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Trust and Insurance Contracts

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We assemble homeowner insurance claims from 28 independently operated country subsidiaries of a multinational insurance firm. We propose a new insurance model, in which consumers can make invalid claims and firms can deny valid claims, as is common in the data. In the model, trust and honesty shape equilibrium insurance contracts, disputes, and claim payments, especially when disputes are too small for courts. We test the model by investigating claim incidence, dispute, rejection, and payment, as well as insurance costs and pricing across countries. The evidence is consistent with the centrality of trust for insurance markets, as our model predicts. (*JEL* G22, D23, L14, Z13)

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We examine the effects of culture and the legal environment on insurance by analyzing homeowner insurance contracts in 28 countries. In cooperation with a multinational insurance firm, we collected data on homeowners insurance in the countries where this firm owns independently run subsidiary companies.

We are deeply grateful to the many employees of the insurance firm that helped us assemble and understand the data. We thank Jan Luksic, Jenny Liu, and Maxens Berre for outstanding assistance with this research and Ralph S. J. Koijen, Paola Sapienza, and two anonymous referees for their comments and helpful advice. We are also grateful for the comments from participants at the NBER Conference on the Financial Economics of Insurance and the NBER Summer Institute Conferences on Risk of Financial Institutions and Corporate Finance. Lopez-de-Silanes acknowledges financial support from the FAIRR Research Center at SKEMA Business School. The findings, interpretations, and conclusion expressed in this paper are entirely those of the authors. Supplementary data can be found on *The Review of Financial Studies* web site. Send correspondence to Florencio Lopez-de-Silanes, florencio.lopezdesilanes@skema.edu.

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Homeowner insurance is a simple transaction, in which a home and its content are insured against fire, other damage (most prominently water damage), and theft. Most countries have it. Because this market is relatively unregulated, we can analyze some basic contracting problems affecting risk-sharing arrangements.

We discover that disputes are a fundamental feature of homeowner insurance in most countries. The client can falsely claim theft, or represent that damages that are entirely his fault—and hence are not covered—are instead an accident, or provide a fraudulent assessment of harm. The insurance company, in turn, can make unreasonable requests for documentation of losses (e.g., require original receipts for payment for stolen goods), or argue that claims are not covered (e.g., because a leak is the builder's fault). In these highly contentious environments, transaction costs take up about 40% of insurance revenues, on average.

Critically, because many claims are small, few disputes go to court, suggesting that the legal system may not be first order important for these transactions. How, then, are these transactions sustained? Arrow (1974) famously argued that even simple economic transactions rely on trust. Societies with a norm of honest behavior should find contracting easier. Does trust matter in a simple transaction like homeowners insurance? And, if it does, how does it affect contracting?

We address these questions by measuring three sets of homeowner insurance outcomes. The first set focuses directly on disputes in the claims process. It includes data on how many claims are made, the share of rejected or disputed claims, and the share of claimed value of damages that is paid. The second set of outcomes measures the company's cost structure: the ratio of general expenses and the ratio of paid losses to total premiums in the homeownership segment. The third set looks at two proxies of economic efficiency: the insurance premiums as a share of value covered and the homeowners insurance profit margin. Variation in the above outcomes allows us to explore how the same insurance contract works across countries.

A first look at the data reveals two striking facts. First, the share of rejected claims worldwide is on average about 20%, but rises to close to 35% in low-trust countries, such as Croatia, Slovakia, and Turkey. Second, eventual compensation averages only 61% of initial claims worldwide, but falls below 40% in low-trust countries, such as Slovenia and Poland. Put differently, the collection of insurance claims is a highly contentious process. To the extent that insurance claims collection varies across countries, it appears to improve with generalized trust in line with Arrow's hypothesis.

To move forward, we study the role of trust in contracting in a new model with a standard risk-sharing structure. The innovation is that both the insurance company and the insuree can engage in opportunistic behavior, and companies must bear administrative costs to deal with contentious claims. The incentive of parties to behave opportunistically may depend on the law, but also on shared norms of trust/honesty. In particular, in countries where many people are trustworthy, it is psychologically costlier for individuals and firms to act opportunistically.

We characterize attributes of the settlement process, the cost structure, the pricing of claims, and profits, all as a function of trust. There are three broad predictions of the model. First, by reducing opportunism on both sides, higher trust reduces disputes over claims, as reflected in the number of claims opened, the share of rejected claims, the share of claimed value that is not paid, and the overall claim payments by the insurance company. The model also predicts that trust should especially improve enforcement of claims in which losses are more difficult to verify objectively.

Second, higher trust reduces the costs of insurance companies. It reduces transaction costs, measured by general expenses as a share of total premiums, as companies spend fewer resources to administer claims and to find new and reliable clients. It also reduces the amount of paid losses as a share of total premiums by reducing the number of false claims that companies must pay.

Third, higher trust leads to greater economic efficiency via two effects. First, it reduces the premiums relative to the amount covered, thereby creating a welfare improvement for customers (given that in higher trust countries claims are more likely to be repaid). Second, it increases the insurer's profit, thereby improving the welfare of firms. Intuitively, when honesty is high: (a) transaction costs are low, which reduce costs for consumers, and (b) indemnities are paid, which increases consumers' demand for insurance contracts and hence the profit of the firm.

We test the predictions of the model using both business-unit- and claim-level data for the 28 countries in our sample. We measure the norms of trust and honesty in two ways. First, we use the standard measure of trust from the World Values Survey, which is the share of the population in a country who say that "most people can be trusted" as opposed to "you need to be very careful in dealing with people." Second, we use a measure of fairness from the European Values Study and the World Values Survey. The measure comes from the answer to the question "do you think most people would try to take advantage of you if they got the chance, or would they try to be fair?", scored on a scale from 1 (would take advantage) to 10 (try to be fair). The correlation between these two measures, which we refer to as *Trust* and *Fairness* in the paper, in our sample is 0.76 (Figure 1). In addition, in various specifications we control for gross domestic product (GDP) per capita, a measure of the quality of the legal system, a measure of theft victimization, and measures of market competition in insurance. Appendix A defines the variables we use in the analysis.

Both *Trust* and *Fairness* matter in most specifications. Higher *Trust* and *Fairness* are associated with fewer disputes over claims. Claims-level data allow us to distinguish theft claims, which are arguably the most difficult to verify, from the others. In line with the model, we find that *Trust and Fairness* are especially beneficial for the difficult-to-verify theft claims. Second, in line with the model, higher *Trust* and *Fairness* are associated with lower costs to

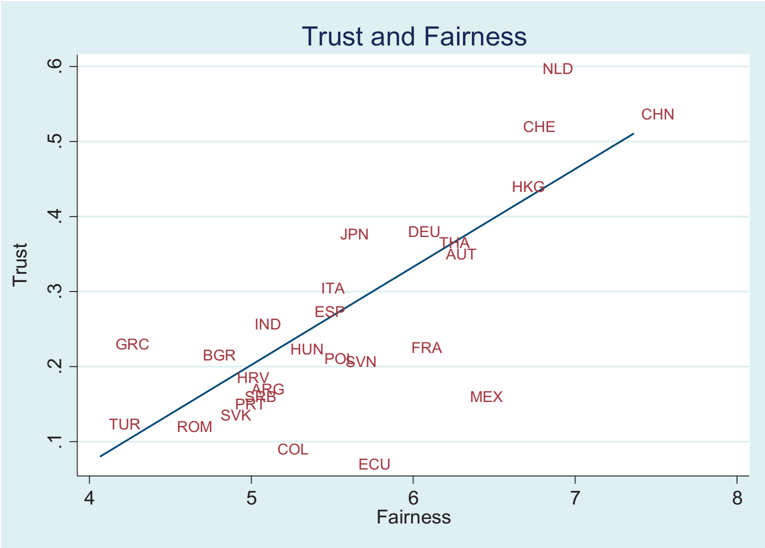

Figure 1
Scatter plot and fitted line for *Trust* versus *Fairness* for the 28 countries in our study.

firms, in terms of both general expenses and indemnities paid. Third, and again consistent with the model, higher *Trust* and *Fairness* are correlated with lower prices and higher profits. Per capita income and the efficiency of the legal system also matter for some contracting outcomes, but not as reliably as *Trust* or *Fairness*. In contrast, our measures of market competition do not seem to matter for outcomes. In part that may be due to measurement error, but possibly also to a race to the bottom in low-trust countries.

Our results convey two messages. First, social norms of honesty play an important role in facilitating contracting when external verification is impossible or too expensive. Second, the norms of trust and honesty affect not only the extent to which people engage in trade but also the entire structure of transactions. They reduce disputes, change the cost structure, and consequently shape equilibrium premiums and profits. Low trust distorts each single step of the contracting process, creating transaction costs and reducing gains from trade.

Our paper falls in the intersection of three research areas. The first is the study of insurance contracts when fraud is a possibility (Crocker and Morgan 1998; Crocker and Tennyson 2002; Dionne, Giuliano, and Picard 2009; Asmat and Tennyson 2014; Burgeon and Picard 2014; Cosconati 2020). This literature recognizes the centrality of deception and verifiability in shaping insurance contracts, but does not take a comparative perspective, nor stress that firms can also act opportunistically. The second area compares financial contracts across different countries as a function of laws and institutions (e.g., La Porta et al.

1997a, 1998, 2008). The third, and perhaps most relevant, literature focuses on the role of cultural factors in general, and trust in particular, in shaping financial transactions and economic outcomes (e.g., La Porta et al. 1997b; Guiso 2012; Guiso, Sapienza, and Zingales 2004, 2006, 2008, 2009, 2013; Aghion et al. 2010; Bottazi et al. 2016). Most relevant are Guiso et al. (2008) and Guiso (2012), who show that trust raises demand for insurance.

These various streams of analysis come together for understanding homeowners insurance. Relative to previous work on trust, we show how in insurance low trust hinders economic efficiency by distorting the entire structure of enforcement, costs, and prices.

1. Insurance Data and Basic Facts

We examine how a homeowner insurance contract varies across 28 countries during 2010–2013. The source of the data is a large multinational insurance firm that operates in all of these countries. Critically, as we confirmed with the top management, headquarters of the multinational firm delegates to country branches decisions regarding product pricing and claims policies, including the handling of disputes (as well as other decisions, such as regulatory compliance and procurement). Our setting thus allows us to examine the adaptation of these policies to local conditions for the same homeowners insurance product and, perhaps uniquely, for the same parent firm.

Our sample includes all 28 countries where the firm has a large homeowners insurance business. The top management allowed us to gather data, and provided logistical and management support. All countries generally supplied all the requested data. The sample includes countries on all continents and with a range of income levels, but most countries are located in Western and Eastern Europe (see Appendix A for a full sample). The United States is not in our sample.

We study a relatively simple and common transaction: homeowners insurance. This type of insurance is a substantial fraction of the gross premiums of the insurance industry in most countries (property insurance is about 25% of the nonlife segment, and nonlife is half of total premiums). It is also a relatively standard contract and cross-country differences in regulation play a minor role.[1]

In most countries, the standard homeowners insurance contract covers protection of the home and belongings against weather, fire, theft, and liability.[2] We obtained all the documents that the insured receives from the company (forms, summary of policy, full contracts, details of policy, details on how to

[1] Car insurance is also a large part of the nonlife insurance business. However, the regulation of car insurance is fairly complex and greatly varies across countries.

[2] Japan is the only country in our sample in which the standard contract includes earthquake damages. To make our pricing data comparable across countries, we exclude earthquake coverage from the price of homeowners insurance in Japan.

make claims, claim forms, etc.). We also obtained all the regulations pertaining to homeowners insurance contracts, including national laws. We also asked each country subsidiary to send us the complete file of the first 20 homeowner's insurance contracts *signed* in 2013.[3]

In addition, we collected data on homeowners insurance segment from each subsidiary in the 28 countries. We have data for the period 2010–2012 on (1) the nature and the number of claims that were initiated, rejected, disputed, paid, and settled; (2) time to first response and time to settle; (3) customer acquisition costs and general expenses; and (4) pricing, premiums, and taxes.

To gather contract-level data on actual home insurance *claims* in each country, we asked each country subsidiary for a copy of the complete file of the first 20 homeowners insurance *claims* settled in 2013. To ensure that these claims were effectively randomly selected, we asked for the first 20 settled claims in the calendar year. For each claim, we obtained: (1) the insurance contract of the claimant; (2) all supporting documentation regarding the claim; (3) the evaluation made by the assessors appointed by the claimant and the insurance company; (4) the analysis of the claim made internally by the company; (5) all written communications about the claim; (6) the calendar of events of the claim; and (7) the resolution of the claim and its justification.

Appendix B lists the various categories of data that we requested and tracks the response of each country office. All 28 countries generally supplied all the required information. The request for 20 files of closed claims is the only area with incomplete compliance. We collect 550 rather than 560 files of closed home insurance claims (India supplied 18 claims and Thailand 12). Appendix C shows the form we used to request the business-segment information.

We first present summary statistics on the homeowners insurance business segment and then on filed claims. We then look at the basic statistical features of the claims process. Finally, we suggest that trust may play an important role in explaining the patterns in the data.

1.1 Homeowners insurance business unit data

Table 1 illustrates the frictions faced by the company in the homeowners insurance business segment. For each country and each variable, we report the time-series average over up to 3 years of data.[4] We also report world means over the 28 countries in our sample at the bottom of each column.

The first three columns of Table 1 provide some basic information on the settlement of claims, which is key to understand contracting and its frictions. To begin, according to column 1, worldwide 17% of the outstanding homeowners insurance policies make a claim in an average year. It is rather remarkable

3 If chronological information is unavailable, we request the first 20 contracts in alphabetical order.

4 Four countries (i.e., China, Ecuador, Japan, and Thailand) submitted data for less than 3 years. For all other countries, we have 3 years of data for each variable. We compute the means using all nonmissing data.

Table 1
Homeowners insurance business segment data

	Claims			Costs			
Country	*Claims/ policies* (1)	*Rejected claims/ claims* (2)	*Settlement days* (3)	*Expense ratio* (4)	*Loss ratio* (5)	*Profit margin* (6)	*Gross written premiums/ policies* (7)
Argentina	0.16	0.28	149.4	0.48	0.52	0.00	214
Austria	0.17	0.10	n/a	0.34	0.56	0.08	1,055
Bulgaria	0.15	0.28	145.3	0.53	0.47	0.00	166
China	0.04	0.10	42.7	0.34	0.21	0.34	64
Colombia	0.23	0.26	161.2	0.48	0.60	−0.07	189
Croatia	0.12	0.34	144.7	0.49	0.55	−0.04	191
Ecuador	0.14	0.22	101.9	0.44	0.55	0.01	n/a
France	0.18	0.16	212.5	0.37	0.75	−0.13	333
Germany	0.16	0.16	62.8	0.39	0.47	0.10	345
Greece	0.22	0.28	205.6	0.41	0.64	−0.05	346
Hong Kong	0.03	0.14	61.2	0.39	0.32	0.25	198
Hungary	0.22	0.12	80.9	0.34	0.49	0.13	158
India	0.05	0.15	80.7	0.29	0.42	0.19	82
Italy	0.33	0.12	151.8	0.38	0.62	0.00	293
Japan	n/a	0.20	75.3	n/a	0.37	n/a	n/a
Mexico	0.28	0.28	196.5	0.43	0.56	0.01	120
Netherlands	0.07	0.07	66.0	0.31	0.27	0.32	155
Panama	0.13	0.14	65.3	0.46	0.44	0.08	138
Poland	0.18	0.24	141.5	0.40	0.52	0.07	249
Portugal	0.34	n/a	198.9	0.48	0.68	−0.16	316
Romania	0.13	0.19	36.3	0.40	0.38	0.19	267
Serbia	0.08	0.28	178.5	0.37	0.57	0.05	65
Slovakia	0.03	0.36	n/a	0.48	0.54	−0.02	64
Slovenia	0.35	0.25	159.9	0.45	0.68	−0.10	484
Spain	0.26	0.12	45.3	0.36	0.63	0.00	196
Switzerland	0.24	0.22	99.0	0.34	0.23	0.35	1,067
Thailand	0.09	0.06	76.2	0.31	0.21	0.35	109
Turkey	0.20	0.38	241.4	0.52	0.51	−0.03	242
Mean	0.17	0.20	122.3	0.41	0.49	0.07	273

The table shows the aggregate homeowners segment data for the insurance firm in each of the 28 countries in our study. We report the averages of 3 years of data. The insurance firm's underwriting and claims department in each country provided the data. Appendix A describes the variables.

that as many as one-third of the insurance policies opened claims in Italy, Portugal, and Slovenia. The frequency of claims is astounding, and explains in part how the expense ratio for this type of insurance is so high. Column 2 shows that this insurance company ultimately rejects in full 20% of the claims, including over one-third in Croatia, Slovakia, and Turkey. The reasons for rejection vary from limited coverage to lack of evidence (for instance, with theft claims, absence of proof of purchase). Finally, column 3 shows the length of the process of verifying claims and reaching a settlement. The average time until claim resolution is 122 days. The entire process takes less than 2 months in China, Romania, and Spain and over 6 months in France, Greece, Mexico, Portugal, and Turkey – on average.

