects (λ_t) in all specifications and country-specific time trends ($t\theta_i$) in some specifications.

GDP per capita, institutional quality and financial market development are arguably strongly correlated, so we take a parsimonious approach and run separate regressions for each one of our measures of interest apart from GDP per capita. These variables are included in vector X_{it-1}. The coefficient of interest is β_3 and should be interpreted as the partial correlation between variable X and insurance penetration once GDP per capita is taken into account.

When analyzing institutional quality, not only do we estimate Equation 1 using the index that summarizes the quality of the institutions of each country, but we also run the regressions using each of the index components separately.

To assess the magnitude of the partial correlations that we estimate, we also propose exercises where we calculate the predicted changes to insurance penetration if a country were to move from one part of the distribution of an independent variable to a higher end of the same distribution. For example, we can estimate the predicted change in insurance penetration if a country were to move from the 25th to the 75th percentile of the distribution of the governance index. Although not causal, this exercise gives us a sense of what would be the expected growth in insurance penetration in a country that significantly increases its institutional quality, for example. We also perform similar exercises for changes within groups of income. In that case, we predict changes in insurance penetration if a country were to move from one percentile of the income distribution to another within the distribution of low and lower-middle income countries.

5. Results

Due to differences between life and non-life insurance markets, we separate the analysis between life and non-life IP. In Table 2 we present the estimates of Equation 1 using all countries in our sample. Estimates in odd-numbered columns do not include country time trends, while in even-numbered columns we include these trends. In some cases, especially when we use data with smaller coverage of countries and time (i.e. Financial Reform data and Findex data), including country time trends may be too demanding due to small sample sizes, so our preferred specifications do not include country time trends. In all columns we include GDP per capita in both linear and non-linear fashion.

In Columns 1 and 2 of Table 2 we regress IP on GDP per capita. In Columns 3-10, we add the other variables of interest, one at a time (always controlling for GDP and GDP^2). We prefer to add each one at a time for two reasons: (i) as mentioned in Section 4, since income per capita, the governance index and our measures of financial markets development are arguably correlated, we want to avoid collinearity issues; and (ii) the geographical and time coverage of the Abiad, Detragiache and Tressel (2010) and of the Findex data is far more limited. In Columns 3 and 4 we add our governance index, while in Columns 5-6, 7-8 and 9-10 we include domestic credit to private sector (as % of GDP), the Financial Reform Index, and the number of account holders (as % of population) from Findex, respectively. Due to sample size restrictions, our preferred specification when using the last two variables does not include country time trends. Appendix Table 2 shows analogous estimates using total (sum of life and non-life) IP.

In order to quantify the magnitude of our estimates, we ask what the predicted increase in IP would be if a country were to move from the 25th to the 75th percentile of the distribution of each one of the predictors. For example, what would be the predicted change in life IP if a country moved from the 25th to the 75th percentile of the distribution of institutional quality (i.e., governance index). The numbers are shown in Table 3a. Appendix Table 3a shows analogous comparative statics using estimates of total IP from Appendix Table 2.

In Table 3a, we can see that the estimates of our preferred specification (from Column 2 of Table 2) imply that an increase in GDP per capita that moves a country from the 25th to the 75th percentile of income per capita distribution (roughly a USD 20,000 increase, or one standard deviation) is associated with an increase in life IP of 141 percent over an average of 1.2% of GDP. The same increase in GDP per capita is associated with an increase of 62 percent in non-life IP, over an average of 1.6% of GDP. Interestingly, changes in institutional quality of the same magnitude as changes in income per capita (around 1.5 SD of the governance index, which moves a country from the 25th to the 75th percentile of the distribution) are associated with similar changes in life and non-life IP (125 and 54 percent, respectively). Thus, our estimates suggest that, even controlling for income per capita, institutional quality is strongly correlated with insurance market development, as much as income per capita per se.

