TRUST AND INSURANCE CONTRACTS

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Abstract

We assemble and analyze a new data set of homeowner insurance claims from 28 independently operated country subsidiaries of a multinational insurance company. A fundamental feature of the data is that such claims are often disputed, and lead to rejections or lower payments. We propose a new model of insurance, in which consumers can make invalid claims and firms can deny valid claims. In this environment, trust and honesty are critical factors that shape insurance contracts and the payment of claims, especially when the disputed amounts are too small for courts. We characterize equilibrium insurance contracts, and show how they depend on the quality of the legal system and the level of trust. We then investigate the incidence of claims, disputes and rejections of claims, and payment of claims in our data, as well as the cost and pricing of insurance. The evidence is consistent with the centrality of trust for insurance markets, as predicted by the model.

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1.Introduction

We examine the effects of culture and the legal environment on insurance by by analyzing homeowner insurance contracts in 28 countries. In cooperation with a multinational insurance company, we collected data on homeowners insurance in the countries where the company owns subsidiaries. Homewoner 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. Arrow (1974) famously argued that even simple economic transactions rely on trust. Societies with a norm of honest behavior should find contracting easier. Is this true? What is the role of trust and that the law in a simple transaction like homeowners insurance? And, if trust matters, precisely how 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 lower trust countries such as Slovenia and Poland. Put differently, collection of insurance claims is a highly contentious process. To the extent that it 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 it also crucially depends 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 harder 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 yields to greater economic efficiency via two effects. First, it reduces the premia 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: i) transaction costs are low, which reduce costs for consumers, and ii) 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. The data confirm that higher trust is associated with fewer disputes over claims. In addition, claim level data allows us to distinguish different types of claims. We show that, in line with the prediction of our model, trust reduces disputes over theft claims, which are arguably harder to verify. Second, and again in line with the predictions of the model, we show that higher trust is associated with lower costs for firms, in terms of both general expenses and indemnities paid. Third, higher trust is correlated with lower prices and higher profits, consistent with our model's predictions regarding economic efficiency. We find that per capita income and the efficiency of the legal system also matter for some contracting outcomes, but not as reliably as trust.

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, trust does not only affect the extent to which people engage in trade, but also the entire structure of transactions. It reduces disptues, changes the cost structure, and consequently shapes equilibrium premia 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, and Burgeon and Picard 2014). 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 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., LaPorta et al 1997, Guiso, Sapienza, Zingales 2006, 2008, 2013, Aghion et al 2010). 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.

2. Insurance Data and Basic Facts.

We examine how a homeowner's insurance contract varies across 28 countries during 2010-2013. The source of the data is a large multinational insurance company which operates in all of these countries. Critically, this company delegates to country offices decisions regarding product pricing and claims policies, including the handling of disputes. Our setting thus allows us to examine how an insurance company adapts its pricing and claims policies to local conditions for the same home insurance product and, perhaps uniquely, for the same parent company.

Our sample includes all 28 countries where the company has a large home 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 non-life segment and non-life is half of total premiums). It is also a relatively standard contract and cross-country differences in regulation play a minor role.[1]

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

In most countries, the standard homeowners' insurance contract covers protection of the home and belongings against weather, fire, theft, and liability.[2] We gather data both on the contracts themselves and (accounting data) on the homeowners' insurance business segment. 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 make claims, claim forms, etc.). We also obtained all the regulations pertaining to these contracts, including laws and national rules. In addition, we asked each country office to send us the complete file of the first 20 homeowner's insurance contracts *signed* in 2013.[3]

In addition, we collected data on the homeowners' insurance unit of our company in each of 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.

We also gathered contract level data on actual home insurance *claims* in each country. We asked each country office for a copy of the complete file of the first 20 homeowner's insurance *claims* settled in 2013. We were concerned, and made sure, that these claims were effecticely randomly selected (i.e., not picked by the company). 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 A lists the various categories of data that we requested and tracks the response by 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 ended up collecting 550 out

[2] In Japan the standard contract also insures earthquake damage. In other countries, earthquake insurance is priced separately in the contract and we excluded it when computing the price of insurance.
[3] If chronological information was unavailable, we requested the first 20 contracts in alphabetical order.

of 560 files of closed home insurance claims (India supplied 18 claims and Thailand 12). Appendix B shows the form that we used to request the business-segment information.

We begin by presenting summary statistics on the homeowners' insurance business segment and then present data on filed claims. We then look at the basic statistics in our data to understand the main features of the claims process. Finally, we suggest that trust may play an important role in explaining the patterns in the data.

2.1. Homeowners insurance business unit data

Table 1 illustrates the frictions faced by the insurance 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] The table also reports world means over the 28 countries in our sample at the bottom of each column. Appendix C defines all the variables in detail.

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 that as many as a third of the insurance policies have 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 a third in Croatia, Slovenia 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 121 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.

[4] Four countries submitted data for less than three years (i.e., China, Ecuador, Japan, and Thailand). For all other countries, we have three years of data for each variable. We compute means using all non-missing data.

The costs of providing homeowners' insurance relative to total gross premiums include two major components: the expense ratio (which includes 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.

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 25% in China, Hong Kong, The Netherlands, Switzerland, and Thailand. In contrast, the loss ratio exceeds 50% in Italy, Spain, Slovenia and Turkey but never reaches 60%.

Column (6) reports the profit ratio after taxes. We measure profitability using statutory tax rates from KPMG for 2010-2012 and define 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 over total gross written premiums. These two ratios include the indirect and direct claim settling expenses respectively. On average, profits after tax are 7 percent. Profits range from close to -15 percent in Portugal and Slovenia, to over 30 percent in China, The Netherlands, Thailand, Colombia, France, Greece, Mexico, Poland, Portugal, and Slovenia.

The central message of columns (4) – (6) is that the expense ratio in 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. A major part of this paper answers the third question.

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 or 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. 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?

2.2. Claims Data

We next 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.[5] Water damages is the most common type of claim in our sample (close to 30 percent of all claims).[6]

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

[5] To illustrate our claims data, we choose two developed economies whose insurance systems work reasonably well compared to other countries. Still, there are remarkable differences between them.
[6] Weather damage and theft are second and third, respectively (they account for close to 25 percent of cases). Property damage is the fourth category of claims with close to 15 percent of the cases. Other claims are much less frequent in our sample (fire damage and third-party liability respectively capture 5 and 3 percent of cases).

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.

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 average value claimed by the insured, the fraction of claims that are small (below 1% of 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 therefore not the reason the settlements are lower than the claims or assessed values. Table 2 also reports the country means for the number of days for claim resolution, the percentage of claims that are disputed, the percentage of claims the company fully rejects, and the gross yearly premium relative to the value insured. Appendix C defines all the variables.

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 $1,003 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 are 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 get involved in facilitating the resolution of disputes – the cost would be prohibitively high.

The insurance company often settles claims for less than the value initially requested by the policyholder. This happens for two main reasons. First, as the example of an 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 87% of the value claimed by the policyholder. [7] This 13% 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 92% 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% of the value of their claims. In fact, as column (6) shows, worldwide 23% of the claims are rejected outright, with that number exceeding 1/3 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 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%-

[7] Deductibles are typically very small (i.e. the sample mean (median) is 2.13% (0.073%) of the initial claim.

47%) of the claimants receive the full value of their initial claim while one quarter of the claimants (i.e. 23%) receive nothing and another quarter (24%=47%-23%) receive 70% of their initial claim.

There are several reasons why the final settlement is lower than the net assessed value. The most common reasons are either that the policy did not cover the damages or that the client was negligent. This turned out to be 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 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 121 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 65% in Poland and Turkey. 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).[8] We then compute the ratio of the premium charged by the insurer to the value of the coverage under the policy (total amount insured).[9] Unlike the analogous measure in Table 1, this measure does not solely reflect what policyholders actually pay, but also the amount insured. The average gross yearly premium as a

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

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

percentage of the total value insured in our sample is 0.13%, i.e. the average annual cost of homeowners insurance is 0.13% of the value covered. As with other measures in this table, there is substantial variation across countries. The smallest insurance costs per dollar of value covered are in China, Germany, Panama and Slovakia. In contrast, yearly premiums are much higher in countries like Argentina, Austria, Bulgaria, Colombia, Greece, Italy and Mexico.

