Service Quality in Financial Intermediaries[*]

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Abstract

We use a novel dataset of the universe of customer complaints to state regulators about insurance companies to measure financial service quality. We find evidence of significant service quality problems, which are especially pronounced in concerns over claim handling, customer care, and misconduct. Consumers endure substantial service quality problems after natural disasters. Further analysis reveals that competition among insurers exacerbates service quality deficiencies. We also discover evidence consistent with weak regulatory oversight of service quality, possibly due to constraints from multiple regulatory objectives. Finally, we show that within state decreases in service quality are followed by substantial increases in personal bankruptcies.

Key Words: Financial Intermediary Regulation, Insurance; Consumer Protection; Regulatory Objectives
JEL Codes: G22; G28; K23; L51; D18

Consumers exhibit difficulties in learning about and understanding financial intermediaries (Dahlby and West, 1986; Israel, 2005). In addition to apprehension over intermediary solvency, a major concern with financial intermediaries stems from potential problems with customer service quality (Campbell et al., 2011). The need for regulation arguably arises because asymmetric information and behavioral issues limit the ability of market mechanisms, such as intermediary reputation and court remedies, to fully protect consumers in their dealings with financial intermediaries (Matvos et al., 2015; Egan, et al., 2016). Legal scholars describe anecdotal accounts of service quality issues by insurers (Mootz, 2002); an industry that accounts for over 6% of the US gross domestic product (Bureau of Economic Analysis). Accenture and JD Power report that roughly one-fourth of the insurance claimants are dissatisfied. Media accounts routinely describe instances where it appears that insurance companies delay and offer reduced settlements to consumers who need money for immediate housing or transportation (e.g. Klas, 2013).[1] Others describe the potentially severe social consequences of insurer settlement delays and misconduct, potentially pushing consumers into financial hardship (Reilly and Rosenthal, 2011). Financially fragile or constrained consumers, which comprise a large portion of U.S. households, appear especially vulnerable to poor service quality, such as payment delays and reduced settlement offers (Lusardi and de Bassa Scheresberg, 2013; Melzer, 2014).

We use a novel measure of intermediary service quality to study consumer protection in the insurance industry. Insurance companies form an important component of the financial intermediary sector, with total written premiums worth of $1.1 trillion and an asset size of $5.1 trillion in 2014. Customer service issues arise from a range of matters including misleading advertisements to deficient claim handling. We exploit a unique dataset of the universe of customer complaints (as well as their outcomes), covering the complete spectrum of customer experience, filed against insurers to state regulators. State regulators evaluate these complaints and the insurance company's responses, ultimately leading to an outcome decision regarding the complaint. Consequently, the data allow us to capture multiple stages of customer experience with insurance companies on marketing, underwriting, services, and claim handling.

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[1] Customer service quality concerns also includes egregious problems such as misleading advertisements, improper disclosures, regulatory noncompliance, and fraud. Critics highlight how insurers seek to produce low settlement offers to financially fragile consumers to exploit their customer's immediacy needs. Florida court records indicate that McKinsey and Company developed software to help Allstate predict the lowest settlement offer a customer would accept for their insurance claim based on the severity of their personal financial conditions (Bloomberg, April 30, 2006). Focusing on cases settled just prior to their scheduled court date, Feinman (2010) suggests that insurers delay and reduce customer claims by about 40% to 70% of the implied value in the policy.

In order to evaluate insurer service quality while controlling for confounding factors, we rely on the differing incentives between stock and mutual insurers (Hansmann, 1985). Both types of insurers compete in the same product space and face the same regulatory requirements (Mayers and Smith, 1986).[2] In mutual insurers the residual profits accrue to policyholders, while in stock insurers the profits are distributed to shareholders (Dafny and Ramanarayanan, 2013). Glaeser and Shleifer (2001) show how the incentives of stock firms potentially encourage shirking on service quality, while the distribution of profits to policyholders in mutual insurers can soften the incentives to exploit customers. Hansmann (1996) and Easley and O'Hara (1983) suggest that both mutual and stock insurers arise and continue to co-exist because of the difficulties that consumers face in evaluating service quality. Consequently, the distribution of profits to outside shareholders introduces the potential for a transfer from policy-holders to shareholders, creating incentives for stock firms to provide lower service quality relative to their mutual peers (Masulis, 1987; Rasmussen, 1988). To the extent that stock intermediaries possess lower incentives to deliver high quality service, the comparison of stock and mutual insurers, which controls for potential confounding factors such as firm size, profitability, and geographic location, facilitates the investigation of the service quality provided by insurance intermediaries.[3]

Using customer complaints to gauge service quality, we first examine whether the number, outcome and nature of customer complaints differs between stock and mutual insurers. In particular, we compare and analyze the change in customer complaints between stock and mutual insurers after natural disasters—circumstances where consumer financial protection is in greater demand. Second, we study the effectiveness of market competition to improve service quality through reputational incentives. Finally, we examine whether the strength of the regulator matters in protecting consumer interests in the financial services sector.

We manually collect customer complaint information for each firm and each state from the website of the National Association of Insurers from 2005 to 2011. The NAIC data contain a rich set of information about these customer complaints and their outcomes in the adjudication process. We focus on property and casualty insurance and collect detailed data on the types of complaints on a variety of (non-mutually-exclusive) issues, including claim handling (73%), underwriting (24%),

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[2] The largest stock firms in our sample are Allstate and Berkshire Hathaway, while the largest mutual insurers are State Farm and Liberty Mutual.

[3] Another common view is that mutual insurers may, on the other hand, exhibit more severe agency costs between managers and policyholders than stock insurers due to limited external oversight and less effective corporate governance (Mayers and Smith, 1986). This argument suggests that the complaint difference between stock and mutual insurers may be a lower bound of the extent of consumer service quality in the insurance industry.

policyholder service (14%), and marketing & sales (4%). Importantly, 60% of the complaints in our sample result in customer success, suggesting that complaints provide a reasonable indicator of service quality by insurance intermediaries. The top three specific complaint types are delay in claim (31%), reduced settlement offer (20%), and denial of claim (11%). Our full sample comprises of 1,224 stock insurers and 522 mutual insurers.

