Does One Size Fit All?
Determinants of Insurer Capital Structure Around the Globe

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Abstract

The goal of this research is to examine insurance companies' capital structure across a broad range of countries including those in developing markets. What we find is that the optimal capital structure of insurance companies is not homogeneous across countries. In addition, we find that country-level factors explain a substantial fraction of the cross-sectional variation in insurance companies' capitalization levels. Our results add to the current policy discussion on global regulatory capital requirements. If insurer capital structure is not homogeneous across countries, a global capital standard – if desired – should take differences in the institutional environments across countries into account to avoid market distortions.

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1. Introduction

How firms choose their capital structure is one of the fundamental questions in financial economics. The literature addressing this research question examines, with few exceptions, the determinants of firms' capital structure choices with data from one country, usually the United States (see, e.g., Korajczyk and Levy, 2003; Flannery and Rangan, 2006; Frank and Goyal, 2009; Huang and Ritter, 2009; Cheng and Weiss, 2012). However, the transaction cost theory proposed by Coase (1937) and Williamson (1985) highlights that firms do not operate in a vacuum and suggests that firms' institutional environment impacts firms' optimal structure. Therefore, the main argument in our article is that the optimal capital structure of insurance companies is not homogenous across countries. Assuming the costs and benefits of holding capital differ across countries, the optimal capital structure of firms trading-off these costs and benefits should differ as well.

The goal of our research is threefold. First, we examine insurance companies' capital structure across a broad range of countries including those in developing markets. Second, we quantify the relative importance of country-level determinants compared with firm-level determinants in explaining firms' capital structure choices. Third, we explicitly examine specific country characteristics and to what extent these country-level factors moderate the relationship between a firm's characteristics and the firm's capital structure decisions.

The country characteristics we hypothesize to impact firms' capital structure decisions are the ease of access to financial markets in a country, the costs associated with financial distress in the country, the level of property rights protection in the country, and the level of competition in the country's product markets. We expect that insurers hold more capital in countries with well-developed capital markets where it is relatively easy to raise external capital. We also expect insurers to hold more capital in countries with relatively high financial distress costs because holding capital is more valuable in those countries. Financial distress costs of insurance companies are

especially high in countries where individuals are risk averse and willing to pay a substantial premium for policies of financially stable insurers. If the legal system in a country is unpredictable and hinders contract enforcement firms may be hesitant to hold much capital because such financial slack may lead to expectations of stakeholders to get their piece of the pie. Thus, insurers' capitalization levels should be lower in countries with poorer property rights protection. Competition puts pressure on firms to produce their output as cost efficiently as possible. Since holding capital is costly, we expect firms in countries with higher levels of competition to utilize less capital in their production process.

To examine the relative importance of firm-level and country-level determinants of insurer capital structure, we perform a variance decomposition analysis. Since property-liability insurance companies and life insurance companies differ substantially with respect to their business model and, hence, their capital structure, we perform the analysis separately for these two sectors of the industry. Using data on 6,545 firm-year observations from property-liability insurers across 28 different countries and 2,001 firm-year observations from life insurers across 14 countries over the period 2001 through 2008, we find that time-invariant country characteristics (i.e. country fixed effects) explain slightly more than two thirds of the variation in insurance companies' capital structure, whereas the firm-level determinants proposed in the prior literature explain less than one third. Comparing the relative importance of specific country characteristics, we find that two of the proxies for financial distress costs and the two measures of competition in a country have the strongest impact on property-liability insurers capital structure. For life insurers, the strongest impact on capital structure comes from two of the proxies for property-rights protection in a country followed by two of the proxies for the ease of access to financial markets. When assessing the impact of country characteristics on insurer capital structure, we do not just measure the direct impact of these characteristics, we also add interaction terms between the country characteristics and

all firm-level determinants to our model specifications to capture potential indirect or moderating effects, and these indirect effects turn out to have a substantially stronger effect on variations in capital structure than the direct effects.

The variance decomposition analysis is basically a static analysis of variations in insurers' capital structure without any assumptions on causality. There is substantial evidence in the literature that firms actively manage their capital structure (see, e.g., Graham and Harvey, 2001; Klein, Phillips, and Shiu, 2002; Bancel and Mittoo, 2004; Flannery and Rangan, 2006; Huang and Ritter, 2009; Cheng and Weiss, 2012; Öztekin and Flannery, 2012; Fier, McCullough, and Carson, 2013). After capital shocks, however, firms' may not immediately return to their target capital structure due to transaction costs, firms' rather make partial adjustment that will restore their capital structure over time (Flannery and Rangan, 2006). To control for firms' capital adjustments over time in our assessment of the determinants of capital structure, we go beyond the static framework of the variance decomposition analysis and estimate a dynamic partial adjustment model. The results of the dynamic model are consistent with the static results: Country characteristics have a strong effect on firms' capital structure choices, mainly by moderating the relationship between firm-level factors and capitalization.

We are only aware of one paper with a similar research focus to ours. Gungoraydinoglu and Öztekin (2011) examine the relative importance of firm- and country-level determinants of corporate leverage for nonfinancial firms across 37 countries. They find that for nonfinancial firms firm-level factors explain about two-thirds of the variation in capital structure and country-level factors explain the remaining one-third. This result contrasts with our finding for insurance companies that country characteristics explain over two-thirds of the variation in capital structure across countries.

Our research extends the existing literature in multiple ways. First, to the best of our knowledge this is the first cross-country analysis of insurer capital structure; we consider a broad range of economies, not just developed or emerging markets. Hence, our results provide the first comprehensive evidence of the determinants of insurer capital structure across different economies. Second, our results provide further evidence that insurance companies have a target capital structure and make partial adjustments towards their targets after capital shocks. Third, we quantify the relative importance of country characteristics for insurance companies capital structure decisions. Our results support the view that the institutional environment plays a crucial role in insurance companies' capitalization choices. Fourth, we explicitly examine how the ease of access to financial markets in a country, the costs associated with financial distress, the level of property rights protection, and the level of competition moderate the relationship between firm-level factors and capitalization. Thus, our results provide novel insights into the interaction effects between specific country characteristics and firm-level determinants of insurer capital structure.

Ours results should also be of interest to insurance regulators. Since the International Association of Insurance Supervisors (IAIS) was established in 1994, insurance regulators and supervisors from over 140 countries have been working on promoting globally consistent supervision of the insurance industry. In the aftermaths of the 2008-2009 financial crisis, the quest for consistency in supervision has gained significant momentum,[1] and on October 9, 2013 the IAIS announced that it is committed to develop a global insurance capital standard by 2016. This international

[1] The two most prominent initiatives in this context are the IAIS' role in identifying and developing policy measures for potentially systemically important global insurers, and the IAIS' project to develop a common framework for the supervision of internationally active insurance groups (ComFrame). Both the discussed policy measures dealing with global systemically important insurers (IAIS, 2012a) as well as the proposed framework for supervision of internationally active insurance groups (IAIS, 2012b) include a discussion on capital requirements. The ComFrame working draft released on July 2, 2012 explicitly states that the IAIS decided, "ComFrame shall develop a partially harmonized approach to group capital for solvency assessment purposes" (IAIS, 2012b, p. 8). On October 9, 2012, thirty-one associations of insurance companies representing about 87% of the insurance market globally established the Global Federation of Insurance Associations (GFIA). The goal of the GFIA is to represent insurance companies' views before international panels including the International Association of Insurance Supervisors.

momentum towards harmonizing regulatory capital requirements raises the question whether a certain degree of heterogeneity in the calibration of capital standards might be necessary to incorporate differences in the institutional environments across countries.

Our analysis is based on two maintained assumptions. First, we assume that firms surviving in a competitive market are the ones that produce the demanded products most efficiently (Stigler, 1968). Second, we assume that minimum regulatory capital requirements are not binding for the average insurance company in the market (Epermanis and Harrington, 2006; de Haan and Kakes, 2010). Therefore, observed capital structures must have economic benefits. Our results document that the optimal capital structure of insurance companies is not homogeneous across countries, but varies systematically with country-level factors. Thus, we argue that the current decentralized structure of country-specific regulatory capital requirements may not be the worst solution and that a global capital standard – if desired – should take differences in the institutional environments across countries into account to avoid market distortions.[2]

The article proceeds as follows. In the next section we provide a conceptual background and discuss our hypotheses. In the third section of the paper, we describe the data and methodology. Then we present the empirical results and, finally, we offer conclusions.

2. The Role of Capital in Insurance Companies

The main role of capital in insurance companies is to provide a cushion against deviations of realized losses from expected losses. Thus, the amount of capital an insurance company has on its balance sheet relative to its liabilities to policyholders determines its probability of insolvency, and regulators monitor insurers' capitalization levels carefully. Due to unfavorable regulatory

[2] Let us assume that the same regulatory capital requirements are imposed on all insurance companies around the globe. In countries with above average capitalization levels, a global minimum capital requirement will not really make a difference because it will not be binding for most insurers. In countries with relatively low average capitalization levels, however, a global minimum capital requirement might be binding for a significant number of insurers, forcing them to change their business model or exit the market.

treatment, insurance companies rarely issue bonds or take out loans and, hence, debt plays a marginal role for insurers' capital structure. Insurers' capital structure is basically determined by their capitalization relative to their liabilities, and the liabilities to capital ratio can be interpreted as a measurer of financial leverage.

Doherty and Tinic (1982) extend the classic Modigliani-Miller irrelevance result and show that changing the level of capital inside an insurance company cannot create value in a world with perfect capital markets. In the presence of market imperfections, however, capital structure is important for insurers. Single period models of insurer capital structure emphasize the tradeoff insurers face between the costs and benefits of holding capital (see, e.g., Cagle and Harrington, 1995). Holding capital in these models is beneficial because of the negative consequences associated with financial distress. More precisely, insurance demand is risk-sensitive in these models, and there is substantial empirical evidence that insurers' default risk is negatively associated with their prices (Sommer, 1996; Cummins and Danzon, 1997) as well as their premium revenue (Epermanis and Harrington, 2006; Carson, Doran, and Dumm, 2011). On the other hand, holding capital is costly due to agency conflicts between owners and managers; managers may not use capital in the owners' best interest (Jensen, 1986; Bertrand and Mullainathan, 2003). Insurers then determine their optimal capitalization level by trading off the costs and benefits of holding capital. Thus, insurers' capital structure directly depends on the cost and availability of external financing or in other words, on the ease of access to financial markets. Obviously the ease of access to financial markets varies by country; some countries have well developed capital markets that allow even smaller firms to relatively easily raise external funds, whereas raising external capital in some other countries may be challenging. Thus, single period models of insurer capital structure predict that insurance companies operating in countries with easier access to financial markets have higher

levels of capital or lower levels of leverage than insurers operating in countries with less developed capital markets.

Dynamic capital structure models extend the single period framework by allowing firms to raise additional capital at a later point in time. However, raising capital in these models is costly in the sense that internal funds are cheaper than externally raised funds (Myers and Majluf, 1984; Froot, Schaftstein, and Stein, 1993; Froot and Stein, 1998). Froot (2008) shows how an insurance company determines its optimal capital structure by trading off the costs of holding capital with the increased probability of having to raise costly external capital after the realization of unexpected losses. If the costs of raising external capital after a shock are relatively low insurance companies' optimal level of capital will be relatively low; the insurers will then simply rely on their ability to easily raise capital later if needed. Thus, dynamic models of insurer capital structure predict that insurance companies operating in countries with easier access to financial markets have lower levels of capital or higher levels of leverage than insurers operating in countries with less developed capital markets. This prediction is contrary to the prediction of the single period capital structure models. The overall effect of capital market development on insurer capital structure is an empirical question. Since most empirical capital structure studies focus on leverage as an inverse measure of capitalization, we will do the same in our empirical analysis (see, e.g., Rajan and Zingales, 1995; Booth, Aivazian, Demirguc-Kunt, and Maksimovic, 2001; Lemmon, Roberts, and Zender, 2008; Cheng and Weiss, 2012; Fier, McCullough, and Carson, 2012; Öztekin and Flannery, 2012).

As outlined above, the cost associated with financial distress also impacts an insurance company's optimal capital structure. The higher the cost of financial distress, the more beneficial it is for an insurance company to hold a substantial amount of capital as a buffer against adverse shocks. In addition to the rather low direct costs of a bankruptcy, such as legal and regulatory fees,

insurance companies face indirect costs as well; if an insurer defaults quasi-rents from building the brand, a distribution system and client relationships will be lost (Harrington and Danzon, 1994). Since risk-averse consumers are willing to pay more for the product of a financially strong insurer and demand a discount from a financially weak insurer (Sommer, 1996), quasi-rents from client relationships start to deteriorate well before the insurer ultimately defaults. Supporting this view, Epermanis and Harrington (2006) show that insurance companies premium revenue declines after a downgrade of their financial strength rating. In this paper, we refer to both the direct cost of bankruptcy as well as the reduction in franchise value associated with a deterioration of financial strength as financial distress costs. Thus, financial distress costs depend on the degree to which the clients of an insurance company value the financial strength of their counterparty, and such risk preferences vary across countries.[3] Overall, we expect insurance companies operating in countries with higher financial distress costs to have higher levels of capital or lower levels of leverage than insurers operating in countries with lower financial distress costs.