The costs of providing homeowners insurance relative to total gross premiums include two major components: the expense ratio (which includes customer acquisition costs) and the loss ratio. Column 4 shows the expense ratio defined as the sum of acquisition costs and general costs, which are associated with the cost of writing and servicing contracts, divided by total gross written premiums in the year. The average expense ratio for the countries in our sample is 41%. The expense ratio is always higher than 25% and it is close to 50% in Argentina, Bulgaria, Colombia, Croatia, Portugal, Slovakia, and Turkey. The high level of transaction costs in selling and administering insurance contracts is a critical feature of this industry worldwide.[5]

Paying claims for the losses suffered by policyholders is a second major cost of doing business. Column 5 of Table 1 reports the loss ratio computed as the value of claims settled over total gross premiums in the year. The average loss ratio in our sample is 49%, but there is substantial variation across countries. The loss ratio is surprisingly low in some countries; it is under 33% in China, Hong Kong, the Netherlands, Switzerland, and Thailand. In contrast, the loss ratio exceeds 60% in Colombia, France, Greece, Italy, Portugal, Slovenia, and Spain.

Column 6 reports the *Profit margin*. We measure profitability using statutory tax rates from KPMG for 2010–2012 and define pretax profits as the difference between total gross written premiums and costs. We calculate costs as the Combined Loss ratio, which is the sum of the *Expense ratio* and the *Loss ratio*, both measured as a proportion of total gross written premiums. These two ratios include the indirect and direct claim settling expenses, respectively. On average, profit margins are 7%. Profit margins range from close to −15% in France, Portugal, and Slovenia, to over 25% in China, Hong Kong, the Netherlands, Switzerland, and Thailand.

The central message of columns 4–6 is that the cost of selling and administering home insurance is extraordinarily high. A homeowner, on average, receives back half of what she pays in paid claims; the rest is lost in transaction costs. These facts raise the obvious question of why individuals buy so much home insurance, why deductibles are not higher, and why it costs so much to implement this contract. It is well known that consumers have a strong preference for low deductibles, which is usually explained by overweighting of low probability losses (e.g., Sydnor 2010). Yet it remains puzzling why so much real or perceived surplus from insurance is dissipated in transaction costs. This is the key question that this paper seeks to answer.

The last column of Table 1 reports the average (gross) annual premium per policy that the insurer receives in each country. Worldwide, homeowners pay annual average gross premiums of $273. Premiums vary with income levels, ranging from over $1,000 in Austria and Switzerland to less than $100 in China, India, Serbia, and Slovakia.

The bottom line of Table 1 is that homeowner insurance entails massive transaction costs, and is far from the textbook model of frictionless risk sharing.

5 One potential concern is that the *Expense ratio* may be inflated in countries with low trust as insurance firms may underreport profits to avoid taxes.

Standard contracting problems in insurance, such as adverse selection by riskier claimants and moral hazard in taking precautions, would be unable to account for the data. These problems reduce the tradeability of risk, but are not themselves a source of disputes and transaction costs. Why does this market work this way?

1.2 Homeonwers insurance claims data

Next, we focus on the individual claims data. To illustrate some of the variables we examine, we compare two actual water damage claims in our sample: one in Switzerland and one in Italy.[6] Water damages is the most common type of claim in our sample (close to 30 percent of all claims).[7]

The Swiss claimant filed a claim for water damages caused by a broken pipe. The claim included a $3,070 repair budget submitted by the plumber whom the claimant hired to visit the house. The company quickly sent a damage assessor to the house, who filed her report with the insurance company 28 days after the claimant reported the damage. In its report, the assessor corroborated the damage, its coverage under the contract, and agreed with the budget for repairs. No deductible applied to this claim. Next, the company contacted the client accepting the claim in full. The client accepted the proposed settlement. Sixty-four days after the filing of the claim, the insurance company mailed the check for the claim to the policyholder and closed the case. In this case, the final settlement as a proportion of the initial claim was 100%. The same is true for the final settlement as a proportion of the total assessed value net of deductibles.

A similar Italian claim triggered an acrimonious process. The policyholder sent a claim to the insurance company for $1,285 in damages caused by the accidental breaking of a valve of the heating system. The $1,285 budget included expenses associated with both the broken valve and water damage to the wall between the living room and the corridor. The company quickly sent a damage assessor and she filed her report only 18 days after the claimant initiated the process. The glitch is that the report assessed damages at only $546, excluding a deductible of $128.

Thirty-six days after the claimant reported the damage, the insurance company contacted the claimant sending her a report detailing the problems with her claim and proposing a settlement amount of $416 (= $546 − $128). Twenty-five days later, the policyholder replied complaining about the proposed settlement and threatening to cancel the insurance policy. The company and the client then engaged in conversations that lasted several months.

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[6] To illustrate our claims data, we choose two developed economies whose insurance systems work reasonably well compared to other countries. Still, the differences between them are remarkable.

[7] Weather damage and theft are second and third, respectively (they account for close to 25% of cases). Property damage is the fourth category of claims with close to 15% of the cases. Other claims are much less frequent in our sample (fire damage and third-party liability, respectively, capture 5% and 3% of cases).

Eventually, the policyholder accepted the initial assessment of the expert and the proposed settlement. Two hundred and forty-five days after the start of the process, the insurance company mailed the check for the reimbursement of the claim to the policyholder and closed the case. The final settlement amounted to 100% of the assessed value net of the deductible, but only 32.5% of the damage initially claimed by the policyholder.

Table 2 summarizes some of the statistics collected from our sample of 550 claims closed in 2013. For each country, the table reports the median value claimed by the insured, the fraction of claims that are small (below a country's one month of average wages), the ratio of the net assessed value of damages to the initial claim, the ratio of settlement amount to the net assessed value, and the ratio of the settlement amount to the initial claim. All amounts are computed net of deductibles, which are thus not the reason why settlements are lower than the claims or assessed values. Table 2 also reports the share of claims the company fully rejects, the share of claims that are paid less that the net assessed value of the damage, the number of days for claim resolution, the percentage of claims that are disputed, and the gross yearly premium per US$100 of value insured.

The first column shows the median (US$) value of damages initially claimed by the insured party. This value ranges from $160 in Serbia to $6,638 in Germany, and $1,063 across countries. These data show that most claims are relatively small. In fact, in column 2, we report the fraction of claims in our sample that is below the level of one month of a country's average wage. This share averages 64%, and is close to 60% in most countries. This means, in part, that courts very rarely become involved in facilitating the resolution of disputes; the cost of doing so would be prohibitively high.

The insurance firm often settles claims for less than the value initially requested by the policyholder. This happens for two main reasons. First, as the example of the Italian claim illustrates, the policyholder may receive less than the value claimed when the assessor chosen by the company disagrees with the value of damages in the claim. Column 3 reports the value assessed by the expert appointed by the insurance company as a fraction of the value claimed by the policyholder. On average, the assessed value net of deductibles equals 88% of the value claimed by the policyholder.[8] This 12% wedge is one reason settlements are lower than claims.

Second, the policyholder may receive less than the value claimed because the settlement is lower than the net assessed value. To quantify this gap, the fourth column reports the final settlement value as a proportion of the net assessed value. This number ranges from 26% in Slovenia to 97% in the Netherlands. On average, the final settlement is 70% of the assessed damages. If we multiply the entries in columns 3 and 4, we see that policyholders on average receive 61%

[8] Deductibles are small in our data. The mean (median) deductible is 1.75% (0.023%) of the initial claim. The correlation between deductibles as a proportion of the initial claim and Trust (*Fairness*) is only −0.135 (0.279).

Table 2
Homeowners insurance claims data

Country	*Value claimed by insured (US$) (median)* (1)	*Claims below one month of average wage* (2)	*Net assessed value/initial claim* (3)	*Settlement/ net assessed value* (4)	*Settlement/ initial claim* =[3]×[4] (5)	*Claims fully rejected* (6)	*Settlement < net assessed value* (7)	*Final proposal days* (8)	*Claimant disputed decision* (9)	*Premium to sum insured* (10)
Argentina	1,802	0.40	0.88	0.67	0.59	0.15	0.45	163.5	0.35	0.19
Austria	1,687	0.75	0.99	0.92	0.91	0.10	0.20	306.3	0.20	0.12
Bulgaria	364	0.85	0.89	0.62	0.55	0.15	0.40	173.7	0.45	0.14
China	265	0.50	0.90	0.82	0.74	0.05	0.20	38.4	0.10	0.08
Colombia	741	0.50	0.80	0.62	0.50	0.35	0.45	173.6	0.45	0.14
Croatia	542	0.80	0.87	0.56	0.48	0.40	0.85	144.3	0.45	0.14
Ecuador	231	0.90	0.70	0.66	0.46	0.25	0.35	139.2	0.30	0.15
France	1,347	0.55	0.90	0.70	0.63	0.30	0.60	291.2	0.55	0.12
Germany	6,638	0.25	0.74	0.72	0.53	0.20	0.45	100.9	0.35	0.10
Greece	807	0.50	0.94	0.58	0.54	0.35	0.55	276.4	0.45	0.11
Hong Kong	970	0.55	0.84	0.71	0.60	0.20	0.60	81.5	0.20	0.06
Hungary	321	0.85	0.65	0.68	0.44	0.40	0.65	84.8	0.25	0.14
India	208	0.65	0.63	0.91	0.57	0.06	0.17	56.5	0.17	0.12
Italy	1,328	0.55	0.90	0.51	0.47	0.30	0.65	160.4	0.70	0.15
Japan	2,230	0.70	1.02	0.88	0.90	0.05	0.10	42.1	0.10	0.12
Mexico	291	0.60	0.93	0.65	0.60	0.30	0.35	191.6	0.40	0.15
Netherlands	2,236	0.50	0.95	0.97	0.92	0.10	0.30	58.2	0.10	0.03
Panama	1,235	0.45	0.89	0.91	0.80	0.15	0.60	85.7	0.25	0.10
Poland	285	0.55	0.71	0.53	0.37	0.35	0.85	152.9	0.65	0.17
Portugal	1,054	0.60	0.90	0.51	0.46	0.45	0.70	188.5	0.60	0.16
Romania	518	0.75	0.86	0.80	0.69	0.20	0.40	71.6	0.25	0.13
Serbia	160	0.80	1.06	0.56	0.59	0.20	0.40	181.4	0.25	0.11
Slovakia	347	0.75	1.04	0.69	0.72	0.30	0.45	96.7	0.20	0.09
Slovenia	428	0.80	1.01	0.26	0.26	0.40	0.80	173.8	0.60	0.16
Spain	562	0.90	n/a	0.83	n/a	0.15	0.30	52.8	0.10	0.10
Switzerland	2,595	0.60	0.90	0.87	0.78	0.05	0.30	74.9	0.05	0.12
Thailand	243	0.50	0.93	0.89	0.83	0.08	0.17	71.8	0.17	0.10
Turkey	321	0.75	0.83	0.51	0.42	0.30	0.80	232.8	0.65	0.15
Mean	1,063	0.64	0.88	0.70	0.61	0.23	0.47	138.0	0.33	0.12

The table shows, for each country, the value of the variables describing the first 20 homeowners insurance claims settled by the insurance firm in 2013 in each of the 28 countries in our study. The first column are medians. All other columns are means. Appendix A describes the variables.

of the value of their claims. In fact, as column 6 shows, worldwide 23% of the claims are rejected outright, with that number exceeding one-third in Colombia, Croatia, Greece, Hungary, Poland, Portugal, and Slovenia. The full rejection of claims is the main reason why only 61% of the original value claimed is paid out on average.

Column 7 combines total and partial rejections and shows that 47% of claims receive a settlement lower than the assessed value net of deductibles. In summary, roughly half (53% = 100% − 47%) of the claimants receive the full value of their claim as a proportion of net assessed value while one quarter of the claimants (i.e., 23%) receive nothing and another quarter (24% = 47% − 23%) receive 70% of the net assessed value of their claim.

The final settlement is lower than the net assessed value for several reasons. The most common reason is that the policy did not cover the damages (including that the client was negligent). This is the case for roughly one quarter of the claims in our sample. The second most-common reason leading to a settlement lower than the assessed damage value is a lack of evidence, missing documentation to prove the claim, or claims made too late. This group of reasons accounts for close to 11% of all the claims in the sample. Other reasons for partial recovery include capped coverage (7% of cases) and underinsurance (4% of cases).

Despite their simplicity, homeowners insurance claims take a long time to settle. As shown in column 8 of Table 2, the process takes 138 days on average, ranging from 38 days in China to 306 days in Austria. The average is close to the 122 days for the analogous variable reported in Table 1 using aggregate business segment data. Claims take a long time to settle partly because the insurance company and the policyholder disagree on the value of the damages. As column 9 shows, the average percentage of disputed claims in our sample is 33%, ranging from 5% in Switzerland to 70% in Italy. Only a tiny minority (0.12%) of these claims are actually legal disputes. Instead, most of the disputes are negotiations between the insurance company and the client.

The final column of Table 2 addresses the pricing of homeowners insurance. We gather data on pricing from our sample of roughly 40 insurance policy contracts per country (20 contracts from the sample of contracts signed in 2013 and 20 contracts from the claims sample).[9] We then compute the ratio of the premium charged by the insurer per $100 of the value of the coverage under the policy (total amount insured).[10] Unlike the analogous measure in Table 1, this measure does not solely reflect what policyholders pay, but also the amount insured. The average gross yearly premium per US$100 of value insured in our sample is 0.12, that is, the average annual cost of homeowners insurance is 0.12% of the value covered. As with other measures in this table,

[9] All results on pricing are qualitatively similar if we use only data from the sample of filed claims.

[10] For homeowners' insurance contracts, the total sum insured refers to the maximum amount that the insurance company will pay to rebuild a home in the event that the home is totally destroyed or badly damaged.

there is substantial variation across countries. The smallest insurance costs per US$100 of value covered ranges from less than 0.10 in China, Hong Kong, the Netherlands, and Slovakia. In contrast, yearly premiums are much higher, ranging from 0.16 to 0.19, in Argentina, Poland, Portugal, and Slovenia.

1.3 Correlations

Table 3 presents correlations between the business-segment-level variables on Tables 1 and claims data in Table 2. The table groups variables based on whether their source is aggregate statistics or the claims data. Three results emerge from these correlations. First, although the data from 20 claim cases are noisier than that aggregated at the segment level, the variables from the claims data are reassuringly highly correlated with their counterparts in the business segment data (e.g., the correlation is 59% for *Claims-to-policies vs. Claimant disputed decision*, 50% for *Rejected-claims-to-claims* vs. *Claim fully rejected*, and 90% for *ln(Settlement days)* vs. *ln(Final proposal days)*).