Our analysis indicates that stock insurers receive 21-25% more complaints per year than their matched, mutual counterparts. The type of complaint also matters as customer complaints about payment delays, reduced settlement offers, and misconduct drive the differences we observe between stock and mutual insurers. While, we use complaint differences between mutual and stock insurers to investigate consumer financial protection, an alternative interpretation centers on differences in customer propensities to file complaints. Moreover, claim delays and reduced settlement offers potentially stem from insurer concerns about inflated losses by policyholders.[4] These arguments regarding customer selection distinctions between stock and mutual insurers, suggest differing customer complaint outcomes in these cases; specifically customers of stock insurers, relative to mutual insurers, should exhibit lower probabilities of winning the complaints filed against them. To further assess whether customer demographics, preferences, or expectations explain these results, we investigate customer complaint success rates (as independently determined by state regulators). We find no differences in customer complaint success rates between mutual and stock insurers. Collectively, this evidence suggests that the differing number of complaints between stock and mutual insurers stem from disparities in insurer service quality and reflects the difficulties customers exhibit in evaluating the reputation or service quality of these financial intermediaries.

Within-insurer tests, before and after random shocks, allow us to better identify insurer service quality (problems) by holding the customer profiles of the same insurer constant. Specifically, we examine random shocks that negatively affect intermediary profitability. Natural disasters provide an especially interesting experiment to examine service quality by property and casualty insurers because this is the precise time where service quality matters the most for consumers. We compare the within-insurer response to large, natural disasters in both stock and mutual insurers. If stock firms focus less on customer service quality than mutual insurers owing to a heightened conflict of interest with customers, then we expect a relative increase in customer complaints in stock insurers

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[4] Insurers face substantial concerns and problems with deception by policyholders, seeking to limit fraudulent and exaggerated claims. The insurance industry estimates that almost 10% of the property and causality claims for damages involve either false or inflated losses http://www.insurancefraud.org/statistics.htm).

after a negative profitability shock. In contrast, if consumers have adequate information to evaluate service quality or if regulators effectively limit the differences in service quality between the organizational types, then we expect to observe little, if any difference between these firms. We use the Spatial Hazard Event and Losses Database (SHELDUS) from the University of South Carolina to identify local natural disasters over $500 million dollars during the 2006-2010 period.

We exploit these random shocks to evaluate the complaints about an exposed firm for policies written in the affected area and for policies written by the firm in other unaffected areas. First, complaints within the affected state increase equally for both mutual and stock insurers. This suggests that natural disasters indeed generate losses for insurance companies and that the intensity of such losses appears to have little difference between the two types of insurers. More surprisingly, the customer complaints about stock insurers rise by 27.9% in their most important *unaffected* states. In contrast, in mutual insurers, there is no increase in customer complaints in their unaffected states. Consider two examples from Oklahoma, where a large, natural disaster occurred in 2008 and led to substantive losses for insurers. Company A, a mutual insurer in Oklahoma, also served a large number of customers in Illinois. After the 2008 natural disaster, there is no impact on their customer claims in Illinois. In contrast, company B, a stock insurer in Oklahoma, also had a substantial customer base in Illinois. In this case, the stock company experienced almost a 30% increase in customer complaints regarding their service quality in Illinois after the negative shock in Oklahoma. One interpretation of these results suggests that stock insurers respond to negative profitability shocks in the affected state by delaying and reducing settlement offers in the other unaffected states in which they operate in an effort to minimize their expenses. Alternatively, stock insurers are ex ante less prepared for customer service, out of their cost cutting incentives, which result in insufficient resources to respond to customer needs after large natural disasters. In this context, stock insurers provide greater economic efficiency than mutual insurers, which arguably occurs at the expense of lower service quality to consumers.

Greater insurer competition within a state could potentially foster market mechanisms or solutions, suggesting greater service quality due to reputational concerns in stock relative to mutual insurers. On the other hand, greater competition may also exacerbate the incentives to exploit customers. We use two measures of competition at the state level. The first measure is a state Herfindahl index, while the second measure of firm presence simply captures the number of firms operating in the state. The results indicate that stock, relative to mutual insurers, receive more customer complaints in states with low industry concentration and greater insurer presence. These

findings suggest a limited role of market mechanisms in protecting consumer interests through service quality.

Next, we study to what extent extant regulation alleviates the service quality problems in the insurance industry. Our investigation exploits the heterogeneity among the different state regulators in the U.S. We focus on three specific measures of the state-level regulatory environment, namely the level of expendable resources, "tough" state regulator indicator, and the elected status of state regulators, to evaluate consumer financial protection. Surprisingly, we find that the number of staff, the size of the regulator budget, and the "tough" state regulator dummy are positively related to increased customer complaints about stock relative to mutual insurers within the same state. If these increased complaints about stock firms arise because the strong regulator is more willing or able to help consumers than in the weak regulator states, then the complaint success rate should also be higher in strong regulator states. However, we find no differences between success rates for customer complaints about stock and mutual insurers in tough regulatory states. In short, this evidence highlights difficulties that regulators have in promoting high service quality.

To evaluate why the strong regulators seem ineffective in mitigating customer concerns about insurer service quality, we hypothesize that regulators face constraints due to their multiple goals. Regulators presumably focus on both insurer solvency and the promotion of consumer interests through service practices, and as a result may face insufficient resources to serve at full capacity. To test this idea, we study whether the customer complaint difference between stock and mutual insurers increase when both types of firms approach regulatory solvency thresholds. Compared to mutual insurers, stock insurers experience a 129% additional increase in complaints when the insurers are inadequately capitalized (i.e. approaching regulatory thresholds). Perhaps even more surprising is that customer complaints with the state regulator about stock insurers become much more unsuccessful as the companies' financial health gets worse (18.3% lower in stock insurers). The incremental complaint difference occurs in customer concerns regarding price increases, new terms in their policies, and the termination of existing policies. Collectively, this set of findings lend support to the interpretation of the limited regulatory efficacy at times when insurers are under-capitalized and face pressure to increase revenues and limit expenses.

