

# **Risk Aversion, Business Risk, and Market Discipline in the Insurance Industry: A Cross-Country Analysis<sup>\*</sup>**

Muhammed Altuntas<sup>a</sup>

Thomas R. Berry-Stölzle<sup>b</sup>

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<sup>a</sup> Department of Risk Management and Insurance, University of Cologne, Albertus-Magnus-Platz, 50923 Cologne, Germany, Tel.: +49-221-470-5805, Fax: +49-221-428-349, [muhammed.altuntas@uni-koeln](mailto:m Muhammed.altuntas@uni-koeln)

<sup>b</sup> Terry College of Business, University of Georgia, 206 Brooks Hall, Athens, GA 30602, Tel.: +1-706-542-5160, Fax: +1-706-542-4295, [trbs@uga.edu](mailto:trbs@uga.edu)

# **Risk Aversion, Business Risk, and Market Discipline in the Insurance Industry: A Cross-Country Analysis**

## **Abstract**

The goal of this research is twofold. First, we examine market discipline in the insurance industry across a broad range of countries including those in developing markets. Second, we analyze the impact of country specific characteristics on the magnitude of market discipline. Our first major result is that we document a negative and significant relationship between measures of firm risk and premium growth and that relationship can be interpreted as evidence for market discipline in the insurance industry. Second, we find that market discipline is more pronounced in countries with a relatively high degree of risk aversion in the population, and that market discipline is stronger in countries with a riskier business environment for insurance companies. Third, we find that market discipline is weaker in countries in which consumers believe that the government will protect them from the financial consequences of insurance company failures. Our research has an important public policy implication. If insurance markets provide incentives for safety and soundness of the insurance industry, providing additional government guarantees combined with stricter capital standards may not be the best agenda.

**JEL Classifications:** F33, G15, L51

**Keywords:** Risk aversion, market discipline, international finance

## **Introduction**

The recent financial crisis is often blamed on *systemic risk*, and regulators started to overhaul the regulation of the financial services sector with the declared goal to reduce systemic risk. While the term systemic risk is sometimes used to refer to a macroeconomic shock, the mainstream definition refers to a chain reaction where the failure of one financial firm leads to the failure of the next financial firm threatening the stability of the financial system as a whole and creating a significant adverse effect on the real economy (Committee on Capital Markets Regulation, 2009; Group of Ten, 2010). Thus, systemic risk can be used to justify government intervention in general and the bailout of individual companies specifically to reduce the adverse effects on the real economy, such as a reduction in available bank credit for businesses. Government guarantees can help to reduce systemic risk by preventing runs on financial institutions. However, government guarantees also create moral hazard in the sense that guarantees reduce the disciplining market pressure on financial institutions to be strong and safe. In general, consumers prefer to deal with financially strong institutions, but guarantees reduce the costs of dealing with weak undercapitalized institutions. Therefore, the implementation of strong government guarantees to combat adverse effects of systemic risk usually goes hand in hand with tighter regulation to address the moral hazard created by such strong guarantees. The regulatory policies currently proposed by the International Association of Insurance Supervisors (IAIS) seem to reflect exactly this point of view: The IAIS developed criteria to classify some insurers as global systemically important insurers (G-SII) or in other words as too big to fail, and on October 9, 2013 the IAIS announced that it is committed to develop a global insurance capital standard by 2016. This international momentum towards stronger government guarantees and stricter capital regulation raises the

question whether moving towards guarantees and stricter capital requirements constitutes good policy in the context of the insurance industry. The answer to that question is only “yes” if the two assumptions used to derive the policy measures are correct. The two underlying assumptions are that there is systemic risk in the insurance industry and that market discipline is not strong enough to incentivize insurance companies to hold enough capital on their balance sheets to deal with shocks. While there is a growing body of research on systemic risk in insurance markets (see, e.g., Berry-Stölzle, Nini and Wende, 2014; Cummins, Feng, and Weiss, 2011; Park and Xie, 2011), we are not aware of any empirical cross-country study that examines market discipline in the insurance industry.

The goal of this research is to examine market discipline in the insurance industry across a broad range of countries including those in developing markets. Our test of market discipline focuses on premium growth and its relationship with measures of firm risk. When customer demand for insurance is risk sensitive, an increase (decrease) of insurance companies’ bankruptcy risk should result in reduced (increased) demand for the company’s products as well as in less (more) favorable terms of trade with the remaining customers, leading to lower (higher) revenues and cash flows. Anticipating these consequences, insurance companies have clear incentives to manage their risk and capitalization levels *ex ante*. Therefore, a negative and significant relationship between measures of firm risk and premium growth can be interpreted as evidence for market discipline in the insurance industry.

In addition to testing for the existence of market discipline in different countries, our analysis also focuses on the impact of country specific characteristics on the magnitude of market discipline. The factors we hypothesize to moderate the firm risk-premium growth

relationship are the average degree of risk aversion in a country, the riskiness of the business environment for insurance companies, and government guarantees or the expectation that the government will protect policyholders of failing insurance companies. We expect that risk-averse consumers will penalize riskier insurance companies by requiring a discount on the insurance premium or by switching to less risky insurance providers. Thus, market discipline should be more pronounced in countries with a relatively high degree of risk aversion in the population. If an insurance company operates in a country prone to natural catastrophes it needs an additional capital buffer to be able to absorb the resulting losses. In such a risky business environment, a reduction in the company's capitalization or an increase in firm specific risk for a given level of capitalization increases the firm's bankruptcy risk more than in countries not prone to catastrophes. Therefore, we expect consumers' response to changes in insurance companies' risk taking to be stronger in countries with a relatively risky business environment for insurers compared to countries with a more stable and predictable environment. We also expect less market discipline in countries in which consumers believe that the government will protect them from the financial consequences of insurance company failures.

Despite the importance of market discipline in the insurance industry we are only aware of five papers that explicitly analyze market discipline, and all of them only focus on a single country. Epermanis and Harrington (2006) document that the premium revenue of U.S. property-liability insurance companies drops significantly after a rating downgrade. Baranoff and Sager (2007) perform a similar analysis for U.S. life insurers and they also find a decline in premium revenue following a rating downgrade. Focusing on policyholder termination rates rather than premium revenue, Zanjani (2002) documents a strong positive relationship

between company default risk and policyholder termination rates for U.S. life insurers. Eling and Schmit (2012) examine the German insurance industry and find that an increase in insurance companies' default risk is accompanied by a reduction in premium revenue. Park and Tokutsune (2013) analyze 28 Japanese life insurance companies and document a positive relationship between premium changes and insolvency risk for the 2002-2005 period.