Second, payment of claims is much more contentious in some countries than others. Countries with more claims generally have more disputes, more rejections, lower payments relative to claims and even relative to estimates, and longer time to settle claims. This raises the question of whether systematic factors shape such conflict. Consistent with this heterogeneity, homeowners insurance is more costly in countries with more conflict between the insurance company and the claimant. The correlation between *Premium-to-sum-insured* and *Claims-to-policies* is 60% and it is 53% with the *Loss Ratio*. Relatedly, costs rise with disputes. The correlation between *Claims fully rejected* and both the *Expense ratio* and the *Loss ratio* is 53% and 71%, respectively. This country heterogeneity is the key feature of homeowners insurance that we seek to explain.

What determines these enormous differences in how countries pay homeowner insurance claims? Why do some have a smooth process, with nearly all claims accepted, and payments in line with claims, while others have high rejection rates and pay substantially less than the claims?

One possibility is that legal enforcement may shape these differences. This however may not be so realistic in a market where most claims are small and thus unlikely to be resolved "in the shadow of the law." A second hypothesis, articulated by Arrow (1974), is that for simple transactions, such as homeowner insurance contracts, trust and honesty norms are essential. From the Swiss and Italian data, comparing the differences in the proportion of rejected claims and the final settlement as a proportion of the value claimed, trust seems like a possibility. Even more striking are the differences between other high-trust countries, such as China and the Netherlands, and low-trust ones, such as Colombia, Portugal or Turkey. In fact, the raw correlations between trust and rejected claims and final settlement over initial claim are −0.63 and 0.59, respectively.

Table 3
Correlations between homeowners business segment variables and claims variables

	Business segment data							Claims data					
	Claims/ policies	*Rejected claims/ claims*	*ln(Settlement days)*	*Expense ratio*	*Loss ratio*	*Profit margin*	*ln(Gross written premiums/ policies)*	*Claimant disputed decision*	*Claims fully rejected*	*Settlement < net assessed value*	*Settlement/ net assessed value*	*Settlement/ initial claim*	*ln(Final proposal days)*
Business segment data													
Rejected claims/claims	0.13												
ln(Settlement days)	0.48**	0.71***											
Expense ratio	0.25	0.79***	0.52***										
Loss ratio	0.59***	0.40**	0.65***	0.44**									
Profit margin	−0.55***	−0.60***	−0.70***	−0.69***	−0.95***								
ln(Gross written premium/policies)	0.57***	−0.06	0.23	0.01	0.22	−0.16							
Claims data													
Claimant disputed decision	0.59***	0.45**	0.75***	0.57***	0.67***	−0.73***	0.25						
Claims fully rejected	0.54***	0.50***	0.61***	0.53***	0.71***	−0.74***	0.12	0.76***					
Settlement < net assessed value	0.40**	0.44**	0.51***	0.56***	0.50***	−0.56***	0.21	0.79***	0.82***				
Settlement/net assessed value	−0.54***	−0.62***	−0.71***	−0.60***	−0.64***	0.70***	−0.11	−0.83***	−0.81***	−0.76***			
Settlement/initial claim	−0.52***	−0.47**	−0.55***	−0.47**	−0.60***	0.62***	−0.07	−0.77***	−0.77***	−0.74***	0.88***		
ln(Final proposal days)	0.46**	0.48**	0.90***	0.49***	0.73***	−0.74***	0.42**	0.73***	0.60***	0.50***	−0.62***	−0.46**	
Premium to sum insured	0.60***	0.50***	0.60***	0.51***	0.53***	−0.60***	0.29	0.65**	0.48***	0.42***	−0.61***	−0.63***	0.54***

This table shows the correlations between country-level variables for the sample of 28 countries in our study. Appendix A describes the variables. *$p < .1$; **$p < .05$; ***$p < .01$.

If consumers and firms in countries with low levels of trust behave more oppurtunistically, then the settlement of claims will be more contentious in these countries. But what are the implications of this possibility? How does trust affect contracting? How does it distort settlement of claims? How does it affect prices and profits? And what is the role played by the law? To address these questions, we next present a model in which cultural and legal factors influence insurance contracts and markets. The model yields predictions that we then bring to the data.

2. A Model of Homeowners Insurance

A risk-averse consumer with increasing and concave utility $u(c)$ contracts with a risk-neutral firm to insure against an accident that occurs with probability $p<0.5$ and entails a loss L According to the contract, the consumer pays a premium P to the firm and receives an indemnity t in case of an accident. With this binary structure, there is no room for deductibles. This is consistent with our data, in which deductibles are very small, and in line with the evidence of consumers' strong distaste for sizable deductibles (Sydnor 2010), typically attributed to psychological factors.

The consumer and the firm observe the accident, but they may try to cheat. The consumer can claim an insured accident when there hasn't been one, and the insurer can deny the claim even after an insured accident. External verification is imperfect: the truth is found with probability v Verification could result from private negotiation and evidence production by the parties, or in rare cases from litigation in court. Higher v means that it is easier, privately or in court, to prove one's rightful claim. When $v=1/2$, the case is so uncertain or the law ineffective that external verification is a coin toss. In this case, if the consumer demands compensation and the firm denies it, and there is no way to determine who is right. Absent other incentives, contracting breaks down.

We assume that cheating is morally costly, to an extent that depends on the social prevalence of honest behavior. Suppose that in a society a fraction $(1-\tau_c)$ of consumers misreport to have suffered an accident and a fraction $\left(1-\tau_f\right)$ of insurers unjustly refuses to compensate for losses. By cheating, these agents seek a material benefit equal to the indemnity t received or avoided. We assume that the moral/psychological cost of cheating to be

$$\frac{1}{\theta}\cdot\left[(1-p)\tau_c+p\tau_f\right]\cdot t. \tag{1}$$

The moral costs are proportional to the illicit gain t. This is mostly a simplifying assumption, but it also captures the intuition that larger stakes increase moral shame for dishonesty. θ is a stochastic shifter of moral costs. It is distributed in $[0,+\infty)$ according to cdf $F(\theta)$

In Equation (1), people find it more costly to cheat when others around them are honest, namely, when τ_c and τ_f are high. Firms' honesty matters in the case of an accident, with probability p, consumers' honesty matters when the accident does not occur, with probability $1-p$. The dependence of the cost of cheating on average honesty can be due to social norms that people find it costly to violate, or to principles of fairness that sanction cheating honest people (but perhaps not dishonest ones). Either way, the end outcome is that the cost of misbehavior is higher in a society in which others are viewed as honest and/or trustworthy.

The prevalence of dishonesty exerts an externality on all insurers. At $\left(\tau_c, \tau_f\right)$, the insurance company must bear a sunk per-contract cost $\left[(1-p)(1-\tau_c)+p\left(1-\tau_f\right)\right]K$, which captures the costs of hiring assessors that catch dishonest clients, of managing disappointed customers, etc.

The timing of the interaction between consumers and firms is as follows.

$t=0$: the firm posts a contract (P,t) to maximize its profit subject to a "competition constraint".

$t=1$: the consumer chooses whether to buy (P,t) or keep his outside utility ω

$t=2$: the accident may occur. The consumer decides whether to file a claim. If the consumer files, the firm decides whether to pay. In this stage, both the consumer and the insurer can cheat.

$t=3$: if parties' are in conflict, the outcome is determined with the verification probability v.

Two clarifications are in order. First, the moral cost shifter θ is realized at $t=2$. This implies that there is no ex ante screening or signaling of moral costs. Allowing for this possibility may be a useful extension, particularly if insurers spend resources to screen clients with high moral costs. We leave this for future work. Second, a firm's competition constraint says that the profit per insurance contract cannot be greater than a constant $\pi \geq 0$, where lower π captures more competititon. When $\pi=0$ this constraint reduces to the usual zero profit condition. We later establish the precise implications of this constraint for the link between the premium P and t.

We formalize competition in a crude way: the profit parameter π and the consumer's outside option ω. The firm's objective function excludes future transactions, abstracting from the value of establishing a good reputation. These elements interact: competition among firms may induce them to behave honestly, reducing the role of trust and improving outcomes.

On the other hand, less efficient outcomes are also possible. Reputational mechanisms rely on observability. However, given the difficulty of verifying losses and the probability of accidents, it may be difficult for consumers to determine whether a firm or its customer has cheated. Firms may then attract customers by cutting prices while maintaining high profit margins by refusing to pay indemnities. With limited observability, this form of misbehavior might not be punished by consumers. Overall, it is not clear whether competitive forces spread honesty or misbehavior (see Shleifer 2004). To simplify the analysis, our model abstracts from these conflicting effects and focuses on trust, which is a more reliable determinant of good conduct. In Section 4.4, we return to these issues and try to empirically assess the role of competition.

2.1 Equilibrium trust

We solve the model starting from $t=3$. Conflict occurs if the consumer files a claim and the firm challenges it. If the firm challenges a valid claim, t is enforced when harm is correctly verified, which occurs with probability v. If the firm challenges an invalid claim, t is enforced if harm is incorrectly verified, with probability $(1-v)$. The outcome of conflict is stochastic.

Consider the implications of conflict for the decision of whether to cheat at $t=2$. If the accident has not occurred, the consumer chooses whether to cheat and make a claim. If the accident has occurred, the firm chooses whether to cheat and deny it. The no-cheating condition for a consumer to truthfully demand the indemnity as well as for a firm to accept to pay rightful claims is

$$(1-v)t-\frac{1}{\theta}\cdot\left[(1-p)\tau_c+p\tau_f\right]\cdot t\leq 0 \Longleftrightarrow \theta\leq\frac{(1-p)\tau_c+p\tau_f}{1-v}. \qquad (2)$$

A consumer or a firm trades off the material benefit from cheating, obtained with probability $(1-v)$, against its moral costs. Agents are honest when the moral cost of cheating is high (θ is low) relative to the moral relief entailed by honest behavior τ_c and τ_f in society. Better verification of the truth, higher v, cuts the benefit of cheating, making condition (2) easier to meet.

Equation (2) stipulates the same condition for honest behavior by firms and consumers. Because the distribution function $F(\theta)$ is common to them, the equilibrium is symmetric: $\tau_c=\tau_f=\tau$, and is pinned down by the condition:

$$\tau=F\left(\frac{\tau}{1-v}\right). \qquad (3)$$

Proposition 1. There is one dishonest equilibrium $\tau=0$. If $f(\theta)$ is decreasing and low moral costs are sufficiently common that $f(0)>1$, there is also one stable interior equilibrium with $\tau>0$. In this equilibrium, honesty monotonically increases with verifiability, and $\tau\to 1$ as $v\to 1$.

When dishonesty is the norm, $\tau=0$, individuals find it easy to cheat, so the norm becomes self-enforcing. Consumers always falsely report damages and firms reject legitimate claims, so trust in bilateral arrangements is low. Under some conditions, there is another stable social equilibrium in which some honesty is normal, $\tau>0$. Here consumers often truthfully report damages and firms pay legitimate claims, so they trust each other more. Trust in turn reduces the willingness to cheat, becoming self sustaining. In this equilibrium cheating is more prevalent for less verifiable claims (such as theft), when v is lower, since the benefit of getting away with cheating is the highest.

The self-enforcing nature of cooperation through norms of honest and fair behavior has been highlighted in previous work. Here, we take the honesty norms as given and ask two questions. First, how do they affect the implementation of a given insurance contract (P,t)? Second, how do they affect contracting in the first place, including insurance prices and firms' profits?

2.2 Trust and the payment of claims

We start by asking how higher trust, captured in the model by higher τ, affects the implementation of, and in particular disputes over, a given contract. In our data, the measureable outcomes are (1) the incidence of opened claims in the business unit data, (2) the prevalence of rejected claims and the length of settlement, which are available, both in the business-unit and in the claim-level data, and (3) the ratio of the final settlement to the initial claim, which is only available in the claims data. Our model makes the following predictions:

Prediction 1. Open claims as a share of all contracts, CL/C, rejected claims as a share of total claims, R/CL, and the average settlement amount over the initial claim SET are given by

$$CL/C = p+(1-p)(1-\tau), \tag{4}$$

$$R/CL = \frac{1-\tau}{p+(1-p)(1-\tau)}, \tag{5}$$

$$SET = \frac{p+(1-2p)(1-\tau)v}{p+(1-p)(1-\tau)}. \tag{6}$$

Higher trust τ reduces CL/C and R/CL, and increases SET.

When trust is low, many consumers file illegitimate claims, so there are many opened claims: CL/C is well above the accident probability p Higher trust means less cheating, and hence lower CL/C Likewise, when trust is low, insurance companies are not only highly suspicious of filed claims but also cheat and refuse to pay legitimate claims. As a result, rejected claims as a share of total claims R/CL is high. Higher trust reduces deception by both consumers and firms, reducing R/CL. This same outcome, R/CL, also captures in our model the probability that a claimant disputes a decision by the insurance company (which is available in the claims-level data), because consumers' and firms' objections are reciprocal.

Finally, when trust is low insurance companies refuse—legitimately or not—to pay many claims. As a result, the average settlement amount *SET* is a smaller fraction of the initial claim. Higher trust reduces cheating, increasing insurance companies' willingness to pay, so SET increases with trust. One way in which, when trust is low, firms can refuse to pay is by adopting a formalistic attitude with claims. Thus, the same mechanism implies that when trust is low the ratio between the settlement and the value assessed by the firm—another enforcement outcome we measure—is low. Of course, higher trust improves enforcement also along this metric.

Predictions regarding length of settlement, which we measure as *Settlement days* (in the accounting data) and as *Final proposal days* (in the claims data), are not independent outcomes of the model, but they naturally follow from the previous ones. When conflict is extensive, so that the number of open and rejected claims is high, settling claims takes more time. As a consequence, higher trust should also facilitate speedier settlement.

2.3 Claims-level data: Enforcement of theft versus nontheft claims

In the claims-level data, we measure claim outcomes, but we also have information about the type of claim filed. This is useful because different types of claims are likely characterized by different degrees of verifiability v, which should affect claims and payments according to the model. Consider the difference between theft and nontheft claims. The former are clearly less verifiable than the latter given that there is no obvious proof of theft. What does our model have to say about measured differences in the resolution of theft and nontheft claims and the role of trust?

To address this question, we must allow for heterogeneity among transactions. Suppose that some contracts have higher verifiability v than others. In each of these transactions, the extent of honest behavior is determined as a function of the level of aggregate trust τ across all contracts. From Equation (2), the frequency of honest behavior by firms and consumers in transaction v when aggregate trust is equal to τ is determined by the condition:

$$\tau(v,\tau)=F\left(\frac{\tau}{1-v}\right), \tag{7}$$

where aggregate trust τ is exogenous to any given category of claims, being determined across all claims according to $\tau=\int^{F}\left(\frac{\tau}{1-v}\right)g(v)dv$, where $g(v)$ is the density of type-v claims.

In this case, dishonesty and litigation in a given claim depends on its verifiability v but also on *aggregate* trust τ. Obviously, higher aggregate trust τ increases honesty in all claims. It is also immediate to see that more verifiable claims entail more honesty, formally $\frac{\partial\tau(v,\tau)}{\partial v}>0$. More interesting, suppose that the moral cost shifter θ is exponentially distributed with mean $1/\lambda$, where higher λ captures higher moral cost of cheating. As we show in Appendix D, if λ is higher than a threshold $\tilde{\lambda}$, then higher aggregate trust τ increases honesty more for less verifiable claims, namely, $\frac{\partial\tau(v,\tau)}{\partial v\partial\tau}<0$. That is, trust is a substitute for low v: it is especially important for less verifiable claims.

As we show in Appendix D, our model yields the following prediction concerning the less verifiable theft claims, which can be tested using our claims-level data.