Next, we consider one other measure regulators often use to protect consumers. Many states stipulate strict rules on policy premiums, which are reflected in state-mandated insurance rates or in requirements to seek approval before increasing rates. If regulators effectively promote service quality, then these rate requirements should have little, if any, differential effect on customer

complaints in stock and mutual insurers. We find that for every 10% increase in the portion of premiums subject to pricing regulation, stock insurers experience 5.7% more complaints than their mutual insurer counterparts. These complaint differences arise across the full-spectrum of complaints but are especially pronounced for complaints about claim handling (delay and reduced settlement offers) and misconduct.

Finally, we seek to assess the potential costs to consumers from poor service quality by financial intermediaries in the form of personal bankruptcies. Because liquidity constraints can increase the probability of bankruptcy (e.g. Gross and Notowidigdo, 2011; Gross et al., 2014), we expect insurers' service practices such as delaying and reducing settlement offers to lead to more instances of personal bankruptcies. Using state and year fixed effect models, we explore changes in the incidence of personal bankruptcy in a given state following changes in the relative number of complaints in stock and mutual insurers in the same state. We find that a one standard deviation increase in the complaint wedge between stock and mutual insurers is followed by a 7% increase in personal bankruptcies. This evidence implies that financially fragile consumers endure substantial costs from poor service quality by stock insurers.

This study makes three important contributions to the literature. First, our paper focuses on a much-ignored aspect of financial intermediary regulatory goal, namely promoting service quality for consumers. To this end, the analysis adds to the literature on consumer financial protection by providing evidence regarding a broad range of customer complaints about financial intermediaries (e.g., Agarwal, et al., 2014; Matvos, et al., 2015; Egan, et al., 2016). Consistent with anecdotal and popular press coverage, our evidence suggests that customers experience substantial problems regarding settlement delay, reduced settlement offers, and misconduct in the insurance industry. Moreover, the evidence of significant and substantial customer complaints subsequent to a stock insurer receiving a negative earnings shock is quite compelling. Thus, the broad and consistent patterns of customer complaints, based on the stock and mutual insurer comparison, regarding settlement problems and misconduct suggest a consumer financial protection problem. In this context, our analysis provides the first comprehensive evidence of a complete spectrum of customer service quality problems with financial intermediaries.

Second, our approach provides evidence on how consumer actions reveal evidence about their perspectives on regulatory efficacy regarding financial intermediaries. The role of regulators in protecting consumers centers on both solvency and the promotion of service quality. Experience goods that exhibit infrequent service by the financial intermediary (Israel, 2005), coupled with the

local nature of learning (Agarwal et al., 2016), provide an environment ripe for service quality problems. Our analysis presents evidence inconsistent with the notion that regulatory oversight facilities service quality in financial intermediaries. Instead, one could arguably interpret the evidence as a race to the bottom in an industry with asymmetric information. Our analysis suggests the need for greater focus educating consumers about financial intermediary service quality, potentially by providing access to comprehensive and transparent data on insurer service quality. Previous literature suggests that better disclosure proves effective in facilitating consumer learning about financial intermediary services (Agarwal, et al., 2015). Currently, the data needed for our analysis is difficult to access and requires processing with statistical software. Beyond the difficulties in accessing and tabulating the data on the NAIC website to evaluate service quality, we observe that their data disappears after 3 years. In other words, consumers can only search a given insurer for a 3-year period, without any easy method to compare across firms. As wide spread insurance shocks occur infrequently, greater transparency about service quality potentially facilitates consumer ability to evaluate intermediary reputation.

Finally, we add to the limited literature on the regulatory efficacy of financial intermediaries (Agarwal et al., 2014; Reeb et al., 2014). This paper highlights the impact of dual goals in financial regulation. Regulators focus on both financial intermediary solvency and service quality to consumers. Joskow (1973) argues that insurance regulators over emphasize the focus on profits or solvency. Consistent with this notion, our evidence implies that regulators primarily focus on financial solvency, putting pressure on their capacity to promote service quality even in times of financial difficulty for consumers. Moreover, price regulation appears to lead to an increased practice of delaying and reducing insurance settlements by insurance intermediaries. These arguably well-intentioned regulatory goals have unintended consequences--consumers bear substantial costs in the form of greater incidences of personal bankruptcy. Two potential policy implications arise from this analysis: 1.) Consumer service data could be made known in a more salient way to consumers (e.g., written in their policy contract etc) and 2.) the entire history of the complaint data could be made available, not just a recent snapshot.

I. The Insurance Industry

I.A. Background Information

The insurance industry serves as an important financial intermediary with total written premiums worth of $1.1 trillion (6.7% of the U.S. GDP) and an asset size of $5.1 trillion in 2014.

The industry offers products in the form of contingent claims against loss and damage, essentially to all consumers in the U.S. economy. For example, legally *all* drivers are required to purchase auto insurance with state-required minimum liability coverage. Most home-owners and a large proportion of renters in the U.S. have home insurance. According to the Insurance Information Institute, U.S. drivers have 213 million auto policies based on the information from the Automobile Insurance Plans Service Office, while homeowners (and renters) in the U.S. have 240 million insurance policies. The insurance industry also contributes to the economy by providing 2.5 million jobs in 2014 (2.1% of the U.S. employment), according to the U.S. Department of Labor.

There are a total of 6,118 insurers in the U.S. (including territories) in 2014, including 2,583 Property-Casualty (P-C) insurers, 1,752 Life-Health (L-H) insurers, and 1,783 other insurers and related agencies.[5] Given the objective to gauge insurers' service quality using customer complaints, our analysis will focus on the P-C insurers.[6] Customer complaints within the L-H industry may weakly correlate with customer experience due to the obvious disconnect between purchasers and beneficiaries of insurance policies—claims of life insurance policies never accrue to the policy buyer, and health insurance purchase is often tied to the employer's plan and less to the individual's choice. Property-Casualty insurance companies represent a significant portion of the entire industry; they account for 44% ($502.6 billion) of the total premiums written in the U.S. in 2014.