If the property rights in a country cannot be predictably enforced insurance companies may be hesitant to make substantial invests in improving their operations, since quasi-rents from those investments are subject to an additional source of uncertainty. Companies with less valuable operations or in other words a lower franchise value have less to protect and should optimally hold less capital than firm with a higher franchise value. In addition, firms operating in countries in which

[3] Clearly, the cultural environment shapes risk preferences of individuals. Therefore, cultural differences across countries should result in measurable differences in the populations' risk preferences. A large fraction of insurance policies are, however, purchased by corporations and not individuals. The literature on corporate risk management points out that in the presence of market frictions, risk management activities including insurance purchases are value enhancing (see, e.g., Mayers and Smith, 1982; Smith and Stulz, 1985), and Greenwald and Stiglitz (1990) conclude that in the presence of bankruptcy costs firms act in a risk-averse manner. A recent strand of literature based on social identity theories (Tajfel, 1978; Turner and Reynolds, 2010) examines the effect of local culture on business decisions. Most of these studies measure local culture by the faction of Protestants (or Catholics) living in a certain geographic region and examine the effect of local culture on firms headquartered in the region. There is substantial evidence that local culture impacts corporate investments (Hilary and Hui, 2009), earnings management (Dyreng, Mayew, and Williams, 2012) as well as investment decisions by mutual funds (Shu, Sulaeman, and Yeung, 2012). Therefore, we also expect the risk cultural in a country to impact insurance purchase decisions of corporations headquartered in the country.

property rights cannot be predictably enforced may be hesitant to hold much capital on their balance sheet because such financial slack may lead to expectations of stakeholders to get their piece of the pie. Firms assessment of property rights and their predictable enforcement in the near future depends on a number of factors including a country's institutions and mechanisms that enforce the law as well as the stability of the political environment and the associated risk that the rules of the game might change. Throughout this paper, we use the term level of property rights protection in a country to refer to the degree to which a country's legal system, institutions, law enforcement, administration and political system provide a stable platform for property rights protection. Overall, we expect insurance companies operating in countries with lower levels of property rights protection to hold less capital on their balance sheets than their peers in countries with high levels of property rights protection.[4]

In perfectly competitive markets, firms are price takers and goods are sold at marginal costs. However, the literature on market structure highlights that oligopolistic markets with a limited number of competitors may deviate from the gold standard of competition. In models of oligopolistic competition based on infinitely repeated games cutting prices will start a price war that hurts the profitability of all firms in the market (see, e.g., Tirole, 1988). Thus, no firm has an incentive to cut prices and firms may be able to sustain the monopoly price based on tacit collusion. Since a firm's benefit from undercutting the monopoly price increases with the number of players in the market, but the costs associated with the resulting price war decreases with the number of players, tactic collusion is easier to sustain in markets with fewer players.

[4] There is an alternative view. If the property rights – including investor rights – in a country cannot be predictably enforced investors may be hesitant to provide funds. Consistent with this view, La Porta et al. (1997) examine differences in the legal systems across countries and document that countries with poorer property rights protection have smaller capital markets. We can interpret this finding as evidence that access to capital as well as the cost of capital depend on a countries' legal system. Therefore, dynamic models of insurer capital structure predict that insurance companies operating in countries with lower levels of property rights protection hold more capital on their balance sheets because raising capital after a shock may be too costly or not possible at all in these countries.

Bertrand and Mullainathan (2003) use the enactment of antitakeover laws by states as a natural experiment to compare decisions of managers that are protected from takeovers with decisions of managers that are not protected. Their results support the view that managers have a preference for a quiet life. Arguably, the manager of an insurance company with relatively high levels of capital or low leverage has a quieter life then the manager of a highly levered insurer. Holding capital, however, is costly and competition puts pressure on insurance companies to produce their output as cost efficiently as possible. Thus, we expect insurance companies operating in countries with strong competition to have lower levels of capital or higher leverage as insurance companies operating in less competitive environments.

3. Data and Methodology

3.1 Sample and Data

There are substantial differences in the products offered by property-liability insurance companies and life insurance companies and, hence, their capital structure. Therefore, we perform our analysis separately for property-liability and life insurers. We construct two firm-level samples of property-liability and life insurance companies, respectively, from A.M. Best's Statement File Global for the period 2001 through 2008. Our initial data consist of all listed insurance companies for the period 1999 through 2008. Note that the database includes a large number of data fragments without even basic information on the companies. Therefore, we first exclude date entries for which the company description is missing.[5] Second, we exclude companies classified as reinsurers or pure holding companies. Third, we exclude companies that report negative direct premiums written, premiums earned, total assets, and policyholder surplus or investment positions. Then we split the sample in two parts, separating the property-liability insurers from the life insurers.

[5] Data entries with missing company description provide hardly any useful information. For example, only 27 of the 42,963 data entries without company description report total premiums written.

More precisely, we classify an insurance company as a property-liability insurer if the company has positive non-life insurance premiums earned and zero life insurance premium earned; and we classify a company as a life insurer if the company has positive life insurance premium earned and zero non-life insurance premium earned. This classification procedure removes diversified insurers that write both property-liability and life insurance from the sample (about 6.4% of the observations). Next, we exclude companies with missing data on the basic accounting variables used to calculate the firm-level variables for the regression analysis (see the Appendix for a full list). Since we use lagged values for some of our independent variables, we exclude firm-year observations for which the preceding two years of data are not available. Finally, we exclude extreme outliers from the two samples. Our first outlier screen is to eliminate firm-year observations with reported life (non-life) insurance premiums in excess of the overall premium volume of the corresponding country's life (non-life) insurance market.[6] Next, we eliminate observations if the return on equity (ROE) has a value above one or below minus one (Berger and Ofek, 1995). Unfortunately, A.M. Best's Statement File Global has a home country bias and overrepresents U.S. insurers in the database. To address this issue, we limit the number of unique U.S. insurance companies in our property-liability insurer sample to 40%, which corresponds to the average world market share of U.S. insurers across the 2001-2008 period.[7] We randomly select insurance companies from the universe of all U.S. insurers until the total number of U.S. insurers accounts for 40% of insurance companies in our sample, and we remove all other U.S. insurers. Similarly, we limit the number of unique U.S. life insurers in our life insurer sample to 29%, which corresponds to the average

[6] Data for countries' life and non-life insurance market premium volume are obtained from Swiss Re's *Sigma* publications.

[7] The market share of U.S. property-liability insurers is based on the aggregate U.S. nonlife insurance premiums as a fraction of the aggregate world nonlife premiums as reported in Swiss Re's *Sigma* publications.

world market share of U.S. insurers across the 2001-2008 periods.[8] We test for sample selection bias and cannot reject the null hypothesis that the chosen set of U.S. property-liability (life) insurers is representative of the universe of U.S. property-liability (life) insurers. Our final sample of property-liability insurance companies consists of 6,545 insurer-year observations from 28 different countries; and our sample of life insurance companies consist of 2,001 insurer-year observations from 14 countries over the period 2001 through 2008.

3.2 Variance Decomposition Analysis of Firm-Level Determinants and Country Fixed Effects

The analysis is divided into three sections. First, we conduct a variance decomposition analysis to assess the importance of firm-level determinants of insurer capital structure relative to time-invariant country-level factors or in other words country fixed effects.[9] The analysis is based on a reduced form model of insurer leverage (the inverse of capitalization):

$$Leverage_{i,c,t} = \alpha + \beta_1 X_{i,c,t-1} + \beta_2 D_c + \beta_3 D_t + \varepsilon \quad (1)$$

where $Leverage_{i,c,t}$ is the ratio of total liabilities to capital and surplus for firm *i* in country *c* and year *t*,[10] $X_{i,c,t-1}$ is a set of one-year lagged firm-specific explanatory variables, D_c are country dummies and D_t are year dummies. A standard analysis of covariance (ANCOVA), allows us to decompose the variation in leverage attributed to each explanatory variable. We follow Lemmon, Roberts, and Zender (2008) and compute the fraction of the Type III partial sum of squares of a specific variable relative to the model sum of squares to measure how much variation in leverage is explained by the variable.

[8] The market share of U.S. life insurers is based on the aggregate U.S. life insurance premiums as a fraction of the aggregate world life premiums as reported in Swiss Re's *Sigma* publications.

[9] Variance decomposition analysis has been used in capital structure research before. For example, Lemmon, Roberts, and Zender (2008) use variance decomposition analysis to document the relative importance of a firm-specific time-invariant effect, and Gungoraydinoglu and Öztekin (2011) use variance decomposition analysis to examine the relative important of country-specific factors in capital structure decisions of nonfinancial firms.

[10] More precisely, we calculate an insurer's total liabilities as total assets minus capital and surplus. We then divide this difference by capital and surplus to get our measure of leverage.

We use different sets of firm-specific variables in the models for property-liability and life insurers. The set of firm-specific variables for property-liability insurers includes a measure of reinsurance utilization. Transferring risks to reinsurance carriers allows insurance companies to build an insurance portfolio that is well balanced and diversified, and requires relatively less capital to operate. In addition, if an insurer has an established relationship with a reinsurance carrier it will be relatively easy for the insurer to transfer additional risks to the reinsurer when the need arises. Thus, insurers with higher reinsurance utilization can operate with higher leverage. To capture differences in reinsurance utilization across insurers, we include the ratio of reinsurance ceded to direct premiums plus reinsurance assumed in the model (Shiu, 2011).

Property-liability insurers operating in more volatile business lines need a larger capital buffer, or in other words less leverage, to deal with this volatility in claim payments (de Haan and Kakes, 2010). Hence, we include the standard deviation of insurers' loss ratio over the 2000 through 2008 period in the model.[11] The expected sign for this variable is negative. Business lines also differ with respect to their payout patterns. In so-called long-tail business lines, e.g. medical malpractice insurance in the U.S., it can take many years before claims are settled and paid (Born, Viscusi, and Baker, 2009). Since premiums are always paid in advance, insurers that have a larger fraction of their business in long-tail lines have a relatively large amount of money in long-term reserves, allowing them to increase leverage. Therefore, we include the ratio of "total gross provisions" (i.e. reserves) to premiums in the model, and we expect this variable to have a positive sign.

Growth opportunities create incentives to hold more capital und to use this relatively cheap "internal" capital to fund business growth rather than raising external capital (Myers and Majluf, 1984). We measure growth opportunities as the one-year percentage growth in net premiums earned. However, actual growth of existing business lines or expansion into new products or mar-

[11] The loss ratio is calculated as the ratio of net claims incurred to premiums earned.

kets requires additional capital to back the new policyholders' claims, or growth increases the insurer's leverage if capital is held constant. Thus, the net effect of the premium growth variable on leverage is undetermined.

All else equal, larger risk pools exhibit less variation in aggregate claim payments across years, allowing larger insurers to operate with narrower safety margins of capital and, hence, higher leverage (Cummins and Nini, 2002). To capture the effect of insurer size on capital structure, we include the natural logarithm of insurers' total assets in the regression model.

There are two main organizational forms in the insurance industry, stock insurance companies and mutual insurance companies; and these organizational forms differ with respect to their business mix (Cummins, Weiss, and Zi, 1999), risk appetite (Lamm-Tennant and Starks, 1993), and capital structure (Harrington and Niehaus, 2002; Cheng and Weiss, 2012). Thus, our model includes an indicator variable equal to 1 for mutual insurers and 0 for all others.

We include an indicator variable for group affiliation in the model. On the one hand, an insurer group can diversify risks within the group allowing each subsidiary to operate with higher leverage. On the other hand, however, insurer groups can strategically decide not to support a financially struggling subsidiary and let it default.[12] Since potential clients shopping for insurance coverage are aware of this default option, they request discounts or do not buy from group insurers unless these insurers have substantial capital (Sommer, 1996). Therefore, we do not have a prior on the sign of the group indicator variable.

The set of firm-specific variables for life insurers include the following variables also used

[12] Born and Klimaszewski-Blettner (2013) examine decisions of insurance companies to withdraw from state markets after major catastrophic events. Their results support the view that subsidiaries of insurance groups are significantly more likely to exit a market completely or to at least reduce the amount of business written in that market compared to single unaffiliated insurers. In addition, Powell and Sommer (2007) and Powell, Sommer, and Eckles (2008) document that insurer groups have active internal capital markets that are efficient in the sense that capital in the group gets reallocated from subsidiaries with relatively low expected performance to subsidiaries with relatively high expected performance.

for property-liability insurers: The ratio of reinsurance ceded to direct premiums plus reinsurance assumed to measure reinsurance utilization, the growth in net premiums earned to capture growth opportunities, the natural logarithm of total assets to measure insurer size, an indicator variable coded equal to 1 for mutual insurance companies, and an indicator variable for group affiliation. In addition, we add a variable capturing differences in life insurers' business mix to the model.