Prediction 2. There are more theft claims in countries in which trust is lower. In a given country, theft claims exhibit, relative to nontheft ones: (1) more rejections, $\frac{\partial(R/CL)}{\partial v}<0$, and (2) lower settlements, $\frac{\partial SET}{\partial v}>0$ These differences shrink as aggregate trust increases, namely, $\frac{\partial(R/CL)}{\partial v\partial\tau}>0$, $\frac{\partial SET}{\partial v\partial\tau}<0$.

In difficult-to-verify accidents, such as theft, cheating is more likely to be successful. As a result, the expected benefit of cheating goes up, which increases disputes between consumers and firms; The share of rejected claims goes up and settlements go down. However, as we discussed above, trust is a substitute for verifiability. This means that as aggregate trust increases, consumers and firms behave more honestly, which disproportionally reduces disputes in theft claims relative to nontheft ones. The resolution of these claims should become similar in countries where trust is higher.

2.4 Trust and the cost structure

Consider now how trust affects the second set of measured outcomes, which capture the cost structure of firms: (1) the ratio of expenses to total premiums and (2) the ratio of claim payments to total premiums. These variables, available in the business unit data, capture transaction costs in insurance and the share of resources actually devoted to compensating consumers. Since in these data we cannot draw distinctions based on verifiability, we go back to considering a single transaction v Naturally, the cost structure depends on the premium P and the indemnity t written in the contract. To simplify, we perform comparative statics on trust under two assumptions. First, we hold t fixed. Second, and in line with the presence of multiple competitors in the industry we assume that firm is not a monopoly. Thus, the "competition constraint" is binding. This means that the price of a contract stipulating indemnity t is given by

$$P=\pi+[p+(1-2p)(1-\tau)(1-v)]t+(1-\tau)K. \tag{8}$$

Here the premium covers costs and the market profit rate π One source of costs is the payment of t. This event occurs with probability $p+(1-2p)(1-\tau)(1-v)$, which is above the accident rate p. Because accidents are rare ($p<0.5$), consumers have more occasions to untruthfully pretend that the accident occurred than for firms to pretend that an accident did not. Hence, even though consumers and firms cheat with the same intensity, cheating by consumers is ex ante more likely. Crucially, this implies that higher trust, τ, reduces the compensation that insurance companies must pay for given stipulated indemnity, t.

The second and key cost is the transaction expense, K of dealing with conflict. Assessors and staff must be hired, disgruntled customers must be attended to or replaced, and so on.

Prediction 3. Under $t=L$ and a binding competition constraint, the Expense ratio and the Loss ratio are given by

$$\textit{Expense ratio} = \frac{(1-\tau)K}{\pi+[p+(1-2p)(1-\tau)(1-v)]t+(1-\tau)K}, \quad (9)$$

$$\textit{Loss ratio} = \frac{[p+(1-2p)(1-\tau)(1-v)]t}{\pi+[p+(1-2p)(1-\tau)(1-v)]t+(1-\tau)K}. \quad (10)$$

Higher trust τ reduces the Expense ratio. It also reduces the Loss ratio provided π is high enough.

When trust τ is low, insurance companies spend a large amount of resources to protect themselves against illicit claims and to avoid paying even legitimate ones. As a result, a large share of resources raised through premiums is spent on these activities. Higher trust makes paying more attractive, thereby reducing the *Expense ratio*. Likewise, when trust is low many illicit claims are filed and some must be paid, absorbing a larger share of premiums. As a result, higher trust reduces the *Loss ratio* as well.[11]

2.5 The optimal contract, prices, and costs

Next, we show how the optimal contract (P,t) varies a function of τ, which yields predictions about two other outcomes that we measure: the premium over the insured value, P/t, and firm profits, namely, the product of margin (price minus cost) and sales. These variables are indicative of welfare. Intuitively, higher P/t ceteris paribus make insurance more expensive for consumers, and lower profits make it less valuable for firms, leading to lower gains from trade.

We solve for the optimal contract by neglecting for simplicity the moral costs of cheating that consumers and firms may expect to incur when fighting. The firm solves the following problem.

$$\max_{P,t} P-[p+(1-2p)(1-\tau)(1-v)]t-(1-\tau)K, \quad (11)$$

$$s.t. \qquad P-[p+(1-2p)(1-\tau)(1-v)]t-(1-\tau)K\in[0,\pi], \quad (12)$$

$$p[1-(1-\tau)(1-v)]u(t-L-P)+p(1-\tau)(1-v)u(-L-P)$$
$$+(1-p)[1-(1-\tau)(1-v)]u(-P)+(1-p)(1-\tau)(1-v)u(t-P)\geq\omega. \quad (13)$$

[11] As we discuss in the proof of Prediction 4, a sufficient condition for the prediction on the expense ratio to be robust when t is endogenous and/or the competition constraint is possibly slack, is that the optimal indemnity $t(\tau)$ is increasing in trust τ and the transaction cost K is large enough. The prediction on the loss ratio is instead fulfilled (in a way consistent with Prediction 4), when in addition the probability $p_t(\tau)$ with which the indemnity is paid drops sufficiently fast in trust so that $p_t(\tau)t(\tau)$ decreases in τ.

Equation (11) is the firm's profit, equal to the premium P minus the expected payment of the transfer minus transaction costs. Equation (12) states that the profit must be nonnegative and below the market level, π. If profits are above π, the firm loses the customer. If profits are negative, the firm does not sell the policy. We assume that when the firm makes exactly the market profit π it chooses the transfer t that maximizes consumer welfare. Equation (13) guarantees that the consumer is willing to buy the insurance contract, where the consumer's outside option is parameterized by ω.

As we show in Appendix D, the optimal contract has the following properties. With full trust, $\tau = 1$, the contract is perfectly enforced. As a result, the firm provides full insurance, $t = L$ As trust drops, τ falls, contract enforcement becomes imperfect. Thus, the firm provides less than full insurance $t < L$, it bears transaction costs K, and its profits fall.[12] The drop in profits is caused by two effects. First, when τ is lower, the enforcement of indemnity is less precise. The value of insurance drops, which reduces the amount of consumer surplus that the firm can extract via the premium P. Second, when τ is lower, the firm must pay higher deadweight transaction costs, which also reduces profits. This implies that as τ falls the insurance price P increases relative to the transfer t. When τ is low enough, these effects are so strong that gains from trade fall to zero and the insurance contract is not sold. This analysis leads to the following prediction.

Prediction 4. Higher trust τ increases the profits of the firm. With quadratic utility, it also reduces the ratio between the premium and the value insured P/t, provided transaction costs K are high enough.

When trust is low, cheating is widespread on both sides. As a result, the enforcement of insurance contracts is highly conflictual. This has two key consequences. First, it creates deadweight transaction costs, which render insurance expensive. Second, it distorts the enforcement of payments, which reduces the value of insurance. The fact that insurance is expensive and imperfect reduces consumer demand for this service, in turn reducing the profits of the firm.

3. Empirical Analysis of Model Predictions

Next, we assess model predictions with the data. We first look at predictions concerning trust/fairness and enforcement outcomes, which are described by Prediction 1. We then differentiate between theft and nontheft claims in the data, looking at predictions on the substitutability between trust and unverifiability,

[12] This is true provided the profit constraint is not binding. We show that this is indeed the case when cheating η is sufficiently severe, a scenario in which the firm must accept a lower profit to motivate the consumer to buy.

as described by Prediction 2. Next, we look at the relationship between trust/fairness and the cost structure, as described by Prediction 3. Finally, we consider the link between trust/fairness and prices and firm profits, as described by Prediction 4.

3.1 Trust, fairness, and claims

According to Prediction 1, countries with higher trust should exhibit fewer opened claims, fewer rejected claims, and higher settlement rates. Table 4 presents a cross-country analysis of these predictions. The dependent variables for the regressions in panels A and C are business unit data, those in panels B and D are from the claims data. To proxy for honesty in panels A and B is *Trust*, which is the standard measure from the World Values Survey defined as the percentage of respondents who answered that "generally speaking, most people can be trusted." In panels C and D, we repeat the analysis using *Fairness* as the alternative proxy for honesty, defined as a country indicator of whether in transactions "most people try to be fair." We also consider a frequently used measure of efficiency of the judiciary defined as an estimate (in calendar days) of the duration of dispute resolution for the collection of a bounced check from the moment a plaintiff files the lawsuit in court, until the moment of actual payment (Djankov et al. 2003). We use *ln(Check collection)* to capture the fact that the legal system may affect verifiability v (even though many claims are so small that court enforcement is highly unlikely). Finally, all specifications also control for *ln(GDP per capita)* in the regressions. Appendix E presents correlations of these and other explanatory variables.

Panel A presents the results using business unit data. Consistent with the predictions of the model, panel A shows that higher *Trust* is associated with fewer claim initiations, fewer claim rejections, and fewer days to settle. The effect of a one-standard-deviation increase in *Trust* (roughly the difference between Japan and France) is to reduce claim initiations by 0.36 of a standard deviation, claim rejections by 0.67 of a standard deviation, and days to settle by 0.47 of a standard deviation. Trust seems to have sizable economic effects on insurance disputes.

The results for *ln(Check collection)*, our measure of judicial inefficiency, are much weaker. The only statistically significant result is that judicial inefficiency is associated with more claim initiations, that is, a one-standard-deviation increase in the length of time it takes to collect on a bounced check increases the fraction of claim initiations by 0.47 of a standard deviation. A higher *ln(GDP per capita)* is associated with *more* claim initiations and longer time to settle, which reinforces the view that it is trust rather than development that leads to smoother functioning insurance markets.

Panel B presents the results using claims data. Consistent with the findings in panel A, *Trust* is associated with fewer disputes and rejections, settlements that are more generous, and a faster settlement process. The estimates imply that a one-standard-deviation increase in *Trust* is associated with a reduction in

Table 4
Homeowners insurance business segment and claims data

A. Business segment data and trust

	Claims/policies (1)	*Rejected claims/claims* (2)	*ln(Settlement days)* (3)
ln(GDP per capita)	0.0750***	0.0219	0.2495**
	[0.017]	[0.020]	[0.118]
Trust	−0.2393**	−0.4296***	−1.8840*
	[0.093]	[0.150]	[0.992]
ln(Check collection)	0.0546**	−0.0050	0.1709
	[0.022]	[0.020]	[0.131]
Constant	−0.8073***	0.1215	1.7333
	[0.189]	[0.219]	[1.196]
Observations	25	25	25
Adj. R^2	53.6%	31.1%	27.8%

B. Claims data and trust

	Claimant disputed decision (1)	*Claims fully rejected* (2)	*Settlement < net assessed value* (3)	*Settlement/ initial claim* (4)	*Settlement/ net assessed value* (5)	*ln(Final proposal days)* (6)
ln(GDP per capita)	0.0939**	0.0793***	0.1581***	−0.0138	−0.0759*	0.4247***
	[0.038]	[0.023]	[0.048]	[0.046]	[0.038]	[0.113]
Trust	−0.7639**	−0.5940***	−0.8010**	0.5892**	0.5477**	−2.5264***
	[0.313]	[0.145]	[0.330]	[0.210]	[0.253]	[0.762]
ln(Check collection)	0.0900	0.0452*	0.0685	−0.0744	−0.0943*	0.2372*
	[0.053]	[0.022]	[0.067]	[0.047]	[0.047]	[0.135]
Constant	−0.8838*	−0.6552***	−1.2704**	0.9903*	1.8313***	−0.1048
	[0.490]	[0.249]	[0.561]	[0.539]	[0.478]	[1.118]
Observations	26	26	26	25	26	26
Adj. R^2	48.3%	54.2%	32.1%	41.9%	48.5%	49.8%

(*Continued*)

disputes by 0.54 of a standard deviation, a fall in rejections by 0.66 of a standard deviation, and a decline in the *ln (Final proposal days)* by 0.59 of a standard deviation. The estimates also imply that a similar increase in *Trust* is associated with a reduction of 0.51 of a standard deviation in the fraction of *Settlements-lower-net-assessed-value*, and higher ratios of *Settlement-to-initial-claims* and *Settlement-to-net-assessed-value* by 0.47 and 0.46 of a standard deviation, respectively.

The top graph in Figure 2 illustrates the results for *Claims fully rejected* and *Trust*. By comparison, *ln(Check collection*) is associated with more rejected claims, settlements that are less generous, and a slower settlement process. The bottom graph in Figure 2 illustrates the result for *Claims fully rejected* and *ln(Check collection*). Again, the evidence for *ln(GDP per capita)* indicates that, if anything, insurance markets are more contentious in richer countries. The results for *Trust* hold also without the per capita income control.

Panels C and D of Table 4 present results using *Fairness* instead of *Trust*. Results for *Fairness* are weaker for the business segment data variables (panel C) than for the claim data variables (panel D). For the business

Table 4
(Continued)

C. Business segment data and fairness

	Claims/policies (1)	*Rejected claims/claims* (2)	*ln(Settlement days)* (3)
ln(GDP per capita)	0.0608***	−0.0017	0.1307
	[0.016]	[0.023]	[0.103]
Fairness	−0.0248	−0.0579***	−0.2163
	[0.016]	[0.020]	[0.157]
ln(Check collection)	0.0676***	0.0143	0.2639**
	[0.019]	[0.016]	[0.093]
Constant	−0.6648***	0.4560	3.1103*
	[0.189]	[0.312]	[1.511]
Observations	24	24	24
Adj. R^2	48.4%	29.5%	22.1%

D. Claims data and fairness

	Claimant disputed decision (1)	*Claims fully rejected* (2)	*Settlement < net assessed value* (3)	*Settlement/ initial claim* (4)	*Settlement/ net assessed value* (5)	*ln(Final proposal days)* (6)
ln(GDP per capita)	0.0534	0.0424	0.1277**	0.0251	0.0402	0.2680*
	[0.038]	[0.030]	[0.047]	[0.039]	[0.038]	[0.131]
Fairness	−0.0990**	−0.0588**	−0.1082**	0.0734**	0.0671*	−0.2420*
	[0.043]	[0.022]	[0.051]	[0.031]	[0.034]	[0.137]
ln(Check collection)	0.1265***	0.0781*	0.1098*	−0.1010**	−0.1193***	0.3801***
	[0.039]	[0.021]	[0.058]	[0.041]	[0.041]	[0.117]
Constant	−0.3377	−0.3017	−0.8179	0.4939	1.3823**	1.3367
	[0.615]	[0.388]	[0.714]	[0.555]	[0.608]	[1.679]
Observations	25	25	25	24	25	25
Adj. R^2	45.1%	39.6%	33.0%	41.0%	46.4%	37.1%

This table presents ordinary least squares (OLS) regressions. Robust standard errors are shown in brackets under each coefficient. Appendix A describes the variables. $*p < .1$; $**p < .05$; $***p < .01$.

segment data variables, *Fairness* is statistcailly significant only for *Rejected-claims-to-claims*. Specifically, a one-standard-deviation increase in *Fairness* (approximately the difference in *Fairness* scores between Austria and Italy) is associated with a drop in *Rejected claims* of 0.54 of a standard deviation. In contrast, *Fairness* is statistically significant in all six of our claims data variables in panel D. A one-standard-deviation increase in *Fairness* lowers *Claimant disputed decision* and *Claims fully rejected* by 0.42 and 0.39 of a standard deviation, respectively, and the *ln(Final proposal days)* by 0.34 of a standard deviation. The estimates also imply that a similar increase in *Fairness* is accompanied by a decrease in *Settlements-lower-net-assessed-value* of 0.41 of a standard deviation and increases in *Settlement-to-initial-claims* and *Settlement-to-net-assessed-value* of 0.32 and 0.33 of a standard deviation, respectively.