The P-C industry features two major ownership structures: stock and mutual (Cummins et al., 1999). Owners in stock insurers are the shareholders who collect the residual cash flows or the profits. In contrast, owners in mutual insurers are the policyholders (or customers) to whom the residual cash flows or profits will be distributed. Clearly, relative to mutual insurers where owners' and policyholders are the same people, stock insurance companies have greater conflicts of interests with customers, especially after insurance policies are sold. Moreover, stock and mutual companies in the insurance industry are profit-seeking firms that offer similar product types, and are subject to the same regulatory scrutiny. These potential incentive differences make mutual and stock insurers a good laboratory to explore consumer financial protection.

It is important to note that the P-C industry becomes more dominated by the stock insurers over time. In 2009, stock insurers accounted for 70%-73% of the industry by the size of the written

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[5] Other companies include specialty insurers that consist of fraternal (85), title (56), and risk retention groups (252); and other insurance agencies, brokers, and other insurance-related enterprises (1,390). These specialty insurers write only a small fraction of insurance premiums. Source: http://www.iii.org.

[6] P-C insurance primarily consists of three lines: auto, home and commercial insurance. These insurance policies help individual consumers recover from losses stemming from car accidents, or from the effects of a disaster on their home arising from storms or fires.

premiums or assets (A.M. Best Company, *Best's Aggregates and Averages, P/C edition, 2010*). Similarly, we also observe, in the banking industry, the prevalence of stock banks (i.e., commercial banks) relative to credit unions, which are owned by members (customers). By asset size, commercial banks were nine times as large as credit unions in 2014.[7] The sheer size of the stock intermediaries further highlights the important regulatory role in facilitating service quality in financial intermediaries.

I.B. Regulatory Environment

The P-C insurance industry is heavily regulated at the state level (Joskow, 1973). While the National Association of Insurance Commissioners (NAIC) seeks to coordinate many regulatory standards via model legislation across states, state regulators have authority to set their own standards and conduct insurance regulation of insurers operating in the state.

Regulation of insurers can be broadly classified into two main areas: solvency regulation and market regulation. Solvency regulations mainly focus on capital adequacy requirements. Every state has its own statutory minimum capital requirement. According to the Uniform Certificate of Authority Application by the NAIC, for example, the statutory minimum paid-in capital at Delaware requires $300,000 capital plus $150,000 surplus while Washington DC requires $300,000 capital plus $30,000 surplus.[8] Note that the state capital requirement is set at a relatively very low level and does not serve as a binding constraint for insurers to expand across states. Risk-based capital (RBC) requirements that went into effect in the U.S. property-liability insurance industry in 1994, which mandates intervention by (state) regulators when the risk-based capital ratio, i.e., total adjusted capital divided by the risk-based capital, falls below 2.

Market regulations concern insurer licensing, policy provisions, pricing, market conduct and customer complaints. Every insurance company must be licensed in each of the states in which it underwrites. Furthermore, each state differs in standards with regards to the price regulation (Grave and Leverty, 2010). While many states adopted competitive rating (CR) laws that allow insurers substantial pricing freedom in most lines of business, many states stringently regulate pricing by insurers. The two most stringent pricing regulation systems require insurers to use rates approved by (prior approval) or determined by (state-made rates) the state's regulatory authorities. The other pricing regulatory requirements—flex, file and use, use and file, and competitive—provide insurers some degree of flexibility in setting and using their own rates (Harrington, 2002).

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[7] The statistics are obtained from the Federal Reserve Board and the National Association of Federal Credit Unions.
[8] Source: http://www.naic.org/documents/industry_ucaa_chart_min_capital_surplus.pdf

Although each insurer must obtain a license in each of the underwriting states and meet the capital and policy pricing requirements of each state, regulators typically concentrate their supervisory efforts on the locally domiciled insurers (and rely on other states to monitor the out-of-state insurers), to avoid duplication of regulatory endeavor across states (Grace and Phillips, 2008).

Finally, there is virtually no difference in capital requirements between stock and mutual insurers (Joskow, 1973).[9] In addition, regulatory laws on policy rates do not differentiate by the organizational form of insurers, nor can we find documentation of inconsistency in other market regulations between stock and mutual insurers. In other words, stock and mutual insurers not only provide similar products but they also face the same regulatory scrutiny. Yet, they potentially exhibit differing incentives to offer high quality services (Glaeser and Shleifer, 2001), providing a natural venue to analyze service quality in the financial services sector.

II. Data and Sample

II.A Customer Complaints Data

When customers cannot resolve their concerns about insurance service or claims with agents or representatives of their insurer (including the consumer complaint department of the insurer), they can file a complaint against their insurer to the state regulator either online, by mail or fax, or by phone. Customers need to provide supporting documents for their complaints. A copy of the complaint will be sent to the insurer involved, who is then given several weeks to respond before further actions are taken by the regulator. For example, Illinois allows 21 days for an insurer or agent to respond to a complaint. After that, an experienced and independent arbitrator, assigned or approved by the state regulator, will determine the validity of the complaint, whether the insurer has satisfactorily resolved it, and whether further follow-up actions are necessary. Customer complaints yield a wide range of outcomes, including no-action required, company position upheld, complaint being withdrawn, insufficient information, compromised settlement, or disciplinary actions against the involved insurer. Potential disciplinary actions against insurers include monetary fine and, in the extreme cases, revoking the insurer's in-state license.[10] Complaining consumers typically hear from the state regulator about the outcome within a few months after filing.

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[9] In the early 1990s, mutuals had relatively lower capital requirements than stocks in some states. However, this differential has been eliminated since the mid-1990s (Zanjani, 2007).

[10] Consumers can also resort to their state's consumer protection division, the Better Business Bureau, or consider pursuing other legal actions. We do not observe their actions through these other venues.