Changes in credit to the private sector as percent of GDP and the Financial Reform Index are not as strongly associated with changes in insurance penetration. Moving a country from the 25th to the 75th percentile of the distribution of the first variable is associated with an increase in life and non-life IP of 49 percent and 18 percent over the same averages of 1.2% and 1.6% of GDP, respectively. Increases in the level of financial liberalization are associated only with 26 percent and 8 percent higher life and non-life IP over the same averages, respectively. Despite being available only for 2011 and 2014, the Findex data on account holders as percent of the adult population seem to be a strong predictor of insurance penetration. Moving a country from the 25th to the 75th percentile of account holding

distribution is associated with increases of 92 percent and 69 percent in life and non-life IP, respectively. Overall, the results presented in Table 3 suggest that financial market development does not seem to be a predictor as good as income per capita and institutional quality, although still relevant.

Finally, to assess the predictive power of Equation 1, we randomly drop 10% of our sample, re-run our preferred specifications of Table 2 and calculate the out-of-sample mean squared error (MSE). The results are shown in Table 4. First, our models perform much better when predicting non-life insurance penetration. Also, interestingly, the best prediction results are observed when we regress IP on both GDP per capita and institutional quality. The additional improvement on prediction performance is substantial when adding our governance index to the model, compared to income per capita alone (life IP MSE drops from 1.17 to 0.82, for example). When predicting life insurance penetration, MSEs are arguably high, but there are important improvements once we take into account institutional quality. Maybe it is not surprising that our model performs better when predicting non-life IP. As argued before, some non-life insurance contracts are often mandated by law, so non-life IP is more predictable over time and across countries according to their level of income, and the additional gain of including the governance index to the model is marginal.

In Table 5, we focus exclusively on institutional quality as a predictor of life and non-life insurance penetration. In particular, along with GDP per capita, we estimate Equation 1 including each component of the governance index separately. In all columns we include country time trends. Appendix Table 4 shows analogous estimates using total IP.

Again, we are interested in the predicted change in IP when moving a country from the 25th to the 75th percentile of the distribution of each component of our governance index. As described above, such a change in the governance index is associated with changes of 110 percent and 47 percent over life and non-life IP averages, respectively. Separately, changes in all of its components are associated with changes of similar magnitude to insurance penetration, except for the Political Stability component. Its predictive power is about a quarter of the predictive power of the index (see Table 6a). Analogous comparative statics using total IP can be found in Appendix Table 5a.

Finally, we investigate what are the predicted changes in insurance penetration when a low-income country moves from one percentile to the other *within the distribution of low and lower-income countries*. For example, moving from the 25th percentile to the 75th percentile of the global income distribution corresponds to an enormous economic growth, which may not be realistic in the short-run for a single country. Moving from the bottom to the top of the income distribution among developing countries is arguably more realistic. In Tables 5b and 6b we run the same exercises presented in Tables 5a and 6a, but using percentiles of distribution of income, institutional quality and financial liberalization of low and lower-middle income countries.

Partial correlations between our predictors and insurance penetration are again higher for life insurance penetration when compared to non-life insurance penetration. Interestingly, institutional quality seems to be a more powerful predictor of insurance penetration among low and lower-income countries than income per capita. Changes in income that correspond to moving a country from the 25th percentile to the 75th percentile of the income per capita distribution among low and lower-income countries are associated with a 93% and 20% increase in life and non-life IP over averages of 0.29% and 0.75% of GDP, respectively. Analogous changes in institutional quality imply much bigger predicted increases in life and non-life IP (255% and 57%, respectively), over the same IP averages. In Table 6a we can see that most of the components of the governance index are strongly correlated with

increases in life and non-life IP. This may not be surprising since the S-curve argument states that small increases in GDP per capita in low and lower-middle income countries are not strongly associated with big increases in IP.

6. Conclusion

Following the insights of Greenwood and Jovanovic (1990) and subsequent empirical work on the link between intermediation and growth, this paper elicits relevant correlates of insurance market development. Based on 20 years of insurance premium data from 180 countries and a similar wealth of data on income, political and economic institutions and financial market development measures, our cross-country analysis shows that while the correlation between income per capita and insurance premium is undeniable, there are other strong correlates of insurance market development, often as strong as economic growth.

We find that the development of a country's economic institutions and financial sector (measured by indicators such as credit to the private sector, bank account ownership rates, or the financial reform index) are important to insurance market development. Institutional quality and financial market development measures are more strongly correlated with life insurance penetration, compared to non-life insurance penetration, controlling for GDP per capita. A plausible explanation for this is that purchase of life insurance is a voluntary decision more often than purchase of non-life insurance.