The results on *Check collection* are stronger when we control for *Fairness* (panels C and D) rather than *Trust* (panels A and B). When we control for *Fairness*, *Check collection* is statistically significant in eight regressions rather than in only four when controlling for *Trust*. The estimates imply sizeable

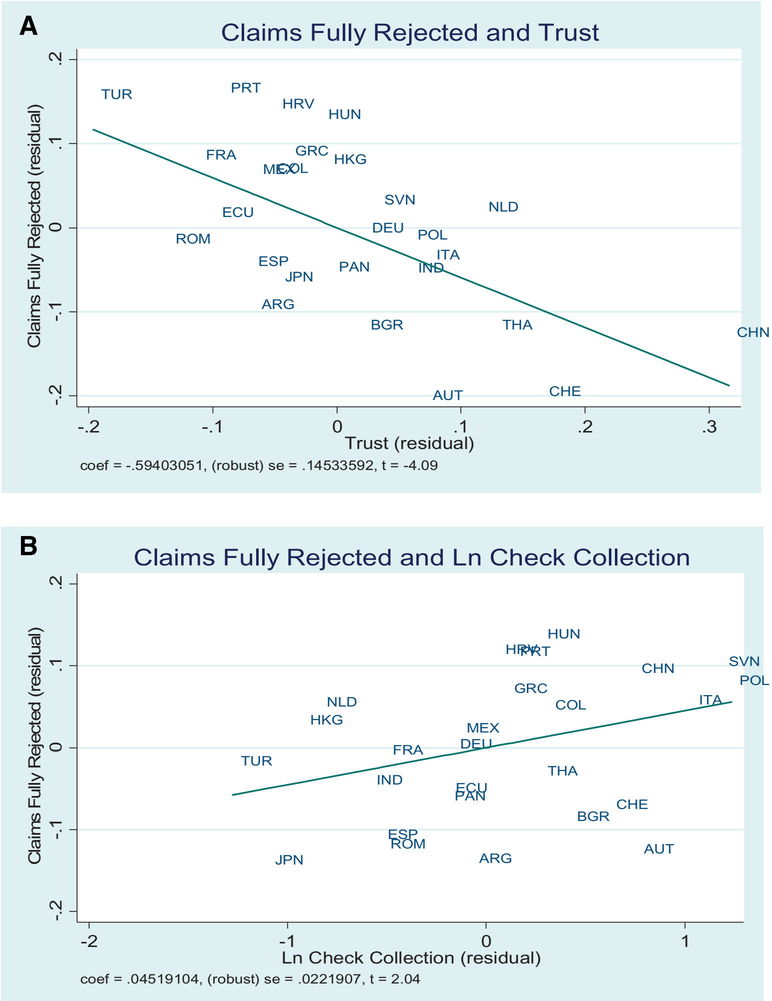

Figure 2
Partial correlation plots of *Claims fully rejected* versus *Trust* (top) and *ln(Check collection)* (bottom). In both panels, we control for *Trust*, *ln(Check collection)*, and *ln(GDP per capita)*.

effects. To illustrate the magnitude of the effects, if we stick to the claims data, a one-standard-deviation increase in the length of time it takes to collect on a bounced check increases the claim disputes, claim rejections and the length to conclude the claim process by 0.53, 0.50, and 0.52 of a standard deviation. A similar one-standard-deviation increase in *ln(Check collection)* implies a reduction of 0.48 and 0.58 of a standard deviation for settlements as a proportion of initial claims and net assessed values, respectively. Meanwhile, when we control for *Fairness*, results for *ln(GDP per capita)* are much weaker:

income per capita is only significant in three regressions rather than in seven when controlling for *Trust*. Overall, the results for both *Trust* and *Fairness* are consistent with the predictions of the model. The results for the quality of the legal system and per capita income are not as uninform, but suggest that the level of development and the quality of the legal system support the functioning of insurance markets as well.

3.2 Theft versus nontheft claims

According to Prediction 2, higher trust should be especially beneficial for the enforcement of claims that are difficult to verify. In that regard, the consensus among industry practitioners is that theft claims are the most difficult to verify. For each country c and outcome variable Y, we compute the difference between the average value for theft claims ($Y_{c,Theft}$) and the average value for all other claims ($Y_{c,Nontheft}$) Because theft claims are the most difficult to verify, they constitute our low verifiability group. Since data about why the claimant suffered damages comes from our data set on claims, we can only implement our empirical strategy for the outcomes variables in panel B of Table 4.[13] One concern with this analysis is that different countries have different incidence of theft. To address this concern, we obtained from the *World Justice Project* a measure of theft victimization rate for each country, defined as the theft rate per person divided by the reporting rate of theft (these numbers are derived from the United Nations data).

We regress the difference between the outcomes of theft and nontheft claims on *Trust*, *ln(Check collection)*, *ln(GDP per capita)*, and *Theft victimization rate*, that is,

$$\begin{aligned} & Y_{c,Theft} - Y_{c,Nontheft} \\ & \quad = \alpha + \beta_1 Trust + \beta_2 \ln(Check\ collection) \\ & \qquad + \beta_3 \ln(GDP\ per\ capita) + \beta_4 Theft\ victimization\ rate + \varepsilon_c. \qquad (14) \end{aligned}$$

We also run a similar regression using *Fairness* in lieu of *Trust*. The model predicts that $\beta_1 < 0$ when the dependent variable is a proxy for cheating and $\beta_1 > 0$ when it is a proxy for the generosity of the settlement. Opposite predictions are made for β_2

Table 5 reports regression results using *Trust* in panel A, and *Fairness* in panel B, controlling for *ln(Check collection)*, *ln(GDP per capita)*, and *Theft victimization rate*, in all specifications. The first outcome variable is the fraction of theft claims. As Figure 3 illustrates, in the cross-section, the fraction of theft claims sharply declines with *Trust*, while *ln(Check collection)* plays no role, consistent with the notion that theft claims are very difficult to verify and *Trust* inhibits bad behavior. In addition, the results in columns 2 through 7 of panel A

[13] Austria and Japan report no theft claims in our sample, so we drop these countries from Table 5.

Table 5
Difference between theft claims and nontheft claims

		A. Trust					
		Difference between theft claims and nontheft claims					
	Theft claims (1)	*Claimant disputed decision* (2)	*Claims fully rejected* (3)	*Settlement < net assessed value* (4)	*Settlement/ initial claim* (5)	*Settlement/net assessed value* (6)	*ln(Final proposal days)* (7)
ln(GDP per capita)	−0.1597***	0.0886	0.1179*	0.0200	−0.1149**	−0.0948*	0.1557
	[0.029]	[0.075]	[0.065]	[0.062]	[0.053]	[0.051]	[0.133]
Trust	−0.4763***	−1.0599**	−1.1487***	−1.2536***	0.8243***	0.8378**	−1.5331*
	[0.140]	[0.410]	[0.359]	[0.373]	[0.248]	[0.300]	[0.753]
ln(Check collection)	0.0098	0.1532***	0.0074	0.0682	0.0091	0.0122	−0.0446
	[0.032]	[0.054]	[0.055]	[0.043]	[0.035]	[0.042]	[0.085]
Theft victimization rate	1.8915	−3.3570	−0.8633	−2.0613	2.7602	1.4492	−0.0418
	[1.145]	[2.358]	[3.058]	[1.927]	[1.863]	[1.771]	[4.384]
Constant	1.8855***	−1.0514*	−0.6353	0.0010	0.6153	0.4257	−0.6284
	[0.37]	[0.558]	[0.526]	[0.559]	[0.520]	[0.472]	[1.293]
Observations	26	24	24	24	23	24	24
Adj. R^2	59.9%	59.1%	27.8%	58.7%	38.9%	35.1%	12.1%

		B. Fairness					
		Difference between theft claims and nontheft claims					
	Theft Theft (1)	*Claimant disputed decision* (2)	*Claims fully rejected* (3)	*Settlement < net assessed value* (4)	*Settlement/ initial claim* (5)	*Settlement/net assessed value* (6)	*ln(Final proposal days)* (7)
ln(GDP per capita)	−0.1883***	0.0008	0.0243	−0.0911	−0.0216	−0.0183	0.0166
	[0.036]	[0.074]	[0.092]	[0.095]	[0.059]	[0.057]	[0.086]
Fairness	−0.0400	−0.1657**	−0.0917*	−0.1482***	0.0957***	0.1075**	−0.2252**
	[0.028]	[0.058]	[0.051]	[0.050]	[0.028]	[0.038]	[0.102]
ln(Check collection)	0.0392	0.1861***	0.0741	0.1228**	−0.0245	−0.0205	0.0050
	[0.030]	[0.045]	[0.051]	[0.047]	[0.034]	[0.038]	[0.056]
Theft victimization rate	2.0521	−1.0539	0.3045	−0.1138	0.7006	0.1973	3.3846
	[1.542]	[3.312]	[4.631]	[3.741]	[2.859]	[2.696]	[5.109]
Constant	2.1006***	0.2440	0.1392	1.2530	−0.4037	−0.4972	1.2605
	[0.460]	[0.861]	[0.959]	[1.105]	[0.667]	[0.723]	[1.043]
Observations	25	23	23	23	22	23	23
Adj. R^2	51.1%	61.2%	4.31%	47.3%	25.4%	24.4%	11.3%

This table presents OLS regressions. Robust standard errors are shown in brackets under each coefficient. Appendix A describes the variables. *$p < .1$; **$p < .05$; ***$p < .01$.

support the prediction that *Trust* plays a larger role in mitigating opportunism for claims that are more difficult to verify than for claims that are easier to verify. As predicted by the model, *Trust* is associated with relatively less conflict, as proxied for by fewer disputes, fewer rejections, and faster settlements, and relatively more generous settlements, as proxied for by fewer settlement lower than net assessed value and higher ratios of settlements-to-initial-claim and settlements-to-net-assessed-value.

The estimated coefficients in panel A of Table 5 imply that a one-standard-deviation increase in *Trust* is associated with a reduction in the difference between *Claims fully rejected* for theft and nontheft claims of 0.65 of a standard deviation. Figure 4 sheds light into this result. The top panel shows the partial correlation plot for fully rejected theft claims and *Trust*, while the bottom panel shows the corresponding graph for nontheft claims. While the coefficient for

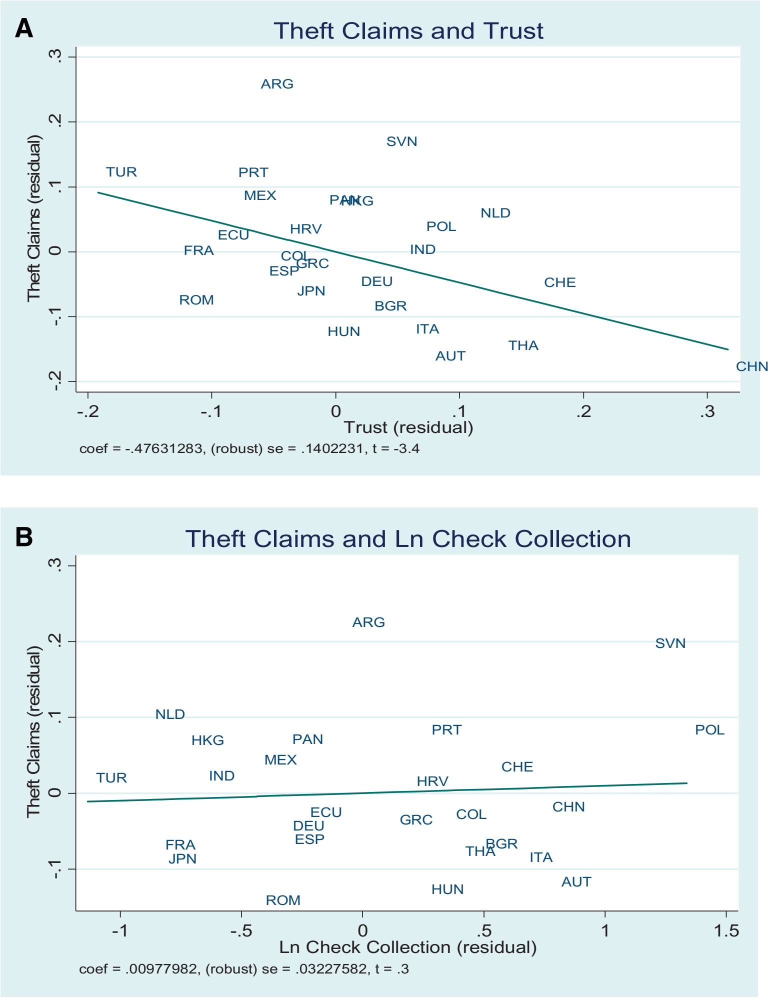

Figure 3
Partial correlation plots of *Theft claims* versus *Trust* (top) and *ln(Check collection)* (bottom). In both panels, we control for *Trust*, *ln(Check collection)*, and *ln(GDP per capita)*.

Trust is negative in both panels of Figure 4, it is much larger in absolute value for theft claims than for nontheft ones. Results for *Fairness* in panel B confirm that honesty is associated with relatively less conflict and more generous terms for theft versus nontheft claims.[14]

[14] We also collected from the *World Justice Project* data on (1) *Theft rate per person,* (2) *Burglary rate per person,* and (3) *Burglary victimization rate.* The results in Table 5 are qualitatively similar if we replace *Theft victimization rate* by any of these other proxies for crime.

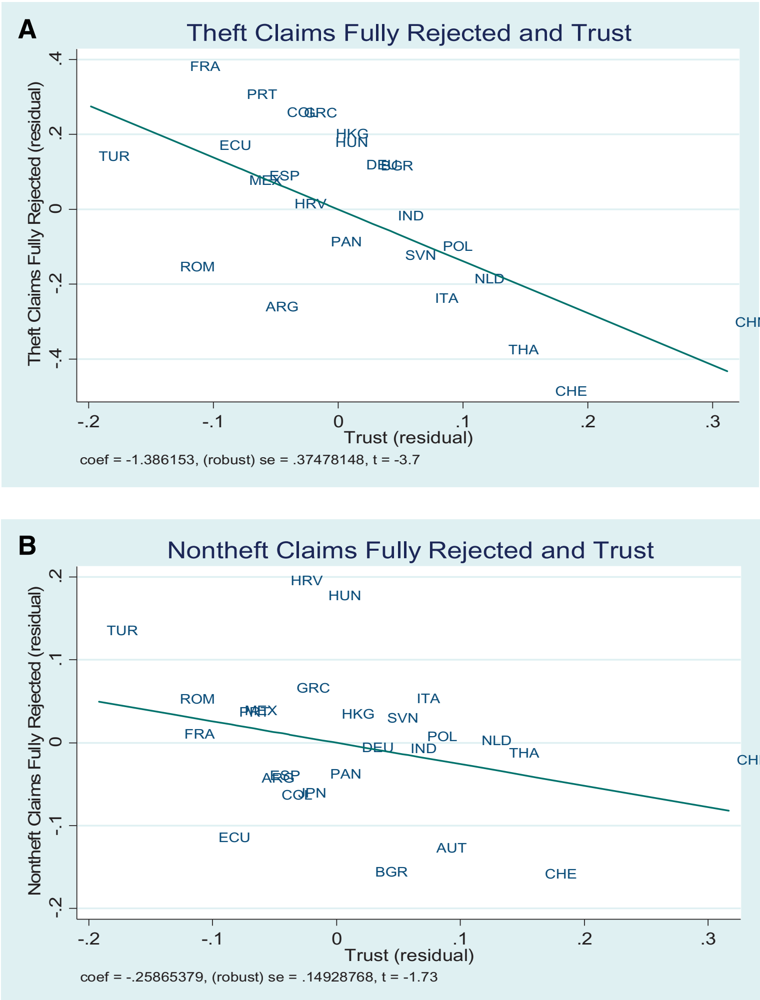

Figure 4
Partial correlation plots of *Theft claims fully rejected* **(top) and** *Nontheft claims fully rejected* **(bottom) versus** *Trust***. In both panels, we control for** *Trust*, *ln(Check collection)*, **and** *ln(GDP per capita)***.**

3.3 Costs, prices, and profits

In Prediction 3, higher trust affects the cost structure: it reduces both the loss ratio and the expense ratio. Prediction 4 holds that it reduces annual premiums (prices) and raises profits.