In our research, we examine market discipline across a broader set of countries than has been used in prior studies; our sample includes 52 countries. Thus, we test for market discipline in a broad range of economies, not just developed or emerging markets. Our research also extends the literature by directly investigating the impact of country characteristics on the magnitude of market discipline in the insurance industry for the first time. Understanding which factors facilitate or hinder market discipline might also be of interest to insurance regulators for evaluating or re-designing regulatory frameworks.

The paper proceeds as follows. The next section provides a conceptual background and develops testable hypotheses about the moderating effect of risk aversion, the riskiness of the business environment, and government guarantees on market discipline. This is followed by a description of the data and methodology, and a section presenting our results. The final section concludes.

### **Market Discipline in the Insurance Industry**

Jensen and Meckling (1976) pointed out that debt financing creates incentives for the owner of a firm to increase expected profits by taking on more risk at the expense of bondholders. Since rational, risk-sensitive bondholders anticipate increased risk-taking, prices of a bond issuance reflect the agency costs associated with increased risk-taking and, hence,

these agency costs are born by the firm owner. To reduce agency costs, it is beneficial for the owner to commit to restrictions on risk-taking. Exactly the same agency cost argument can be applied to the context of insurance companies and their risk-sensitive customers. An insurance company can reduce its insolvency risk by holding more capital on its balance sheet; the main role of capital in insurance companies is to provide a cushion against deviations of realized losses from expected losses. The optimal amount of capital depends on the magnitude of market discipline or in other words on the sensitivity of insurance demand with respect to insurer capitalization levels and insolvency risk.

The sensitivity of insurance demand with respect to insurer capitalization levels and insolvency risk and, hence, market discipline should depend on the institutional environment (Coase, 1937; Williamson, 1985; Altuntas, Berry-Stölzle and Wende, 2014). The country-level factors we hypothesize to impact market discipline are the average degree of risk aversion in a country, the riskiness of the business environment for insurance companies, and explicit or implicit government guarantees. We expect that market discipline is stronger in countries with a culture that embraces risk aversion and values financial security of counterparties.<sup>1</sup> In risky business environments insurance companies need an additional capital buffer to be able to absorb volatile losses. In such an environment, a reduction in the company's capitalization or an increase in firm specific risk for a given level of capitalization

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<sup>1</sup> Clearly, the cultural environment shapes risk preferences of individuals. We also argue that the risk culture in a country impacts insurance purchases decision of corporations headquartered in that country. The literature on corporate risk management points out that in the presence of market frictions, risk management activities including insurance purchases are value enhancing, 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 (see, e.g., Turner and Reynolds, 2010) examines the effect of local culture on business decisions. Most of these studies measure local culture by the fraction 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.

increases the firm's bankruptcy risk more than in less risky business environments. Therefore, we expect consumers' response to changes in insurance companies' risk taking to be stronger in countries with a relatively risky business environment for insurers compared to countries with a more stable and predictable environment. We expect market discipline to be less pronounced in countries with explicit or implicit guarantee schemes that protect policyholders from the financial consequences of insurance companies' bankruptcies.

## **Data and Methodology**

### ***Sample and Data***

The firm-level data required to test our hypotheses are taken from the A.M. Best's Statement File Global for the period 2002 through 2012. Our initial data consist of all listed insurance companies for the period 1999 through 2012. We first exclude date entries for which the company description is missing. 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, policyholder surplus or investment positions, and for which capital surplus is smaller than total assets. We then separate property-liability insurers from other primary insurers. 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 premiums earned. This classification procedure removes diversified insurers that write both property-liability and life insurance from the sample (about 6.6% 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 complete list of the variables). Since we use lagged values



for some of our independent variables, we exclude firm-year observations for which the preceding three years of data are not available. Finally, we exclude extreme outliers from the sample. Our first outlier screen is to eliminate firm-year observations with reported non-life insurance premiums in excess of the overall premium volume of the corresponding country's non-life insurance market.<sup>2</sup> We also exclude countries whose legal systems are based on Islamic law, or Sharia.<sup>3</sup>

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 sample to 43%, which corresponds to the average world market share of U.S. property-liability insurers across the 2000-2012 period.<sup>4</sup> We randomly select insurance companies from the universe of all U.S. insurers until the total number of U.S. insurers accounts for 43% of insurance companies in our sample, and we remove all other U.S. insurers. We test for sample selection bias and cannot reject the null hypothesis that the chosen set of U.S. property-liability insurers is representative of the universe of U.S. property-liability insurers. Our final sample of insurance companies consists of 31,342 insurer-year observations from 52 different countries over the period 2002 through 2012.

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<sup>2</sup> Data for countries' life and non-life insurance market premium volume are obtained from Swiss Re's *Sigma* publications.

<sup>3</sup> The classification is done by using the University of Ottawa legal system variables. According to this classification, we exclude the following countries from our dataset: Bahrain, Malaysia, Pakistan, Saudi Arabia, and the United Arab Emirates.

<sup>4</sup> 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.

## ***Methodology***

Market discipline in the insurance industry can be described as a situation in which stakeholders face increasing costs as insurance companies take more risk, take actions to counteract the increased cost in such a way that their actions create a feedback mechanism and penalize risk taking by insurance companies. More precisely, if an insurance company takes more risk new customers may require a discount on the insurance premium or simply choose a financially stronger insurance company to do business with, leading to a decline in premium revenue. Our analysis of market discipline is based on the firm risk-premium growth relationship. A negative and significant relationship between measures of firm risk and premium growth can be interpreted as evidence for market discipline in the insurance industry.

We analyze the relationship between firm risk and insurer premium growth in two steps. First, we measure the impact of proxies for firm risk on the premium growth of insurance companies directly by regressing firm-level risk variables on percentage changes in premium revenue. This baseline regression model is similar to the methodology used in previous studies focusing on the banking industry (see, e.g., Sironi, 2003; Demirgüç-Kunt and Huizinga, 2004). In a second step, we then include interaction terms between country characteristics and the firm-level risk measures to the baseline regression model. Such a model specification allows us to examine to what extent these country level factors moderate the firm risk-premium growth relationship.