Finally, the strength of the relevant correlations depends on the country's income level. In particular, our measures of institutional quality are more strongly correlated with insurance penetration than income per capita in low income countries, which corroborates the S-curve theory commonly explored in the literature.

Although only capable of establishing correlations, in this paper we hope to help expand the scope of the search for determinants of financial market development, especially insurance markets, by showing that income growth alone probably will not close the protection gap.

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Tables

Table 1. Summary Statistics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Time period	*Countries*	*N*	*Mean*	*Std Dev.*	*Min.*	*Percentiles*			*Max.*
							25th	*50th*	*75th*	
Insurance penetration (% GDP)										
Total	1996-2016	180	3462	2.87	2.89	0.00	0.77	1.74	4.14	16.54
Non-life	1996-2016	180	3462	1.64	1.53	0.00	0.60	1.27	2.03	10.18
Life	1996-2016	180	3462	1.23	1.85	0.00	0.07	0.39	1.61	10.74
Institution quality										
Governance standardized index	1996-2016	174	3101	0.00	1.00	-2.19	-0.75	-0.20	0.80	2.16
Control of Corruption	1996-2016	174	3101	0.00	1.02	-1.81	-0.79	-0.26	0.68	2.47
Government Effectiveness	1996-2016	174	3101	0.05	0.98	-2.23	-0.70	-0.11	0.75	2.44
Political Stability and Absence of Violence/Terrorism	1996-2016	174	3101	-0.06	0.96	-3.18	-0.72	0.02	0.75	1.76
Rule of Law	1996-2016	174	3101	-0.02	1.00	-2.24	-0.80	-0.22	0.76	2.10
Regulatory Quality	1996-2016	174	3101	0.06	0.97	-2.34	-0.60	-0.08	0.80	2.26
Voice and Accountability	1996-2016	174	3101	-0.05	0.99	-2.26	-0.89	-0.06	0.84	1.80
Income										
GDP per capita (2011 USD PPP 000s)	1996-2016	172	3354	17.71	19.86	0.46	3.80	10.47	25.46	135.32
Financial market development										
Domestic private credit (% GDP)	1996-2016	169	3201	48.67	44.43	0.00	15.54	34.75	65.74	312.12
Financial Reform Index (0-1)	1996-2005	90	900	0.74	0.18	0.18	0.62	0.74	0.90	1.00
Account holding (% population aged 15+)	2011, 2014	150	280	51.20	31.80	0.40	21.76	45.90	81.58	100.00

Notes: this table presents descriptive statistics of the full sample of countries used in the main analysis. In Column 1, we report the time period spanned by the data. In Columns 2 and 3 we report the number of countries in our sample and how many observations we have in our panel for each variable, respectively. In Columns 4-10 we report the average, standard deviation, minimum, 25th percetile, median, 75th percetile and the maximum value of each variable, respectively. Insurance penetration data is provided by AXCO. Data on institutional quality is provided by the World Bank. The governance standardized index summarizes the 6 indicators of insitutional quality (see text for details). Data on GDP per capita and domestic credit to the private sector also come from the World Bank. The Financial Reform Index is calculated by the IMF (see text for details) and account holding data come from the Findex database.