Table 6 addresses these predictions. As before, we include *ln(Check collection)* and *ln(GDP per capita)* in all regressions, and, alternatively, look at *Trust* and *Fairness*. Begin with the results on *Trust* in panel A. Consistent with

Table 6
Costs, profit margins, and Premiums

A. Trust				
	Expense ratio (1)	*Loss ratio* (2)	*Profit margin* (3)	*Premium to sum insured* (4)
ln(GDP per capita)	0.0214	0.1086**	−0.0949***	0.0039
	[0.025]	[0.041]	[0.030]	[0.005]
Trust	−0.3669***	−0.8273***	0.9335***	−0.1385***
	[0.101]	[0.197]	[0.198]	[0.031]
ln(Check collection)	−0.0014	0.0356	−0.0220	0.0171***
	[0.015]	[0.025]	[0.024]	[0.006]
Constant	0.2961	−0.5705	0.8959***	0.2890
	[0.250]	[0.421]	[0.276]	[0.047]
Observations	25	26	25	26
Adj. R^2	39.7%	60.9%	67.2%	67.9%

B. Fairness				
	Expense ratio (1)	*Loss ratio* (2)	*Profit margin* (3)	*Premium to sum insured* (4)
ln(GDP per capita)	0.0045	0.0591	−0.0432	−0.0047
	[0.026]	[0.037]	[0.034]	[0.005]
Fairness	−0.0434**	−0.0804***	0.0982***	−0.0155**
	[0.015]	[0.026]	[0.026]	[0.007]
ln(Check collection)	0.0184	0.0868***	−0.0737***	0.0241***
	[0.016]	[0.017]	[0.020]	[0.005]
Constant	0.4949	−0.1136	0.3737	0.1262**
	[0.340]	[0.426]	[0.390]	[0.049]
Observations	24	25	24	25
Adj. R^2	29.6%	40.0%	44.8%	61.1%

This table presents OLS regressions. Robust standard errors are shown in brackets under each coefficient. Appendix A describes the variables. *$p<.1$; **$p<.05$; ***$p<.01$.

Prediction 3, the estimated coefficients for *Trust* imply that a one-standard-deviation increase in *Trust* is associated with a reduction in the expense and loss ratios of 0.75 and 0.77 of a standard deviation, respectively. Turning to Prediction 4, we assess profitability by the ratio of after tax profits to gross written premiums and prices by the ratio of the gross yearly premium paid by the claimant to the total sum insured in the year before the claim was settled. The estimated coefficients for *Trust* imply that a one-standard-deviation increase in *Trust* is associated with an increase in profit margins of 0.86 of a standard deviation and a reduction in premium to sum insured of 0.58 of a standard deviation. Panel B confirms these results for *Fairness*.

The results in panel A of Table 6 also show that *ln(Check Collection)* is largely insignificant with the exception of *Premium to sum insured*. Meanwhile, *ln(Check Collection)* is significant with the exception of the *Expense ratio*. Finally, *ln(GDP per capita)* is associated with modestly higher losses and lower profit margins. The estimated coefficients for *ln(GDP per capita)* imply that a one-standard-deviation increase in *ln(GDP per capita)* is associated with an increase in the loss ratio of 0.44 and a decrease in profit margins of 0.38 of a standard deviation, respectively.

In sum, *Trust* and *Fairness* matter for both price margins and profitability, as predicted by the theory.[15,16]

3.4 Competition

In this subsection, we examine the role of market competition. We try to assess a nuanced mechanism not present in the model, namely, whether competition can substitute for trust in mitigating misbehavior. In this respect, as we argued in Section 3, the effects of competition are ambiguous. On the one hand, competition may make it costly for insurance companies to behave opportunistically for fear of losing customers, and as such act as a substitute for trust and judicial efficiency. But competition may also lead to a race to the bottom: if company misconduct is difficult to observe, insurance companies may cut costs and prices by refusing claims. In a highly competitive environment, this effect may be so strong that every firm may need to misbehave to survive in the market (Shleifer 2004). Nonetheless, we take a preliminary empirical look.

To create market competition measures, we use data for the nonlife insurance segment. We follow Thorburn (2008) and create Herfindahl-Hirschman indexes (HHI) of market concentration for the top-10, top-5 and top-3 companies, the aggregate market share of the top-10, top-5 and top-3 companies, the (log) number of insurance companies in each country, and our insurance firm's market share and rank in each market. As for other industries, each of these measures has its own limitations and may not be able to capture the true nature of competition in the market. For instance, different firms may dominate different parts of the nonlife segment, reducing the informativeness of our HHI index for competition in the homeowner insurance segment. Alternatively, different firms may be dominant in different regions of a country, again reducing the informativeness of HHI.

Panels A and B in Appendix F show what happens to the results in Table 4 when we add the *HHI top 10* (i.e., the Herfindahl-Hirschman index for the top-10 nonlife insurance companies in each country).[17] The estimated coefficients for *Trust* and *ln(Check Collection)* remain largely unchanged by the additional control variable in both panels. Note that while *Trust* remains statistically significant in all regressions, *ln(Check Collection)* is statistically significant in only two regressions. Trust remains the consistently significant predictor of the outcomes we measure. Finally, panels C and D in Appendix F show that the results on *Trust* for theft versus nontheft claims in Table 5 and for costs, prices,

[15] As a further robustness check, we controlled for the incidence of crime in Tables 4 and 6 (i.e., we added, one at a time, *Theft victimization rate, Theft rate per person, Burglary rate per person,* and *Burglary victimization rate*). These proxies for crime are occasionally significant (i.e., in Table 6). Most importantly, the results for *Trust* and *Fairness* are unaffected by the inclusion of these proxies for crime.

[16] We also ran all the regressions in the paper using the average of *Trust* and *Fairness* (since those two variables are measured on different scales, we standardized their values before averaging them). Results using the average of *Trust* and *Fairness* are very similar to those reported in Tables 4, 5, and 6 and are available on request.

[17] We ran all regressions in the paper using the other competition variables described in the previous paragraph and found very similar results.

and premiums in Table 6 are robust to controlling for market competition. The coefficients for *HHI top 10* in Appendix F are mostly statistically insignificant and suggest no clear pattern. Panels A, B, C, and D of Appendix G repeat all the specifications in Appendix F but include *Fairness* instead of *Trust*. Results are qualitatively similar.[18,19]

4. Conclusion

We have proposed a new model of homeowners insurance, in which consumers can make invalid claims and firms can deny valid claims. In this environment, especially when the disputes are too small for courts, trust and honesty are critical factors that shape insurance contracts. We described the equilibrium insurance contracts in this model, and showed how they depend on the quality of the legal system and the level of trust. We then brought the predictions of the model to a data set of both business unit data and individual claims data, for 28 independently operated country business units of a multinational insurance firm. We studied the filing of claims, the disputes over claims, the rejections of claims, and the payment of claims in this data, as well as the cost and pricing of insurance. We used to measures of trust, a standard indicator of trust in others from the World Values Survey, and a separate indicator of fairness in transactions.

Particularly with respect to trust and fairness, the evidence is broadly consistent with the predictions of the model. It is not consistent with a basic neoclassical model which sees insurance as just a reallocation of cash flows across states of the world. Cultural factors shape insurance markets in economically meaningful ways, just as they shape other spheres of human activity.

Our paper raises a broader set of unanswered questions of how market mechanisms can function in a low-trust environment. Arrow (1974) was skeptical that they can, but perhaps he underestimated the effectiveness of market forces. Insurance illustrates some possibilities. For example, contracts

18 We also ran alternative specifications including measures of corruption and income inequality (i.e., the Gini coefficient). These variables are statistically insignificant in most regressions. The main results of the paper in terms of *Trust* and *Fairness* survive the inclusion of these variables.

19 An interesting question is whether *Trust* is correlated with the size of insurance markets. Ideally, to examine that idea, we would want cross-country data on a relatively standard insurance contract with little regulation (such as homeowners insurance). Unfortunately, such data are unavailable. Instead, cross-country data on insurance premiums for the life and nonlife segments are available. We collected data on insurance premiums from the annual World Insurance reports published by the Swiss Re Institute for the years 2010 to 2014 and computed time-series averages of the log of (1) nonlife premiums as a percent of GDP, (2) life premiums as a percent of GDP, and (3) the sum of nonlife and life premiums as a percent of GDP. We regressed these three measures of the size of the insurance market on our standard control variables plus *Trust* and, alternatively, *Fairness*. For our sample of 28 countries, we find that the estimated coefficients for *Trust* and *Fairness* are positive and significant. However, results for *Trust* and *Fairness* are weaker for a larger sample of countries. Specifically, *Trust* is significant only for the size of the life sector in a sample of 64, whereas *Fairness* is significant for both the size of the life sector and the sum of the life and nonlife sectors in a sample of 59 countries. Cross-country differences in regulatory policies as well as in the mix of public and private insurance may account for this result.

can adjust to facilitate transactions, perhaps through increased deductibles. This approach limits the scope of insurance, and may be unattractive to people who want to insure small risks, but it may prove beneficial for large transactions, which can also rely on (imperfect) court enforcement. A second market mechanism is reputation. Some firms can try to cover more claims without disputes, and establish a reputation for integrity. This entails losses if customers cheat, but perhaps these losses can be limited or avoided if a reputation for integrity attracts more honest clients. This strategy may benefit the entire market in the long run only if the good behavior of many insurers changes the social norm from cheating to honesty, in turn fostering better customer behavior. This is not, however, the only possibility: market competition could spread mistrust and norms of cheating as competitors seek to cut costs. Exploring these possibilities opens up interesting avenues for future work.

Appendix A

Table A1
Variable definitions

Explanatory variables	
Trust	Percentage of the population that answered that most people can be trusted when asked the question "generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people." Average of all values available for each country between 2000 and 2014. Data come from the World Values Survey.
Fairness	Average score given by respondents to the question "do you think that most people would try to take advantage of you if they got the chance, or would they try to be fair?" The answer is provided in a 10-point scale, where 1 corresponds to "most people try to take advantage of me," and 10 corresponds to "most people try to be fair." Data come from the European Values Study 2008 when available (i.e., 18 countries) and otherwise from the World Values Survey closest in date to 2008.
ln(Check collection)	Natural logarithm of the total estimated duration in calendar days of the court procedure for the collection of a bounced check. Data come from Djankov et al. (2003).
ln(GDP per capita)	Natural logarithm of the 2010 Gross Domestic Product per capita (purchasing power parity current international dollars). Data come from the World Development Indicators.
Theft victimization rate	The number of thefts per person divided by the fraction of theft cases reported to a competent authority. Data from the World Justice Project using data from the United Nation's UNODC and UNICRI projects on crime rates and reporting rates.
HHI top 10	Herfindahl-Hirschman index of concentration in the non-life-insurance market among the top-10 insurance companies during the period 2010–2014. Calculated using data on insurance premiums. Data come from the Swiss Re Institute.
Business segment data	
Claims	Number of homeowners insurance claims made to the insurance firm in a calendar year. Average for the years 2010 to 2012.
Number of policies	Number of homeowners insurance policies of the insurance firm in a calendar year. Average for the years 2010 to 2012.
Rejected claims	Number of homeowners insurance claims rejected by the insurance firm as a proportion of homeowners insurance claims made to the insurance firm in a calendar year. Average for the years 2010 to 2012.
Settlement days	Average number of days it takes to settle a homeowners insurance claim from the date of the filling of the claim to the date of the settlement of the claim. Settled claims include rejected claims, claims settled by negotiation, and claims settled in court in a calendar year. Average for the years 2010 to 2012.
Expense ratio	Sum of acquisition costs and general expenses divided by *Gross written premiums*, that is, percentage of premium used to pay the costs of acquiring, writing, and servicing homeowners insurance policies in a calendar year. Acquisition costs are the cost accrued by the insurance firm in relation to efforts involved in acquiring a new customer, including marketing and advertising, incentives, commissions, discounts, and the staff associated with these activities along with other sales staff. General expenses include employee wages, advertising, legal fees, and other general and administrative expenses. Average for the years 2010 to 2012.
Loss ratio	Value of settled claims, claim settling expenses, and loss adjustment expenses over *Gross written premiums* in a calendar year. It represents the premiums to cover the claims and expenses related to those claims. Average for the years 2010 to 2012.
Profit margin	Equals the ratio of after-tax profits to *Gross written premiums* in a calendar year.We define profits as the difference between *Gross written premiums* and the sum of (1) acquisition costs, (2) general expenses, (3) settled claims, (4) claim settling expenses, and (5) loss adjustment expenses. We use statutory corporate tax rates to impute taxes. Average for the years 2010 to 2012. Data on corporate tax rates are from KPMG.

(*Continued*)

Table A1
(Continued)

Gross written premiums	Total gross written premiums charged by the insurance firm to provide the coverage described in each homeowners policy in a calendar year. Average for the years 2010 to 2012.
Claims data	
Value claimed by insured or *initial claim*	Value of the damages the insured party claims at the beginning of the claim process. If the insured makes multiple claims, we take the first one. It equals the technically assessed value of the claim when the claimant leaves it up to the insurance firm to assess the value of the damage. Data come from the first 20 claims settled in 2013.
Claims below one month of average wage	Percentage of claims in each country that are smaller than the average monthly wage in the country in 2012. Data on wages from the International Labor Organization Statistics. Data come from the first 20 claims settled in 2013.
Net assessed value	Value assessed by an expert paid by the insurance firm of the damages reported by the claimant, net of applicable deductibles. Typically, the experts carrying out the assessment of damages are not employees of the insurance firm. Data from the first 20 claims settled in 2013.
Settlement	Value at which the claim is finally settled. Data from the first 20 claims settled in 2013.
Claims fully rejected	Equals one if the claim was rejected by the insurance firm, and zero otherwise. Data from the first 20 claims settled in 2013.
Settlement < net assessed value	Equals one if the claim was partially or fully rejected by the insurance firm resulting in a settlement lower than the *Net assessed value*. The main reasons for rejection include: (1) limited or capped coverage, (2) the damage is not covered in the policy, (3) the claimant was negligent, (4) lack of evidence or missing documents to prove the claim, and (5) claim made out of time. Data from the first 20 claims settled in 2013.
Final proposal days	Average number of days between filing a claim and the insurance firm's final settlement proposal. Data from the first 20 claims settled in 2013.
Claimant disputed decision	Equals one if the claimant disputed the insurance firm decision regarding her claim. Disputes include legal processes as well as complaints filed with the insurance firm. The variable is zero otherwise. Data from the first 20 claims settled in 2013.
Premium to sum insured	Gross yearly premium payed by the claimant per US$100 of total sum insured in the year before the claim is settled. The total sum insured is the maximum amount of money that the insurance firm might have to pay according to the insurance contract. Data from the first 20 claims settled in 2013.
Theft claims	Claims for theft damages as a proportion of the total number of claims received. The causes of damage include the following categories: (1) theft or burglary, (2) water, (3) fire, (4) external factors, such as a natural disaster or atmospheric event, (5) deterioration or malfunction, (6) vandalism or violence, (7) disputes with others, (8) bodily injury, and (9) other causes. Data from the first 20 claims settled in 2013.

This table provides detailed definitions of the variables we use in the analysis.