Life insurance companies offer two main categories of products (see, e.g., Graham and Xie, 2007). Standard life insurance products (e.g., term life insurance contracts) transfer mortality risk to the insurance company; the insurance company only pays a prespecified amount to the beneficiaries if the insured individual passes away during the contract period, otherwise no payment is made. Insurance companies manage mortality risk by creating a large homogeneous risk pool. Aggregate losses of such risk pools do not exhibit much volatility and, hence, reserves and capital requirements for pure mortality products are relatively low. The second product category, annuities, transfers longevity risk and investment risk to the insurance company. In exchange for one or multiple premium payments before a prespecified retirement age, annuities provide pension benefits to an insured individual after the retirement age until that person passes away. The insurance company invests the premiums and bears the risk that investment returns fall short of the policyholders' claims either due to lower than expected investment returns or due to unexpected improvements in longevity.[13] Hence, annuity providers have substantially higher reserves and capitalization levels than companies that only offer standard life insurance products. To capture differences between companies that predominantly write life insurance contracts and those that predom-

[13] Insurance companies cannot perfectly hedge their insurance portfolio because there are not enough long-term fixed-income investment options available in today's capital markets. Consider, for example, a deferred life annuity for a one-year-old male. Such a product is usually purchased by parents for their children (e.g., in Germany). The product requires regular contributions for a certain number of years and once the insured individual reaches retirement age, the insurance company will pay pension benefits until the insured passes away. Given todays life expectancy of a one-year-old male in Germany, the insurance company would have to invest in bonds with a maturity of up to78 years to hedge its payment obligations, assuming that the contribution is made in one lump sum and that there are no improvements in average longevity. If contributions are made in monthly payments the insurance company would have to enter corresponding long-term forward rate contracts to hedge the obligations.

inantly write annuities, we include the ratio of "total gross provisions" (i.e. reserves) to premiums in the model, and we expect this variable to be negatively related to firm leverage.

3.3 Quantifying the Impact of Specific Country-Level Factors on Capital Structure

The second part of our analysis focuses on specific country characteristics rather than country fixed effects. To examine the explanatory power of these country-level factors for firms' leverage levels, we include these country-level factors in a reduced form model of insurer leverage and perform a variance decomposition analysis. The business environment in a country may not just have a level effect on the capital structure of all insurers operating in that country, but may also moderate the relationship between firm-level factors and capital structure. To capture any indirect effects of country characteristics on firms' capital structure, we include interaction terms between all firm-level variables and the country-level factors into the model. The specification of the model is as follows:

$$Leverage_{i,c,t} = \alpha + \beta_1 X_{i,c,t-1} + \beta_2 C_{c,t-1} + \beta_3 X_{i,c,t-1} \times C_{c,t-1} + \varepsilon \qquad (2)$$

where $X_{i,c,t-1}$ is the set of one-year lagged firm-level variables from Equation (1), $C_{c,t-1}$ is a specific one-year lagged country-level factor, $X_{i,c,t-1} \times C_{c,t-1}$ are the country-firm interaction effects, and ε is a random error term.

Note that we estimate Equation (2) separately for each country-level measure hypothesized to impact insurer's capital structure. The following section discusses our measures of access to financial markets, cost of financial distress, property right protection, and competition in detail (a summary of the variable definitions can be found in the Appendix). Some of these measures are not available for all 28 countries and all sample years. Therefore, the number of observations used varies slightly across the different models.

Arguably, firms' access to financial markets depends on the size, efficiency and level of development of these markets. Since firms can either access securities markets or the banking system to raise external financing, we use a variety of proxies to capture the size, efficiency and level of development of both of these markets. More precisely, we use the ratio of stock market capitalization to GDP to measure the size of a country's capital market, and the ratio of credit to the private sector from deposit money banks to GDP to measure the amount of bank financing available in a country.[14] Since the availability and cost and external financing in a country also depends on a county's credit rating, we use the average of the two country credit ratings published semiannually by Institutional Investor as an additional proxy for the availability of external financing in a country. To capture efficiency differences across countries' financial systems we use Levine's (2002, p. 411) measure of finance-efficiency. This measure captures the efficiency of both the stock market and the banking system and is calculated as the natural logarithm of the value of domestic equities traded relative to GDP divided by the overhead costs of the banking system relative to banking system assets. The smooth operation and efficiency of financial markets depends on the willingness of shareholders and bondholders to provide financing, and that willingness to invest in stocks and bonds depends on the rights attached to such securities, the enforcement of these rights as well as on the disclosure requirements to mitigate information asymmetries. To capture differences in securities rights and disclosure, we use the creditor rights enforcement index from Djankov et al. (2003), the shareholder rights enforcement indices from Djankov et al. (2008), the corporate transparency index from La Porta et al. (1998) and the equity disclosure index from La Porta et al. (2006).[15]

[14] The data are obtained from the World Bank's World Development Indicators database.

[15] We are grateful to Andrei Shleifer for making several of the proxies freely available on his web page (http://www.economics.harvard.edu/faculty/shleifer/dataset).

We use two measures for the cost of financial distress in a country. Financial distress costs are especially high in countries where individuals are risk averse and willing to pay a substantial premium for policies of financially stable insurers. To capture differences in risk aversion across countries we use the uncertainty avoidance index from Hofstede, Hofstede, and Minkov (2010). Risk aversion is also associated with precautionary savings; putting money aside for bad states of the world is a way of managing the risk of having to deal with those unpleasant scenarios. Hence, gross savings in percent of GDP is our second proxy for risk aversion.[16]

Our four measures of the level of property rights protection in a country capture the stability and strength of the political and legal system in general as well as the enforceability of contracts in particular. More precisely, we use the government effectiveness index and the strength of legal system index from the World Bank's World Development Indicators database as well as the political risk index from PRS' International Country Risk Guide Researchers dataset to measure political stability and legal strength. In addition, we capture the enforceability of contracts with the time to enforce a contract in days as reported in the World Development Indicators.

We use two measures for the level of competition in a country. Based on game theoretic models of oligopolistic competition, market concentration can be viewed as an inverse measure of competition because market concentration facilitates tacit collusion and leads to prices above competitive levels (see, e.g., Tirole, 1988). Thus, we use the market share of the five largest insurers in a country to capture differences in industry concentration and competition.[17] Our broad set of countries allows us to explore competitive differences between emerging and developed insurance markets. Competition is usually tougher in developed economies and their relatively saturated market. Hence, we use insurance penetration as an inverse measure of competition. Insurance

[16] Gross savings are calculated as gross national income less total consumption, plus net transfers. The data are obtained from the World Bank's World Development Indicators database.
[17] More precisely, we divide the total premium volume of the largest five insurers in our data set by the aggregate insurance market premium as reported in Swiss Re's *Sigma* publications for the corresponding country and year.

penetration is calculated as the ratio of a country's aggregate insurance premium volume to GDP.[18]

3.4 A Partial Adjustment Model of Leverage

The variance decomposition analysis is based on a static model of firm leverage. However, shocks to income on the one hand and new investments and business growth on the other hand push firms off the optimum capital structure. In a world with transaction costs, it is too costly to return to the optimum instantaneously. Firms rather work their way back towards their target capital structure over time, and there is substantial empirical evidence supporting this view (see, e.g., Flannery and Rangan, 2006). Thus, in the third part of our analysis, we estimate a partial adjustment model of insurer leverage.

$$Leverage_{i,c,t} - Leverage_{i,c,t-1} = \lambda\left(Leverage^{*}_{i,c,t} - Leverage_{i,c,t-1}\right) + \varepsilon_{i,c,t}\,, \tag{3}$$

where $Leverage_{i,c,t}$ is the actual leverage of insurer *i* in country *c* and year *t*, $Leverage^{*}_{i,c,t}$ represents the insurer's target or desired leverage level and λ is the adjustment parameter. Since firms' target leverage is unobservable we, model firms' target leverage as a function of observable firm- and country-level factors, interaction effects between the firm- and country-level factors as well as time-invariant firm-specific effects.

$$Leverage^{*}_{i,c,t} = \beta_1 X_{i,c,t-1} + \beta_2 C_{c,t-1} + \beta_3 X_{i,c,t-1} \times C_{c,t-1} + \theta_i\,, \tag{4}$$

where $X_{i,c,t-1}$ is the set of one-year lagged firm-level variables from Equation (1), $C_{c,t-1}$ is a specific one-year lagged country-level factor, $X_{i,c,t-1} \times C_{c,t-1}$ are the country-firm interaction effects, and θ_i is the firm-specific effect. To control for time-varying macroeconomic conditions, we fol-

[18] Data on countries' aggregate market premium volumes are obtained from Swiss Re's *Sigma* publications, and GDP data are obtained from the World Bank's World Development Indicators database.

low Gungoraydinoglu and Öztekin (2011) and include the one-year lagged inflation rate, GDP growth and the interaction terms between these two macroeconomic variables and the country-level factors into the model.[19]

Substituting Equation (4) for target leverage in Equation (3) and solving for $Leverage_{i,c,t}$ leads to

$$Leverage_{i,c,t} = (1-\lambda)Leverage_{i,c,t-1} + (\lambda\beta_1)X_{i,c,t-1} + (\lambda\beta_2)C_{c,t-1} + (\lambda\beta_3)X \times C + \lambda\theta_i + \varepsilon, \quad (5)$$

We add country indicators and year indicators to Equation (5) and estimate it separately for each country-level measure hypothesized to impact insurer's capital structure. The estimation is performed with Blundell and Bond's (1998) generalized method of moments (GMM) estimator. Among the recently proposed alternative dynamic panel data estimators, Blundell and Bond's (1998) system GMM estimator is expected to have the least bias for the model in Equation (5) (Flannery and Hankins, 2012). This estimator uses lagged levels as well as lagged differences as instruments for the lagged dependent variable. We test for the validity of the instruments with the Sargan test, and we test for autocorrelation in the residuals with Arellano and Bond's (1991) test. Since the estimation is performed on first differences, few expect to find serial correlation of order one (AR(1)). Significant serial correlation of order two (AR(2)), however, would indicate that the model is misspecified.

Table 1 contains summary information of the country-level measures and our measure of insurer leverage for each country in our sample. The country-level variables presented in the first eighteen columns exhibit substantial variation across countries and are, hence, well suited for our research design. See Appendix A for a detailed description of the country-level variables. The leverage measure used in our analysis is the ratio of total assets minus capital and surplus to capital

[19] Data on annual inflation rates and GDP growth are obtained from the World Bank's World Development Indicators database.

and surplus. To minimize the impact of outliers, we winsorize the leverage variable at the 1st and 99th percentiles.

4. Results

Table 2 provides summary statistics for the firm-level variables used in the analysis as well as univariate differences between insurance companies with leverage above the sample median and insurance companies with leverage below the sample median. Differences in means tests suggest that insurers in these two groups are statistically different in terms of size, their business mix and reinsurance arrangements as well as their organizational form. To compare the relative importance of firm-level and country-level characteristics in explaining insurance companies' leverage decisions, we employ a multivariate variance decomposition approach.

In the first part of our variance decomposition analysis, we compare the explanatory power of the firm-level variables with the explanatory power for country- and year-dummy variables. The results of this first part are presented in Table 3 for property-liability insurance companies and in Table 4 for life insurance companies, respectively. Each column in the table presents a different model specification. For each variable we normalize the Type III partial sum of squares by dividing through the total Type III partial sum of squares of the model, and we present the resulting percentage numbers in the table. Therefore, the percentages of the firm-specific factors and the percentages of year and country fixed effects in each column are forced to sum to 100. Model 7 shows the major results for the model including firm-specific factors, year and country fixed effects.

The results for property-liability insurance companies suggest that country fixed effects explain 69% of the variation in insurer leverage while the firm-level variables proposed in the prior literature explain less than 27% of the variation in leverage and year fixed effects explain about

4% (see Model (7) in Table 3). We find similar results for life insurance companies. The explanatory power of country fixed effects on the variation in insurer leverage is 76% while firm-level variables explain about 22% of the variation in leverage and year fixed effects explain less than 2% (see Model (7) in Table 4). Among the firm-level variables, firm size has the highest explanatory power; firm size explains about 73% of the variation in leverage for property-liability insurers and about 81% of the variation in leverage for life insurers (see Models (1) in Tables 3 and 4, respectively). Overall, the results suggest that country effects play a major role when insurers choose their leverage.

In the second part of our variance decomposition analysis, we replace the country dummies with specific measures of the country characteristics that are hypothesized to impact firms' capital structure decisions. We estimate a separate model for each country-level measure and include the measure itself in the model as well as interaction terms between the measure and all firm-level variables. Such a model specification allows us to capture any moderating or indirect effect of the country-level characteristics on firm leverage in addition to the direct effect. The results are presented in Table 5 for property-liability insurance companies and in Table 6 for life insurance companies, respectively. The country characteristics hypothesized to impact firms' capital structure are the ease of access to capital markets in a country (models 1-8), the cost of financial distress (models 9-10), the degree of property rights protection (models 11-14) and competition (models 15-16). Column 17 contains the average of the percentages of the Type III partial sum of squares of all 16 model specifications. The last row of the variance decomposition percentages presents the total effect of the individual country characteristics. In Table 5, the average of this total institutional effect across Models (1) through (8) is 37.76%, indicating that the different proxies of access to capital markets in a country explain roughly 38% of the variation in insurance companies' leverage. The averages of the total effects of the proxies for the cost of financial distress, the degree of

property rights protection and the degree of competition in a country are 54.89%, 38.23% and 55.59%; these averages are calculated across Models (9) and (10), (11) through (14), and (15) and (16), respectively. Overall, each of these averages is over half the size of the 69% explanatory power of country fixed effects (see Table 3), indicating that capital market development, the cost of financial distress, the degree of property rights protection and the degree of competition in a country are indeed important drivers of capital structure decisions. Interestingly, the direct institutional effect of country-level determinants on leverage is relatively small, averaging 3.92% across all sixteen model specifications (see column 17), compared to the indirect effect which explains on average 37.66% of the variation in leverage. Note that the indirect effect for a model specification is calculated as the sum of the explanatory percentages for all interaction terms between the country-level measure and the firm-level variables. Therefore, we conclude that country characteristics have a strong effect on firms' capital structure choices, mainly by moderating the relationship between firm-level factors and capitalization.