The specification of the baseline model is as follows:

$$\text{Premium growth}_{i,j,t} = \alpha + \beta_1 \text{SDROE3}_{i,j,t} + \beta_2 \text{Growth in capitalization}_{i,j,t} + \beta_3' X_{i,j,t} + \varepsilon_{i,j,t}, \quad (1)$$

where  $Premium\ growth_{i,j,t}$  is the change in net premiums written from year  $t-1$  to year  $t$  relative to the premium volume in year  $t-1$  of insurer  $i$  operating in country  $j$ ,  $X$  is a vector of control variables,  $\varepsilon$  is a random error term, and  $SDROE3$  and  $Growth\ in\ capitalization$  are our measures of firm risk.

Insurance companies assume risks from their clients in exchange for premium payments, pool these risks in an actively managed portfolio, and back the obligations from their insurance portfolio with capital. Since premium payments are made in advance and insurance claims are paid as they incur, the company can invest the premium money in capital markets and generate investment income. If the aggregate loss from the insurance portfolio and the investment portfolio exceeds the insurance company's equity capital then the insurer is bankrupt. The probability that an insurance company defaults on its obligations is relatively high if its capitalization is relatively low and/or if the aggregate income from its insurance portfolio and its investments is relatively volatile. To capture the volatility of an insurance company's income from its core insurance business and its investments, we calculate the standard deviation of the company's return on equity (ROE) over the past three years on a rolling window basis, and we include this variable as a risk measure in our regression model.<sup>5</sup> We also include insurance companies' capital to asset ratio in our regression model. Since insurance companies with higher levels of capital are less likely to default on their obligations, the capital to asset ratio can be viewed as an inverse measure of firm risk (see, e.g., Sommer, 1996).

The vector of control variables includes a measure of insurer size. Epermanis and Harrington (2006) document a negative relationship between insurers' size and their premium

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<sup>5</sup> ROE is calculated as the ratio of net income to capital and surplus.

growth. We use the natural logarithm of total assets to measure insurer size. In addition, our model includes year indicator variables as well as firm indicator variables to control for any possible omitted firm-specific effects.

The second part of the analysis examines whether market discipline in the insurance industry varies systematically across countries. We use an approach similar to Demirgüç-Kunt and Huizinga (2004) and focus on whether specific country characteristics moderate the firm risk-premium growth relationship by including interaction terms between country characteristics and our two measures of firm risk in the regression model. The specification of this extended model is as follows:

$$\begin{aligned}
 \text{Premium growth}_{i,j,t} = & \alpha + \beta_1 \text{SDROE3}_{i,j,t} + \beta_2 \text{Growth in capitalization}_{i,j,t} \\
 & + \beta_3 \text{SDROE3}_{i,j,t} \times \text{Moderator}_{j,t} \\
 & + \beta_4 \text{Growth in capitalization}_{i,j,t} \times \text{Moderator}_{j,t} \\
 & + \beta_5' X_{i,j,t} + \varepsilon_{i,j,t}
 \end{aligned} \tag{2}$$

where  $\text{Premium growth}_{i,j,t}$  is the change in net premiums written from year  $t-1$  to year  $t$  relative to the premium volume in year  $t-1$  of insurer  $i$  operating in country  $j$ ,  $\text{SDROE3}$  is the standard deviation of insurer  $i$ 's return on equity over the past three years,  $\text{Growth in capitalization}$  is growth in capital to assets ratio,  $\text{Moderator}_{j,t}$  denotes a country-level moderator variable,  $X$  is a vector of control variable including firm and year fixed effects, and  $\varepsilon$  is a random error term.

Note that we estimate Equation (2) separately for each country level moderator. The following section discusses our proxies for the average degree of risk aversion in a country, the riskiness of the business environment for insurance companies, and explicit or implicit government guarantees. Some of these country level measures are not available for all 52

countries and all 11 years in our sample. Therefore, the number of observations used varies slightly across the estimated models.

Ideally, a measure of risk aversion should be derived from observed choices between different risky lotteries. Unfortunately, such a measure is not available for the populations of our sample countries. We therefore build on recent empirical research on the relationship between risk aversion and wealth (Paravisini, Rappoport, and Ravina, 2012) that finds support for decreasing relative risk aversion. We use two measures for wealth and interpret them as inverse proxies of risk aversion, namely gross savings in percent of GDP from the World Development Indicators database and the *Socio-economic conditions* variable from the PRS International Country Risk Guide Researchers Dataset. Our third measure of risk aversion is based on the assumption that risk-averse individuals should be more likely to have a contingency plan for retirement. We use the percentage of respondents from the Swiss Re Risk Perception Survey that save towards retirement as a measure of the average risk aversion in a country.

We use three measures for the riskiness of the core insurance business in a country. We use the number of natural catastrophes in a country as reported in Swiss Re's Sigma publications, the average of the standard deviation of insurance companies' loss ratio over the past three years in a country based on all insurance companies in our sample, and a survey based measure of the subjective catastrophe risk in a country from the Swiss Re Risk Perception Survey. In addition, we use ten variables that capture the riskiness of the general business environment in a country. These variables range from three different political risk indices to measures of regulator quality and corruption in a country; see the Appendix for a full description of these variables and the data sources.

We use one measure of explicit government guarantees in our analysis. We code an indicator variable whether a country has an insurance guarantee scheme to protect policyholders from insurer bankruptcy based on the membership list of the International Forum of Insurance Guarantee Schemes; full membership in this association is only open to insurance guarantee schemes. However, insurance guarantee schemes provide very limited guarantees. Hence, it is an empirical question whether these guarantee schemes actually reduce market discipline. We also include three proxies for implicit government guarantees in our analysis. The assumption underlying the variables is that higher tax rates and more regulatory restrictions in a country create expectations that the government might intervene and protect policyholders from the financial consequences of insurance company failures. More precisely, we use the tax rate on goods and services in a country, the time spent dealing with regulation and the time required to get a business license as reported in the World Development Indicators database as proxies for implicit government guarantees.