2.3. Correlations

Table 3 presents correlations between the segment level accounting 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 is noisier than that aggregated at the segment level, the variables from the claims data are reassuringly highly correlated with their counterparts in accounting 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 83% for *Ln Settlement Days* vs. *Ln Days 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 *Gross-yearly-premium-to-value-insured* and *Claims-to-policies* is 61% and it is 54% 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 72%, respectively. This country heterogeneity is the key feature of homeowners insurance that we seek to explain.

What determines these enormous differences between countries in the payment of homeowner insurance claims. Why do some countries have a smooth process, with nearly all claims accepted, and payments in line with claims, while others have high rejection rates and payments substantially lower 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 strking 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 -0.64 and 0.60, respectively.

If in countries with low levels of trust there is more opportunism by consumers and firms, settlement of claims will be more contentious. 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.

3. 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 t in case of accident. The consumer and the firm observe the accident, but they may try to cheat. The consumer can claim that there is an insured accident when there isn't 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 figure out who is right. Absent other incentives, contracting breaks down.

We depart from conventional analyses by assuming 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 in Equation (1) 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. The dependence of the cost of cheating on average honesty can be due to social norms of honesty that people find it costly to violate, or to principles of fairness whereby people find it unfair to cheat honest people (but perhaps not dishonest ones). Although we cannot tease out the precise mechanism, we can measure the end outcome: whether in a society others are viewed as honest/trustworthy.

The prevalence of dishonesty exerts an externality on all insurers. If honesty is $\left(\tau_c,\tau_f\right)$, the insurance company must bear a sunk per-contract cost $\left[(1-p)(1-\tau_c)+p\left(1-\tau_f\right)\right]K$. It 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).

$t = 2$: 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, but we leave it for future work. Second, the competition constraint faced by firms says that the profit per insurance contract cannot be greater than π, where higher competition means lower π. 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.

3.1 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 with probability that harm is incorrectly verified, $(1 - v)$. 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 condition for a consumer to truthfully demand the indemnity as well as for a firm to accept to pay rightful claims is given by:

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

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) more stringent.

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

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

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 consumers and firms 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?

3.2 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 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. O*pen 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, so that CL/C is well above the accident probability p. Higher trust means less cheating, and hence lower CL/C. Likewise, when trust is low, not only insurance companies are highly suspicious of filed claims, but they also cheat and refuse to pay even legitimate ones. 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 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 "days to settlement" (in the accounting data) and as "days to final proposal" (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.

3.3 Claim Level Data: Enforcement of Theft vs. Non Theft Claims

In the claim 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 non theft 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 non theft claims and the role of trust?

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

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

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, which is of course exogenous to the individual claim v. 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 the Appendix, if λ is higher than a threshold $\hat{\lambda}$, 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 limited verifiability: it is especially important for unverifiable claims.

As we show in the Appendix, then, given that theft claims are the least verifiable, our model yields the following prediction concerning our measured outcomes at the claim level.

Prediction 2 *There are more theft claims in countries in which trust is lower. In a given country, theft claims exhibit relative to non theft 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 hard-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 non theft ones. The resolution of these claims should become similar in countries where trust is higher.

3.4 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 with verifiability 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, so the "competition constraint" is binding. That is, the price of a contract stipulating indemnity t is given by:

$$P = \pi + [p + (1 - 2p)(1 - \tau)(1 - v)]t + (1 - \tau)K. \quad (7)$$

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, particularly when trust τ is low. Because accidents are rare $(p < 0.5)$, there are many more occasions for consumers to untruthfully pretend that the accident occurred than for firms to pretend that it did not. Hence, even though consumers and firms cheat with the same intensity, cheating by consumers is ex-ante more likely. This implies that higher trust τ reduces the compensation that insurance companies must pay for given stipulated indemnity t.

The second, and key, cost if 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 ER and the loss ratio LR are given by:*

$$ER = \frac{(1 - \tau)K}{\pi + [p + (1 - 2p)(1 - \tau)(1 - v)]t + (1 - \tau)K}, \quad (8)$$

$$LR = \frac{[p + (1 - 2p)(1 - \tau)(1 - v)]t}{\pi + [p + (1 - 2p)(1 - \tau)(1 - v)]t + (1 - \tau)K}. \quad (9)$$

Higher trust τ reduces the ER. It also reduces the LR 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 in these activities. Higher trust makes paying more attractive, reducing ER. Likewise, when trust is low many illicit claims are files and some must be paid, absorbing a larger share of premia. As a result, higher trust reduces LR as well.[10]

3.5 The Optimal Contract, Prices, and Costs

[10] 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.

We next show how the optimal contract (P, t) varies a function of τ, which yields predictions about two other outcomes that we measure: the premium 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.

$$\max_{P,t} \; P - [p + (1-2p)(1-\tau)(1-v)]t - (1-\tau)K \tag{10}$$

$$s.t. \qquad P - [p + (1-2p)(1-\tau)(1-v)]t - (1-\tau)K \in [0, \pi] \tag{11}$$

$$p[1-(1-\tau)(1-v)]u(t-L-P) + p(1-\tau)(1-v)u(-L-P)$$
$$+ (1-p)[1-(1-\tau)(1-v)]u(-P) + (1-p)(1-\tau)(1-v)u(t-P) \geq \omega. \tag{12}$$

Equation (10) is the firm's profit, equal to the premium P minus the expected payment of the transfer minus transaction costs. Equation (11) states that the profit must be non-negative 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 (12) 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 the Appendix, 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.[11] The drop in profits is caused by two effects. First, when τ is lower, the enforcement of compensation is less precise. The value of insurance drops, which reduces the amout 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

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

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.

4. Empirical Analysis of Model Predictions

We next assess model predictions with the data. We first look at predictions concerning trust and enforcement outcomes, which are described by Prediction 1. We then differentiate between theft and non theft claims in the data, looking at predictions on the substitutability between trust and unverifiability, as described by Prediction 2. We next look at the relationship between trust and the cost structure, as described by Prediction 3. Finally, we consider the more welfare related link between prices and firm profits and trust, as described by Prediction 4.

4.1 Trust 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 Panel A are business unit data, those in Panel B are from the claims data. To proxy for honesty we include in the regressions *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”. 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.

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* is to reduce claim initiations by 36%, claim rejections by 67%, and days to settle by 42%. Trust seems to have sizable economic effects on insurance disputes.

The results for *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, i.e. 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 47% of a standard deviation. A higher ln GDP per capita is associated with *more* claim initiationss 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* (roughly the difference between France and Japan) is associated with a reduction in disputes by 54% of a standard deviation, a fall in rejections by 71% of a standard deviation, and a decline in the (ln) number of days for the final proposal by 59% of a standard deviation. The estimates also imply that a similar increase in *Trust* is associated with a reduction of 51% in the fraction of *Settlements-lower-net-assessed-value*, and higher ratios of *Settlement-to-initial-claims* and *Settlement-to-net-assessed-value* by 48% and 45%, respectively.

The top panel in Figure 1 illustrates the results for *Claims Fully Rejected* and *Trust*. By comparison, *Ln Check Collection* is (marginally significantly) associated with more rejected claims, settlements that are less generous, and a slower settlement process. The bottom plot in Figure 1 illustrates the result for *Claims Fully Rejected* and *Ln Check Collection.* Again, the evidence on ln GDP per capita indicates that, if anything, insurance markets are more contentious in richer countries. We note that the results on *Trust* hold also without the per capita income control.

4.2 Theft vs Non-theft Claims

According to Prediction 2, higher trust should be especially beneficial for the enforcement of claims that are hard to verify. In that regard, the consensus among industry practitioners is that theft claims are the hardest 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 ($Y_{c,NotTheft}$). Because theft claims are the hardest to verify, they constitute our low verifiability group. Since data regarding why the claimant suffered damages comes from our dataset on claims, we can only implement our empirical strategy for the outcomes variables in Panel B of Table 4.[12] We then regress the difference between the outcomes of theft and non-theft claims on *Trust*, (ln) *Check Collection*, and (ln) GDP per capita, i.e.

$$Y_{c,Theft} - Y_{c,NotTheft} = \alpha + \beta_1\, Trust + \beta_2 \ln(Check\ Collection) + \gamma\, \ln(GDP\ pc) + \epsilon_c.$$

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. It makes the opposite predictions for β_2.