The results for life insurers in Table 5 allow a similar conclusion. The averages of the total institutional effects of the proxies for access to capital markets, cost of financial distress, the degree of property rights protection and the degree of competition in a country are 43.46%, 43.94%, 54.65% and 37.33%, respectively. Each of these averages is roughly half the size of the 76.39% explanatory power of country fixed effects (see Table 4), indicating that capital market development, the cost of financial distress, the degree of property rights protection and the degree of competition in a country are important factors in insurers' capital structure decisions. The indirect or moderating effects of country characteristics on the relationship between firm-level variables and leverage are substantially stronger than the direct effect of those country characteristics on leverage; on average a country-level factor only explains 8.44% of the variation in leverage directly,

whereas the interaction terms of the country-level factor with the firm-level variables explain an additional 37.23% of the variation.

In the third part of our analysis, we estimate a partial adjustment model of insurer leverage. The model is defined in Equation (5) and is estimated separately for each country-level factor. Each model specification includes the country-level factor directly as well as interaction terms between the country-level factor and all firm-level variables. Table 7 presents the results of the Blundell and Bond (1998) system GMM estimator for our sample of property-liability insurance companies. The diagnostic tests indicate that there is *no* significant serial correlation of order two (AR(2)) in the residuals and that we can*not* reject the null hypothesis of the Sargan test of overidentifying restrictions that the instruments are valid. The coefficient of the country-level factor is significant in eight of the sixteen model specifications, and in each of the model specifications between two and eight of the interaction terms with the country-level factor are significant, averaging 4.5 significant interaction effects. We interpret these results as evidence that country characteristics impact a firm's capital structure choices, mainly by moderating the relationship between firm-level factors and leverage. To determine the overall impact of country characteristics on firms' capital structure, including the direct and indirect effect, we calculate the percentage change in the predictive margins. More precisely, we calculate the sample mean and standard deviation for each country-level factor. We then calculate the model predictions at the sample mean of the country-level factor, using the original data points for all other variables, as well as the model predictions at the mean plus one standard deviation of the country-level factor. Then, we calculate the percentage change between the two predictions for each observation. The average of these percentage changes across all observations in the sample are reported in Table 7. The percentage change in the predictive margins for all eight measures of the ease of access to capital markets (Models (1) through (8)) is negative, indicating that insurance companies operating in countries

with well developed capital markets have, on average, a lower leverage or high capitalization than companies operating in countries with less developed capital markets. This result supports the theoretical prediction of single period models of insurer capital structure which emphasize the tradeoff between the costs and benefits of holding capital (see, e.g., Cagle and Harrington, 1995); if capital is relatively cheap and easy to raise firms will hold more capital in equilibrium. Both percentage changes in the predictive margins for the measures of the cost of financial distress (Models (9) and (10)) are negative, indicating that insurers operating in countries with relatively high cost of financial distress have lower levels of leverage or higher levels of capitalization on average. For the first three measures of property rights protection in a country, the percentage change in the predictive margins is negative and for the fourth measure, namely the *time to enforce a contract* variable, the change in the predictive margins is positive. Note that the time to enforce a contract is an inverse measure whereas the other three indices directly measure property right protection. Therefore, our results indicate that insurers headquartered in countries where property rights are well protected have relatively low leverage or hold relatively high levels of capital. This result is consistent with our prediction that insurance companies may be hesitant to hold much capital if property rights cannot be predictably enforced because financial slack may lead to expectations of stakeholders to get their piece of the pie. The change in the predictive margins of the *market concentration* variable in Model (15) is negative, and the change in the predictive margins of the *insurance penetration* variable in Model (16) is positive. Since market concentration is an inverse measure and insurance penetration a direct measure of competition, the results indicate that insurance companies operating in countries with strong competition have relatively high leverage or hold relatively low levels of costly capital.

Table 8 presents the results of the dynamic partial adjustment model defined in Equation (5) for our sample of life insurance companies. The coefficient of the country-level factor is signif-

icant in thirteen of the sixteen model specifications, and in each of the model specifications at least five of the interaction terms with the country-level factor are significant. Again, we interpret these results as evidence that country characteristics impact a firm's capital structure choices, mainly by moderating the relationship between firm-level factors and leverage. The percentage change in the predictive margins is negative for five of the variables measuring the ease of access to capital markets, but positive for three of the measures (Models (2), (5) and (8)). The mixed evidence does not allow drawing a clear conclusion about the relationship between capital market development and lifer insurers' capital structure. The change in the predictive margins of the two proxies for the cost of financial distress in Models (10) and (11) is positive, contradicting the theoretical expectation that firms should hold more capital if consumers are risk averse and demand for insurance is sensitive to insurers' bankruptcy risk. For all four measures of property right protection (Models (11) through (13)) the change in the predictive margins is negative resulting in mixed evidence. Recall that the *time to enforce a contract* variable is an inverse measure whereas the other three variables measure property rights protection directly. Both changes in the predictive margins for the two measures of competition in a country have the opposite sign, contradicting the view that increased competition leads to higher leverage.

Overall, the ease of access to financial markets, the costs associated with financial distress, the level of property rights protection, and the level of competition in a country's product markets seem to explain differences in the capital structure of property-liability insurance companies. However, those specific country characteristics do not seem to systematically explain the variation in life insurers capitalization levels across countries. A possible explanation is that life insurance polices are not as homogeneous as property-liability insurance policies. Life insurance products are influenced by the tax law and different products may lead to different business models and optimal capital structures. In summary, we do find that life insurers capital structure varies across

countries and that country fixed effects explain 76% of the variation in insurer leverage whereas firm-level variables explain only about 22%. However, the mechanism explaining the cross-country differences seems to be more complex for life insurers than for property-liability insurers.

5. Conclusion

Previous research has ignored the relationship between country-level determinants and insurer capital structure. This research examines the determinants of insurance companies' capital structure across a broad range of economies including both, developed and emerging market countries. Since property-liability insurance companies and life insurance companies differ substantially with respect to their business model and, hence, their capital structure, we perform the analysis separately for these two sectors of the industry. We find that time-invariant country characteristics (i.e. country fixed effects) explain over two thirds of the variation in insurance companies' capital structure, whereas the firm-level determinants proposed in the prior literature explain less than one third.

In addition to the static variance decomposition analysis, we also estimate a dynamic partial adjustment model. After capital shocks, firms' may not immediately return to their target capital structure due to transaction costs, but rather restore their capital structure over time (Flannery and Rangan, 2006). A partial adjustment model controls for firms' capital adjustments over time. The results of the dynamic model are consistent with the static results: Country characteristics have a strong effect on firms' capital structure choices, mainly by moderating the relationship between firm-level factors and capitalization.

This research contributes to the policy discussion on global regulatory capital requirements. The International Association of Insurance Supervisors (IAIS) is currently developing a global capital standard. Our results document that the optimal capital structure of insurance com-

panies is not homogeneous across countries, but varies systematically with country-level factors. Thus, we argue that the current decentralized structure of country-specific regulatory capital requirements may not be the worst solution and that a global capital standard – if desired – should be flexible enough to incorporate differences in the institutional environments across countries to avoid market distortions.

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Table 1. Descriptive Statistics of Country and Insurer Characteristics, 2000-2008

	Mean																Median			
Country	*Market capitalization*	*Financial efficiency*	*Credit to private sector*	*Country credit rating*	*Creditor rights enforcement*	*Shareholder rights enforcement*	*Corporate transparency*	*Equity disclosure*	*Uncertainty avoidance*	*Savings*	*Government effectiveness*	*Political risk index*	*Strength of legal system*	*Time to enforce a contract*	*Market concentration*	*Insurance penetration*	*Leverage property-liability insurers*	*Leverage life insurers*	*Firm-year observations property-liability*	*Firm-year observations life*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*	*(14)*	*(15)*	*(16)*				
Australia	120.14	1.71	111.64	87.09	1.80	0.76	75.00	0.75	51.00	21.84	1.81	87.20	9.00	395.00	0.20	0.08	2.77	-	57	-
Austria	33.52	0.48	111.28	91.94	3.52	0.21	54.00	0.25	70.00	25.53	1.87	87.69	7.00	397.00	0.42	0.06	3.76	-	53	-
Belgium	71.65	0.19	80.42	89.93	2.73	0.54	61.00	0.42	94.00	25.13	1.74	84.00	6.00	505.00	0.54	0.10	3.92	-	100	-
Bolivia	18.94	-	42.11	29.38	5.75	0.14	-	-	-	21.25	-0.53	60.34	1.00	591.00	-	-	1.33	3.82	29	26
Canada	109.66	1.84	164.48	91.56	2.09	0.64	74.00	0.92	48.00	22.88	1.91	87.14	7.00	570.00	0.24	0.07	2.47	3.69	622	211
Chile	96.08	0.20	76.00	68.34	4.57	0.63	52.00	0.58	86.00	21.08	1.18	78.66	4.00	480.00	0.33	0.04	2.32	7.62	65	30
Colombia	31.54	-2.51	34.55	51.98	4.11	0.57	50.00	0.42	80.00	17.87	-0.08	56.71	5.00	1387.00	0.25	0.02	1.64	-	8	-
Denmark	62.62	0.58	170.13	92.12	2.55	0.46	62.00	0.58	23.00	24.55	2.20	87.75	8.35	380.00	0.40	0.08	0.84	-	48	-
Ecuador	8.15	-1.52	23.15	26.08	4.92	0.08	-	0.00	67.00	23.47	-0.87	56.41	3.00	588.00	0.13	0.01	2.11	-	29	-
Finland	111.97	0.98	70.87	92.05	3.14	0.46	77.00	0.50	59.00	26.59	2.14	93.63	8.00	250.75	0.62	0.09	1.82	14.33	120	66
France	80.04	0.64	94.29	92.99	3.23	0.38	69.00	0.75	86.00	20.07	1.66	78.31	4.90	390.00	0.33	0.09	5.18	20.56	442	71
Germany	46.62	1.91	112.81	93.02	3.51	0.28	62.00	0.42	65.00	22.50	1.62	84.97	7.89	398.71	0.18	0.07	2.80	51.48	1009	457
Hong Kong	357.56	-	144.81	71.14	0.73	0.96	69.00	0.92	29.00	32.36	1.59	78.80	10.00	211.00	0.04	0.08	1.06	-	17	-
India	74.91	0.52	40.56	56.32	3.34	0.58	57.00	0.92	40.00	33.08	-0.04	61.78	6.84	1420.00	0.72	0.04	1.45	-	50	-
Ireland	54.58	4.14	152.08	89.84	2.63	0.79	-	0.67	35.00	22.79	1.61	90.32	9.00	515.00	0.28	0.17	1.84	31.62	108	10
Italy	43.15	0.13	88.61	84.35	4.04	0.42	62.00	0.67	75.00	20.42	0.60	79.07	3.00	1330.21	0.26	0.07	5.47	17.93	286	76
Japan	85.59	3.32	180.36	86.90	2.98	0.50	65.00	0.75	92.00	26.40	1.40	82.00	6.73	360.00	0.37	0.10	2.26	15.62	88	272
Netherlands	95.90	2.95	161.24	93.66	3.07	0.20	64.00	0.50	53.00	26.73	1.93	87.95	6.00	514.00	0.35	0.10	2.68	13.00	86	24
Norway	53.00	0.91	79.26	93.59	2.95	0.42	74.00	0.58	50.00	35.23	1.93	88.97	6.00	310.00	0.55	0.05	0.92	-	67	-
Pakistan	14.33	-0.45	29.84	34.75	3.76	0.41	-	0.58	70.00	19.85	-0.68	44.29	6.00	976.00	0.26	0.01	1.14	-	11	-
Philippines	52.98	0.03	36.45	43.85	5.00	0.22	65.00	0.83	44.00	24.42	-0.12	65.49	4.00	967.75	0.20	0.01	0.96	-	87	-
Portugal	41.27	-0.19	145.15	82.67	3.93	0.44	36.00	0.42	104.00	15.21	1.02	85.19	3.00	577.00	0.42	0.08	4.05	-	56	-
South Korea	73.66	-	94.94	74.19	3.37	0.47	62.00	0.75	85.00	31.43	1.05	76.48	8.00	230.00	0.42	0.10	7.45	-	62	-
Spain	88.30	0.57	148.87	88.13	5.25	0.37	64.00	0.50	86.00	22.12	1.32	80.50	6.00	515.00	0.22	0.05	2.80	19.10	161	27
Sweden	102.08	1.49	113.29	92.65	2.98	0.33	83.00	0.58	29.00	26.58	1.95	89.78	6.73	508.00	0.39	0.07	1.18	3.73	233	28
Switzerland	230.07	2.98	156.46	95.36	3.13	0.27	68.00	0.67	58.00	31.00	2.02	90.04	8.00	417.00	0.49	0.11	4.09	-	31	-
United Kingdom	129.04	2.72	155.83	93.30	2.58	0.95	78.00	0.83	35.00	15.01	1.80	85.66	10.00	404.00	0.15	0.15	2.67	23.49	239	126
United States	126.65	2.24	191.46	93.23	2.62	0.65	71.00	1.00	46.00	14.56	1.65	81.12	9.00	300.00	0.11	0.09	1.72	5.33	2783	577

Notes: Mean and Median values are based on the pooled sample for the years 2000-2008. A detailed description of the variables is available in the Appendix.