Table 2. Life and Non-life Insurance Penetration

Panel A. Life insurance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Life Insurance Penetration (% of GDP)									
GDP per capita (2011 USD PPP 000s) (T-1)	0.126***	0.088***	0.050***	0.020***	0.068***	0.068***	0.174***	0.139***	0.091***	0.087**
	(0.004)	(0.005)	(0.005)	(0.006)	(0.004)	(0.005)	(0.019)	(0.025)	(0.019)	(0.040)
GDP per capita^2 (T-1)	-0.001***	-0.001***	-0.001***	-0.000***	-0.001***	-0.001***	-0.001***	-0.001**	-0.001***	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Governance standardized index (T-1)			1.018***	0.997***						
			(0.044)	(0.054)						
Domestic credit to private sector (% GDP) (T-1)					0.023***	0.012***				
					(0.001)	(0.001)				
Financial Reform Index (0-1) (T-1)							1.129**	1.437***		
							(0.495)	(0.456)		
Account holding (% of population aged 15+) (T-1)									0.019***	0.014**
									(0.006)	(0.005)
Observations	2,784	2,784	2,784	2,784	2,784	2,784	610	610	266	266
R-squared	0.349	0.834	0.453	0.854	0.490	0.844	0.624	0.933	0.464	0.985
Mean dep var	1.277	1.277	1.277	1.277	1.277	1.277	1.654	1.654	1.307	1.307
SD dep var	1.889	1.889	1.889	1.889	1.889	1.889	2.251	2.251	1.870	1.870
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country time trends	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Panel B. Non-life insurance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Non-life Insurance Penetration (% of GDP)									
GDP per capita (2011 USD PPP 000s) (T-1)	0.076***	0.047***	0.014***	0.007**	0.047***	0.036***	0.089***	0.079***	0.037***	0.051*
	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.010)	(0.013)	(0.013)	(0.026)
GDP per capita^2 (T-1)	-0.001***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.001***	-0.001***	-0.000***	-0.001*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Governance standardized index (T-1)			0.835***	0.573***						
			(0.034)	(0.029)						
Domestic credit to private sector (% GDP) (T-1)					0.012***	0.006***				
					(0.001)	(0.001)				
Financial Reform Index (0-1) (T-1)							0.486*	0.761***		
							(0.263)	(0.250)		
Account holding (% of population aged 15+) (T-1)									0.019***	0.008**
									(0.004)	(0.004)
Observations	2,784	2,784	2,784	2,784	2,784	2,784	610	610	266	266
R-squared	0.362	0.919	0.474	0.929	0.431	0.923	0.608	0.926	0.511	0.987
Mean dep var	1.619	1.619	1.619	1.619	1.619	1.619	1.573	1.573	1.518	1.518
SD dep var	1.492	1.492	1.492	1.492	1.492	1.492	1.171	1.171	1.322	1.322
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country time trends	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Notes: this table reports the OLS estimation of Equation 1 using the full set of countries in our sample and our main set of explanatory variables. In Panel A, the dependent variable is life insurance penetration, while in Panel B the dependent variable is non-life insurance penetration. In all columns we include GDP per capita and the square of GDP per capita as independent variables, as well as year and region fixed effects. In even columns, we also include country time trends. ***,**,* denote statistical significance at the 1, 5 and 10 percent level, respectively.

Table 3a: Life and Non-life Insurance Penetration, Comparative Statics

Panel A: Life insurance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	25th	75th	SD	Increase		Coefficients		Change in		Change as %
	percentile	percentile		Value	% SD	Linear	Quadratic	IP	Average IP	IP average
GDP per capita	3.80	25.46	19.86	21.65	109%	0.088	-0.001	1.74	1.23	141%
Governance index	-0.75	0.80	1.00	1.55	155%	0.997	0	1.54	1.23	125%
Credit % GDP	15.54	65.74	44.43	50.20	113%	0.012	0	0.60	1.23	49%
Fin. Ref. Index	0.62	0.90	0.18	0.29	155%	1.129	0	0.32	1.23	26%
Acc. holding	21.76	81.58	31.80	59.83	188%	0.019	0	1.14	1.23	92%

Panel B: Non-life insurance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	25th	75th	SD	Increase		Coefficients		Change in		Change as %
	percentile	percentile		Value	% SD	Linear	Quadratic	IP	Average IP	IP average
GDP per capita	3.80	25.46	19.86	21.65	109%	0.047	0.000	1.02	1.64	62%
Governance index	-0.75	0.80	1.00	1.55	155%	0.573	0	0.89	1.64	54%
Credit % GDP	15.54	65.74	44.43	50.20	113%	0.006	0	0.30	1.64	18%
Fin. Ref. Index	0.62	0.90	0.18	0.29	155%	0.486	0	0.14	1.64	8%
Acc. holding	21.76	81.58	31.80	59.83	188%	0.019	0	1.14	1.64	69%

Notes: this table shows comparative statics for all countries in our sample using estimates of Equation 1. The estimates are presented in Table 2 and were calculated using the full set of countries in our sample and the main set of explanatory variables. Panel A presents the numbers for life insurance penetration, while in Panel B we show the comparative statics for non-life insurance penetration. In Columns 1 and 2 we report the 25th and 75th percentiles of the distribution of each independent variable in Equation 1 among all countries in our sample. In Column 3 we report the standard deviation of each independent variable. In Columns 4 and 5 we calcualte the difference between the 75th and the 25th percentiles of the distribution of each independent variable. We report the absolute value and the same number as a percentage of the standard error. We then report the estimates of the relevant coefficients from Equation 1 in Columns 6 and 7 and calculate the corresponding change in insurance penetration in Column 8. In Column 9 we report the average insurance penetration among all countries in our sample and in Column 10 we report the change in IP as a percentage of the average.