## **Results**

Table 1 contains summary statistics for the country-level variables used in our analysis, and Table 2 presents the summary statistics for the firm-level variables by region. The regression results based on Equation (1) are presented in Table 3. The focus of our analysis is on the firm risk-premium growth relationship. The two measure of firm risk included in the regression model are the standard deviation of insurers' ROE over the past three years (*SDROE3*) and the insurers' growth in capital to asset ratio (*Growth in capitalization*). A negative relationship between the *SDREO3* variable and our dependent variable *Premium growth* would provide evidence supporting the existence of market

discipline. Similarly, a positive relationship between the *Growth in capitalization* variable and the dependent variable *Premium growth* would be consistent with market discipline in the insurance industry. We estimate Equation (1) for the full sample including insurance companies from 52 countries as well as for subsamples of insurance companies from different geographic regions. We find evidence of market discipline in the full sample as well as in all subsamples except for the relatively small subsample of insurers from Africa and the Middle-East with only 178 observations. The coefficient of the *Growth in capitalization* variable is positive and significant in all models except Model (5) for the subsample of Africa and the Middle-East; and the coefficient of the *SDREO3* variable is negative and significant in all but two of the seven estimated models.

Table 4 presents the regression results for Equation (2). We estimate Equation (2) separately for the different country-level variables. Models (1)-(3) present the results for the measures of average risk aversion in a country. Note that the *Retirement provision* variable is a direct measure of risk aversion whereas the *Savings* and the *Socio-economics conditions* variables are inverse measures of risk aversion. In all three models, risk aversion strengthens the negative relationship between the measures of firm risk and premium growth, indicating that risk aversion in a country strengthens market discipline.

Models (4)-(16) present results for our measures of the riskiness of business environment in a country. Models (4)-(6) focus on measure for the riskiness of the core insurance business in a country whereas Models (7)-(16) capture the riskiness of the general business environment. In each of Models (4), (5) and (6), the estimated coefficient of the interaction term between the *SDROE3* variable and the country-level measure of the riskiness of the business environment is negative and significant, and the interaction term between the

*Growth in capitalization* variable and the country-level measure is positive and significant, indicating that market discipline is stronger in countries with a relatively risky business environment for insurance companies. In the same vein, Models (7)-(16) provide evidence that market discipline is stronger in countries with a relatively risky business environment with respect to the stability of the political environment, the legal process, the regulatory environment, and corruption.

Model (17) includes the indicator variable whether a country has an insurance guarantee scheme to protect policyholders from insurer bankruptcy. Surprisingly, the estimated coefficient of the interaction term between the *Growth in capitalization* variable and the guarantee scheme indicator variable is positive and significant. This result implies that market discipline is actually stronger in countries that have a guarantee scheme, contradicting the theoretical prediction that guarantees weaken incentives for safety and create moral hazard. We interpret this result as evidence that the insurance guarantee schemes currently in place are relatively weak and, hence, do not interfere with market forces.

Models (18)-(20) focus on our proxies for implicit government guarantees. In all three models the coefficient of the interaction term between the *Growth in capitalization* variable and the country-level variable capturing implicit guarantees is negative and significant, indicating that market discipline is less pronounced in countries where policyholders expect that the government might intervene and protect them from the financial consequences of insurance company failures.

## **Conclusion**

In summary, our research provides the first large-scale test of market discipline in the



insurance industry including both, developed and emerging market countries. We find evidence of market discipline in our sample of insurance companies from 52 countries, but the magnitude of market discipline depends systematically on country-level factors. The average degree of risk aversion in a country and the riskiness of the business environment for insurance companies in a country strengthen the disciplining market forces. Expectation of policyholders that the government will protect them from the financial consequences of failing insurance companies weakens market discipline. We do not find evidence that the insurance guarantee schemes that are currently in place weaken market discipline. The scope of these guarantee schemes does not seem to be broad enough to undermining markets' incentives for safety and soundness of insurance companies.

Our research has an important public policy implication. If insurance markets provide incentives for safety and soundness of the insurance industry, providing additional government guarantees combined with stricter capital standards may not be the best agenda. Regulators should rather work on facilitating market discipline and on developing procedures to quickly resolve failing multinational insurance companies.

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**Table 1. Descriptive statistics of country characteristics**