Table 5 reports regression results using the same controls as in Table 4, i.e. *Trust*, *Check Collection*, and *Ln GDP per capita* in all specifications. The new outcome variable is the fraction of theft claims. As Figure 2 illustrates, in the cross-section, the fraction of theft claims declines sharply with *Trust* while *Check Collection* plays no role, consistent with the view that theft claims are very

[12] Because in our sample, there are no theft claims in Austria and Japan, we drop these countries from Table 5.

difficult to verify. Furthermore, the results in columns 2 through 7 support the prediction that *Trust* plays a larger role in mitigating opportunism for claims that are harder to verify than for claims that are easier to verify. Specifically, as predicted by the model, *Trust* is associated with *relatively* less conflict –as proxied by fewer disputes, fewer rejections, and faster settlements—and *relatively* more generous settlements – as proxied 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 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 non-theft claims of 133% of a standard deviation. Figure 3 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 non-theft claims. While the coefficient for *Trust* is negative in both panels of Figure 3, it is much larger in absolute value for theft claims than for non-theft ones.

4.3 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 premia (prices), and raises profits.

Table 6 addresses these predictions. As before, we include *Trust*, *Check Collection*, and *Ln GDP per capita* in all regressions. Consistent with Prediction 3, the estimated coefficients on *Trust* imply that a one-standard deviation increase in *Trust* is associated with a reduction in the expense and loss ratios of 75% and 78% of a standard deviation, respectively. Turning to Prediction 4, we assess price margin as the ratio of gross premium to the value of insured assets and profitability as the ratio of after tax profits to gross premium. The estimated coefficients on *Trust* imply that a one-standard deviation increase in *Trust* is associated with a reduction in price margins of 47% and an increase in profitability of 87% of a standard deviation

Table 6 also shows that while *Check Collection* is largely insignificant with the exception of price margins. Finally, GDP per capita is associated with modestly higher losses, higher prices margins, and lower profitability. The estimated coefficients on *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 and price margins of 44% and 37% of a standard deviation, respectively, and a decrease in profitability of 38% of a standard deviation.

In sum, *Trust* matters for both price margins and profitability, as predicted by the theory.

4.4. Robustness

As a robustness check, we examine the role of corruption and market competition. Corruption is a further proxy for institutional development. We include the Herfindahl index to capture the idea that market concentration may make it costly for insurance companies to behave opportunistically and, as a result, act as a substitute for trust and judicial efficiency. Panels A and B in Appendix D shows what happens to the results in Table 4 when we add *Corruption* and the *Herfindahl Index*. The estimated coefficients for *Trust* and *Check Collection* remain largely unchanged by the additional control variables. Note that while *Trust* remains statistically significant in all regressions, *Check Collection* is statistically significant in only two. The coefficients for *Corruption* and *Herfindahl index* have the predicted signs but are rarely significant. Trust remains the consistently significant predictor of the outcomes we measure. Finally, Panels C and D in Appendix D show that the results on Trust for theft vs. non-theft claims in Table 5 and for costs, prices, and margins in Table 6 are robust to controlling for corruption and market competition.

5. 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 company. 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. Particularly with respect to trust, the evidence is broadly consistent with the predictions of the model. Cultural factors appear to shape insurance markets in economically meaningful ways, just as they shape other spheres of human activity.

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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:

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

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, denote $\hat{\tau} = \tau(v,\tau)$ Since $F(.)$ Is increasing, it is immediate to prove that $\tau(v,\tau)$ increases in its arguments. Under an exponential distribution $f(\theta) = \lambda e^{-\lambda\theta}$, the equilibrium becomes:

$$1 - \hat{\tau} = e^{-\lambda\left(\frac{\tau}{1-v}\right)}.$$

It is immediate to find that

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

It is then immediate to see that:

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

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,

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

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

Consider now the effects of aggregate trust on these gaps.

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

Which is positive provided

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

Under the exponential distributon this is equivalent to:

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

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

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

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 (8) and (9).

Prediction 4 Consider the monopoly problem of a firm selling insurance to a captive consumer. We then analyze the profit constraints in Equation (11).

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

$$s.t. \qquad p(1-e)u(t-L-P) + peu(-L-P) + (1-p)(1-e)u(-P) + (1-p)eu(t-P) \geq \omega.$$

For simplicity we define $e = (1-\tau)(1-v)$ the probability of an enforcement error. Of course, in our comparative statics we must consider the inverse relationship between the error rate e and trust τ. Denote by μ the Lagrange multiplier associated with the constraint. The first order conditions are:

P: $$1 - \mu \sum_{s \in S} p_s u'_s = 0,$$

t: $$-p_t + \mu \sum_{s \in S_t} p_s u'_s = 0,$$

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) and p_t is their total probability, 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 conditions. 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 and the marginal utility $u'(-P)$ when it does not occur. The optimal contract achieves full insurance, $t = L$, and the first best is obtained.

Suppose that the first best contract with $t = L$ is signed and add a small amount of enforcement errors $e > 0$. 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 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. If the competition constraint is binding, it means that insurance creates enough surplus that the contract is signed and it also measn that the profit per contract is fixed. As a result, trust does not affect profit. Suppose therefore that the competition constraint is slack, so that P is determined by the consumer's participation constraint. By the envelope theorem, an increase in trust τ causes the following change in the profit at the optimum:

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

Disregarding the transaction cost K, a sufficient condition for the profit to increase is:

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

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:

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

which can in turn be rewritten as:

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

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. 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:

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

t increases in τ. Using this expression for t, consider now the behavior of P/t. There are two cases two consider. In the first case, the competition constraint is binding and we have:

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

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:

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

This implies:

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

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:

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

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:

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

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 3.4). 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 binding:

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

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

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

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

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

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.

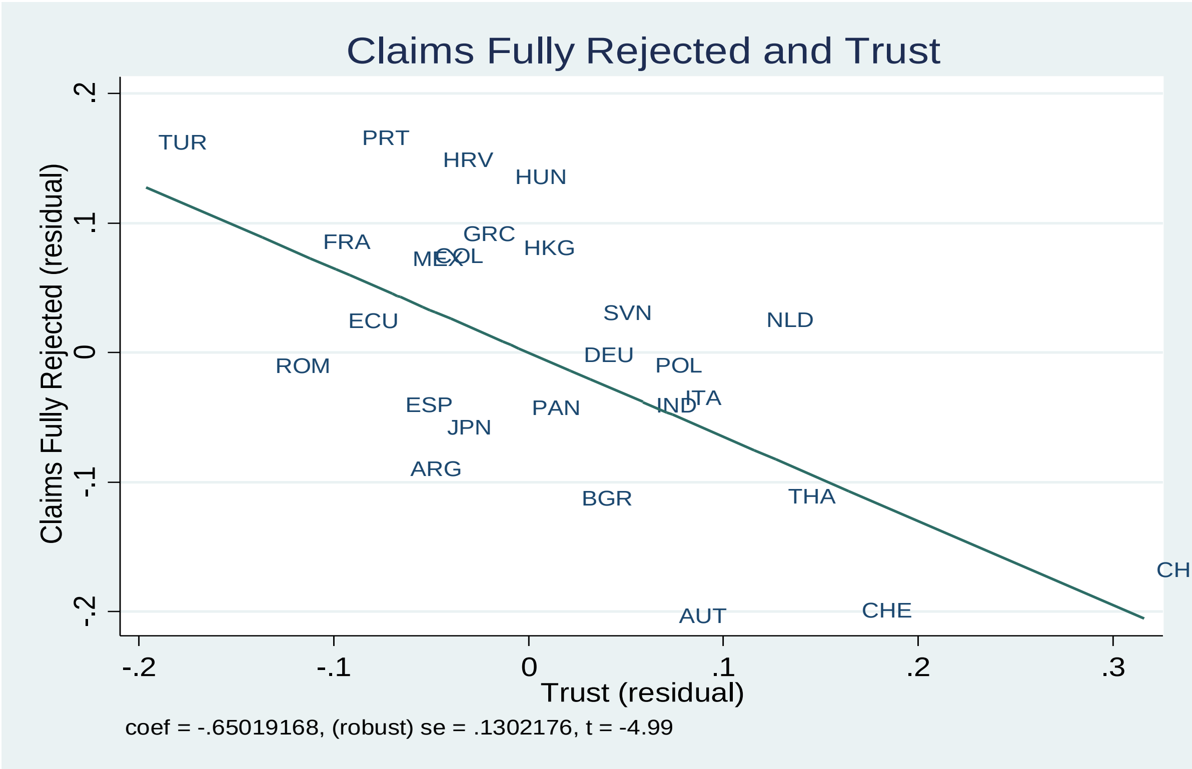
The prediction with respect to the loss ratio LR is more complex. The reason is that the loss ratio can be rewritten as:

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

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.