Table 3b: Life and Non-life Insurance Penetration, Comparative Statics, Low and Lower-Middle Income Countries

Panel A: Life insurance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	25th	75th	SD	Increase		Coefficients		Change in		Change as %
	percentile	percentile		Value	% SD	Linear	Quadratic	IP	Average IP	IP average
GDP per capita	1.61	4.84	2.42	3.23	133%	0.088	-0.001	0.27	0.29	93%
Governance index	-1.11	-0.36	0.51	0.75	147%	0.997	0	0.75	0.29	255%
Credit % GDP	9.36	31.87	19.00	22.51	118%	0.012	0	0.27	0.29	92%
Fin. Ref. Index	0.56	0.73	0.16	0.17	106%	1.129	0	0.19	0.29	64%
Acc. holding	12.43	32.76	16.98	20.33	120%	0.019	0	0.39	0.29	131%

Panel B: Non-life insurance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	25th	75th	SD	Increase		Coefficients		Change in		Change as %
	percentile	percentile		Value	% SD	Linear	Quadratic	IP	Average IP	IP average
GDP per capita	1.61	4.84	2.42	3.23	133%	0.047	0.000	0.15	0.75	20%
Governance index	-1.11	-0.36	0.51	0.75	147%	0.573	0	0.43	0.75	57%
Credit % GDP	9.36	31.87	19.00	22.51	118%	0.006	0	0.14	0.75	18%
Fin. Ref. Index	0.56	0.73	0.16	0.17	106%	0.486	0	0.08	0.75	11%
Acc. holding	12.43	32.76	16.98	20.33	120%	0.019	0	0.39	0.75	51%

Notes: this table shows comparative statics for low and lower-middle income countries using estimates of Equation 1. The estimates are presented in Table 2 and were calculated using the full set of countries in our sample and the main set of explanatory variables. Panel A presents the numbers for life insurance penetration, while in Panel B we show the comparative statics for non-life insurance penetration. In Columns 1 and 2 we report the 25th and 75th percentiles of the distribution of each independent variable in Equation 1 among low and lower-middle income countries. In Column 3 we report the standard deviation of each independent variable. In Columns 4 and 5 we calcualte the difference between the 75th and the 25th percentiles of the distribution of each independent variable. We report the absolute value and its absolute value as a percentage of the standard error. We then report the estimates of the relevant coefficients from Equation 1 in Columns 6 and 7 and calculate the corresponding change in insurance penetration in Column 8. In Column 9 we report the average insurance penetration among low and lower-middle income countries and in Column 10 we report the change in IP as a percentage of the average.

Table 4. Out-of-sample MSEs

Panel A. Life insurance penetration regressions

	(1) GDP per capita	(2) Governance index	(3) Credit % GDP	(4) Fin. Ref. Index	(5) Acc. holding
All countries	1.17	0.82	0.91	2.07	0.96

Panel B. Non-life insurance penetration regressions

	(1) GDP per capita	(2) Governance index	(3) Credit % GDP	(4) Fin. Ref. Index	(5) Acc. holding
All countries	0.24	0.17	0.19	0.40	0.52

Notes: this table presents the out-of-sample mean squared error (MSE) of our OLS models estimated using Equation 1 for the full set of countries in our sample. We calculate the MSEs by randomly dropping 10% of our sample and re-running our preferred specifications of Equation 1. In Panel A, we use estimates of Equation 1 using life insurance penetration as the dependent variable, while in Panel B the dependent variable is non-life insurance penetration. All regressions include GDP per capita as independent variable. In Columns 2-5 we also include, once at a time, the governance index, credit to the private sector as percentage of GDP, the financial reform index and percent of adults with an account as independent variable. Our preferred specifications for columns 1-3 include country time trends.