Country	Mean																				Firm-year observation
	Savings	Retirement provision	Socio-economic conditions	No. of catastrophes	Subjective catastrophe risk	SD of loss ratio	Political risk index	Political stability	Government effectiveness	Law and order	Regulatory quality	Reputation index	Expropriation index	Control of corruption	Country credit rating	Economy status	Guarantee scheme	Taxes on goods and capital gains	Time dealing with regulation	Time to get a business license	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	
Argentina	0.22	-	5.07	1.00	-	0.48	65.16	-0.02	-0.22	2.48	-0.82	4.91	5.91	-0.45	36.12	6.48	0	0.29	0.21	176.10	119
Australia	0.22	8.77	9.62	2.64	5.32	5.19	86.57	0.95	1.78	5.70	1.67	8.71	9.27	2.00	87.00	-	1	0.24	-	-	457
Austria	0.25	-	9.59	1.40	-	0.09	87.72	1.08	1.85	6.00	1.53	9.60	9.69	1.92	90.21	-	0	0.24	-	-	66
Belgium	0.24	-	8.48	1.38	-	0.83	83.11	0.86	1.72	5.00	1.29	9.48	9.63	1.41	87.26	-	0	0.24	-	-	455
Bolivia	0.17	-	5.10	1.25	-	0.07	62.92	-0.62	-0.43	2.99	-0.29	-	-	-0.79	28.75	5.43	0	0.40	0.17	28.83	12
Brazil	0.17	2.20	5.95	3.01	-4.51	0.22	66.69	-0.07	-0.06	2.03	0.14	6.30	7.62	-0.02	55.52	7.62	0	0.30	0.16	83.50	236
Bulgaria	0.18	-	5.35	0.53	-	0.29	69.23	0.32	0.08	2.75	0.61	-	-	-0.20	55.78	7.92	0	0.45	0.12	29.72	87
Canada	0.22	10.28	8.78	2.89	-4.27	0.82	87.16	1.01	1.86	5.83	1.61	8.96	9.67	2.03	91.66	-	1	0.16	-	-	1,666
Chile	0.22	-	7.19	0.68	-	0.09	77.58	0.58	1.20	4.89	1.46	6.80	7.50	1.44	72.77	8.70	0	0.44	0.08	44.94	197
China	0.52	0.18	7.81	18.16	-5.58	0.14	65.19	-0.54	0.08	4.12	-0.20	-	-	-0.55	76.42	6.27	0	0.58	0.01	27.50	192
Colombia	0.19	-	3.61	2.81	-	0.13	59.65	-1.59	-0.05	1.93	0.28	7.02	6.95	-0.32	58.78	6.63	0	0.24	0.13	25.60	70
Denmark	0.24	-	10.06	0.66	-	0.25	87.22	1.16	2.16	6.00	1.81	9.31	9.67	2.47	91.07	-	0	0.40	-	-	920
Ecuador	0.24	-	4.38	0.47	-	0.44	55.10	-0.75	-0.78	2.68	-0.92	5.18	6.57	-0.84	25.84	5.25	0	-	0.19	25.29	101
Estonia	0.22	-	7.94	0.00	-	0.12	76.10	0.67	1.04	4.00	1.37	-	-	0.86	67.23	9.34	0	0.39	0.04	8.30	6
Finland	0.25	-	9.24	0.15	-	0.48	92.90	1.53	2.17	6.00	1.77	9.15	9.67	2.41	91.50	-	0	0.34	-	-	203
France	0.19	-20.14	8.10	2.48	-0.34	0.54	77.95	0.55	1.59	4.93	1.16	9.19	9.65	1.39	91.47	-	1	0.24	-	-	1,076
Germany	0.23	-8.50	8.14	3.80	-2.10	0.22	84.88	0.92	1.62	5.06	1.53	9.77	9.90	1.82	92.72	-	1	0.23	0.01	-	2,235
Hong Kong	0.31	1.92	8.32	0.32	-15.76	0.09	79.40	0.95	1.66	4.88	1.88	8.82	8.29	1.81	78.48	-	1	0.10	-	-	85
India	0.33	0.39	4.62	9.88	-4.39	0.14	61.19	-1.20	-0.04	4.00	-0.34	6.11	7.75	-0.47	61.19	6.51	0	0.25	0.07	-	122
Indonesia	0.29	18.16	5.59	5.13	14.39	0.10	58.17	-1.06	-0.28	2.88	-0.36	6.09	7.16	-0.72	48.37	5.88	0	0.30	0.02	21.10	340
Ireland	0.20	-	9.59	0.73	-	1.08	86.87	1.18	1.54	6.00	1.72	8.96	9.67	1.58	82.44	-	0	0.33	0.02	-	780
Israel	0.18	-	7.38	0.00	-	0.90	62.49	-1.36	1.20	5.00	0.98	7.54	8.25	1.09	58.28	-	0	0.28	-	-	16
Italy	0.20	-5.48	8.24	2.29	10.07	4.86	78.23	0.53	0.54	4.18	0.92	9.17	9.35	0.36	81.11	-	0	0.22	-	-	659
Japan	0.24	-15.73	8.48	4.33	0.60	0.21	81.05	0.97	1.40	5.00	1.05	9.69	9.67	1.37	84.54	-	0	0.32	-	-	346
Kazakhstan	0.28	-	7.98	0.63	-	0.46	72.27	0.41	-0.43	3.95	-0.31	-	-	-0.93	55.05	6.47	0	0.40	0.05	30.80	36
Kenya	0.13	-	1.90	0.48	-	0.06	56.11	-1.31	-0.58	2.00	-0.15	5.66	5.98	-1.00	29.19	4.51	1	0.40	0.05	23.40	20

(continued)

**Table 1. (Continued)**

Country	Mean																				Firm-year observation
	Savings	Retirement provision	Socio-economic conditions	No. of catastrophes	Subjective catastrophe risk	SD of loss ratio	Political risk index	Political stability	Government effectiveness	Law and order	Regulatory quality	Reputation index	Expropriation index	Control of corruption	Country credit rating	Economy status	Guarantee scheme	Taxes on goods and services	Time dealing with regulation	Time to get a business license	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	
Latvia	0.22	-	6.26	0.28	-	0.06	73.94	0.54	0.62	5.00	0.99	-	-	0.20	58.66	8.25	0	0.37	0.08	11.50	43
Lithuania	0.16	-	7.24	0.29	-	0.15	76.06	0.81	0.70	4.00	1.06	-	-	0.16	59.24	8.95	0	0.38	0.13	60.40	68
Luxembourg	0.25	-	10.01	0.36	-	0.36	92.98	1.45	1.81	6.00	1.76	-	-	1.96	93.66	-	0	0.30	-	-	65
Mexico	0.22	16.68	7.48	3.52	17.14	0.25	71.09	-0.58	0.20	2.34	0.34	6.55	7.29	-0.30	65.19	6.90	0	0.62	0.16	39.06	262
Netherlands	0.26	-19.40	9.87	0.94	0.37	0.62	88.54	1.12	1.91	6.00	1.82	9.35	9.98	2.16	93.12	-	0	0.27	-	-	1,197
New Zealand	0.16	-	9.23	0.37	-	0.84	88.01	1.22	1.75	5.68	1.75	9.29	9.69	2.36	83.34	-	0	0.26	-	-	204
Nigeria	0.20	-	1.77	0.00	-	0.05	44.57	-1.91	-1.09	2.00	-0.76	4.36	5.33	-0.90	37.70	5.17	0	0.02	0.06	12.10	5
Norway	0.36	-	10.35	0.58	-	0.28	88.43	1.29	1.91	6.00	1.36	9.71	9.88	2.09	93.57	-	1	0.25	-	-	341
Paraguay	0.19	-	3.50	-	-	0.09	55.96	-0.68	-0.86	2.00	-0.54	-	-	-1.13	31.38	5.54	0	0.39	0.21	81.30	6
Philippines	0.24	-	4.99	5.62	-	0.05	64.56	-1.38	-0.12	2.45	0.10	4.80	5.22	-0.47	46.04	5.49	0	0.27	0.07	17.79	31
Poland	0.17	-	5.90	1.95	-	0.24	77.29	0.64	0.50	4.34	0.83	-	-	0.29	68.12	8.72	1	0.38	0.10	14.91	96
Portugal	0.14	-	7.95	0.56	-	1.45	82.51	0.95	1.04	5.00	1.01	8.57	8.90	1.06	75.32	-	0	0.32	0.01	-	153
Romania	0.21	-	5.51	1.59	-	0.18	68.46	0.23	-0.31	4.00	0.62	-	-	-0.21	53.54	7.95	1	0.36	0.09	23.70	22
Russian Federation	0.29	-	6.09	1.41	-	0.16	64.43	-0.93	-0.41	3.97	-0.34	-	-	-1.00	65.14	6.33	0	0.21	0.17	57.00	154
Singapore	0.43	27.02	9.57	0.06	-11.45	0.17	85.08	1.15	2.16	5.25	1.89	8.86	9.30	2.25	89.00	9.31	1	0.23	-	-	149
South Africa	0.15	9.73	4.23	1.02	5.21	0.28	67.75	-0.09	0.57	2.29	0.56	7.27	6.88	0.34	59.50	7.22	0	0.32	0.07	26.79	137
South Korea	0.31	-19.75	9.06	1.89	-6.05	0.14	76.75	0.34	1.10	4.92	0.85	8.59	8.31	0.44	75.18	8.87	1	0.27	0.00	-	115
Spain	0.21	-	7.38	1.28	-	0.08	77.27	-0.05	1.28	4.77	1.20	8.40	9.52	1.16	81.28	-	1	0.17	0.01	-	1,049
Sweden	0.25	-	9.15	0.49	-	2.90	89.25	1.24	1.99	6.00	1.61	9.58	9.40	2.26	90.88	-	0	0.36	-	-	645
Switzerland	0.32	10.53	10.24	2.03	-1.90	1.01	88.81	1.30	1.98	5.12	1.66	9.98	9.98	2.12	94.79	-	0	0.30	-	-	636
Thailand	0.30	-	7.02	1.71	-	0.05	63.50	-0.68	0.28	3.22	0.29	7.57	7.42	-0.26	58.31	6.65	1	0.39	0.01	33.48	168
Turkey	0.15	-	5.61	1.30	-	0.22	59.63	-0.91	0.23	4.09	0.29	5.95	7.00	-0.04	48.63	7.14	0	0.37	0.21	41.52	113
Ukraine	0.16	-	4.95	1.28	-	0.17	64.78	-0.07	-0.72	4.00	-0.56	-	-	-0.95	39.11	6.08	0	0.33	0.11	31.00	47
United Kingdom	0.14	9.34	9.80	2.71	-10.80	9.33	83.52	0.47	1.72	5.65	1.74	9.63	9.71	1.87	90.98	-	1	0.30	-	-	1,547
United States	0.17	7.64	8.73	29.55	14.07	9.02	82.20	0.43	1.63	5.16	1.54	9.00	9.98	1.50	91.19	-	1	0.03	-	-	13,565
Uruguay	0.16	-	4.99	0.50	-	0.10	72.30	0.79	0.49	2.58	0.39	7.29	6.58	1.00	43.47	7.78	0	0.44	0.09	125.20	22