FIGURE 1

Partial correlation plots of *Claims Fully Rejected* and *Trust* (top) and *Ln Check Collection* (bottom). In both panels, we control for *Trust*, *Ln Check Collection*, and *Ln GDP per Capita*.



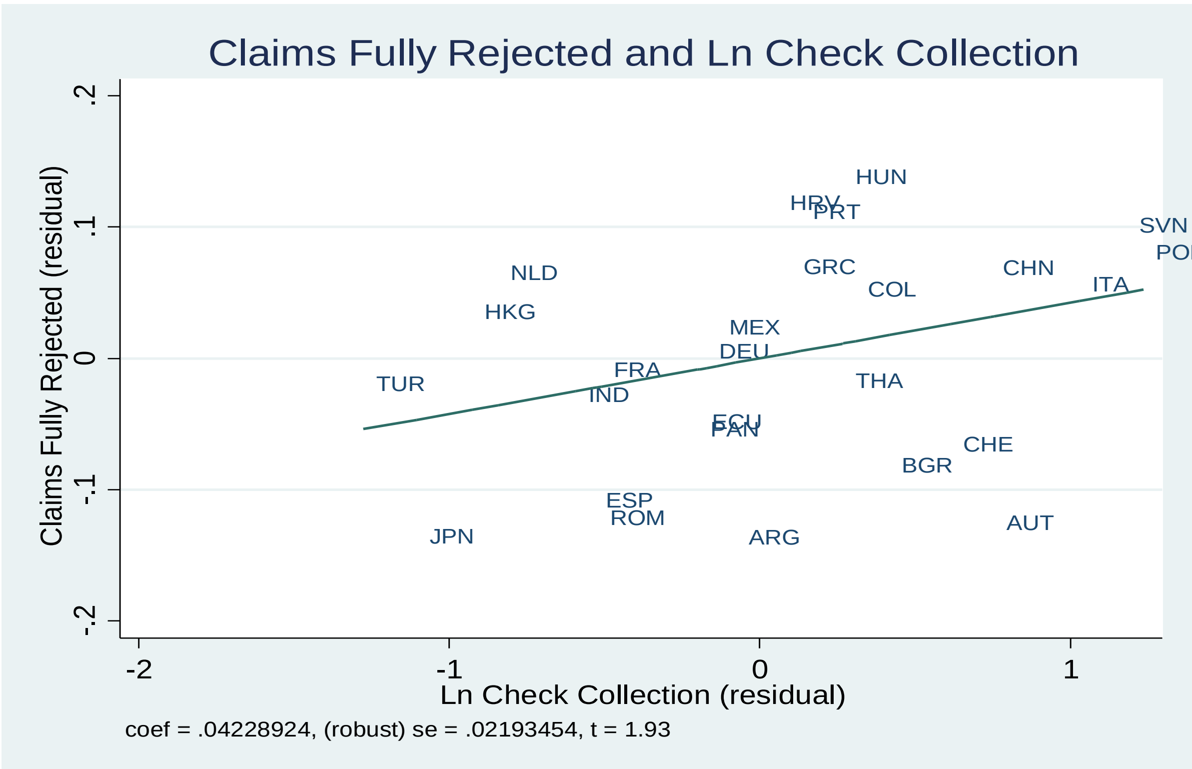


FIGURE 2

Partial correlation plots of *Theft Claims* and *Trust* (top) and *Ln Check Collection* (bottom). In both panels, we control for *Trust*, *Ln Check Collection*, and *Ln GDP per Capita*.

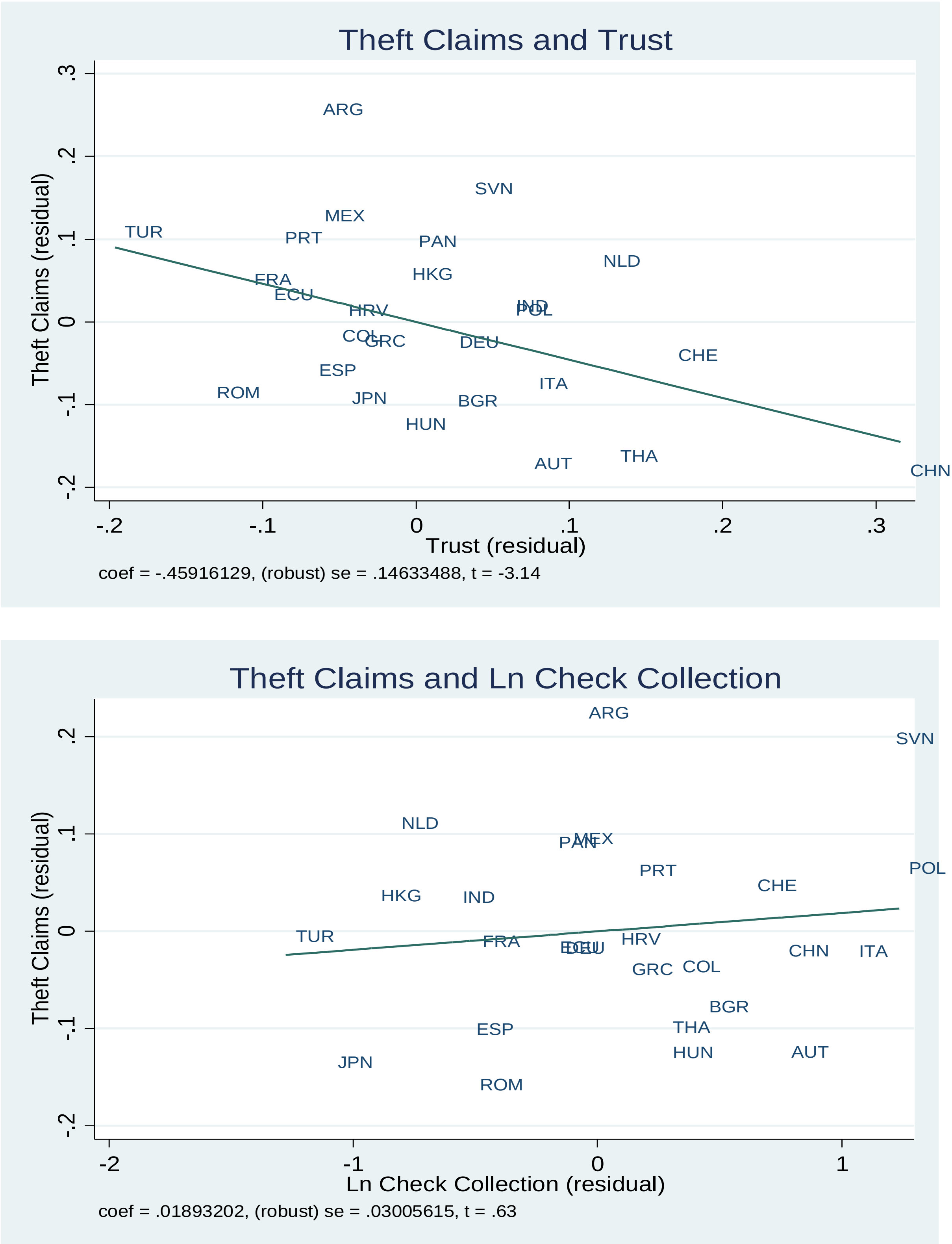
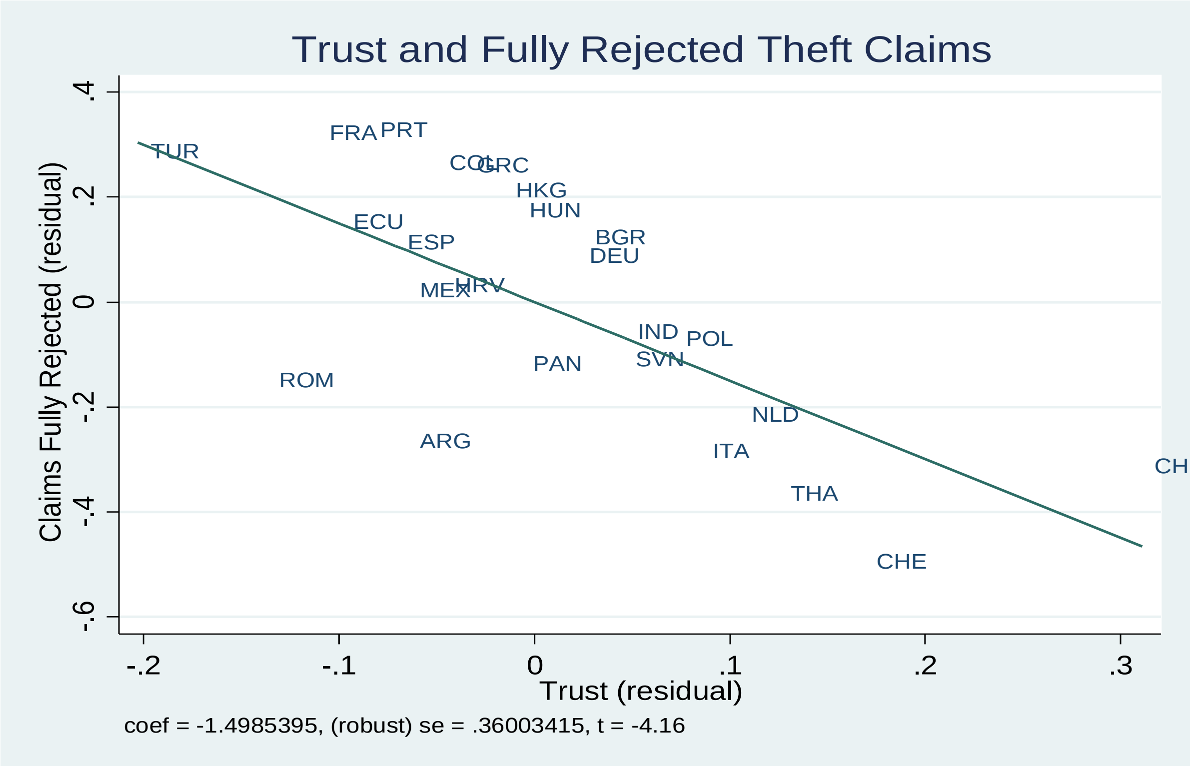