Table 2. Univariate Comparison between Insurers with High and Low Leverage

Panel A: Property-Liability Insurance Companies

Firm characteristics	*Full sample*				*Firms with leverage below sample median*			*Firms with leverage above sample median*		
	N	*Mean*	*Median*	*Std. Dev.*	*N*	*Mean*	*Median*	*N*	*Mean*	*Median*
Reinsurance	6,545	0.340	0.263	0.749	3,270	0.370	0.292	3,275	0.311***	0.242***
Std. dev. of loss ratio	6,947	1.287	0.091	23.635	3,474	1.699	0.105	3,473	0.876	0.079***
Longtail business	6,928	5.227	1.099	141.324	3,460	8.099	0.823	3,468	2.362*	1.368***
Premium growth	6,947	0.260	0.114	3.257	3,474	0.220	0.096	3,473	0.300	0.137***
Size	6,947	12.299	12.272	1.876	3,474	11.610	11.564	3,473	12.990***	12.985***
Mutual	6,947	0.181	0.000	0.385	3,474	0.248	0.000	3,473	0.114***	0.000***
Group	6,947	0.701	1.000	0.458	3,474	0.654	1.000	3,473	0.747***	1.000***

Panel B: Life Insurance Companies

Firm characteristics	*Full sample*				*Firms with leverage below sample median*			*Firms with leverage above sample median*		
	N	*Mean*	*Median*	*Std. Dev.*	*N*	*Mean*	*Median*	*N*	*Mean*	*Median*
Reinsurance	1,837	0.143	0.048	0.212	932	0.187	0.078	905	0.099***	0.027***
Product mix	1,997	0.337	0.108	1.668	997	0.558	0.140	1,000	0.117***	0.092***
Premium growth	2,001	0.441	0.080	8.997	1,001	0.264	0.074	1,000	0.619	0.087
Size	2,001	14.351	14.542	2.361	1,001	13.135	12.908	1,000	15.568***	15.626***
Mutual	2,001	0.135	0.000	0.342	1,001	0.097	0.000	1,000	0.174***	0.000***
Group	2,001	0.730	1.000	0.444	1,001	0.658	1.000	1,000	0.802***	1.000***

Notes: Panel A presents summary statistics for "*Property-Liability Insurance Companies*" and Panel B for "*Life Insurance Companies*". Descriptive statistics are presented for for the full sample, for the subsample of firms with leverage below the sample median, and for the subsample of firms with leverage above the sample median. *N* denotes firm-year observations. Statistical significance of differences is based on a t-test for means, and a Wilcoxon signed-ranks test for medians. ***, **, and * denotes statistical significance at the 1, 5, and 10 percent level, respectively. *Leverage* is the ratio of total assets minus capital surplus to capital surplus. *Reinsurance* is the ratio of reinsurance ceded to reinsurance premiums assumed plus direct premiums. *Std. dev. of loss ratio* is the standard deviation of net claims incurred divided by premiums earned for the years 2000-2008. *Longtail business* is the ratio of total gross provisions to the sum of gross premiums, the variable is only calculated for property-liability insurers. *Product mix* is the ratio of total gross provisions to the sum of gross premiums, the variable is only calculated for life insurers. *Premium change* is the growth in net earned premiums. *Size* is equal to the natural logarithm of the insurer's total assets. *Mutual* is a dummy variable equal to one if the insurer is a mutual, and zero otherwise. *Group* is a dummy variable equal to one if the insurer is a member of a group, and zero otherwise. Data are for the years 2000 through 2008.

Table 3. Explanatory Power of Firm-Level Determinants, Country Fixed Effects, and Year Fixed Effects (Property-Liability Insurance Companies)

	Model (1)		*Model (2)*	*Model (3)*	*Model (4)*		*Model (5)*		*Model (6)*	*Model (7)*	
	Variance Decomp.	*OLS Coefficients*	*Variance Decomp.*	*Variance Decomp.*	*Variance Decomp.*	*OLS Coefficients*	*Variance Decomp.*	*OLS Coefficients*	*Variance Decomp.*	*Variance Decomp.*	*OLS Coefficients*
Firm-specific factors											
Reinsurance	1.87	0.42456***	-	-	3.63	0.81578***	1.72	0.44503***	-	3.51	0.82109***
Std. dev. of loss ratio	0.01	-0.00048	-	-	0.02	-0.00085	0.05	-0.00103	-	0.04	-0.00126
Longtail business	0.07	-0.00021	-	-	0.01	-0.00012	0.04	-0.00017	-	0.01	-0.00009
Premium growth	0.02	-0.00011	-	-	0.03	-0.00019	0.02	-0.00011	-	0.03	-0.00018
Size	73.40	0.50078***	-	-	17.61	0.35976***	67.48	0.53472***	-	18.95	0.38630***
Mutual	16.00	-1.10768***	-	-	3.75	-0.75121***	13.07	-1.09534***	-	3.57	-0.74994***
Group	8.62	-0.70926***	-	-	0.44	-0.24254***	7.84	-0.74048***	-	0.45	-0.25300***
Year and country fixed effects											
Country FE	-		100.00	-	74.51		-		97.82	69.19	
Year FE	-		-	100.00	-		9.79		2.18	4.24	
Summary											
Firm effect	100.00		-	-	25.49		90.21		-	26.57	
Country effect	-		100.00	-	74.51		-		97.82	69.19	
Year effect	-		-	100.00	-		9.79		2.18	4.24	
Adj. R-squared	0.12		0.24	0.01	0.30		0.14		0.24	0.31	
Number of observations	6,947		6,947	6,947	6,947		6,947		6,947	6,947	
Number of countries	28		28	28	28		28		28	28	

Notes: This table presents a variance decomposition based on an analysis of covariance (ANCOVA) for several different model specifications for property-liability insurers only. The Type III partial sum of squares for each effect in the model is normalize by dividing through the sum across the effects, forcing the parts "*Firm specific factors*" and "*Year and country fixed effects*" of each column to sum to 100. Variance decomposition results are reported in percent. The "*Summary*" provides aggregates. Country FE are country fixed effects. Year FE are calendar year fixed effects. For the model specifications (1), (4), (5) and (7) we also present OLS regression coefficient and significance tests. In all models, *Leverage* is the dependent variable. ***, **, and * denotes statistical significance at the 1, 5, and 10 percent level, respectively. *Leverage* is the ratio of total assets minus capital surplus to capital surplus. *Reinsurance* is the ratio of reinsurance ceded to reinsurance premiums assumed plus direct premiums. *Std. dev. of loss ratio* is the standard deviation of net claims incurred divided by premiums earned for the year. *Longtail business* is the ratio of total gross provisions to the sum of gross premiums. *Premium change* is the growth in net earned premiums. *Size* is equal to the natural logarithm of the insurer's total assets. *Mutual* is a dummy variable equal to one if the insurer is a mutual, and zero otherwise. *Group* is a dummy variable equal to one if the insurer is a member of a group, and zero otherwise. All independent variables are measured in year t-1. Data are for the years 2000 through 2008.

Table 4. Explanatory Power of Firm-Level Determinants, Country Fixed Effects, and Year Fixed Effects (Life Insurance Companies)

	Model (1)		*Model (2)*	*Model (3)*	*Model (4)*		*Model (5)*		*Model (6)*	*Model (7)*	
	Variance Decomp.	*OLS Coefficients*	*Variance Decomp.*	*Variance Decomp.*	*Variance Decomp.*	*OLS Coefficients*	*Variance Decomp.*	*OLS Coefficients*	*Variance Decomp.*	*Variance Decomp.*	*OLS Coefficients*
Firm-specific factors											
Reinsurance	1.35	-5.79453**	-	-	0.39	5.81113***	1.24	-5.68775**	-	0.45	6.37128***
Product mix	1.36	-0.81972**	-	-	0.00	-0.06308	1.27	-0.80828**	-	0.00	-0.01919
Premium growth	0.21	-0.02770	-	-	0.05	-0.02456	0.25	-0.03106	-	0.07	-0.02806
Size	80.91	4.15336***	-	-	20.76	4.05671***	78.96	4.20148***	-	20.96	4.17014***
Mutual	1.55	3.79076**	-	-	0.21	-2.55304**	1.33	3.58195**	-	0.28	-3.00032**
Group	14.61	8.87953***	-	-	0.28	2.22299**	14.55	9.05716***	-	0.35	2.54677***
Year and country fixed effects											
Country FE	-		100.00	-	78.30		-		99.52	76.39	
Year FE	-		-	100.00	-		2.40		0.48	1.50	
Summary											
Firm effect	100.00		-	-	21.70		97.60		-	22.11	
Country effect	-		100.00	-	78.30		-		99.52	76.39	
Year effect	-		-	100.00	-		2.40		0.48	1.50	
Adj. R-squared	0.21		0.46	0.00	0.57		0.21		0.46	0.57	
Number of observations	2,001		2,001	2,001	2,001		2,001		2,001	2,001	
Number of countries	14		14	14	14		14		14	14	

Notes: This table presents a variance decomposition based on an analysis of covariance (ANCOVA) for several different model specifications for life insurers only. The Type III partial sum of squares for each effect in the model is normalize by dividing through the sum across the effects, forcing the parts "*Firm specific factors*" and "*Year and country fixed effects*" of each column to sum to 100. Variance decomposition results are reported in percent. The "*Summary*" provides aggregates. Country FE are country fixed effects. Year FE are calendar year fixed effects. For the model specifications (1), (4), (5) and (7) we additionally report OLS regression coefficients and significance tests. In all models, *Leverage* is the dependent variable. ***, **, and * denotes statistical significance at the 1, 5, and 10 percent level, respectively. *Leverage* is the ratio of total assets minus capital surplus to capital surplus. *Reinsurance* is ratio of reinsurance ceded to reinsurance premiums assumed plus direct premiums. *Product mix* is the ratio of total gross provisions to the sum of gross premiums. *Premium change* is the growth in net earned premiums. *Size* is equal to the natural logarithm of the insurer's total assets. *Mutual* is a dummy variable equal to one if the insurer is a mutual, and zero otherwise. *Group* is a dummy variable equal to one if the insurer is a member of a group, and zero otherwise. All independent variables are measured in year t-1. Data are for the years 2000 through 2008.