Notes: Mean values of time-variant country characteristics are based on the averages across the years 2000 to 2012 (Number of countries=52). Firm-year observations are based on our regression analysis in Table 3. A detailed description of the variables is available in the Appendix.

**Table 2. Descriptive statistics of firm-level variables**

<i>Region</i>		<i>Mean</i>	<i>Median</i>	<i>Std. deviation</i>
World (N=31,342)	Premium growth	0.195	0.085	0.716
	SDROE3	0.110	0.067	0.147
	Growth in capitalization	0.053	0.008	0.410
	Size	11.588	11.525	1.982
North and South America (N=16,250)	Premium growth	0.180	0.068	0.737
	SDROE3	0.099	0.063	0.128
	Growth in capitalization	0.038	0.010	0.366
	Size	11.489	11.417	1.864
Europe (N=12,550)	Premium growth	0.195	0.103	0.687
	SDROE3	0.119	0.072	0.160
	Growth in capitalization	0.075	0.009	0.450
	Size	11.618	11.560	2.091
Asia-Pacific (N=2,358)	Premium growth	0.296	0.180	0.726
	SDROE3	0.136	0.075	0.185
	Growth in capitalization	0.043	-0.013	0.464
	Size	12.106	12.043	2.110
Africa and Middle-East (N=178)	Premium growth	0.292	0.200	0.495
	SDROE3	0.119	0.097	0.104
	Growth in capitalization	-0.003	-0.050	0.428
	Size	11.689	11.831	1.566
World without USA (N=17,777)	Premium growth	0.219	0.119	0.697
	SDROE3	0.121	0.073	0.160
	Growth in capitalization	0.064	0.004	0.440
	Size	11.668	11.621	2.065
USA (N=13,565)	Premium growth	0.164	0.057	0.739
	SDROE3	0.096	0.060	0.127
	Growth in capitalization	0.038	0.012	0.366
	Size	11.482	11.391	1.863

*Notes:* This table presents descriptive statistics of firm-level variables for different regions. *N* denotes firm-year observations. *Premium growth* is the growth in net premiums written. *SDROE3* is the standard deviation of the return on equity over the past 3 years. *Growth in capitalization* is the growth in (capital surplus/(total assets-capital surplus)). *Size* is the natural logarithm of the insurer's total assets. All firm-specific variables are winsorized at the 1st and 99th percentiles. Data are for the years 2002 through 2012.

**Table 3. Risk and capitalization on premium growth by region**

<i>Dependent Variable:</i> <i>Premium growth</i>	<i>World</i>	<i>North and South America</i>	<i>Europe</i>	<i>Asia-Pacific</i>	<i>Africa and Middle-East</i>	<i>World without USA</i>	<i>USA</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SDROE3	-0.271*** (0.036)	-0.493*** (0.059)	-0.124** (0.049)	-0.104 (0.112)	-0.139 (0.455)	-0.163*** (0.042)	-0.483*** (0.065)
Growth in Capitalization	0.087*** (0.010)	0.133*** (0.016)	0.059*** (0.014)	0.063* (0.034)	0.127 (0.088)	0.054*** (0.012)	0.161*** (0.018)
Size	-0.483*** (0.013)	-0.571*** (0.019)	-0.424*** (0.019)	-0.377*** (0.048)	-0.651*** (0.154)	-0.405*** (0.016)	-0.649*** (0.022)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.084	0.089	0.097	0.068	0.447	0.088	0.098
Observations	31,342	16,250	12,550	2,358	178	17,777	13,565
Countries	52	10	24	13	4	51	1