FIGURE 3

Partial correlation plots of *Claims Fully Rejected* and *Trust* for the subsamples of *Theft* claims (top) and *Non-Theft* claims (bottom). In both panels, we control for *Trust*, *Ln Check Collection*, and *Ln GDP per Capita*.



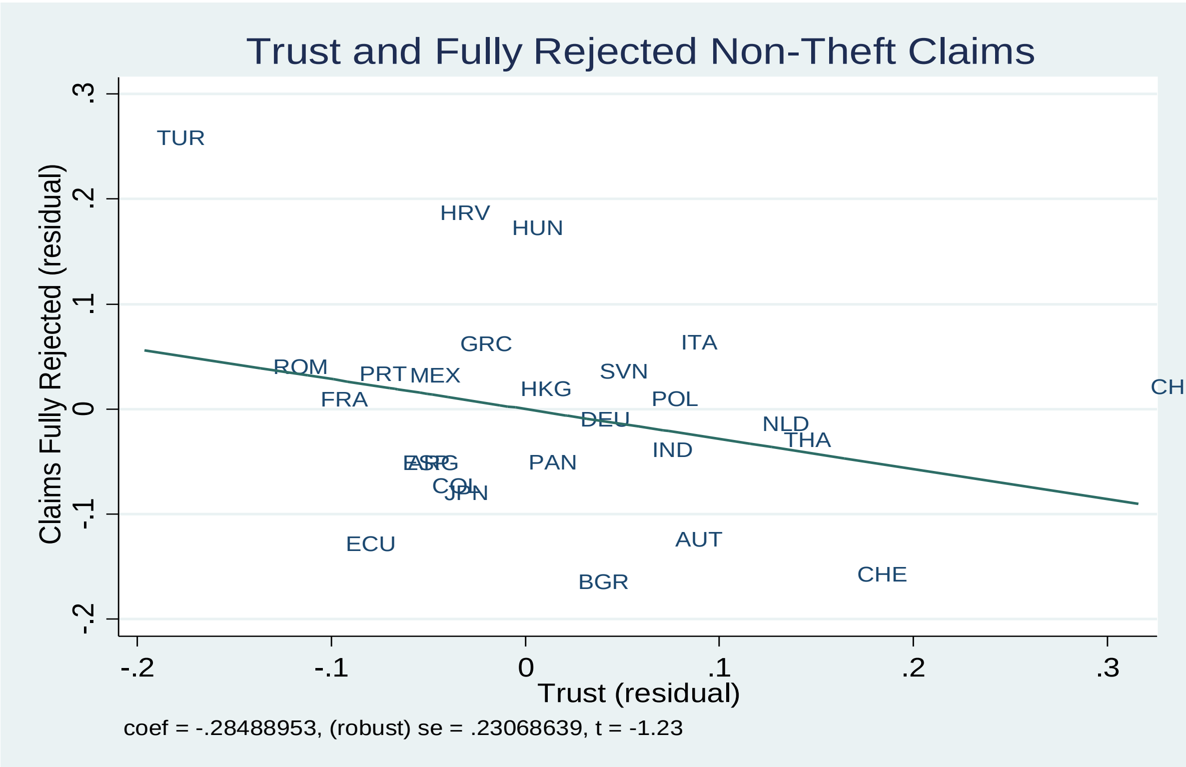


Table 1: Aggregate Homeowners Insurance Business Segment Data

The table shows the aggregate homeowners segment data for the firm in each country. We report averages of three years of data. The data was provided by the underwriting department and the claims department of the Firm in each country.

	Costs			Claims			
	Expense Ratio	Loss Ratio	Profits After Taxes	Claims / Policies	Rejected Claims / Claims	Settlement Days	Gross Written Premiums / Policies
Country	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Argentina	0.48	0.52	0.00	0.16	0.28	149.4	214
Austria	0.34	0.56	0.08	0.17	0.10	n.a.	1,055
Bulgaria	0.53	0.47	0.00	0.15	0.28	145.3	166
China	0.34	0.21	0.34	0.04	0.10	42.7	64
Colombia	0.48	0.60	-0.07	0.23	0.26	151.2	189
Croatia	0.49	0.55	-0.04	0.12	0.34	144.7	191
Ecuador	0.44	0.55	0.01	0.14	0.22	121.9	n.a.
France	0.37	0.75	-0.13	0.18	0.16	212.5	333
Germany	0.39	0.47	0.10	0.16	0.16	62.8	345
Greece	0.41	0.64	-0.05	0.22	0.28	205.6	346
Hong Kong	0.39	0.32	0.25	0.03	0.14	61.2	198
Hungary	0.34	0.49	0.13	0.22	0.12	80.9	158
India	0.29	0.42	0.19	0.05	0.15	80.7	82
Italy	0.38	0.62	0.00	0.33	0.12	151.8	293
Japan	n.a.	0.37	n.a.	n.a.	0.20	75.3	n.a.
Mexico	0.43	0.56	0.01	0.28	0.28	196.5	120
Netherlands	0.31	0.27	0.32	0.07	0.07	66.0	155
Panama	0.46	0.44	0.08	0.13	0.14	65.3	138
Poland	0.40	0.52	0.07	0.18	0.24	121.5	249
Portugal	0.48	0.68	-0.16	0.34	n.a.	198.9	316
Romania	0.40	0.38	0.19	0.13	0.19	36.3	267
Serbia	0.37	0.57	0.05	0.08	0.28	178.5	65
Switzerland	0.34	0.23	0.35	0.24	0.22	99.0	1,067
Spain	0.36	0.63	0.00	0.26	0.12	45.3	196
Slovakia	0.48	0.54	-0.02	0.03	0.36	n.a.	64
Slovenia	0.45	0.68	-0.13	0.35	0.25	139.9	484
Thailand	0.31	0.21	0.35	0.09	0.06	76.2	109
Turkey	0.52	0.51	-0.03	0.20	0.38	241.4	242
Mean	**0.41**	**0.49**	**0.07**	**0.17**	**0.20**	**121.2**	**273**

Table 2: Claims Data

The table shows the data obtained from the analysis of the first 20 claims closed by the Firm in 2013. The numbers are averages across claims for each country.