Table 5. Explanatory Power of Firm and Country-Level Determinants (Property-Liability Insurance Companies)

	Market capitalization (1)	*Financial efficiency* (2)	*Credit to private sector* (3)	*Country credit rating* (4)	*Creditor rights enforcement* (5)	*Shareholder rights enforcement* (6)	*Corporate transparency* (7)	*Equity disclosure* (8)	*Uncertainty avoidance* (9)	*Savings* (10)	*Government effectiveness* (11)	*Political risk index* (12)	*Strength of legal system* (13)	*Time to enforce a contract* (14)	*Market concentration* (15)	*Insurance penetration* (16)	*Average of models (1)-(16)* (17)
Firm-specific factors																	
Reinsurance	7.81	3.19	0.93	3.97	0.60	11.83	15.59	8.69	8.72	1.76	0.67	14.81	10.00	0.44	1.39	3.89	5.73
Std. dev. of loss ratio	2.44	4.52	0.71	4.58	1.70	5.19	15.44	0.01	22.29	4.66	2.98	2.48	6.12	0.06	1.89	4.99	4.45
Longtail business	0.63	0.05	0.03	0.10	0.17	0.04	0.96	0.06	0.46	0.03	0.18	1.85	0.19	0.01	0.37	0.19	0.30
Premium growth	0.00	0.05	0.11	0.04	0.01	0.01	0.07	0.00	0.00	0.00	0.11	0.43	0.12	0.05	0.30	0.02	0.07
Size	55.91	59.13	52.49	13.20	0.24	42.20	9.35	36.73	5.30	6.71	53.53	23.80	37.36	22.41	10.79	12.71	29.56
Mutual	13.51	3.30	9.65	0.23	1.98	18.65	5.30	28.84	0.05	0.19	3.08	0.02	1.99	0.05	5.01	6.11	6.82
Group	0.18	3.01	4.50	28.14	13.30	0.20	7.43	0.91	0.09	39.98	7.66	14.14	1.85	40.67	28.83	12.33	11.48
Institutional factors																	
Direct institutional effect (I)	1.93	5.29	6.84	0.21	20.70	0.74	1.43	1.16	0.05	2.35	0.00	1.07	10.43	0.27	7.83	7.42	3.92
Reinsurance*(I)	3.50	0.37	0.03	8.19	3.35	6.49	11.24	4.28	21.75	5.32	7.26	21.82	6.91	0.22	8.40	0.10	6.94
Std. dev. of loss ratio*(I)	2.46	4.67	0.66	4.56	1.70	5.63	15.55	0.01	23.03	4.77	2.95	2.43	6.23	0.07	2.25	5.09	4.56
Longtail business*(I)	0.65	0.05	0.04	0.11	0.16	0.05	0.99	0.05	0.41	0.02	0.17	1.83	0.19	0.01	0.31	0.31	0.30
Premium change*(I)	0.00	0.05	0.10	0.03	0.03	0.01	0.08	0.00	0.00	0.00	0.08	0.44	0.11	0.11	0.32	0.03	0.08
Size*(I)	4.20	9.81	13.24	0.50	37.58	2.87	0.00	3.08	9.91	1.09	0.39	5.49	14.97	0.17	5.53	12.30	7.18
Mutual*(I)	2.94	0.14	3.34	0.52	12.06	5.60	1.05	11.43	6.77	1.58	0.44	0.33	0.53	0.97	0.04	0.38	4.59
Group*(I)	3.85	6.37	7.33	35.62	6.40	0.49	15.51	4.76	1.16	31.54	20.49	9.07	3.01	34.49	26.75	34.13	14.02
Summary																	
Firm effect	80.48	73.25	68.42	50.26	18.01	78.12	54.15	75.24	36.91	53.32	68.22	57.54	57.62	63.70	48.58	40.24	58.42
Institutional effect																	
Direct	1.93	5.29	6.84	0.21	20.70	0.74	1.43	1.16	0.05	2.35	0.00	1.07	10.43	0.27	7.83	7.42	3.92
Indirect	17.59	21.47	24.74	49.53	61.28	21.14	44.42	23.61	63.04	44.33	31.78	41.39	31.95	36.03	43.60	52.33	37.66
Total	19.52	26.76	31.58	49.74	81.98	21.88	45.85	24.77	63.09	46.68	31.78	42.46	42.38	36.3	51.43	59.75	41.58
Adj. R-squared	0.17	0.20	0.21	0.13	0.17	0.16	0.15	0.16	0.22	0.15	0.13	0.12	0.24	0.18	0.17	0.13	0.17
Number of observations	6,947	6,839	6,947	6,947	6,947	6,947	6,770	6,918	6,918	6,947	6,947	6,947	6,947	6,947	6,916	6,918	6,920
Number of countries	28	25	28	28	28	28	24	27	27	28	28	28	28	28	27	27	27

Notes: The estimates are based on a variance decomposition analysis of the model defined in Equation (2). Results are reported in percent. The estimates for firm-specific factors are reported in "*Firm-specific factors*", the direct institutional effect is reported as (I), and the indirect institutional effects are reported in "*Institutional factors*", separately for each country-level determinant. Models 1-8 include measures for "*Access to financial markets*"; models 9-10 include measures for "*Cost of financial distress*"; models 11-14 include measures for "*Property rights protection*", and models 15-16 include measures for "*Competition*" in insurance markets. Column 17 reports the overall mean of the estimates across all country-level determinants (across Columns 1-16). All independent variables are measured in year t-1. Data are for the years 2000 through 2008. The definitions of the variables are provided in the Appendix.

Table 6. Explanatory Power of Firm and Country-Level Determinants (Life Insurance Companies)

	Market capitalization (1)	*Financial efficiency* (2)	*Credit to private sector* (3)	*Country credit rating* (4)	*Creditor rights enforcement* (5)	*Shareholder rights enforcement* (6)	*Corporate transparency* (7)	*Equity disclosure* (8)	*Uncertainty avoidance* (9)	*Savings* (10)	*Government effectiveness* (11)	*Political risk index* (12)	*Strength of legal system* (13)	*Time to enforce a contract* (14)	*Market concentration* (15)	*Insurance penetration* (16)	*Average of models (1)-(16)* (17)
Firm-specific factors																	
Reinsurance	0.00	0.43	2.15	0.14	1.22	3.52	0.88	1.67	1.61	0.29	0.01	0.29	0.12	0.01	2.14	9.80	1.59
Product mix	0.13	0.05	0.39	4.29	1.53	1.10	4.22	1.34	6.06	1.31	0.75	7.57	3.58	0.25	0.00	0.28	2.56
Premium growth	0.14	0.09	0.33	0.12	0.19	0.01	0.01	0.16	0.13	0.03	0.01	0.47	0.02	0.00	0.04	0.05	0.12
Size	42.35	48.28	37.48	15.88	4.57	8.53	8.92	37.94	46.72	41.74	15.29	0.14	6.73	42.83	62.24	8.97	27.47
Mutual	0.85	15.65	0.86	8.66	20.70	14.75	4.60	1.08	2.23	4.82	25.94	16.32	5.76	19.12	3.83	28.49	9.65
Group	30.35	15.28	21.50	5.18	5.55	28.42	36.41	14.39	0.24	6.95	9.59	13.73	3.12	9.74	0.07	9.43	12.95
Institutional factors																	
Direct institutional effect (I)	2.85	3.69	9.26	17.97	13.63	1.76	1.26	10.66	15.16	10.24	5.81	4.81	30.97	2.35	11.21	0.19	8.44
Reinsurance*(I)	0.07	0.04	2.10	0.27	1.76	4.89	1.00	0.91	1.30	0.65	0.23	0.59	0.05	0.81	0.62	9.23	1.75
Product mix*(I)	0.05	0.00	0.52	3.46	1.43	0.92	4.08	1.30	6.45	1.98	0.02	9.13	2.46	0.00	0.22	0.18	2.70
Premium change*(I)	0.08	0.03	0.24	0.13	0.20	0.01	0.01	0.15	0.08	0.00	0.03	0.52	0.09	0.01	0.01	0.00	0.11
Size*(I)	6.85	4.26	12.48	26.90	17.28	0.54	3.44	18.41	15.82	14.66	7.10	6.27	38.02	2.33	16.55	0.20	11.50
Mutual*(I)	1.23	10.19	0.49	9.27	21.23	18.64	4.39	2.06	0.96	3.36	35.21	18.28	8.70	22.45	1.40	27.60	10.36
Group*(I)	15.05	2.02	12.21	7.73	10.70	16.91	30.78	9.92	3.25	13.96	0.01	21.86	0.37	0.10	1.67	5.59	10.82
Summary																	
Firm effect	73.82	79.77	62.70	34.27	33.77	56.33	55.04	56.58	56.99	55.13	51.59	38.52	19.34	71.94	68.33	57.01	54.33
Institutional effect																	
Direct	2.85	3.69	9.26	17.97	13.63	1.76	1.26	10.66	15.16	10.24	5.81	4.81	30.97	2.35	11.21	0.19	8.44
Indirect	23.33	16.54	28.03	47.76	52.59	41.91	43.70	32.75	27.85	34.62	42.60	56.67	49.69	25.71	20.46	42.80	37.23
Total	26.18	20.23	37.29	65.73	66.22	43.67	44.96	43.41	43.01	44.86	48.41	61.48	80.66	28.06	31.67	42.99	45.67
Adj. R-squared	0.37	0.23	0.35	0.27	0.39	0.37	0.34	0.51	0.25	0.24	0.22	0.22	0.25	0.22	0.26	0.30	0.32
Number of observations	2,001	1,975	2,001	2,001	2,001	2,001	1,965	1,975	1,975	2,001	2,001	2,001	2,001	2,001	1,975	1,975	1,989
Number of countries	14	13	14	14	14	14	12	13	13	14	14	14	14	14	13	13	14

Notes: The estimates are based on a variance decomposition analysis of the model defined in Equation (2). Results are reported in percent. The estimates for firm-specific factors are reported in "*Firm-specific factors*", the direct institutional effect is reported as (I), and the indirect institutional effects are reported in "*Institutional factors*", separately for each country-level determinant. Models 1-8 include measures for "*Access to financial markets*"; models 9-10 include measures for "*Cost of financial distress*"; models 11-14 include measures for "*Property rights protection*", and models 15-16 include measures for "*Competition*" in insurance markets. Column 17 reports the overall mean of the estimates across all country-level determinants (across Columns 1-16). All independent variables are measured in year t-1. Data are for the years 2000 through 2008. The definitions of the variables are provided in the Appendix.

Table 7. The Impact of Firm- and Country-Level Determinants on the Capital Structure of Property-Liability Insurance Companies

Panel A: Access to financial markets

	Market capitalization	*Financial efficiency*	*Credit to private sector*	*Country credit rating*	*Creditor rights enforcement*	*Shareholder rights enforcement*	*Corporate transparency*	*Equity disclosure*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Leverage	0.67453***	0.67684***	0.66497***	0.67901***	0.65593***	0.65702***	0.64215***	0.67876***
	(0.01306)	(0.01624)	(0.01220)	(0.01452)	(0.01781)	(0.01695)	(0.01688)	(0.01709)
Reinsurance	0.29015	0.16035	0.31729	2.01632**	-2.00557**	0.25961	-1.43916	1.12151*
	(0.31021)	(0.47911)	(0.34526)	(0.79527)	(0.81908)	(0.46921)	(1.82528)	(0.58894)
Std. dev. of loss ratio	-0.01111***	0.02896	-0.02565***	0.30037***	0.07256	0.04479**	-0.06040	0.00154
	(0.00241)	(0.02510)	(0.00508)	(0.03906)	(0.05471)	(0.02126)	(0.16083)	(0.06809)
Longtail business	-0.00245**	-0.00081	0.00049	-0.02724	-0.02085	-0.00270	0.02969*	-0.01221**
	(0.00117)	(0.00266)	(0.00182)	(0.02701)	(0.01650)	(0.00282)	(0.01611)	(0.00530)
Premium growth	0.05615	0.06128	0.12203	0.34959**	0.16337	-0.11748**	-0.35383	-0.13194
	(0.05821)	(0.07901)	(0.07944)	(0.16542)	(0.13921)	(0.05844)	(0.22233)	(0.08602)
Size	-0.12960***	-0.06661	-0.19223**	-0.42418***	0.10835	-0.22068*	-0.35853	0.29309***
	(0.04253)	(0.08153)	(0.07653)	(0.09657)	(0.16246)	(0.11473)	(0.28233)	(0.06771)
Mutual	-0.30602**	0.27666	-0.38573	-1.79147*	1.49846	-0.13507	0.39015	-0.28415
	(0.13325)	(1.06135)	(0.28413)	(1.02784)	(1.32473)	(0.91900)	(2.67057)	(0.88073)
Group	-0.27780*	-0.43426	0.78348**	1.03874	-0.54842	-0.68506	-0.66273	-1.32436
	(0.15697)	(0.51312)	(0.35914)	(0.90866)	(0.85533)	(1.13449)	(2.29526)	(0.91454)
Inflation	-0.01974***	-0.02588**	-0.01537*	-0.02103**	-0.16394***	0.00357	-0.36911**	-0.00777
	(0.00412)	(0.01196)	(0.00855)	(0.00966)	(0.05506)	(0.00773)	(0.17159)	(0.00636)
GDP growth	0.36541	11.55314***	-1.64435	-1.63255	2.80215	-4.59594*	-1.57288	-6.47732***
	(2.18664)	(2.98626)	(2.90284)	(2.86652)	(5.08942)	(2.76658)	(10.87824)	(2.42881)
Institution (I)	-0.02093***	-5.70218	-0.01576***	-0.04299***	-0.46406	-26.18267	-0.19939***	0.62261
	(0.00435)	(5.47901)	(0.00515)	(0.01194)	(0.58285)	(16.55056)	(0.05986)	(6.27808)
Reinsurance*(I)	-0.00167	-0.06820	-0.00217	-0.02252***	0.77456**	-0.35272	0.01999	-0.98335
	(0.00219)	(0.21119)	(0.00156)	(0.00840)	(0.31264)	(0.64982)	(0.02525)	(0.60715)
Std. dev. of loss ratio*(I)	0.00003**	-0.01767	0.00013***	-0.00339***	-0.03580	-0.07252**	0.00077	-0.00637
	(0.00001)	(0.01360)	(0.00003)	(0.00044)	(0.02609)	(0.03238)	(0.00217)	(0.07440)
Longtail business*(I)	0.00002**	0.00030	-0.00000	0.00029	0.00808	0.00285	-0.00038*	0.01464**
	(0.00001)	(0.00098)	(0.00001)	(0.00029)	(0.00640)	(0.00297)	(0.00021)	(0.00635)
Premium change*(I)	0.00036	-0.02505	-0.00043	-0.00220	-0.03776	0.25445**	0.00532	0.17138*
	(0.00059)	(0.03362)	(0.00049)	(0.00183)	(0.04257)	(0.10692)	(0.00338)	(0.09862)
Size*(I)	0.00147***	0.10752***	0.00156***	0.00469***	0.01075	0.50565***	0.00660	-0.36475***
	(0.00031)	(0.03532)	(0.00042)	(0.00107)	(0.05328)	(0.16965)	(0.00401)	(0.09873)
Mutual*(I)	0.00065	-0.30117	0.00114	0.01674	-0.79969*	-0.45428	-0.01327	-0.29237
	(0.00110)	(0.52800)	(0.00158)	(0.01112)	(0.46236)	(1.68962)	(0.03690)	(1.05069)
Group*(I)	0.00122	0.25394	-0.00519***	-0.00985	0.20255	2.99928*	0.00820	1.40874
	(0.00135)	(0.23368)	(0.00193)	(0.00988)	(0.29873)	(1.81653)	(0.03173)	(0.98134)
Inflation*(I)	-0.00033**	0.00416	-0.00031*	-0.00077**	0.02940***	-0.19264***	0.00462**	-0.10427***
	(0.00017)	(0.00627)	(0.00017)	(0.00030)	(0.01111)	(0.04967)	(0.00234)	(0.02912)
GDP growth*(I)	0.05099**	-4.08814***	0.02579	0.04952	0.87289	21.65216***	0.11356	16.14661***
	(0.02167)	(1.50111)	(0.02141)	(0.03480)	(1.35958)	(6.35667)	(0.16616)	(3.85573)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)/AR(2)	0.00/0.66	0.00/0.60	0.00/0.68	0.00/0.63	0.00/0.76	0.00/0.71	0.00/0.72	0.00/0.77
Sargan	0.15	0.64	0.29	0.16	0.50	0.54	0.59	0.20
%Change in predictive margins	-3.16	-131.63	-1.93	-0.01	-0.09	-119.08	-22.17	-27.31
Observations	5,279	5,199	5,279	5,279	5,279	5,279	5,160	5,258
Countries	27	24	27	27	27	27	24	26