*Notes:* This table presents fixed-effects regression models. Model (1) includes all insurers from 52 countries in our sample, model (2) includes insurers from North and South America, model (3) includes European insurers, model (4) includes insurers from the Asia-Pacific region, model (5) includes insurers from Africa and Middle-East, model (6) includes all insurers without USA, and model (7) includes only US insurers. The dependent variable is *Premium growth*, which is the growth in net premiums written. *SDROE3* is the standard deviation of the return on equity over the past 3 years. *Growth in capitalization* is the growth in (capital surplus/(total assets-capital surplus)). *Size* is the natural logarithm of the insurer's total assets. All firm-specific variables are winsorized at the 1st and 99th percentiles. The independent variables, except *SDROE3*, are lagged one year behind the dependent variable. The regressions include firm fixed-effects (Firm FE) and year fixed-effects (Year FE). Firm FE and Year FE are jointly significant at the 1 percent level based on a F-test. Data are for the years 2002 through 2012. \*, \*\*, and \*\*\* denote statistical significance at the 10, 5, and 1 percent levels, respectively.

**Table 4. The impact of country-level determinants on premium growth**

<b>Panel A</b>						
<i>Dependent variable: Premium growth</i>	Risk aversion			Riskiness of business environment for insurers		
	<i>Savings</i>	<i>Retirement provision</i>	<i>Socio- economic conditions</i>	<i>No. of catastrophes</i>	<i>Subjective catastrophe risk</i>	<i>SD of loss ratio</i>
	(1)	(2)	(3)	(4)	(5)	(6)
SDROE3	-0.518*** (0.127)	-0.274*** (0.042)	-0.836*** (0.205)	-0.144*** (0.045)	-0.185*** (0.049)	-0.208*** (0.051)
Growth in capitalization	0.091*** (0.033)	0.111*** (0.013)	0.373*** (0.065)	0.030** (0.013)	0.087*** (0.015)	0.047*** (0.015)
Size	-0.484*** (0.013)	-0.527*** (0.015)	-0.484*** (0.013)	-0.484*** (0.013)	-0.527*** (0.015)	-0.482*** (0.013)
SDROE3*(I)	1.178** (0.579)	-0.007* (0.004)	0.065*** (0.023)	-0.012*** (0.003)	-0.018*** (0.005)	-0.016* (0.009)
Growth in capitalization*(I)	-0.018 (0.149)	0.002* (0.001)	-0.033*** (0.007)	0.005*** (0.001)	0.005*** (0.001)	0.009*** (0.002)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.084	0.087	0.085	0.086	0.087	0.085
Observations	31,342	25,022	31,342	31,336	25,022	31,342
Countries	52	19	52	51	19	52

  

<b>Panel B</b>					
<i>Dependent variable: Premium growth</i>	General riskiness of business environment (I)				
	<i>Political risk index</i>	<i>Political stability</i>	<i>Government effectiveness</i>	<i>Law and order</i>	<i>Regulatory quality</i>
	(7)	(8)	(9)	(10)	(11)
SDROE3	-1.422*** (0.422)	-0.322*** (0.051)	-0.450*** (0.101)	-0.462** (0.203)	-0.436*** (0.113)
Growth in capitalization	0.425*** (0.117)	0.122*** (0.014)	0.140*** (0.027)	0.342*** (0.061)	0.132*** (0.028)
Size	-0.483*** (0.013)	-0.483*** (0.013)	-0.484*** (0.013)	-0.483*** (0.013)	-0.484*** (0.013)
SDROE3*(I)	0.014*** (0.005)	0.089 (0.063)	0.120* (0.063)	0.038 (0.039)	0.119 (0.076)
Growth in capitalization*(I)	-0.004*** (0.001)	-0.061*** (0.017)	-0.036** (0.017)	-0.050*** (0.012)	-0.032* (0.019)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R-squared	0.084	0.084	0.084	0.085	0.084
Observations	31,342	31,342	31,342	31,342	31,342
Countries	52	52	52	52	52

(continued on next page)



**Table 4. (Continued)**

<b>Panel C</b>					
	General riskiness of business environment (II)				
<i>Dependent variable:</i>	<i>Repudiation</i>	<i>Expropriation</i>	<i>Control of</i>	<i>Country</i>	<i>Economy</i>
<i>Premium growth</i>	<i>index</i>	<i>index</i>	<i>corruption</i>	<i>credit rating</i>	<i>status</i>
	(12)	(13)	(14)	(15)	(16)
SDROE3	-1.713*** (0.426)	-0.815 (0.521)	-0.443*** (0.080)	-1.190*** (0.236)	-1.912*** (0.685)
Growth in capitalization	0.057 (0.120)	-0.162 (0.145)	0.127*** (0.022)	0.122*** (0.021)	0.626*** (0.194)
Size	-0.478*** (0.013)	-0.478*** (0.013)	-0.485*** (0.013)	-0.487*** (0.013)	-0.486*** (0.039)
SDROE3*(I)	0.160*** (0.047)	0.057 (0.054)	0.119** (0.049)	0.011*** (0.003)	0.220** (0.090)
Growth in capitalization*(I)	0.003 (0.013)	0.026* (0.015)	-0.027** (0.013)	-0.001** (0.000)	-0.079*** (0.027)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R-squared	0.083	0.082	0.084	0.085	0.102
Observations	30,508	30,508	31,342	31,342	2,976
Countries	39	39	52	52	29

  

<b>Panel D</b>					
	Regulatory intervention				
<i>Dependent variable:</i>	<i>Guarantee</i>	<i>Taxes on</i>	<i>Time</i>	<i>Time to get</i>	
<i>Premium growth</i>	<i>scheme</i>	<i>goods and</i>	<i>dealing with</i>	<i>a business</i>	
	(17)	(18)	(19)	(20)	
SDROE3	-0.256*** (0.057)	-0.384*** (0.062)	-0.292*** (0.082)	-0.344* (0.189)	
Growth in capitalization	0.042*** (0.016)	0.149*** (0.017)	0.172*** (0.024)	0.163*** (0.053)	
Size	-0.483*** (0.013)	-0.485*** (0.013)	-0.406*** (0.022)	-0.453*** (0.043)	
SDROE3*(I)	-0.029 (0.073)	0.602** (0.252)	0.318 (0.924)	0.001 (0.004)	
Growth in capitalization*(I)	0.077*** (0.021)	-0.290*** (0.067)	-1.222*** (0.288)	-0.002* (0.001)	
Firm FE	Yes	Yes	Yes	Yes	
Year FE	Yes	Yes	Yes	Yes	
R-squared	0.084	0.085	0.111	0.092	
Observations	31,342	31,241	7,044	2,590	
Countries	52	51	32	26	