Table 5. Institutional Quality

Panel A. Life insurance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Life Insurance Penetration (% of GDP)						
GDP per capita (2011 USD PPP 000s) (T-1)	0.088***	0.023***	0.020***	0.073***	0.025***	0.034***	0.051***
	(0.005)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)	(0.005)
GDP per capita^2 (T-1)	-0.001***	-0.000***	-0.000***	-0.001***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Control of Corruption (T-1)		0.898***					
		(0.050)					
Government Effectiveness (T-1)			1.003***				
			(0.053)				
Political Stability and Absence of Violence/Terrorism (T-1)				0.267***			
				(0.039)			
Rule of Law (T-1)					0.934***		
					(0.050)		
Regulatory Quality (T-1)						0.874***	
						(0.054)	
Voice and Accountability (T-1)							0.759***
							(0.050)
Observations	2,784	2,784	2,784	2,784	2,784	2,784	2,784
R-squared	0.834	0.853	0.854	0.837	0.854	0.849	0.848
Mean dep var	1.277	1.277	1.277	1.277	1.277	1.277	1.277
SD dep var	1.889	1.889	1.889	1.889	1.889	1.889	1.889
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country time trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel B. Non-life insurance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Non-life Insurance Penetration (% of GDP)						
GDP per capita (2011 USD PPP 000s) (T-1)	0.047***	0.012***	0.011***	0.036***	0.011***	0.017***	0.023***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
GDP per capita^2 (T-1)	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Control of Corruption (T-1)		0.478***					
		(0.028)					
Government Effectiveness (T-1)			0.525***				
			(0.030)				
Political Stability and Absence of Violence/Terrorism (T-1)				0.182***			
				(0.022)			
Rule of Law (T-1)					0.534***		
					(0.028)		
Regulatory Quality (T-1)						0.483***	
						(0.030)	
Voice and Accountability (T-1)							0.482***
							(0.027)
Observations	2,784	2,784	2,784	2,784	2,784	2,784	2,784
R-squared	0.919	0.927	0.928	0.921	0.929	0.926	0.928
Mean dep var	1.619	1.619	1.619	1.619	1.619	1.619	1.619
SD dep var	1.492	1.492	1.492	1.492	1.492	1.492	1.492
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country time trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: this table reports the OLS estimation of Equation 1 using the full set of countries in our sample and the individual components of the governance index. In Panel A, the dependent variable is life insurance penetration, while in Panel B the dependent variable is non-life insurance penetration. In all columns we include GDP per capita and the square of GDP per capita as independent variables, as well as year and region fixed effects. In even columns, we also include country time trends. ***,**,* denote statistical significance at the 1, 5 and 10 percent level, respectively.

Table 6a: Institutional Quality, Comparative Statics

Panel A: Life insurance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	25th	75th	SD	Increase		Coefficients		Change in		Change as %
	percentile	percentile		Value	% SD	Linear	Quadratic	IP	Average IP	IP average
GDP per capita	3.80	25.46	19.86	21.65	109%	0.088	-0.001	1.74	1.23	141%
Control of Corruption	-0.79	0.68	1.02	1.47	145%	0.898	0	1.32	1.23	107%
Government Effectiveness	-0.70	0.75	0.98	1.45	149%	1.003	0	1.46	1.23	118%
Political Stability	-0.72	0.75	0.96	1.47	153%	0.267	0	0.39	1.23	32%
Rule of Law	-0.80	0.76	1.00	1.56	157%	0.934	0	1.46	1.23	118%
Regulatory Quality	-0.60	0.80	0.97	1.40	145%	0.874	0	1.23	1.23	100%
Voice and Accountability	-0.89	0.84	0.99	1.73	174%	0.759	0	1.31	1.23	106%

Panel B: Non-life insurance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	25th	75th	SD	Increase		Coefficients		Change in		Change as %
	percentile	percentile		Value	% SD	Linear	Quadratic	IP	Average IP	IP average
GDP per capita	3.80	25.46	19.86	21.65	109%	0.047	0.000	1.02	1.64	62%
Control of Corruption	-0.79	0.68	1.02	1.47	145%	0.478	0	0.70	1.64	43%
Government Effectiveness	-0.70	0.75	0.98	1.45	149%	0.525	0	0.76	1.64	46%
Political Stability	-0.72	0.75	0.96	1.47	153%	0.182	0	0.27	1.64	16%
Rule of Law	-0.80	0.76	1.00	1.56	157%	0.534	0	0.83	1.64	51%
Regulatory Quality	-0.60	0.80	0.97	1.40	145%	0.483	0	0.68	1.64	41%
Voice and Accountability	-0.89	0.84	0.99	1.73	174%	0.482	0	0.83	1.64	51%