(continued on next page)

Table 7. (*continued*)

Panel B: Cost of financial distress, property rights protection, and competition								
	Uncertainty avoidance	*Savings*	*Government effectiveness*	*Political risk index*	*Strength of legal system*	*Time to enforce a contract*	*Market concentration*	*Insurance penetration*
	(9)	*(10)*	*(11)*	*(12)*	*(13)*	*(14)*	*(15)*	*(16)*
Leverage	0.65100***	0.68471***	0.69657***	0.66291***	0.64284***	0.63418***	0.66689***	0.67101***
	(0.01605)	(0.01303)	(0.01331)	(0.01349)	(0.01589)	(0.01565)	(0.01304)	(0.01239)
Reinsurance	0.41564	1.02226***	1.75495***	-0.35828	2.97793***	-0.53075*	0.10939	0.22510
	(0.60741)	(0.25199)	(0.49805)	(0.98330)	(0.94543)	(0.30850)	(0.08933)	(0.25721)
Std. dev. of loss ratio	0.00855	-0.06760***	-0.04528***	-0.10035***	0.00693	-0.18566***	-0.00530**	0.01002***
	(0.03880)	(0.00649)	(0.01162)	(0.01341)	(0.01147)	(0.02659)	(0.00238)	(0.00293)
Longtail business	-0.00249	0.00311***	0.01037**	0.00724	0.02609**	0.02091***	0.00031***	0.00063
	(0.00224)	(0.00108)	(0.00445)	(0.00551)	(0.01132)	(0.00424)	(0.00011)	(0.00143)
Premium growth	0.11786	0.13231	0.13305**	0.19866	-0.13320	0.44494***	0.30300***	0.36305***
	(0.10221)	(0.08242)	(0.06105)	(0.31338)	(0.11834)	(0.05500)	(0.03719)	(0.08944)
Size	0.18276	0.00280	-0.13358**	-1.61177***	-0.35830**	0.30888***	0.25494***	0.06481
	(0.12766)	(0.04873)	(0.06307)	(0.23817)	(0.16809)	(0.05639)	(0.02709)	(0.05582)
Mutual	2.72036***	0.16010	-0.62376**	-0.31797	2.37401**	-1.14828**	-0.03513	-0.08306
	(0.82238)	(0.18747)	(0.31047)	(1.05638)	(1.02170)	(0.56615)	(0.16278)	(0.43484)
Group	1.21919	-0.04787	-0.21784	-0.89933	2.40855***	-0.50990*	0.49910***	-0.80824***
	(0.76722)	(0.22904)	(0.40424)	(1.14659)	(0.75129)	(0.27738)	(0.14061)	(0.23150)
Inflation	0.00572	-0.15933***	-0.04646***	-0.00777	0.00730	-0.12353***	-0.03609*	-0.00908**
	(0.05842)	(0.05512)	(0.00882)	(0.04712)	(0.01764)	(0.03663)	(0.02034)	(0.00403)
GDP growth	-8.92215*	15.31695***	4.93424***	38.92292***	14.40118***	-1.82136	6.65218***	-13.24516***
	(5.02088)	(4.61223)	(1.46226)	(7.85594)	(4.55146)	(3.09665)	(2.01660)	(3.95551)
Institution (I)	0.04914	-0.00730	-1.83874***	-0.27394***	-0.35247	0.00248*	6.64301***	-4.74517
	(0.04430)	(0.04068)	(0.48920)	(0.04131)	(0.26843)	(0.00130)	(1.46095)	(6.60151)
Reinsurance*(I)	-0.00652	-0.07060***	-1.11706***	0.00377	-0.30981***	0.00197***	0.58488	-2.83161
	(0.01312)	(0.01784)	(0.31051)	(0.01244)	(0.10614)	(0.00071)	(0.74987)	(2.35183)
Std. dev. of loss ratio*(I)	-0.00030	0.00303***	0.02190***	0.00110***	-0.00241	0.00033***	-0.00132	-0.23166***
	(0.00081)	(0.00031)	(0.00653)	(0.00016)	(0.00151)	(0.00005)	(0.00743)	(0.04007)
Longtail business*(I)	0.00007	-0.00020***	-0.00626**	-0.00009	-0.00261**	-0.00005***	-0.00430***	-0.00331
	(0.00006)	(0.00007)	(0.00269)	(0.00007)	(0.00113)	(0.00001)	(0.00140)	(0.00793)
Premium change*(I)	-0.00144	-0.00421	0.02674	0.00064	0.02734*	-0.00079***	-0.65918***	-2.99958***
	(0.00168)	(0.00377)	(0.03937)	(0.00394)	(0.01586)	(0.00013)	(0.12151)	(0.86660)
Size*(I)	-0.00437**	0.00181	0.15419***	0.02073***	0.05434***	-0.00036***	-0.48685***	0.19903
	(0.00220)	(0.00272)	(0.03663)	(0.00294)	(0.01975)	(0.00009)	(0.10503)	(0.51566)
Mutual*(I)	-0.05538***	-0.02019*	0.26953	0.00183	-0.32135**	0.00220	-0.11237	-2.17235
	(0.01255)	(0.01087)	(0.19506)	(0.01290)	(0.12912)	(0.00149)	(0.58594)	(4.95342)
Group*(I)	-0.01659	-0.00476	0.07641	0.00829	-0.40101***	0.00091**	-1.35145***	7.74259***
	(0.01247)	(0.01281)	(0.24624)	(0.01396)	(0.09365)	(0.00045)	(0.45085)	(2.47420)
Inflation*(I)	-0.00037	0.00568**	-0.02880***	-0.00019	-0.00733	0.00017***	-0.02296	-1.01204***
	(0.00089)	(0.00253)	(0.00951)	(0.00078)	(0.00471)	(0.00006)	(0.08690)	(0.23002)
GDP growth*(I)	0.21013***	-0.57724***	-2.35593***	-0.43650***	-1.09777*	0.01064*	-12.29080**	198.88900***
	(0.07869)	(0.20495)	(0.86628)	(0.09859)	(0.59835)	(0.00545)	(4.98881)	(52.08767)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)/AR(2)	0.00/0.67	0.00/0.68	0.00/0.67	0.00/0.60	0.00/0.79	0.00/0.69	0.00/0.62	0.00/0.62
Sargan	0.32	0.31	0.34	0.26	0.59	0.24	0.19	0.30
%Change in predictive margins	-16.89	-1.94	-4.45	-3.13	-11.23	1.72	-3.30	1.34
Observations	5,258	5,279	5,279	5,279	5,279	5,279	5,257	5,258
Countries	26	27	27	27	27	27	26	26

Notes: This table presents partial-adjustment models for property-liability insurers, and is divided into Panels A and B. Models 1-8 include measures for "*Access to financial markets*", models 9-10 include measures for "*Cost of financial distress*", models 11-14 include measures for "*Property rights protection*", and models 15-16 include measures for "*Competition*" in insurance markets. The estimates are obtained from Blundell and Bond's (1998) two-step system GMM. Regressions include year and country dummies. Standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels respectively. AR(1) and AR(2) denote the p-values for the first- and second-order autocorrelation in the residuals. Hansen reports the p-value under the null hypothesis of joint validity of the instrument set. All independent variables are measured in year t-1. Data are for the years 2000 through 2008. The definitions of the variables are provided in the Appendix.

Table 8. The Impact of Firm- and Country-Level Determinants on the Capital Structure of Life Insurance Companies

Panel A: Access to financial markets

	Market capitalization	*Financial efficiency*	*Credit to private sector*	*Country credit rating*	*Creditor rights enforcement*	*Shareholder rights enforcement*	*Corporate transparency*	*Equity disclosure*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Leverage	0.85871***	0.85458***	0.84579***	0.89760***	0.87493***	0.84650***	0.86017***	0.86433***
	(0.00541)	(0.00707)	(0.00504)	(0.00442)	(0.00760)	(0.00669)	(0.00629)	(0.00720)
Reinsurance	11.93258***	-3.96689**	-2.64386*	26.93811***	-4.42916***	4.20040**	20.88113***	-12.83729***
	(1.06999)	(1.56303)	(1.54322)	(1.09440)	(1.23328)	(1.88655)	(5.89969)	(3.40664)
Product mix	0.94777***	0.60888	0.68326***	0.18467**	-2.11818***	1.88216***	2.83530	-0.30459
	(0.11145)	(0.56301)	(0.08317)	(0.07730)	(0.22036)	(0.36548)	(3.85773)	(0.54453)
Premium growth	0.83077***	-1.57405***	-1.29368***	1.45868***	2.03405***	-0.36354**	6.17822***	2.37838***
	(0.13351)	(0.23091)	(0.20719)	(0.22561)	(0.24394)	(0.17522)	(0.79103)	(0.42190)
Size	0.81073***	-0.61915***	1.47310***	-0.94492***	-1.72269***	0.57243*	8.28588***	1.94431***
	(0.11231)	(0.16261)	(0.14990)	(0.17276)	(0.22899)	(0.30389)	(0.86643)	(0.27513)
Mutual	-0.07830	-18.14966***	-11.63940***	-30.62147***	14.12346*	-13.08003***	51.26242***	-14.17853***
	(0.66802)	(2.13881)	(1.41449)	(2.37344)	(7.80701)	(2.75914)	(11.63589)	(2.34342)
Group	-2.16598***	1.10680	-2.50226**	11.30412***	-6.79908***	19.74055***	29.91190***	-6.76174***
	(0.54199)	(0.70366)	(1.02432)	(1.75206)	(1.19125)	(1.78567)	(2.59600)	(1.97321)
Inflation	-0.11085	0.61948***	-0.58880***	0.40528***	1.08861***	-0.22166**	-1.56663***	0.98194***
	(0.10084)	(0.14717)	(0.07306)	(0.11353)	(0.21927)	(0.10915)	(0.47461)	(0.20101)
GDP growth	-6.16280	44.96211***	33.22081***	-55.87971***	20.31819	-26.52963***	-93.22960***	-62.03811***
	(4.57950)	(10.79741)	(7.60763)	(4.16399)	(15.32911)	(5.15613)	(33.45234)	(12.16861)
Institution (I)	0.00342	0.00863	0.07303***	-0.11404***	-15.49586***	-339.48642***	1.90905***	14.19955***
	(0.01145)	(0.70860)	(0.01144)	(0.02678)	(1.52888)	(87.99322)	(0.18634)	(4.71089)
Reinsurance*(I)	-0.09155***	5.95024***	0.02585***	-0.26411***	3.40422***	-0.73443	-0.25864***	17.84080***
	(0.00847)	(0.71389)	(0.00894)	(0.01325)	(0.44170)	(2.27961)	(0.08047)	(3.93433)
Product mix*(I)	-0.00845***	-0.38246	-0.00452***	-0.00352***	0.87257***	-3.57202***	-0.04493	0.17515
	(0.00087)	(0.28944)	(0.00051)	(0.00105)	(0.08459)	(0.56470)	(0.05315)	(0.59134)
Premium change*(I)	-0.00142	0.94596***	0.01237***	-0.00597**	-0.44225***	2.31531***	-0.07515***	-1.41921***
	(0.00152)	(0.08662)	(0.00142)	(0.00282)	(0.06128)	(0.33713)	(0.01135)	(0.51865)
Size*(I)	-0.00281***	0.29796***	-0.00774***	0.01454***	0.81441***	0.01898	-0.10928***	-1.68418***
	(0.00085)	(0.06133)	(0.00090)	(0.00202)	(0.09782)	(0.46728)	(0.01188)	(0.31271)
Mutual*(I)	-0.02822***	5.95761***	0.05714***	0.32759***	-6.07933**	18.86446***	-0.88832***	18.45936***
	(0.00643)	(0.73543)	(0.00806)	(0.02769)	(2.45952)	(6.20922)	(0.17546)	(3.56013)
Group*(I)	0.01969***	0.65467***	0.01700***	-0.12896***	3.27688***	-32.01724***	-0.40011***	9.10379***
	(0.00562)	(0.24009)	(0.00598)	(0.02052)	(0.40670)	(3.29763)	(0.03730)	(2.47730)
Inflation*(I)	0.00654***	-0.23128***	0.00397***	-0.00151	-0.21382***	0.55637**	0.02600***	-1.15397***
	(0.00113)	(0.07155)	(0.00068)	(0.00166)	(0.05144)	(0.23174)	(0.00622)	(0.26433)
GDP growth*(I)	0.26215***	-28.41800***	-0.22501***	0.32824***	-5.29177*	72.24443***	1.33490***	75.38324***
	(0.07573)	(4.76339)	(0.06438)	(0.07940)	(3.21466)	(16.43254)	(0.46804)	(18.16583)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)/AR(2)	0.00/0.73	0.00/0.90	0.00/0.69	0.00/0.71	0.00/0.72	0.00/0.69	0.00/0.73	0.00/0.69
Sargan	0.45	0.40	0.50	0.36	0.29	0.44	0.19	0.89
%Change in predictive margins	-42.45	7.44	-19.87	-1.67	10.33	-12,249.89	-22.84	2.15
Observations	1,509	1,489	1,509	1,509	1,509	1,509	1,484	1,489
Countries	14	13	14	14	14	14	12	13