Appendix B

Table B1
Country coverage and information requested and obtained from each branch of the insurance firm

Country	GDP per capita PPP in 2010 (US$)	Continent	Legal origin	Business segment data	Contract and claim information	Actual contracts (number)	Actual claims (number)	Laws & regulations
Argentina	18,712	America	French Civil Law	Yes	Yes	20	20	Yes
Austria	43,336	Europe	German Civil Law	Yes	Yes	20	20	Yes
Bulgaria	15,283	Europe	German Civil Law	Yes	Yes	20	20	Yes
China	9,352	Asia	German Civil Law	Yes	Yes	20	20	Yes
Colombia	10,901	America	French Civil Law	Yes	Yes	20	20	Yes
Croatia	20,118	Europe	French Civil Law	Yes	Yes	20	20	Yes
Ecuador	9,352	America	French Civil Law	Yes	Yes	20	20	Yes
France	36,872	Europe	French Civil Law	Yes	Yes	20	20	Yes
Germany	40,429	Europe	German Civil Law	Yes	Yes	20	20	Yes
Greece	28,726	Europe	French Civil Law	Yes	Yes	20	20	Yes
Hong Kong	48,108	Asia	English Common Law	Yes	Yes	20	20	Yes
Hungary	22,404	Europe	German Civil Law	Yes	Yes	20	20	Yes
India	4,405	Asia	English Common Law	Yes	Yes	20	18	Yes
Italy	36,201	Europe	French Civil Law	Yes	Yes	20	20	Yes
Japan	35,750	Asia	German Civil Law	Yes	Yes	20	20	Yes
Mexico	15,535	America	French Civil Law	Yes	Yes	20	20	Yes
Netherlands	45,525	Europe	French Civil Law	Yes	Yes	20	20	Yes
Panama	15,419	America	French Civil Law	Yes	Yes	20	20	Yes
Poland	21,771	Europe	German Civil Law	Yes	Yes	20	20	Yes
Portugal	27,238	Europe	French Civil Law	Yes	Yes	20	20	Yes
Romania	17,818	Europe	French Civil Law	Yes	Yes	20	20	Yes
Serbia	12,688	Europe	French Civil Law	Yes	Yes	20	20	Yes
Slovakia	25,159	Europe	German Civil Law	Yes	Yes	20	20	Yes
Slovenia	28,678	Europe	German Civil Law	Yes	Yes	20	20	Yes
Spain	32,507	Europe	French Civil Law	Yes	Yes	20	20	Yes
Switzerland	55,866	Europe	German Civil Law	Yes	Yes	20	20	Yes
Thailand	13,487	Asia	English Common Law	Yes	Yes	20	12	Yes
Turkey	17,959	Asia	French Civil Law	Yes	Yes	20	20	Yes

The table shows the scope of the data that we requested and obtained from the branches of the insurance firm in the 28 countries of our study. Data pertains only to the homeowners segment. For each country, we requested segment data from the underwriting and the claims departments of the insurance firm. We obtained business segment, contract, and claim data for all countries. The contract and claim information includes (a) the common homeowners contract, (b) additional modules that may be added to it, (c) all contract forms, (d) all contract information and explanations given to the insured, (e) all claim information and explanations given to the insured, and (f) all claim forms to be filed in in case of a claim. The columns on actual contracts and actual claims show the number of contracts and claims obtained. The table also shows data for GDP per capita as well as the continent and legal origin of the commercial laws of each country in the sample.

Appendix C

Table C1
Information requested about the homeowners insurance business segment

	Explanation/format requested	Year 1	Year 2	Year 3
1. Underwriting Department				
List of risks covered in the policy	Provide the full list of risks covered in the typical policy.			
List of risks that could be covered under the policy	Provide the list of additional risks that could be covered under this policy.			
Number of policies subscribed & break up by peril				
a. Water damages				
b. Fire				
c. liability				
d. Other (1)				
e. Other (2)				
f. Other (3)				
Gross written premium	Renewed portfolio (specify currency).			
Gross written premium	New portfolio (specify currency).			
Acquisition costs (percent of Total Gross written premium)	Percentage of average acquisition costs as a percentage of total gross written premium.			
General expenses (percent of Total Gross written premium)	Average general expenses as percentage of total gross written premium.			
2. Claims Department				
Number claims made	Claims reported and incurred in the calendar year.			
Amount of claims made	Payments, internal costs and reserves of claims above. Please specify if net or gross of deductible. Provide amounts net of deductibles if possible.			
Number claims reopened	Claims that were reopened in the calendar year.			
Amount of claims reopened	Payments, internal costs and reserves of claims above. Please specify if net or gross of deductible. Provide amounts net of deductibles if possible.			
Number claims settled/paid	Ready adjusted claims (closed cases) with payment.			
Value of claims settled/paid	The payment of the above claims.			
Average time to settle	Average number of days to settle a claim.			
Average time to settle material damages' claims	Average number of days to settle material damages claims.			
Average time to settle bodily injury claims	Average number of days to settle bodily injury claims.			
Average time to settle third party liability claims	Average number of days to settle third party liability claims.			
Average time to respond	Average number of days to first respond to a claim.			
Number of claims going into court/arbitration/dispute				
Value of claims going into court/arbitration/dispute				
Number of claims rejected	Rejected claims = claims without payment gross of deductibles.			
Value of claims rejected	Value of finally rejected claims.			
Average claim settlement expenses (%)	Claim settlement expenses as percentage of gross written premiums.			
Loss ratio				
Combined loss ratio				
Deductibles applied:	Calculated total amount of deductibles applied in case of payment.			
a. Water damages				
b. Fire				
c. liability				
d. Other				
Breakup of the amount of claims of main categories:				
a. Water damages				
b. Fire				
c. liability				
d. Other				

This table shows the business segment information that we requested from the branches of the insurance firm in the 28 countries of our study. The request asked for data for the years of 2010 to 2012.

Appendix D. Proofs

Proof of Proposition 1. Define $x = \frac{1}{1-v}$ Then, the equilibrium is $\tau = F(\tau x)$, where $F(.)$ Is the cdf of θ. The function $F(\tau x)$ is such that $F(0)=0$ because $\theta \geq 0$. As a result, $\tau = 0$ is always an equilibrium. Furthermore, $F(\tau x)$ is increasing and concave in τ because $f(\theta) > 0$ and $f'(\theta) < 0$ We also know that at $\tau = 1$, $F(x) \leq 1$ Thus, if $f(0) > 1$ there is a equilibrium $\tau \in (0,1]$ with $\tau = 1$ for $v \to 1$. Because at the interior equilibrium it must be that $\partial F(\tau x)/\partial \tau = f(\tau x)x < 1$, we have that

$$\frac{\partial \tau}{\partial x} = \frac{f(\tau x)\tau}{1 - f(\tau x)x} > 0, \tag{D1}$$

so that τ increases in verifiability v.

Prediction 1. The proof of the prediction immediately follows by inspection of Equations (4), (5), and (6). Higher τ reduces CL/C and R/CL, and increases SET.

Prediction 2. Equilibrium honesty in transaction v is pinned down by $\tau(v,\tau) = F\left(\frac{\tau}{1-v}\right)$. To ease notation, we write $\hat{\tau} = \tau(v,\tau)$ Since $F(.)$ is increasing, we can immediately prove that $\tau(v,\tau)$ increases in its arguments. Under an exponential distribution $f(\theta) = \lambda e^{-\lambda\theta}$, the equilibrium becomes

$$1 - \hat{\tau} = e^{-\lambda \frac{\tau}{1-v}}. \tag{D2}$$

It is immediate to find that

$$\frac{\partial \hat{\tau}}{\partial \tau} = \left(\frac{\lambda}{1-v}\right) e^{-\lambda\left(\frac{\tau}{1-v}\right)} > 0. \tag{D3}$$

It is then immediate to see that

$$\frac{\partial^2 \hat{\tau}}{\partial \tau \partial v} = \frac{\lambda}{(1-v)^2} e^{-\lambda\left(\frac{\tau}{1-v}\right)} - \left(\frac{\lambda}{1-v}\right)^2 \left(\frac{\tau}{1-v}\right) e^{-\lambda\left(\frac{\tau}{1-v}\right)}, \tag{D4}$$

so that $\frac{\partial \hat{\tau}}{\partial \tau \partial v} < 0$ if and only if $\lambda\tau > 1 - v$ For any $v < 1$, this holds true provided λ is large enough (note that higher λ also exerts an indirect effect, increasing aggregate trust τ).

Consider now the predictions about litigation. First, more verifiable claims have lower R/CL Second, more verifiable claims have higher SET Indeed,

$$\frac{\partial \frac{R}{CL}}{\partial v} = -\frac{p}{\left[p + (1-p)\left(1-\hat{\tau}\right)\right]^2} \frac{\partial \hat{\tau}}{\partial v} < 0, \tag{D5}$$

$$\frac{\partial SET}{\partial v} = \frac{(1-2p)\left(1-\hat{\tau}\right)\left[p + (1-p)\left(1-\hat{\tau}\right)\right] + \frac{\partial \hat{\tau}}{\partial v} p\left[(1-p)(1-v) + pv\right]}{\left[p + (1-p)\left(1-\hat{\tau}\right)\right]^2} > 0. \tag{D6}$$

Consider now the effects of aggregate trust on these gaps.

$$\frac{\partial \frac{R}{CL}}{\partial v \partial \tau} = -p \frac{\frac{\partial^2 \hat{\tau}}{\partial v \partial \tau}\left[p + (1-p)\left(1-\hat{\tau}\right)\right] + 2(1-p)\frac{\partial \hat{\tau}}{\partial \tau}\frac{\partial \hat{\tau}}{\partial v}}{\left[p + (1-p)\left(1-\hat{\tau}\right)\right]^3}, \tag{D7}$$

which is positive provided

$$\frac{\partial^2 \hat{\tau}}{\partial v \partial \tau}\left[p + (1-p)\left(1-\hat{\tau}\right)\right] + 2(1-p)\frac{\partial \hat{\tau}}{\partial \tau}\frac{\partial \hat{\tau}}{\partial v} < 0. \tag{D8}$$

Under the exponential distribution this is equivalent to

$$[1 - \lambda\tau(1-v)]\left[pe^{\lambda\left(\frac{\tau}{1-v}\right)} + (1-p)\right] + 2(1-p)\left(\frac{\lambda}{1-v}\right)\tau < 0, \tag{D9}$$

which is also fulfilled for λ sufficiently large. A similar result holds for SET:

$$\frac{\partial^2 SET}{\partial v \partial \tau} \propto \left[\frac{\partial^2 \hat{\tau}}{\partial v \partial \tau} \left[p+(1-p)\left(1-\hat{\tau}\right) \right] + 2(1-p)\frac{\partial \hat{\tau}}{\partial \tau}\frac{\partial \hat{\tau}}{\partial v} \right]$$

$$[(1-p)(1-v)+pv] - \left[p+(1-p)\left(1-\hat{\tau}\right) \right](1-2p)\frac{\partial \hat{\tau}}{\partial \tau}. \quad \text{(D10)}$$

Thus, a sufficient condition for $\frac{\partial^2 SET}{\partial v \partial \tau} < 0$ is that $\frac{\partial \frac{R}{CL}}{\partial v \partial \tau} > 0$, which we established before to be true for λ sufficiently large, which we express as $\lambda > \hat{\lambda}$.

Prediction 3. The proof of the prediction follows by inspection of Equations (9) and (10).

Prediction 4. Consider first the monopoly problem of a firm selling insurance to a captive consumer. We later study the role of the profit constraints in Equation (12).

$$\max_{P,t} P - [p+(1-2p)e]t - (1-\tau)K \quad \text{(D11)}$$

$$s.t. p(1-e)u(t-L-P)+peu(-L-P)+(1-p)(1-e)u(-P)+(1-p)eu(t-P) \geq \omega. \quad \text{(D12)}$$

For simplicity define $e=(1-\tau)(1-v)$ as the probability of an enforcement error. Recall for the comparative statics that there is an inverse relationship between the error rate e and trust $\tau \cdot \mu$ denotes the Lagrange multiplier associated with the constraint. The first-order conditions are

$$P: \qquad 1-\mu\sum_{s\in S} p_s u'_s = 0, \quad \text{(D13)}$$

$$t: \qquad -p_t+\mu\sum_{s\in S_t} p_s u'_s = 0, \quad \text{(D14)}$$

where S is the set of all states (accident without error, accident with error, no accident without error, and no accident with error), S_t is the set of states where t is paid (accident without error and no accident with error), p_t is the total probability that t is paid, p_s is the probability of state s, and u'_s is marginal utility in state s The following two properties hold.

First, $\mu > 0$. If $\mu = 0$ the firm could raise the premium while still having the consumer to participate. Second, by the two first order conditions, the average marginal utility obtained across states in which t is paid should be equal to the average marginal utility obtained across states in which t is not paid.

Consider now the implications of these two properties. If trust is full, $\tau = 1$, the error rate is zero, $e=0$. Then, t is paid if an only if there is an accident, so the optimal contract equalizes the marginal utility $u'(t-L-P)$ when the accident occurs with the marginal utility $u'(-P)$ when the accident does not occur. The optimal contract achieves full insurance, $t=L$, and the first best is obtained.

Suppose that the first best contract is signed and a small amount of enforcement errors $e > 0$ is added. Then, the average marginal utility when $t=L$ is paid drops because $u'(L-P) < u'(-P)$, and the average marginal utility when $t=L$ is not paid increases because $u'(-L-P) > u'(-P)$. If at this point t is increased above L, and P is increased so that buyer participation stays binding (which as we will see below requires $dP = p_t dt$), the marginal utility in states where the transfer is not paid raises even further, while the marginal utility in states where the transfer is paid goes further down relative to the case $t=L$. As a result, $t=L$ is excessive and in the optimal contract less than full insurance is provided, namely, $t < L$. Low trust reduces coverage. Of course, it also creates transaction costs.

If trust is very low, $\tau = 0$, contract enforcement is highly distorted and transaction costs are prohibitive. If K is large enough and/or if v sufficiently close to $1/2$, the firm must make negative profits to induce the consumer to buy. The insurance market breaks down.

Consider now the effect of higher trust on firm profits (first part of Prediction 4). If the competition constraint is binding, it means that insurance creates enough surplus that the contract is signed and it also means that the profit per contract is fixed. As a result, trust does not affect profits. Suppose that the competition constraint is slack. Here, P is determined by the consumer's participation constraint. By the envelope theorem, an increase in τ causes the following change in profits at the optimum:

$$\frac{\partial \Pi}{\partial \tau} \propto (1-2p)t + K - \mu\{p[u(-L-P)-u(t-L-P)]+(1-p)[u(t-P)-u(-P)]\}. \quad \text{(D15)}$$

If we disregard the transaction cost K, then a sufficient condition for the profit to increase is

$$\frac{(1-2p)t}{\mu} + p[u(t-L-P)-u(-L-P)]-(1-p)[u(t-P)-u(-P)] > 0. \quad \text{(D16)}$$

At the optimum, $1/\mu$ is the average marginal utility across states in which t is paid but also the average marginal utility across states in which t is not paid. We can rewrite this as

$$-pt\sum_{s\in S_t}\left(\frac{p_s}{p_t}\right)u'_s + (1-p)t\sum_{s\notin S_t}\left(\frac{p_s}{1-p_t}\right)u'_s$$
$$+p[u(t-L-P)-u(-L-P)]-(1-p)[u(t-P)-u(-P)] > 0, \quad \text{(D17)}$$

which in turn can be rewritten as

$$p\left[u(t-L-P)-u(-L-P)-t\sum_{s\in S_t}\left(\frac{p_s}{p_t}\right)u'_s\right]$$
$$+(1-p)\left[t\sum_{s\notin S_t}\left(\frac{p_s}{1-p_t}\right)u'_s - [u(t-P)-u(-P)]\right] > 0. \quad \text{(D18)}$$

Because the marginal utility across states in which t is paid is always lower than or equal than $u'(t-L-P)$, the first term in square bracket is positive by concavity of utility. Because the marginal utility across states in which t is not paid is always higher than or equal than $u'(-P)$, the second term in square brackets is also positive by concavity of utility. Thus, profits increase with trust.