State regulators collect all filed complaints and report them to the NAIC. With a goal to help inform consumers about their insurance purchase decisions, the NAIC's Consumer Information Source (CIS) database publishes online the closed consumer complaint reports by insurer and by year for each of its underwriting states, along with the insurers' key financial data. In addition, for each insurer, the regulator database tabulates the complaint reasons in each year, with which they further classify into four types based on the different stages of customer experience: marketing and sales, underwriting, policyholder service, and claim handling (see Appendix A for detailed definitions of these types). Finally, the regulator database also releases information about the outcome information of the closed complaints for every insurer in each year.

We manually collect the entirety of the U.S. licensed property-casualty (P-C) insurers' complaint data from the NAIC website for the period from 2005 to 2011. Table 1 provides a breakdown of the 136,232 customer complaints in our raw sample according to the complaint types, reasons, and outcomes. Note that the complaint types and reasons are not mutually exclusive, while the complaint outcome is unique for each case. Panel A shows that the vast majority of complaints (73%) arise from customer experience in claim handling. Panel B presents a frequency breakdown of the top ten reasons cited in the customer complaints. The NAIC data provide a very detailed list with over 80 complaint reasons, but most of the customer complaints concentrate on a few common categories related to either the claim process or the underwriting process. For example, the top five complaint reasons are delay of claim (31%), unsatisfactory settlement offer (i.e., reduced settlement offer) (20.3%), denial of claim (11.3%), policy cancelation (7.3%), and premium pricing (6.4%). In the subsequent empirical analysis, we group the complaint reasons into five broad categories reflecting the nature of the concerns: policy termination, policy pricing & other terms, denial, delay and underpayment, misconduct, and customer care (please refer to Appendix A for the detailed construction of these categories). We also classify the complaint outcomes and are specifically interested in the customer-favorable resolutions. To that end, we tabulate in Panel C the fraction of all customer complaints that are resolved in either compromised settlement (to the customer), company's position being overturned, fine or other disciplinary actions. Nearly 60% of complaints are based on legitimate claims, as supported by the regulators, which suggests that customer complaints serve as a good indicator of the quality of an insurer's service quality.

II.B Financial Data

We match the insurer complaint data with the financial information from the NAIC annual statement database. The main control variables in this study are the insurer's size (logarithm of net admitted assets), ROA, underwriting profitability (to better capture the operating performance of the underwriting business), and the insurer's independent standing (i.e., the insurer is not part of an insurance group). The ownership structure information (i.e., stock or mutual) of insurers is further cross-checked with *A.M. Best's Insurance Reports: Property/Casualty Edition* (*Best's Insurance Reports*),[11] and proxy statements of the publicly-traded insurers. This renders 20,988 insurer-year observations between 2005 and 2011. We drop all observations with non-positive assets, non-positive premiums written, or non-positive surplus. These insurers are either under regulatory capture or in the run-off state. This step reduces the sample size to 16,673 insurer-year observations between 2005 and 2011. Finally, we restrict our sample to stock and mutual insurers, and furthermore those that did not switch from stock to mutual or vice versa within our sample period.[12] This leaves us with a final sample of 1,746 insurers (1,224 of which are stock insurers) and 10,867 insurer-year observations in the period from 2005 to 2011.

II.C Regulatory Environment Data

To examine the implications of the regulatory environment, we obtain the state-level regulatory staff, budget, and commissioner appointment process information from the 2010 Insurance Department Resources Report by the NAIC, and information on the state-level regulatory law on policy rates from the NAIC's *Compendium of State Laws and Regulations on Insurance Topics*.

III. Customer Complaint Difference between Stock and Mutual Insurers

III.A Univariate Statistics and Matched Sample

Table 2 provides the summary statistics of the financial characteristics and customer complaints between stock and mutual insurers in our sample. The first three columns report the mean statistics as well as the difference in the full sample between 1,224 stock and 522 mutual insurance insurers. During the period from 2005 to 2011, a typical stock insurer has an asset size of $121.6 million, which is 78% higher than the asset size of an average mutual insurer and the

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[11] A.M. Best Company, various years, *Best's Insurance Reports: Property/Casualty Edition* (Oldwick, NJ).
[12] There are 37 (2%) converters in our sample period and we exclude them to facilitate a cleaner interpretation as the (likely endogenous) switching decision makes these insurers distinct from others.

difference is statistically significant at the 1% level.[13] In addition, stock insurers have better performance than mutual insurers in general. For example, stock insurers have an annual ROA of 0.024, compared to 0.019 for the mutual insurers, and the difference is statistically significant at the 1% level. Stock insurers also underwrite in significantly more states and are much more likely to be part of an insurance group.

Turning to customer complaints, stock insurers are associated with a much higher level of complaints that customers file with the regulators. A typical stock insurer receives 45.6% (=exp(0.376)-1) higher customer complaints per year than mutual insurers. The 45.6% difference in customer complaints is economically large and statistically significant (at the 1% level). The fact that customer complaints differ may either reflect the disparity in customer treatment by the insurers or simply arise due to distinct clientele and the associated difference in their perception of customer treatment. However, if the higher number of complaints for stock insurers is due to the selection of "bad" customers, then these complaints would have a lower chance to succeed. Tracking the outcome of these customer complaints, 62.9% of the complaints about stock insurers result in success, very similar to the 62.8% complaint success rate for mutual insurers. The (almost) equal complaint success rate between the two types of insurers shifts the interpretation of the drastic difference in complaints towards one that reflects the disparity in service quality of the two types of insurers.

An obvious confounding factor to the above interpretation lies in the difference in insurer characteristics between stock and mutual insurers. As indicated in Table 2, stock insurers are much larger and more profitable than mutual insurers. To address the observable differences in the key financial variables between stock and mutual insurers, we construct a matched sample. Specifically, we use the nearest neighboring matching algorithm and match the stock insurer with the mutual insurer based on log assets, ROA and the affiliation status. Such an exercise leaves us with 939 stock insurers and 498 mutual insurers, and columns 4-6 of Table 2 report the summary statistics of the matched sample.