Country	Value claimed by insured (USD) (Median)	Claims below one month of Average Wage	Net Assessed Value / Initial Claim	Settlement / Net Assessed Value	Settlement / Initial Claim = [3] x [4]	Claims Fully Rejected	Settlement < Net Assessed Value	Final Proposal Days	Claimant Disputed Decision	Price Margin
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Argentina	1,802	0.40	0.88	0.67	0.59	0.15	0.45	163.50	0.35	0.19%
Austria	1,687	0.75	0.99	0.92	0.91	0.10	0.20	306.30	0.20	0.17%
Bulgaria	364	0.85	0.88	0.62	0.55	0.15	0.40	173.69	0.45	0.17%
China	265	0.50	0.90	0.82	0.74	0.00	0.20	38.00	0.10	0.08%
Colombia	741	0.50	0.80	0.62	0.50	0.35	0.45	173.39	0.45	0.18%
Croatia	542	0.80	0.87	0.56	0.48	0.40	0.85	144.25	0.45	0.14%
Ecuador	231	0.90	0.70	0.66	0.46	0.25	0.35	139.25	0.30	0.10%
France	1,347	0.55	0.90	0.70	0.63	0.30	0.60	291.17	0.55	0.12%
Germany	6,638	0.25	0.74	0.72	0.53	0.20	0.45	100.85	0.35	0.10%
Greece	807	0.50	0.93	0.58	0.54	0.35	0.55	276.93	0.45	0.17%
Hong Kong	970	0.55	0.85	0.71	0.60	0.20	0.60	81.35	0.20	0.11%
Hungary	321	0.85	0.64	0.68	0.44	0.40	0.63	84.36	0.25	0.14%
India	208	0.65	0.63	0.91	0.57	0.05	0.17	56.67	0.17	0.12%
Italy	1,328	0.55	0.90	0.51	0.47	0.30	0.65	160.40	0.70	0.15%
Japan	2,230	0.70	1.02	0.88	0.90	0.05	0.10	42.13	0.10	0.12%
Mexico	291	0.60	0.92	0.65	0.60	0.30	0.35	191.63	0.40	0.15%
Netherlands	2,236	0.50	0.95	0.97	0.92	0.10	0.30	58.17	0.10	0.11%
Panama	1,235	0.45	0.89	0.91	0.80	0.15	0.60	85.67	0.25	0.09%
Poland	285	0.55	0.71	0.53	0.37	0.35	0.85	152.82	0.65	0.17%
Portugal	1,054	0.60	0.90	0.51	0.46	0.45	0.70	188.50	0.60	0.16%
Romania	518	0.75	0.86	0.80	0.69	0.25	0.40	71.60	0.25	0.13%
Serbia	160	0.80	1.05	0.56	0.59	0.20	0.30	181.27	0.25	0.11%
Slovakia	347	0.75	1.04	0.69	0.72	0.30	0.45	96.68	0.20	0.09%
Slovenia	428	0.80	1.00	0.26	0.26	0.40	0.83	173.72	0.60	0.16%
Spain	562	0.90	n.a.	0.83	n.a.	0.15	0.30	52.80	0.10	0.17%
Switzerland	2,595	0.60	0.90	0.87	0.78	0.05	0.30	74.85	0.05	0.12%
Thailand	243	0.50	0.93	0.90	0.83	0.08	0.20	71.54	0.15	0.10%
Turkey	321	0.75	0.82	0.51	0.42	0.30	0.80	232.76	0.65	0.15%
Mean	**1,063**	**0.64**	**0.87**	**0.70**	**0.61**	**0.23**	**0.47**	**138.01**	**0.33**	**0.13%**

Table 3: Correlations of Homeowners Business Segment variables and Claims variables

This Table shows the raw correlations of country level variables for the sample of 28 countries in our study. Significance levels: ^{a} if p<0.01; ^{b} if p<0.05; ^{c} if p<0.10.

	Business Segment Data							*Claims Data*					
VARIABLES	Claims / Policies	Rejected Claims / Claims	Expense Ratio	Loss Ratio	Profits After Taxes	Ln Settlement Days	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	0.1258												
Expense Ratio	0.2465	0.7892^{a}											
Loss Ratio	0.5908^{a}	0.4022^{b}	0.4354^{b}										
Profits After Tax	-0.5479^{a}	-0.5954^{a}	-0.6889^{a}	-0.9478^{a}									
Ln Settlement Days	0.5591^{a}	0.6852^{a}	0.5077^{a}	0.6602^{a}	-0.7097^{a}								
Ln (Gross Written Premium / Policies)	0.5651^{a}	-0.0560	0.0125	0.2179	-0.1565	0.2949							
Claims Data													
Claimant Disputed Decision	0.5893^{a}	0.4520^{b}	0.5722^{a}	0.6705^{a}	-0.7322^{a}	0.7412^{a}	0.2498						
Claims Fully Rejected	0.5467^{a}	0.5034^{a}	0.5341^{a}	0.7168^{a}	-0.7459^{a}	0.6187^{a}	0.1405	0.7571^{a}					
Settlement < Net Assessed Value	0.3992^{b}	0.4418^{b}	0.5616^{a}	0.5055^{a}	-0.5678^{a}	0.5189^{a}	0.2142	0.7845^{a}	0.8183^{a}				
Settlement / Net Assessed Value	-0.5392^{a}	-0.6196^{a}	-0.5982^{a}	-0.6423^{a}	0.6962^{a}	-0.7777^{a}	-0.1205	-0.8255^{a}	-0.8020^{a}	-0.7636^{a}			
Settlement / Initial Claim	-0.5200^{a}	-0.4653^{b}	-0.4681^{b}	-0.6051^{a}	0.6174^{a}	-0.5859^{a}	-0.0695	-0.7716^{a}	-0.7599^{a}	-0.7354^{a}	0.8825^{a}		
Ln Final Proposal Days	0.4595^{b}	0.4850^{b}	0.4937^{a}	0.7282^{a}	-0.7451^{a}	0.8316^{a}	0.4194^{b}	0.7322^{a}	0.6056^{a}	0.5074^{a}	-0.6125^{a}	-0.4612^{b}	
Price Margin	0.6133^{a}	0.3105	0.3720^{c}	0.5418^{a}	-0.5491^{a}	0.5344^{a}	0.4511^{b}	0.5146^{b}	0.3970^{b}	0.3038	-0.4384^{b}	-0.4428^{b}	0.5557^{a}

Table 4: Homeowners Insurance and Trust

This table presents robust OLS regressions for all the countries in our sample. Robust standard errors are shown in parentheses under each coefficient. Significance levels: [a] if p<0.01; [b] if p<0.05; [c] if p<0.10.