Consider now the comparative statics concerning P/t (second part of Prediction 4). Under quadratic utility $u(c)=c-\frac{\gamma}{2}c^2$ it is easy to find, using the optimality condition $\sum_{s\in S_t}(p_s/p_t)u'_s = \sum_{s\notin S_t}(p_s/1-p_t)u'_s$ that t is equal to

$$t=\left[\frac{1-(1-\tau)(1-v)}{p+(1-2p)(1-\tau)(1-v)} - \frac{(1-\tau)(1-v)}{(1-p)-(1-2p)(1-\tau)(1-v)}\right]pL. \quad \text{(D19)}$$

t increases in τ. Using this expression for t, let us study the behavior of P/t. Two cases should be considered. In the first case, the competition constraint is binding, and we have

$$\frac{P}{t} = \frac{\pi+(1-\tau)K+[p+(1-2p)(1-\tau)(1-v)]t}{t}. \quad \text{(D20)}$$

It is immediate to see that as τ inceases, this ratio falls for given t. Furthermore, higher trust τ increases t, which further reduces P/t because $\pi+(1-\tau)K>0$.

If the competition constraint is not binding, then P is set so that the consumer is indifferent between buying insurance and his outside option ω. By differentiating the consumer's participation constraint with respect to e (akin to a drop in τ), we obtain:

$$-p[u(t-L-P)-u(-L-P)]+(1-p)[u(t-P)-u(-P)]+\frac{p_t}{\mu}\frac{dt}{de} - \frac{1}{\mu}\frac{dP}{de} = 0. \quad \text{(D21)}$$

This implies

$$\frac{dP}{de}=p_t\frac{dt}{de}+\mu\Delta, \tag{D22}$$

where $\Delta\equiv -p[u(t-L-P)-u(-L-P)]+(1-p)[u(t-P)-u(-P)]$. P/t increases with e (and hence drops with trust τ) provided:

$$\frac{dP}{de}t-\frac{dt}{de}P>0\Leftrightarrow\frac{dt}{de}(P-p_t t)-\mu\Delta t<0. \tag{D23}$$

Because the insurer is making positive profits, we have that $P-p_t t>(1-\tau)K>0$. Furthermore, the same reasoning used to show that profits increase in trust implies that $\Delta<(1-2p)t/\mu$. As a result, a sufficient condition for P/t to go down with trust is that:

$$\frac{dt}{de}(1-\tau)K-(1-2p)t^2<0. \tag{D24}$$

Because $\frac{dt}{de}<0$, the condition is fulfilled provided K is large enough.

Consider finally the implications of an endogenous indemnity t for the quantities in Prediction 3. With respect to the expense ratio ER nothing changes. Consider first the case in which the competition constraint is binding (which is the one considered in Section 2.4). In this case, ER this quantity unambiguously decreases in trust τ when t is fixed, and so it continues to decrease in trust when t increases with trust, too. In the case of quadratic utility, t montonotically increases in trust, so the prediction concerning ER is confirmed in this case. Suppose now that the competition constraint is slack. In this case, a sufficient condition for ER to drop in trust is that transaction cost K be large enough. Indeed, previous analysis implies that when the competition constraint is slack:

$$\frac{dP}{d\tau}=\frac{dP}{de}\frac{de}{d\tau}=p_t\frac{dt}{d\tau}-\mu\Delta(1-v), \tag{D25}$$

so that, $ER=(1-\tau)K/P$ is decreasing in τ provided:

$$-KP-(1-\tau)K\frac{dP}{d\tau}<0\Leftrightarrow P+(1-\tau)\left[p_t\frac{dt}{d\tau}-\mu\Delta(1-v)\right]>0, \tag{D26}$$

so that, considering as before that profits must be nonnegative $P>p_t t+(1-\tau)K$ and that $\Delta<(1-2p)t/\mu$, a sufficient condition for ER to decrease in trust is equal to

$$p_t t+(1-\tau)\left[K+p_t\frac{dt}{d\tau}-(1-2p)t(1-v)\right]>0, \tag{D27}$$

which is fulfilled provided K is large enough. Thus, prediction 3 on ER is confirmed in the entire range provided $\frac{dt}{d\tau}>0$ as in the case of quadratic utility and K is large enough.

The prediction with respect to the loss ratio LR is more complex. The reason is that the loss ratio can be rewritten as:

$$LR=p_t\frac{t}{P}. \tag{D28}$$

That is, the loss ratio is equal to the overall probability of paying the transfer times the inverse of the price margin. The fact that the price margin P/t decreases with τ, as from Prediction 4, tends to cause the loss ratio to increase with trust, contrary to prediction 3. Despite this force, the loss ratio can still decrease in trust if higher τ strongly reduces the probability of payment p_t. In particular, it is easy to check that Prediction 3 for the loss ratio remains valid when the expected payment $p_t t$ decreases in trust. This prediction is not fulfilled in the quadratic utility case, because in this case $p_t t$ can be shown to increase in trust. However, it is fulfilled provided the probability of payment is sufficiently more sensitive to trust than the optimal indemnity t.

Appendix E

Table E1
Correlations between Explanatory Variables

	ln(GDP per capita)	*Trust*	*Fairness*	*ln(Check collection)*	*Theft victimization rate*
Trust	0.43**				
Fairness	0.25	0.76***			
ln(Check collection)	−0.13	−0.52***	−0.28		
Theft victimization rate	0.55***	0.23	0.33*	0.12	
HHI top 10	−0.20	−0.29	−0.23	0.37*	−0.31

This table shows the correlations between the explanatory variables used in the paper for the 28 countries in our study. Appendix A describes the variables. *$p<.1$; **$p<.05$; ***$p<.01$.

Appendix F

Table F1
Trust and product market competition

A. Business segment data

	Claims/policies (1)	*Rejected claims/claims* (2)	*ln(Settlement days)* (3)
ln(GDP per capita)	0.0724***	0.0255	0.2378**
	[0.019]	[0.019]	[0.118]
Trust	−0.2335**	−0.4376***	−1.8531*
	[0.099]	[0.152]	[1.017]
ln(Check collection)	0.0589**	−0.0107	0.1942
	[0.024]	[0.022]	[0.142]
HHI top 10	−0.1437	0.2731	−1.0259
	[0.340]	[0.327]	[1.443]
Constant	−0.7960***	0.0961	1.7985
	[0.200]	[0.212]	[1.179]
Observations	25	25	25
Adj. R^2	51.7%	29.8%	24.8%

B. Claims data

	Claimant disputed decision (1)	*Claims fully rejected* (2)	*Settlement < net assessed value* (3)	*Settlement/ initial claim* (4)	*Settlement/ net assessed value* (5)	*ln(Final proposal days)* (6)
ln(GDP per capita)	0.0959**	0.0888***	0.1777***	−0.0211	−0.0880**	0.3881***
	[0.036]	[0.022]	[0.049]	[0.047]	[0.033]	[0.116]
Trust	−0.7679**	−0.6127***	−0.8390**	0.6007***	0.5713**	−2.4550***
	[0.321]	[0.125]	[0.308]	[0.205]	[0.226]	[0.810]
ln(Check collection)	0.0866	0.0291	0.0358	−0.0612	−0.0739	0.2987**
	[0.059]	[0.030]	[0.083]	[0.051]	[0.044]	[0.139]
HHI top 10	0.1596	0.7560*	1.5406	−0.6666	−0.9564*	−2.8914*
	[0.517]	[0.417]	[0.925]	[0.620]	[0.528]	[1.490]
Constant	−0.8973*	−0.7196***	−1.4015***	1.0425*	1.9127***	0.1414
	[0.478]	[0.217]	[0.492]	[0.522]	[0.420]	[1.080]
Observations	26	26	26	25	26	26
Adj. R^2	45.9%	58.8%	38.0%	41.8%	52.2%	51.8%

(*Continued*)

Table F1
(Continued)

C. Difference between theft claims and nontheft claims

	Theft claims (1)	*Claimant disputed decision* (2)	*Claims fully rejected* (3)	*Settlement < net assessed value* (4)	*Settlement/ initial claim* (5)	*Settlement/net assessed value* (6)	*ln(Final proposal days)* (7)
ln(GDP per capita)	−0.1596***	0.0926	0.1157*	0.0185	−0.1151**	−0.0985*	0.1714
	[0.029]	[0.075]	[0.066]	[0.065]	[0.051]	[0.048]	[0.126]
Trust	−0.4752***	−1.0940**	−1.1298***	−1.2411***	0.8504***	0.8692***	−1.6659**
	[0.140]	[0.402]	[0.396]	[0.404]	[0.227]	[0.297]	[0.747]
ln(Check collection)	0.0106	0.1304*	0.0200	0.0766	0.0291	0.0332	−0.1335
	[0.032]	[0.069]	[0.080]	[0.062]	[0.043]	[0.052]	[0.124]
Theft victimization rate	1.8626	−2.9385	−1.0950	−2.2151	2.2613	1.0634	1.5892
	[1.290]	[2.624]	[3.364]	[2.223]	[1.969]	[1.753]	[5.125]
HHI top 10	−0.0330	0.6859	−0.3798	−0.2522	−0.6328	−0.6324	2.6731
	[0.730]	[1.273]	[1.258]	[0.980]	[0.546]	[0.633]	[2.071]
Constant	1.8837***	−1.0206*	−0.6524	−0.0103	0.5618	0.3973	−0.5085
	[0.354]	[0.548]	[0.540]	[0.585]	[0.536]	[0.485]	[1.299]
Observations	26	24	24	24	23	24	24
Adj. R^2	57.9%	57.8%	24.3%	56.6%	38.3%	34.5%	17.7%

D. Costs, profit margins, and profits

	Expense ratio (1)	*Loss ratio* (2)	*Profit margin* (3)	*Premium to sum insured* (4)
ln(GDP per capita)	0.0234	0.1091**	−0.0983***	0.0042
	[0.026]	[0.043]	[0.032]	[0.005]
Trust	−0.3714***	−0.8284***	0.9412***	−0.1390***
	[0.101]	[0.204]	[0.204]	[0.032]
ln(Check collection)	−0.0048	0.0347	−0.0163	0.0166**
	[0.018]	[0.028]	[0.029]	[0.007]
HHI top 10	0.1129	0.0429	−0.1931	0.0216
	[0.269]	[0.327]	[0.406]	[0.116]
Constant	0.2872	−0.5742	0.9111***	0.0271
	[0.254]	[0.432]	[0.275]	[0.049]
Observations	25	26	25	26
Adj. R^2	37.2%	59.1%	65.9%	66.5%

This table presents OLS regressions. Robust standard errors are shown in brackets under each coefficient. Appendix A describes the variables. *$p<.1$; **$p<.05$; ***$p<.01$.

Appendix G

Table G1
Fairness and product market competition

A. Business segment data

	Claims/policies (1)	*Rejected claims/claims* (2)	*ln(Settlement days)* (3)
ln(GDP per capita)	0.0581***	0.0005	0.1184
	[0.018]	[0.024]	[0.100]
Fairness	−0.0242	−0.0580**	−0.2153
	[0.017]	[0.020]	[0.157]
ln(Check collection)	0.0728***	0.0107	0.2914**
	[0.021]	[0.018]	[0.102]
HHI top 10	−0.1892	0.1944	1.3522
	[0.359]	[0.346]	[1.593]
Constant	−0.6537***	0.4394	3.1888*
	[0.205]	[0.314]	[1.532]
Observations	24	24	24
Adj. R^2	46.5%	26.9%	19.3%

B. Claims data

	Claimant disputed decision (1)	*Claims fully rejected* (2)	*Settlement < net assessed value* (3)	*Settlement/ initial claim* (4)	*Settlement/ net assessed value* (5)	*ln(Final proposal days)* (6)
ln(GDP per capita)	0.0536	0.0493	0.1423***	0.0200	−0.0492	0.2331*
	[0.038]	[0.032]	[0.048]	[0.041]	[0.037]	[0.125]
Fairness	−0.0990**	−0.0588**	−0.1081**	0.0729**	0.0671*	−0.2424*
	[0.044]	[0.023]	[0.049]	[0.032]	[0.033]	[0.128]
ln(Check collection)	0.1260***	0.0656**	0.0830	−0.0908*	−0.1028**	0.4439***
	[0.042]	[0.029]	[0.072]	[0.044]	[0.037]	[0.117]
HHI top 10	0.0248	0.6492	1.3920	−0.5651	−0.8570	−3.3200*
	[0.514]	[0.445]	[0.896]	[0.646]	[0.552]	[1.605]
Constant	−0.3397	−0.3449	−0.9337	0.5390	1.4526**	1.6087
	[0.619]	[0.370]	[0.657]	[0.537]	[0.574]	[1.688]
Observations	25	25	25	24	25	25
Adj. R^2	42.3%	41.7%	37.3%	40.1%	49.1%	39.9%

(*Continued*)

Table G1
(Continued)

C. Difference between theft claims and nontheft claims

	Theft claims (1)	*Claimant disputed decision* (2)	*Claims fully rejected* (3)	*Settlement < net assessed value* (4)	*Settlement/ initial claim* (5)	*Settlement/net assessed value* (6)	*ln(Final proposal days)* (7)
ln(GDP per capita)	−0.1883***	0.0001	0.0238	−0.0914	−0.0186	−0.0189	0.0187
	[0.036]	[0.078]	[0.092]	[0.096]	[0.063]	[0.060]	[0.093]
Fairness	−0.0395	−0.1710***	−0.0929	−0.1459**	0.1006***	0.1120***	−0.2451**
	[0.028]	[0.057]	[0.055]	[0.057]	[0.029]	[0.038]	[0.099]
ln(Check collection)	0.0419	0.1629**	0.0922	0.1328*	−0.0029	−0.0007	−0.0819
	[0.030]	[0.062]	[0.078]	[0.070]	[0.046]	[0.054]	[0.095]
Theft victimization	1.9487	−0.5198	−0.1146	−0.1162	−0.0533	−0.6545	5.3902
rate	[1.638]	[3.539]	[5.192]	[4.120]	[2.937]	[2.718]	[5.699]
HHI top 10	0.1080	0.7296	−0.5724	−0.3149	−0.7016	−0.6245	2.7397
	[0.796]	[1.213]	[1.353]	[1.109]	[0.640]	[0.715]	[2.058]
Constant	2.0989***	0.3243	0.0761	1.2183	−0.5094	−0.5660	1.5623
	[0.453]	[0.908]	[1.003]	[1.151]	[0.723]	[0.782]	[1.195]
Observations	25	23	24	23	22	23	23
Adj. R^2	48.6%	60.1%	−0.1%	44.5%	25.0%	23.0%	17.4%

D. Costs, profit margins, and premiums

	Expense ratio (1)	*Loss ratio* (2)	*Profit margin* (3)	*Premium to sum insured* (4)
ln(GDP per capita)	0.0050	0.0581	−0.0432	−0.0048
	[0.028]	[0.039]	[0.038]	[0.006]
Fairness	−0.0436**	−0.0805***	0.0982***	−0.0155**
	[0.016]	[0.027]	[0.028]	[0.007]
ln(Check collection)	0.0174	0.0846***	−0.0737***	0.0242***
	[0.019]	[0.019]	[0.025]	[0.007]
HHI top 10	0.0384	−0.1019	−0.0027	−0.0027
	[0.294]	[0.391]	[0.496]	[0.120]
Constant	0.4926	−0.1053	0.3739	0.1264**
	[0.348]	[0.441]	[0.404]	[0.052]
Observations	24	25	24	25
Adj. R^2	26.0%	37.1%	41.8%	59.1%

This table presents OLS regressions. Robust standard errors are shown in brackets under each coefficient. Appendix A describes the variables.. * $p < .1$; ** $p < .05$; *** $p < .01$.

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