*Notes:* This table presents fixed-effects regression models, and is divided into Panel A to Panel D. Panel A includes measures for “Risk aversion” and “Riskiness of business environment for insurers”. Panel B and C includes measures for “General riskiness of business environment”. Panel D includes measures of “Regulatory intervention”. All firm-specific variables are winsorized at the 1st and 99th percentiles. The independent variables, except *SDROE3*, are lagged one year behind the dependent variable. The regressions include firm fixed-effects (Firm FE) and year fixed-effects (Year FE). Firm FE and Year FE are jointly significant at the 1 percent level based on a F-test. Data are for the years 2002 through 2012. \*, \*\*, and \*\*\* denote statistical significance at the 10, 5, and 1 percent levels, respectively. A detailed description of the variables is available in the Appendix.

## Appendix Description and sources of firm- and country-level determinants

<i>Variable name</i>	<i>Variable description, and source</i>
<b>Firm-level determinants</b>	
Premium growth	Growth in net premiums written. Source: A.M. Best's Statement File Global.
SDRO3	Standard deviation of return on equity over the past 3 years. Source: A.M. Best's Statement File Global.
Growth in capitalization	Growth in capital surplus divided by total assets minus capital surplus. 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.
<b>Country-level determinants</b>	
<b><i>Risk Aversion</i></b>	
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.
Retirement provision	Survey-based measure. This component is based on answers of respondents of all age groups across 19 countries. The respondents were asked the following question: "Did you save towards your retirement?" This variable presents the percentage of respondents answered "Yes" on country-level. We centered the variable at zero by subtracting the world mean. Source: Swiss Re Risk Perception Survey. Source: Swiss Re Risk Perception Survey.
Socio-economic conditions	This is an assessment of the socioeconomic pressures at work in society that could constrain government action or fuel social dissatisfaction, and is the sum of the subcomponents (1) unemployment, (2) consumer confidence, and (3) poverty, each with a maximum score of four points and a minimum score of 0 points. A score of 4 points equates to very low risk and a score of 0 points to very high risk. Source: PRS International Country Risk Guide Researchers dataset.
<b><i>Riskiness of business environment for insurers</i></b>	
No. of catastrophes	Number of catastrophic events caused by natural forces. Natural catastrophes are subdivided into the following categories: floods, storms, earthquakes, droughts/forest fires/heat waves, cold waves/frost, hail, tsunami and other natural catastrophes. Source: Swiss Re Sigma publications.
Subjective catastrophe risk	Survey-based measure. This component is based on answers of respondents of all age groups across 19 countries. The respondents were asked the following question: "If your local area has not been hit before, how large do you think the risk is that your neighborhood will be hit by a natural catastrophe in the future?" This variable presents the percentage of respondents perceiving neighborhood natural catastrophes in the future as a "high risk" on country-level. We center the variable around zero by subtracting the world mean. Source: Swiss Re Risk Perception Survey.
SD of loss ratio	Mean values of standard deviation of the net claims incurred divided by premiums earned over the past 3 years of insurance companies in a country. Source: A.M. Best's Statement File Global.
<b><i>General riskiness of business environment</i></b>	
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.
Political stability	Index reflects perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism. This index ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance. Source: World Development Indicators.
Government effectiveness	Index 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
Law and order	Law and Order are assessed separately, with each sub-component comprising zero to three points. The Law sub-component is an assessment of the strength and impartiality of the legal system, while the Order sub-component is an assessment of popular observance of the law. Thus, a country can enjoy a high rating - 3 - in terms of its judicial system, but a low rating - 1 - if it suffers from a very high crime rate or if the law is routinely ignored without effective sanction. Source: PRS International Country Risk Guide Researchers dataset.

## Appendix (Continued)

<i>Variable name</i>	<i>Variable description, and source</i>
<b>Country-level determinants</b>	
<b><i>General riskiness of business environment</i></b>	
Regulatory quality	Index reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. This index ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance. Source: World Development Indicators.
Repudiation index	ICR assessment of the “risk of a modification in a contract taking the form of a repudiation, postponement, or scaling down” due to “budget cutbacks, indigenization pressure, a change in government, or a change in government economic and social priorities.” Average of the months of April and October of the monthly index between 1982 and 1995. Scale from zero to ten, with lower scores for higher risks. Source: La Porta et al. (1998).
Expropriation index	Integrated Corporate Relations (ICR) assessment of the risk of “outright confiscation” or “forced nationalization.” Average of the months of April and October of the monthly index between 1982 and 1995. Scale from zero to ten, with lower scores for higher risks. Source: La Porta et al. (1998).
Control of corruption	Index reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as “capture” of the state by elites and private interests. This index ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance. 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.
Economy status	The state of economic transformation (market economy status) is measured in terms of seven criteria, which are based on a total of 14 indicators. The index includes aspects such as economic performance, regulatory, competition policy, property rights, and elements of social justice. Source: BTI Database.
<b><i>Regulatory intervention</i></b>	
Guarantee scheme	Dummy variable equal to 1, if country is member of the International Forum of Insurance Guarantee Schemes (IFIGS). Source: International Forum of Insurance Guarantee Schemes.
Taxes on goods and service	Taxes on goods and services in percentage of revenue, include general sales and turnover or value added taxes, selective excises on goods, selective taxes on services, taxes on the use of goods or property, taxes on extraction and production of minerals, and profits of fiscal monopolies. Source: World Development Indicators.
Time dealing with regulation	Time spent dealing with the requirements of government regulations is the proportion of senior management's time, in a typical week, that is spent dealing with the requirements imposed by government regulations (e.g., taxes, customs, labor regulations, licensing and registration, including dealings with officials, and completing forms). Source: World Development Indicators.
Time to get a business license	Time required to obtain operating license is the average wait to obtain an operating license from the day the establishment applied for it to the day it was granted. Source: World Development Indicators.