Notes: this table shows comparative statics for all countries in our sample using estimates of Equation 1. The estimates are presented in Table 5 and were calculated using the full set of countries in our sample and the components of the governance index. Panel A presents the numbers for life insurance penetration, while in Panel B we show the comparative statics for non-life insurance penetration. In Columns 1 and 2 we report the 25th and 75th percentiles of the distribution of each independent variable in Equation 1 among all countries in our sample. In Column 3 we report the standard deviation of each independent variable. In Columns 4 and 5 we calculate the difference between the 75th and the 25th percentiles of the distribution of each variable. We report the absolute value and the same number as a percentage of the standard error. We then report the estimates of the relevant coefficients from Equation 1 in Columns 6 and 7 and calculate the corresponding change in insurance penetration in Column 8. In Column 9 we report the average insurance penetration among all countries in our sample and in Column 10 we report the change in IP as a percentage of the average.

Table 6b: Institutional Quality, Comparative Statics, Low and Lower-Middle Income Countries

Panel A: Life insurance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	25th	75th	SD	Increase		Coefficients		Change in		Change as %
	percentile	percentile		Value	% SD	Linear	Quadratic	IP	Average IP	IP average
GDP per capita	1.61	4.84	2.42	3.23	133%	0.088	-0.001	0.27	0.29	93%
Control of Corruption	-1.07	-0.45	0.47	0.62	132%	0.898	0	0.55	0.29	189%
Government Effectiveness	-1.00	-0.40	0.47	0.60	128%	1.003	0	0.60	0.29	204%
Political Stability	-1.21	-0.11	0.80	1.10	138%	0.267	0	0.29	0.29	100%
Rule of Law	-1.12	-0.37	0.51	0.74	145%	0.934	0	0.70	0.29	237%
Regulatory Quality	-0.94	-0.28	0.53	0.66	124%	0.874	0	0.58	0.29	196%
Voice and Accountability	-1.19	-0.17	0.65	1.01	155%	0.759	0	0.77	0.29	262%

Panel B: Non-life insurance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	25th	75th	SD	Increase		Coefficients		Change in		Change as %
	percentile	percentile		Value	% SD	Linear	Quadratic	IP	Average IP	IP average
GDP per capita	1.61	4.84	2.42	3.23	133%	0.047	0.000	0.15	0.75	20%
Control of Corruption	-1.07	-0.45	0.47	0.62	132%	0.478	0	0.30	0.75	39%
Government Effectiveness	-1.00	-0.40	0.47	0.60	128%	0.525	0	0.31	0.75	42%
Political Stability	-1.21	-0.11	0.80	1.10	138%	0.182	0	0.20	0.75	27%
Rule of Law	-1.12	-0.37	0.51	0.74	145%	0.534	0	0.40	0.75	53%
Regulatory Quality	-0.94	-0.28	0.53	0.66	124%	0.483	0	0.32	0.75	42%
Voice and Accountability	-1.19	-0.17	0.65	1.01	155%	0.482	0	0.49	0.75	65%

Notes: this table shows comparative statics for low and lower-middle income countries using estimates of Equation 1. The estimates are presented in Table 5 and were calculated using the full set of countries in our sample and the components of the governance index. Panel A presents the numbers for life insurance penetration, while in Panel B we show the comparative statics for non-life insurance penetration. In Columns 1 and 2 we report the 25th and 75th percentiles of the distribution of each independent variable in Equation 1 among low and lower-income income countries. In Column 3 we report the standard deviation of each independent variable. In Columns 4 and 5 we calculate the difference between the 75th and the 25th percentiles of the distribution of each variable. We report the absolute value and the same number as a percentage of the standard error. We then report the estimates of the relevant coefficients from Equation 1 in Columns 6 and 7 and calculate the corresponding change in insurance penetration in Column 8. In Column 9 we report the average insurance penetration among low and lower-income countries and in Column 10 we report the change in IP as a percentage of the average.