After matching, stock insurers and mutual insurers have no discernible difference in size, measures of insurer performance, and the percentage of insurers that are part of an insurance group. Although the gap in customer complaint diminishes somewhat after matching, complaints remain

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[13] In general, the difference, say X, in log variables between stock and mutual insurers in Table 1 means a percentage difference equal to exp(X) − 1. For example, the difference of 0.577 in log assets between stock and mutual insurers (first row of column 3) suggests that the percentage difference is exp(0.577)-1 = 78%.

significantly higher among stock insurers. On average, a stock insurer in the matched sample receives 24.7% (=exp(0.221)-1) higher complaints per year than mutual insurers, and the difference is statistically significant at the 1% level. Similarly as before, there exists no difference in the complaint success rate between the stock and mutual insurers in the matched sample. In sum, the univariate comparison in the matched sample provides the first piece of evidence that the significant difference in customer complaints between stock and mutual insurers appears to reflect the disparity in insurer service quality and is not driven by observable differences in insurer size and profitability.

Admittedly, the particular matching procedure does not fully eliminate the observable differences between the two types of insurers. Table 2 suggests that the matched stock continue to operate in more states. We will explicitly address this issue in the next section and study an alternative matched sample by including the number of underwriting states, in addition to size, profitability, and affiliation status, as the matching variables. The choice of the current matched sample arises from the concern over the sample size of the matched sample and the associated power issues in the empirical tests. Lastly, matching in this situation may not eliminate the *unobservable* differences between stock and mutual insurers. Our empirical identification relies on plausibly exogenous shocks (explained in the subsequent sections) to exploit the within-insurer response in the customer complaints after the shock in the stock and mutual insurers respectively.

III.B Baseline Specification

In this section we study, in a multivariate regression framework, the difference in customer complaints between stock and mutual insurers. We hypothesize that stock insurers have less incentive to provide high quality service to customers compared to mutual insurers. However, we expect strong regulatory oversight to mitigate the impact of such conflict of interests. Thus, the difference in customer complaints between stock and mutual insurers informs us about the impact of the conflict of interests on service quality as well as the overall regulatory efficacy in promoting quality of service.

Since the data provide the complaint outcome (as well as the heterogeneous types and reasons of complaints) aggregated at the insurer level, the unit of observation in our baseline specifications is an insurer in a given year. Specifically, we run the following regression specification:

$$Y_{i,h,t+1} = \alpha + \gamma_{h,t+1} + \beta_1 Stock + \Phi \overrightarrow{X_{i,t}} + \epsilon_{i,t} \tag{1}$$

where $Y_{i,h,t+1}$ is either the natural logarithm of one plus the number of customer complaints received by insurer i domiciled in state h in time $t+1$ or the fraction of the complaints received by insurer i in year $t+1$ that results in customer success (i.e., with outcomes of either compromised settlement in favor of customers, insurer position being overturned, or disciplinary actions against the insurer). *Stock* is a dummy variable equal to one for insurers with stock ownership, and zero for mutual insurers. We include insurer characteristics in year t as controls, and we also include the insurer's home state (i.e., state of domicile)-year fixed effects to control for any time-varying macro conditions or regulatory activities in the insurer's home state. The independent variables (controls) are measured with one year lag relative to the dependent variables to take into account either the possible delay in customer response in filing complaints or simply the lengthy time spent dealing with insurers before customers can respond (recall that 31% of the complaints in the sample concern delay in claim processing).

Columns 1-2 of Table 3 report the matched sample results. In general, customer complaints are positively associated with the insurer asset size and are negatively associated with the insurer performance measures (i.e., ROA and underwriting profitability). Given that the insurer's assets are highly correlated with the size of the underwritten premium, these results suggest that insurers with a larger underwriting business, or insurers when their underwriting business experiences poor performance, appear to draw more customer complaints. In addition, independent insurers are associated with fewer customer complaints. More importantly, after controlling for these insurer characteristics, we find that, consistent with the pattern in the univariate statistics in Table 2, on average stock insurers receive 20.7% (=exp(0.188) -1) more customer complaints than mutual insurers on an annual basis in our matched sample. The difference is economically large and statistically significant at the 1% level.

Although the complaint difference likely reflects the disparity in service quality between stock and mutual insurers, there exists an alternative interpretation that arises from (unobservable) differences in the insurance contracts or simply distinct customer clientele between the two types of insurers, which lead to different customer perceptions and the propensity to complain. To differentiate the two interpretations, we study the outcome of the complaints between stock and mutual insurers. If a typical stock insurer tends to attract customers who are more likely to complain regardless of the quality of customer treatment provided by the insurer, we would observe a significantly lower fraction of complaints *ex-post* proven to be legitimate claims against the insurer. Indeed, we find no statistically significant difference in the complaint success rate between the stock

and mutual insurers (Table 3, column 2), which suggests the complaint difference is more likely to reflect the disparity in the service quality provided by the insurers.

For the baseline specification, we conduct one more set of analysis based on a different matched sample by including the number of underwriting states as an additional matching variable. As a result, stock and mutual insurers are matched not only by insurer size, performance and affiliation status, but the matched stock and mutual insurers also exhibit no difference in the number of underwriting states (for brevity we do not show the summary statistics of this matched sample). Then we repeat the analysis in equation (1) and the results are reported in columns 3-4 of Table 3. Consistently, stock insurers are associated with 24.6% (=exp(0.220)-1) more customer complaints per year than mutual insurers. The difference is statistically significant at the 1% level and is even greater in magnitude than the original matched sample results. We also study the complaint outcome in this matched sample and continue to find no difference in the success rate between the two types of insurers.

Overall, results based on this alternative matched sample, which exploits a broader set of matching variables, confirm our previous findings. In particular, they alleviate concerns that higher customer complaints about stock insurers are driven by the omitted variables associated with the number of underwriting states. On the other hand, due to the large difference in the number of underwriting states between stock and mutual insurers in the full sample, the more comprehensive matching results in a sample with a significantly smaller size (by 17%) than the matched sample without using the number of underwriting states as a matching variable. Given the consistency in the results in Table 3, we will focus on the first matched sample (based on insurer size, ROA, and whether the insurer is part of an insurance group) in the subsequent analysis to maximize the power of our empirical tests.