Panel A: Business Segment Data

VARIABLES	Claims / Policies	Rejected Claims /Claims	Ln Settlement Days
	(1)	(2)	(3)
Ln GDP per Capita	0.0750[a]	0.0219	0.3048[b]
	[0.017]	[0.020]	[0.135]
Trust	-0.2393[b]	-0.4296[a]	-1.8058[c]
	[0.093]	[0.150]	[1.011]
Ln Check Collection	0.0546[b]	-0.0050	0.2411
	[0.022]	[0.020]	[0.166]
Constant	-0.8073[a]	0.1215	0.8268
	[0.189]	[0.219]	[1.572]
Observations	25	25	25
Adj R^2	53.6%	31.1%	29.7%

Panel B: Claims Data

VARIABLES	Claimant Disputed Decision	Claims Fully Rejected	Settlement < Net Assessed Value	Settlement / Initial Claim	Settlement / Net Assessed Value	Ln Final Proposal Days
	(1)	(2)	(3)	(4)	(5)	(6)
Ln GDP per Capita	0.0939[b]	0.0899[a]	0.1579[a]	-0.0152	-0.0769[c]	0.4266[a]
	[0.038]	[0.020]	[0.048]	[0.047]	[0.039]	[0.113]
Trust	-0.7639[b]	-0.6502[a]	-0.8001[b]	0.5939[b]	0.5508[b]	-2.5296[a]
	[0.313]	[0.130]	[0.330]	[0.213]	[0.256]	[0.762]
Ln Check Collection	0.0900	0.0423[c]	0.0681	-0.0741	-0.0944[c]	0.2375[c]
	[0.053]	[0.022]	[0.067]	[0.047]	[0.047]	[0.135]
Constant	-0.8838[c]	-0.7332[a]	-1.2669[b]	1.0007[c]	1.8399[a]	-0.1247
	[0.490]	[0.223]	[0.560]	[0.543]	[0.483]	[1.115]
Observations	26	26	26	25	26	26
Adj R^2	48.7%	57.8%	32.1%	41.5%	48.1%	49.8%

Table 5: Homeowners Insurance: Difference between Theft Claims and Non-Theft Claims

This table presents robust OLS regressions for all the countries in our sample. Robust standard errors are shown in parentheses under each coefficient. Significance levels: [a] if p<0.01; [b] if p<0.05; [c] if p<0.10.

		Difference Between Theft and Non-Theft Claims					
	Theft Claims	Claimant Disputed Decision	Claims Fully Rejected	Settlement < Net Assessed Value	Settlement / Initial Claim	Settlement / Net Assessed Value	Ln Final Proposal Days
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Ln GDP per Capita	-0.1309[a]	0.0296	0.1153[b]	0.0226	-0.0555	-0.0731	0.1405
	[0.024]	[0.073]	[0.051]	[0.060]	[0.043]	[0.045]	[0.135]
Trust	-0.4592[a]	-1.0604[b]	-1.2247[a]	-0.7976[c]	0.6827[b]	0.8543[b]	-1.4846[c]
	[0.146]	[0.408]	[0.339]	[0.376]	[0.301]	[0.302]	[0.715]
Ln Check Collection	0.0189	0.1465[b]	-0.0002	0.1073[c]	0.0050	0.0122	-0.0283
	[0.030]	[0.057]	[0.056]	[0.059]	[0.037]	[0.044]	[0.081]
Constant	1.5804[a]	-0.4913	-0.5696	-0.3711	0.1661	0.2307	-0.5665
	[0.297]	[0.622]	[0.512]	[0.720]	[0.398]	[0.472]	[1.239]
Observations	26	24	24	24	23	24	24
Adj R^2	58.8%	54.9%	34.0%	35.2%	4.87%	35.9%	15.0%

Table 6: Homeowners Insurance; Cost, Prices and Margins

This table presents robust OLS regressions for all the countries in our sample. Robust standard errors are shown in parentheses under each coefficient. Significance levels: [a] if p<0.01; [b] if p<0.05; [c] if p<0.10.

	Expense Ratio	Loss Ratio	Price Margin	Profits After Taxes
VARIABLES	(1)	(2)	(3)	(4)
Ln GDP per Capita	0.0214	0.1086[b]	0.0002[b]	-0.0949[a]
	[0.025]	[0.041]	[0.000]	[0.030]
Trust	-0.3669[a]	-0.8273[a]	-0.0011[a]	0.9335[a]
	[0.101]	[0.197]	[0.000]	[0.198]
Ln Check Collection	-0.0014	0.0356	0.0001[b]	-0.0220
	[0.015]	[0.025]	[0.000]	[0.024]
Constant	0.2961	-0.5705	-0.0008	0.8959[a]
	[0.250]	[0.421]	[0.001]	[0.276]
Observations	25	26	26	25
Adj R^2	39.7%	60.9%	39.2%	67.2%

Appendix A: Country Coverage and Information Requested and Obtained from each Branch of the Insurance Firm

The table shows the scope of the request of information and the data obtained from each of the branches of the insurance firm in the 28 countries of our sample. The data pertains to the segment of homeowners Insurance only. For each country, we requested the segments data from the underwriting and the claims department. The data for the actual contracts and claims are also only for Homeowners Insurance. If the data were obtained, we marked the cell with a "Yes." The contract and claim information includes all the information about the common homeowners contract, additional modules that may be added to it, all contract forms, all contract information and explanations given to the insured, all claim information and explanations given to the insured and all claim forms to be filed in in case of a claim. For the columns of actual contracts and actual claims, we include the number of contracts and claims obtained.

Country	GDP per capita PPP in 2010 (USD)	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

Appendix B: Information Requested about Homeowners Insurance Business Segment

This table shows the scope of the information requested for the Homeowners Insurance segment from the branch of the firm in the 28 countries of our sample. The request asked for information for the years of 2010 to 2012.

	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) d) Other (2) d) Other (3)				
Gross written premium	Renewed portfolio (specify currency).			
Gross written premium	New portfolio (specify currency).			
Acquisition costs (as a percentage of Total Gross written premium)	Percentage of average acquisition costs (acquisition + general) as a percentage of total gross written premium.			
General expenses (as percentage 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.			

	Explanation / Format Requested	Year 1	Year 2	Year 3
2. Claims Department				
Number claims settled/paid	Ready adjusted claims (closed case) 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	First reserves 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				

APPENDIX C: VARIABLE DEFINITIONS

BUSINESS SEGMENT DATA FOR HOMEOWNERS' INSURANCE

Gross Written Premiums	Total gross written premiums charged by the insurance company to provide the coverage described in each homeowners' policy. Average for the years 2010 to 2012.
Number of Policies	The number of homeowners' insurance policies of the insurance company in the country in a given year. Average for the years 2010 to 2012.
Claims	The number of claims made in the course of the year. Average for the years 2010 to 2012.
Rejected Claims	The number of claims rejected by the insurance company in the course of the year. Average for the years 2010 to 2012.
Settlement Days	The average number of days it takes to settle a claim. The number of days runs 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. Average for the years 2010 to 2012.
Expense Ratio	The sum of Acquisition Costs, General Expenses and Adjustment Expenses divided by Gross Written Premiums. This ratio is equivalent to the percentage of premium used to pay all the costs of acquiring, writing, and servicing the insurance policies. Acquisition Costs are the direct costs incurred by the insurer to get a customer or to "acquire" the premium – for example, commissions paid to a broker or fronting company. They are the cost accrued by the insurance company in relation to efforts involved in acquiring a new customer. These costs traditionally include marketing and advertising, incentives and discounts, and the staff associated with those business areas, along with other sales staff. General Expenses include employee wages, agent and broker commissions, dividends, advertising, legal fees, and other general and administrative expenses (G&A).
Loss Ratio	The Loss Ratio calculated as the value of settled claims settled, claim settling expenses and loss adjustment expenses over Gross Written Premiums. It reflects whether a company is collecting enough premiums to cover claims and the expenses related to those claims. We calculate the average for the years 2010 to 2012.
Profits After Taxes	We measure profitability using data on statutory tax rates from KPMG for 2010-2012 and define profits as the difference between total gross written premiums and costs. We calculate costs as the sum of the Expense Ratio and the Loss Ratio over total Gross Written Premiums, typically known as the Combined Loss Ratio. We calculate the average for the three years between 2010 and 2012.