(continued on next page)

Table 8. (*continued*)

Panel B: Cost of financial distress, property rights protection, and competition								
	Uncertainty avoidance	*Savings*	*Government effectiveness*	*Political risk index*	*Strength of legal system*	*Time to enforce a contract*	*Market concentration*	*Insurance penetration*
	(9)	*(10)*	*(11)*	*(12)*	*(13)*	*(14)*	*(15)*	*(16)*
Leverage	0.81282***	0.85753***	0.83108***	0.86864***	0.87427***	0.89540***	0.84200***	0.86201***
	(0.00631)	(0.00589)	(0.00602)	(0.00595)	(0.00562)	(0.00586)	(0.00412)	(0.00438)
Reinsurance	-19.12244***	13.61820***	-1.41841***	-19.37464***	-4.34383***	7.75363***	4.90636***	-3.75477***
	(1.69713)	(1.45728)	(0.46589)	(4.56193)	(1.41109)	(1.09807)	(0.80653)	(0.95468)
Product mix	-0.36218	-0.19564	0.39653***	-0.40294	0.31367**	0.01651	-1.55970***	0.46163***
	(0.56963)	(0.21358)	(0.05670)	(0.33769)	(0.14534)	(0.17011)	(0.21559)	(0.14831)
Premium growth	-1.19759***	-1.42624***	1.62268***	-2.84474***	0.77193***	3.25951***	0.44959***	-3.07498***
	(0.22375)	(0.22027)	(0.20839)	(0.81567)	(0.29744)	(0.24696)	(0.11125)	(0.23246)
Size	1.69169***	0.93934***	0.53358***	0.05301	-0.37588**	0.81677***	1.03263***	2.88760***
	(0.27287)	(0.17524)	(0.06437)	(0.50155)	(0.16890)	(0.08465)	(0.11324)	(0.14226)
Mutual	-20.08046***	0.30861	3.93028***	-26.63188***	4.05566*	2.09352***	-3.81731***	-13.78663***
	(4.62195)	(1.47940)	(0.70830)	(4.35040)	(2.12931)	(0.72333)	(0.66827)	(1.26656)
Group	-0.93854	-2.33464***	-0.02124	-7.77296***	7.80599***	0.04254	0.34105	0.15411
	(1.49255)	(0.76708)	(0.52324)	(2.91310)	(1.13255)	(0.35608)	(0.50096)	(0.87078)
Inflation	0.15385	0.29791	0.05974	-2.98891***	-0.16235**	0.06859	-0.61525***	0.17733
	(0.24666)	(0.26359)	(0.04502)	(0.23397)	(0.06751)	(0.11131)	(0.10275)	(0.12089)
GDP growth	28.53693**	62.87549***	-15.44045***	69.59662***	0.36810	36.33799***	-18.99558***	21.26267*
	(13.65035)	(15.38254)	(2.13495)	(18.28122)	(3.94207)	(5.64201)	(5.47571)	(12.39120)
Institution (I)	0.20803***	0.54158***	-1.63953***	-0.43340***	-1.23855***	0.00029	31.78153***	362.04221***
	(0.07278)	(0.11011)	(0.53934)	(0.08482)	(0.36056)	(0.00203)	(5.88879)	(24.84392)
Reinsurance*(I)	0.38269***	-0.67297***	2.10049***	0.25015***	0.91009***	-0.00718***	-7.30321**	100.30751***
	(0.02597)	(0.08309)	(0.27853)	(0.05482)	(0.17551)	(0.00168)	(2.84733)	(7.92536)
Product mix*(I)	-0.00312	0.00825	-0.34063***	0.00489	-0.07013***	-0.00009	6.23369***	-6.45759***
	(0.01128)	(0.00956)	(0.03641)	(0.00392)	(0.02040)	(0.00030)	(0.83533)	(2.05901)
Premium change*(I)	0.03369***	0.12358***	-0.39403***	0.04726***	0.01620	-0.00527***	1.79061***	48.57979***
	(0.00285)	(0.01101)	(0.14514)	(0.00962)	(0.03702)	(0.00043)	(0.41209)	(2.51081)
Size*(I)	-0.01467***	-0.01925***	0.02361	0.00587	0.11628***	-0.00154***	-1.64491***	-31.09584***
	(0.00383)	(0.00688)	(0.03394)	(0.00598)	(0.02455)	(0.00012)	(0.36865)	(1.64766)
Mutual*(I)	0.20826***	-0.09140	-4.94885***	0.29198***	-1.21724***	-0.01239***	4.47391**	127.62416***
	(0.05172)	(0.06255)	(0.50380)	(0.05018)	(0.32704)	(0.00249)	(1.77837)	(13.17293)
Group*(I)	0.00508	0.13431***	0.24276	0.09600***	-1.14990***	0.00316***	-1.00310	8.23880
	(0.01665)	(0.03218)	(0.32609)	(0.03495)	(0.17855)	(0.00051)	(1.42388)	(8.69375)
Inflation*(I)	-0.00250	-0.01869	0.15108***	0.04063***	0.08429***	0.00042*	1.57536***	2.92117***
	(0.00435)	(0.01262)	(0.04012)	(0.00348)	(0.01395)	(0.00023)	(0.23786)	(1.02921)
GDP growth*(I)	-0.45115**	-3.96876***	4.49564*	-0.88480***	0.75140	-0.06046***	-49.24230***	-566.32176***
	(0.19180)	(0.68400)	(2.63115)	(0.23744)	(0.82783)	(0.00907)	(17.05910)	(148.94192)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)/AR(2)	0.00/0.92	0.00/0.84	0.00/0.68	0.00/0.66	0.00/0.70	0.00/0.66	0.00/0.69	0.00/0.74
Sargan	0.56	0.28	0.17	0.16	0.15	0.40	0.12	0.42
%Change in predictive margins	4.25	6.25	-14.31	-0.96	-13.19	-24.38	27.44	-15.32
Observations	1,489	1,509	1,509	1,509	1,509	1,509	1,489	1,489
Countries	13	14	14	14	14	14	13	13

Notes: This table presents partial-adjustment models for life insurers, and is divided into Panels A and B. Models 1-8 include measures for "*Access to financial markets*", models 9-10 include measures for "*Cost of financial distress*", models 11-14 include measures for "*Property rights protection*", and models 15-16 include measures for "*Competition*" in insurance markets. The estimates are obtained from Blundell and Bond's (1998) two-step system GMM. Regressions include year and country dummies. Standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels respectively. AR(1) and AR(2) denote the p-values for the first- and second-order autocorrelation in the residuals. Hansen reports the p-value under the null hypothesis of joint validity of the instrument set. All independent variables are measured in year t-1. Data are for the years 2000 through 2008. The definitions of the variables are provided in the Appendix.

Appendix Description and Sources of Firm- and Country-Level Determinants

Variable name	*Variable description, and source*
Firm-level determinants	
Leverage	Book leverage; ratio of total assets minus capital surplus to capital surplus. Source: A.M. Best's Statement File Global.
Reinsurance	Ratio of reinsurance ceded to reinsurance premiums assumed plus direct premiums. Source: A.M. Best's Statement File Global.
Std. dev. of loss ratio	Standard deviation of the net claims incurred divided by premiums earned for the years 2000-2008. Source: A.M. Best's Statement File Global.
Longtail business	For property-liability insurers: Ratio of total gross provisions to sum of gross premiums. Source: A.M. Best's Statement File Global.
Product mix	For life insurers: Ratio of total gross provisions to sum of gross premiums. Source: A.M. Best's Statement File Global.
Premium growth	Growth in net earned premiums. Source: A.M. Best's Statement File Global.
Size	Natural logarithm of the insurer's total assets. Source: A.M. Best's Statement File Global.
Mutual	Dummy variable equal to one if the insurer is a mutual, and zero otherwise. Source: A.M. Best's Statement File Global.
Group	Dummy variable equal to one if the insurer is a member of a group, and zero otherwise. Source: A.M. Best's Statement File Global.
Country-level determinants	
Access to financial markets	
Market capitalization	Market capitalization of listed companies (% of GDP). Source: World Development Indicators.
Financial efficiency	Financial system's efficiency. Measured by the logarithm of the total value-traded ratio divided by overhead costs. The total value-traded ratio captures the efficiency of stock markets and the overhead costs capture the efficiency of the banking sector. Source: Levine (2002).
Credit to private sector	Amount of credit banks provide to private sector as a percent of GDP. Source: World Development Indicators.
Country credit rating	Average of two ratings published semi-annually. The ratings are based on surveys of bankers and are on a scale from 0 to 100, with higher values indicating a better rating. Source: Institutional Investor.
Creditor rights enforcement	Debt enforcement. The index measures substantive and procedural statutory intervention in judicial cases at lower-level civil trial courts and ranges from 0 to 7. Higher scores indicate stronger level of intervention in the judicial process. Source: Djankov et al. (2003).
Shareholder rights enforcement	Equity enforcement. Average of ex ante and ex post private control of self-dealing. Higher scores indicate better enforcement. Source: Djankov et al. (2008).
Corporate Transparency	The index is created by examining and rating companies' 1990 annual reports on their inclusion or omission of 90 items. These items fall into seven categories (general information, income statements, balance sheets, funds flow statement, accounting standards, stock data, and special items). Higher scores indicate higher transparency. Source: La Porta et al. (1998).
Equity disclosure	The index equals the arithmetic mean of prospectus, compensation, shareholders, inside ownership, and transactions. Higher scores indicate better disclosure. Source: La Porta et al. (2006).
Cost of financial distress	
Uncertainty avoidance	Measures the extent to which people feel uncomfortable with uncertainty and ambiguity. A high uncertainty avoidance generally indicates higher anxiety and stress levels, a greater propensity to display emotions, and a tendency toward aggressive behavior when challenged. Source: Hofstede, Hofstede, and Minkov (2010) and Hofstede's Homepage.
Savings	Gross savings in percent of GDP. Gross savings are calculated as gross national income less total consumption, plus net transfers. Source: World Development Indicators.
Property rights protection	
Government effectiveness	Reflects perceptions of the 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. This index ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance. Source: World Development Indicators.
Political risk index	Index is an assessment of government accountability and stability, quality of bureaucracy and law enforcement, investment climate, and various sources of political and social conflicts. The index takes on values between zero and 100, with lower values representing unstable institutions and higher risk. Source: PRS International Country Risk Guide Researchers dataset.
Strength of legal System	Strength of legal rights index measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending. The index ranges from 0 to 10, with higher scores indicating that these laws are better designed to expand access to credit. Source: World Development Indicators.
Time to enforce a contract	Procedures to enforce a contract are the number of independent actions, mandated by law or courts that demand interaction between the parties of a contract or between them and the judge or court officer. Source: World Development Indicators.
Competition	
Market concentration	Market share of the 5 largest insurers. It is calculated as the sum of premiums earned for the 5 largest insurers in the sample divided by the industry's premiums written. Source: A.M. Best's Statement File Global, and Swiss Re *Sigma* publications.
Insurance penetration	Insurance penetration is the ratio of the industry's premiums written to GDP. Source: World Development Indicators, and Swiss Re *Sigma* publications.
Macroeconomic determinants	
Inflation rate	Annual inflation rate. Growth in Consumer Price Index (CPI). Source: World Development Indicators.
GDP growth	Economic growth. Growth in nominal Gross Domestic Product (GDP). Source: World Development Indicators.