Lastly, to verify the external validity of the results in the matched sample, we repeat the analysis in the full sample. Consistent with the matched sample results, we find 17% (=exp(0.157)-1) higher customer complaints per year in the stock insurers in comparison to mutual insurers (Table 3, column 5). Again, in the full sample, complaints about the stock insurers do not differ in their success rate from those about mutual insurers (Table 3, column 6).[14]

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[14] For completeness, we also re-estimate the rest of the analysis in the full sample instead of the matched sample. The only exception is Table 5 as the empirical identification requires the two types of insurers to have comparable profitability before the treatment. All results are qualitatively and quantitatively similar. For brevity, we present these results in Table A2 in the Internet Appendix.

An interesting ensuing question relates to the geographical variation in the complaint difference between stock and mutual insurers. Using the full sample of observations, we estimate the specification in equation (1) for insurers headquartered in each state (or district) in the U.S. respectively. We obtain the regression coefficients for *stocks* and plot the variation in the complaint difference between stock and mutual insurers at the state level (Figure 1). There is evident geographical variation across the country; states such as Kentucky, Rhode Island, Kansas, South Carolina, and Florida are associated with the greatest level of customer complaints received by stock insurers relative to mutual insurers, while stock insurers based in Colorado, Nevada, Virgina, Utah, and DC are associated with the lowest complaints relative to mutual insurers. It is important to note that the level and pattern of the cross-state heterogeneity suggests that the documented customer complaint difference between stock and mutual insurers is not clustered either by location or by eminent economic indicators.

III.C Heterogeneity in the Types and Nature of Customer Complaints

In addition to the number of customer complaints, we also observe, at the insurer level, the breakdown of the customer complaints into the types of complaints as well as the reasons for such complaints. This allows us to further gauge the difference in customer complaints between stock and mutual insurers.

First, we decompose the total number of customer complaints for each insurer at a given year into four categories corresponding to the different aspects of customers' dealing with the insurance company: marketing and sales, underwriting, the general policyholder service, and claim handling. Then we study whether the complaint difference between stock and mutual insurers, as documented in Table 3, is uniformly distributed across these four categories. We use the same empirical specifications as in Table 3 and report the results in Panel A of Table 4. Stock insurers are associated with more customer complaints about claim handling and policyholder service, while there exists no statistically significant difference in the number of customer complaints regarding marketing and sales or underwriting. Complaints about claim handling (policyholder service) in stock insurers are 14.9% (11.5%) higher than those in the mutual insurers, and both coefficients are statistically significant, either at the 1% or 5% level.

Next, we explore in greater detail the reasons for customer complaints. As described earlier, there is a detailed list of over 80 complaint reasons in the original data obtained from NAIC, and we group them into five broad categories based on the nature of the complaint reasons. The five

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categories are policy termination, policy pricing and other terms, denial, delay, and underpayment of claims, misconduct, and customer care.[15] The first two categories describe specific concerns customers have for the underwriting process. Denial, delay, and underpayment reflect the major issues customers perceive during the claim handling process. Misconduct and customer care capture concerns regarding unreliable or fraudulent customer practice which can occur either in marketing and sales, underwriting, or claim handling. We use the same empirical specifications as in Table 3 and report the results in Panel B of Table 4.

The complaint difference between stock and mutual insurers is largely driven by concerns over claim denial, delay or underpayment, misconduct, and service quality. In particular, customers of stock insurers file 14.6% more complaints about denial, delay and underpayment of claims than mutual insurers. Regarding policy termination and policy pricing and other (contract) terms, no difference is observed between the two types of insurers. These results resonate with those in Panel A of Table 4; taken together, the findings in Table 4 are consistent with the interpretation that stock insurers, due to their weaker incentive to serve customers, are more aggressive in handling customer claims, in order to minimize expenses associated with their underwriting business. They also imply limited regulatory influence on customer practice by insurance companies in general and especially the stock insurers.

III.D Natural Disasters as Negative Profitability Shocks

Previous findings in the matched sample, particularly those on the complaint outcome as well as on the heterogeneity in the types and nature of complaints, offer a striking pattern consistent with stock insurers providing poorer service quality by denying, delaying or underpaying their customers' claims and with other fraudulent behavior. However, the above analysis largely captures the cross-sectional nature of the correlation. Specifically, we cannot fully eliminate concerns about the *unobservable* differences in product features or customer characteristics between the two types of insurers that can explain in part the difference in customer complaints.

To identify a causal channel, we will exploit exogenous shocks to insurer profitability and study the within-insurer response in customer complaints. A negative profitability shock aggravates the weak incentives to serve customers, especially in stock insurers. If customer complaints truly reflect insurer's service quality, *and* if regulators in general have limited oversight over insurers'

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[15] Please refer to Appendix A for detailed construction of the nature of complaints.

service quality, we would expect an increase in customer complaints about stock insurers after the negative profitability shock, relative to the change in complaints about mutual insurers.

Specifically, we employ natural disasters, such as thunderstorms, hurricanes, floods, wildfires, and tornados, as negative profitability shocks to insurance insurers. Severe natural disasters, i.e., those that cause significant property damages, will lead to a large number of claims, and equivalently a large increase in expenses and decrease in profits for the exposed property and casualty insurance insurers.[16] These shocks are plausibly exogenous to insurers' behavior in the pre-disaster-event period for the following reasons. First, an insurer's choice of location of their operation is determined long before the occurrence of the disasters in our sample period. Second, while it remains feasible to have a reasonably good idea of disaster-prone locations, the precise timing and severity of the disasters are much less predictable. This in turn makes the insurers less able to change their behavior in full anticipation of a severe natural disaster in the near future. More importantly, to isolate the impact of an exogenous profitability shock on insurer's response, we will make use of the fact that a typical insurer operates in multiple states (see summary statistics in Table 2). When a natural disaster hits state A, the exposed insurers—those that underwrite in state A—tend to also operate in other states which do not experience the natural disaster. By focusing on the change in customer complaints in the no-disaster states of exposed insurers, we further alleviate concerns about the unobservable characteristics in product features or customer profiles that may correlate with the disaster risk in the affected locations.