CLAIMS DATA

Value claimed by insured	The value of the damages the insured party claims or estimates at the very beginning of the claim process. If more than one, we take the first in chronological order. If the insured party claims a damage that has no specific value and by so doing entrusts the insurance company to assess it, this variable will equal the technically assessed claim value.
Claims below one month of Average Wage	The percentage of the claims in each country that are smaller than the average monthly wage in 2012. The data on average wages comes from the International Labor Organization Statistics.
Net Assessed Value (NAV)	The Total Assessed Value of the damage reported by the claimant as assessed by a technician/expert paid by the insurance company net of the applicable deductible. In general, the expert is not an employee of the insurance company in general.
Settlement	The final value on which the claim is settled.
Total Sum Insured (TSI)	The sum of the full value of the insured's covered property. It is equivalent to the maximum amount of money that an insurer might have to pay, according to the insurance contract.
Gross Yearly Premium	The gross premium payed by the claimant the most recent year before the claim is settled.
Price Margin	This variable is calculated as the Gross Yearly Premium over the Total Sum Insured the most recent year before the claim is settled.
Claimant Disputed Decision	This variable is equal to one if the claimant disputed the decision on the claim taken by the insurance company. The dispute can be using the legal system or a simple dispute with the company. The variable is zero otherwise
Claims Fully Rejected	The variable is equal to one if the claim was rejected by the insurance company, and zero otherwise.
Settlement < Net Assessed Value	The variable is equal to one if the claim was rejected or if part of the claim was rejected by the insurance company resulting in a settlement lower than the total assessed value of the damage net of the applicable deductible. The main reasons of rejection are: (i) limited or capped coverage; (ii) the damage is not covered in the policy; (iii) the claimant was negligent; (iv) lack of evidence or missing documents to prove claim or claim made out of time.
Final Proposal Days	The number of days from the filling of the claim to the Firm's final proposal to settle the claim.

Type of damage reported	The types of damages reported are: (1) theft or burglary; (2) damage caused by water; (3) damage caused by fire; (4) damage caused by an external factor, such as a natural disaster, atmospheric event; (5) damage caused by deterioration or malfunction; (6) vandalism or damage caused by violence; (7) damaged caused by disputes with others; (8) bodily injury; (9) other causes of damage.
Theft Claims	The proportion of theft claims in the total number of the claims received for each country.

OTHER VARIABLES

Ln GDP per Capita	The natural logarithm of the 2010 Gross Domestic Product per capita from World Development Indicators (Purchasing Power Parity current international dollars).
Trust	The percentage of the population that answered they trusted their neighbour when asked the question "can you trust your neighbour or you can never be too careful." Average of all values available for each country between 2000 and 2014. Data from the World Values Survey.
Ln Check Collection	The total estimated duration in calendar days of the court procedure for the collection of a bounced check. Data from Djankov et al, (2003).
Corruption	The index of Corruption from the Heritage Foundation for 2010. This index is based on data from Transparency International.
HHI top 10	The Herfindalh index is based on market shares in the residential insurance market during the period 2010-2013 for the top 10 firms in that segment in each country.

Appendix D: Homeowners Insurance; Full Specification with Corruption and Competition

This table presents robust OLS regressions for all the countries in our sample. Robust standard errors are shown in parentheses under each coefficient. Significance levels: [a] if p<0.01; [b] if p<0.05; [c] if p<0.10.

Panel A: Business Segment Data

VARIABLES	Claims / Policies (1)	Rejected Claims / Claims (2)	Ln Settlement Days (3)
Ln GDP per Capita	0.0257	0.0652[c]	0.1428
	[0.032]	[0.038]	[0.337]
Trust	-0.3079[b]	-0.3632[b]	-2.1102[b]
	[0.115]	[0.150]	[0.862]
Ln Check Collection	0.0636[b]	-0.0148	0.2389
	[0.026]	[0.023]	[0.194]
Corruption	0.0019	-0.0017	0.0072
	[0.001]	[0.002]	[0.014]
HHI top 10	-0.1287	0.2374	1.2840
	[0.288]	[0.316]	[2.063]
Constant	-0.4302	-0.2123	2.0742
	[0.274]	[0.289]	[2.246]
Observations	25	25	25
Adj R^2	53.7%	29.4%	24.6%

Panel B: Claims Data

VARIABLES	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	0.1624[c]	0.0885[c]	0.3080[a]	0.0021	-0.1244[c]	0.3603
	[0.092]	[0.049]	[0.098]	[0.080]	[0.065]	[0.246]
Trust	-0.6632[b]	-0.6832[a]	-0.6319[b]	0.6491[a]	0.5199[b]	-2.5049[a]
	[0.310]	[0.123]	[0.264]	[0.184]	[0.189]	[0.789]
Ln Check Collection	0.0794	0.0296	0.0230	-0.631	-0.0708	0.2987[c]
	[0.058]	[0.032]	[0.081]	[0.057]	[0.049]	[0.153]
Corruption	-0.0026	0.0004	-0.0053	-0.0010	0.0014	0.0013
	[0.003]	[0.002]	[0.003]	[0.003]	[0.003]	[0.010]
HHI top 10	0.1556	0.6553	1.4592	-0.6829	-0.9379	-2.7534[b]
	[0.523]	[0.414]	[0.882]	[0.599]	[0.550]	[1.469]
Constant	-1.4166[c]	-0.7117[b]	-2.417[a]	0.8577	2.1968[a]	0.3505
	[0.762]	[0.341]	[0.670]	[0.580]	[0.371]	[1.637]
Observations	26	26	26	25	26	26
Adj R^2	45.0%	59.0%	40.2%	39.0%	50.2%	49.3%

Panel C: Difference between Theft Claims and Non-Theft Claims

		Difference Between Theft and Non-Theft Claims					
	Theft Claims	Claimant Disputed Decision	Claims Fully Rejected	Settlement < Net Assessed Value	Settlement / Initial Claim	Settlement / Net Assessed Value	Ln Final Proposal Days
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Ln GDP per Capita	-0.1214[c]	-0.0554	-0.2105	-0.1504	0.1487	-0.0153	-0.0517
	[0.064]	[0.129]	[0.127]	[0.123]	[0.131]	[0.086]	[0.155]
Trust	-0.4352[a]	-1.2419[b]	-1.6746[a]	-0.9798[c]	1.1393[a]	0.9901[a]	-1.9311[b]
	[0.151]	[0.452]	[0.302]	[0.471]	[0.238]	[0.310]	[0.811]
Ln Check Collection	0.0217	0.1373[c]	0.0632	0.1634[b]	0.0302	0.0234	-0.0634
	[0.033]	[0.069]	[0.054]	[0.075]	[0.051]	[0.056]	[0.110]
Corruption	-0.0005	0.0040	0.0131[a]	0.0064	-0.0097[c]	-0.0028	0.0093
	[0.003]	[0.004]	[0.004]	[0.004]	[0.005]	[0.003]	[0.008]
HHI top 10	-0.1934	0.7749	-0.4824	-1.0534	-1.8905	-0.7008	2.2575
	[0.679]	[0.897]	[0.696]	[0.856]	[1.093]	[0.696]	[1.877]
Constant	1.5035[a]	0.1977	1.8463	0.8599	-1.5046	-0.2491	1.0244
	[0.461]	[1.001]	[1.076]	[1.102]	[1.014]	[0.649]	[1.078]
Observations	26	24	24	24	23	24	24
Adj R^2	55.1%	53.1%	55.9%	37.7%	32.9%	32.9%	20.3%

Panel D: Costs, Margins and Profits

	Expense Ratio	Loss Ratio	Price Margin	Profits After Taxes
VARIABLES	(1)	(2)	(3)	(4)
Ln GDP per Capita	0.0554	-0.0022	0.0001	-0.0233
	[0.042]	[0.060]	[0.000]	[0.052]
Trust	-0.3192[a]	-1.0051[a]	-0.0012[a]	1.0594[a]
	[0.103]	[0.210]	[0.000]	[0.204]
Ln Check Collection	-0.0075	0.0464[c]	0.0002[b]	-0.0247
	[0.018]	[0.027]	[0.000]	[0.029]
Corruption	-0.0013	0.0044[b]	0.0000	-0.0030
	[0.001]	[0.002]	[0.000]	[0.002]
HHI top 10	0.0837	-0.0690	-0.0015	-0.1894
	[0.260]	[0.298]	[0.001]	[0.395]
Constant	0.0356	0.2955	0.0001	0.3255
	[0.347]	[0.525]	[0.001]	[0.381]
Observations	25	26	26	25
Adj R^2	37.4%	65.5%	38.9%	67.9%