We obtain natural disaster data from the Spatial Hazard Events and Losses Database (SHELDUS), which is a county-level hazard data set covering the U.S. with different natural hazard event types including thunderstorms, hurricanes, floods, wildfires, and tornados. We identify large disaster events in our sample period, namely those that result in over $500 million of loss at the state level. We focus on the states with a *single* large disaster in our sample period and remove those with multiple disaster occurrences. As a result, we identify six states, Wisconsin, California, Iowa, Oklahoma, Texas, and Tennessee, as the *hit* states with a staggered timing of severe natural disasters during the sample period between 2007 and 2010.[17]

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[16] For example, in the five-year period between 2009 and 2013, wind and hail accounted for the largest share of claims, affected 3.2% of the insured homes with an average loss of $8,793.

[17] Specifically, the timing of the natural disaster events is as follow: 2007 for Wisconsin and California, 2008 for Iowa, Oklahoma and Texas, and 2010 for Tennessee. We do not consider disasters before 2007 or after 2010 to ensure two years of observations in the pre-disaster-period and one year of observations after the disaster event.

To increase the power of our empirical analysis, we study insurers subject to a greater level of negative profitability shock induced by such disasters. Specifically, we define insurers as *heavily exposed* if they underwrite more than 5% of their total premiums in (one or more of) the six hit states in the disaster year. Given the staggered nature of the disaster shocks, we restrict our analysis to the no-disaster states of heavily exposed insurers (treatment states). To ensure our treatment states are truly free from (damaging) disasters, we require the no-disaster states do *not* correspond to any of the six states that experience $500 million in loss *nor* are among the top five highest loss states in the same year. In addition, to warrant a comparable profitability condition between the stock and mutual insurers before the natural disaster, we use the matched sample in the analysis. Then we run the following regression,

$$Y_{i,s,t+1} = \alpha + \rho_i + \lambda_s + \tau_{t+1} + \beta_1 1_{nodisaster\ state\ pre} + \beta_2 1_{nodisaster\ state\ post} +$$
$$\beta_3 1_{nodisaster\ states\ post} \times Stock + \Phi \overrightarrow{X_{i,t}} + \Gamma \overrightarrow{Z_{i,s,t}} + \epsilon_{i,s,t} \qquad (2)$$

where $Y_{i,s,t+1}$ is the (natural logarithm of one plus the) number of customer complaints for a given insurer i in its underwriting state s in year $t+1$, and $1_{nodisaster\ state\ pre}$ and $1_{nodisaster\ state\ post}$ are the treatment dummy variables for the post- and pre- period respectively (please refer to Appendix A for detailed definitions of the variable construction). To study the differential effect between stock and mutual insurers, we also include an interactive term between $1_{nodisaster\ state\ post}$ and the *Stock* dummy variable. We include a pre-disaster dummy variable ($1_{nodisaster\ state\ pre}$) as a validation test of our empirical identification strategy: if these natural disasters are truly exogenous shocks, we expect to see no change in customer complaints in the period immediately before the disaster event. We control for the insurer-level variables ($\overrightarrow{X_{i,t}}$) as well as insurer-state-level characteristics ($\overrightarrow{Z_{i,s,t}}$), and include (underwriting) state (λ_s), year (τ_{t+1}), as well as insurer (ρ_i) fixed effects in the regression. Standard errors are clustered at the insurer level. To interpret, given a natural disaster event in year t, the coefficient β_2 captures the customer complaints in a no-disaster state in year $t+1$ for the heavily exposed *mutual* insurers relative to the complaints in the same state of the same insurer in the period before the natural disaster event. The coefficient β_3 thus measures the incremental change in customer complaints after a natural disaster in a no-disaster state about heavily exposed *stock* insurers. We report the regression results in Table 5.

In the first column of Table 5, we first study the average customer complaint response after the disaster shock without distinguishing stock and mutual insurers. On average there is no

significant change in complaints in the no-disaster states of the heavily exposed insurer. However, when we separate stock and mutual insurers, we observe different responses in complaints. Column 2 of Table 5 shows that relative to the change in complaints in the no-disaster states of heavily exposed mutual insurers, their stock counterparts experience a 2.5% (=exp(0.025)-1) increase in complaints in the year following the disaster. At the same time, we find no difference in complaints in the disaster year from those in the pre-disaster period. Given that complaints are likely a lagging measure of insurer's service quality, the lack of complaint response in the disaster year suggests that the disaster events are uncorrelated with insurer's pre-disaster behavior, validating our identification strategy.

The effect of a 2.5% increase in complaints in the no-disaster states of heavily exposed stock insurers relative to their mutual counterparts may appear marginal both in economic magnitude and statistical significance (*p-value* = 0.093). However, this is likely a weak test by assuming a uniform effect across all no-disaster states in which an insurer underwrites. To further gauge the heterogeneity in complaint response about the stock insurers, we hypothesize that if the negative profitability shock compels stock insurers to engage in more aggressive customer practice ex post, it would be more economical for them to concentrate such practices in a few states where they have a large underwriting business. Alternatively, insurers may need to mobilize limited company resources in order to respond to the large number of claims in the disaster states; leading insurers to deploy means or make transfers from their larger underwriting states, which in turn produces deteriorating service quality in those states. In addition, the heterogeneity test can also help address an alternative interpretation that stock insurers (more promptly) respond to the disaster state's experience and revise the claim processing standard in *all* states, resulting in an increase in complaints in the no-disaster states.

To test this idea, we identify, within each insurer, the no-disaster states that comprise 25% or more of the insurer's total underwriting business in a year.[18] We label such a state as *Important state,* which typically corresponds to the top one or two underwriting states for an insurer. Then we interact $1_{nodisaster\ state\ post}$ with the *Important state* dummy and repeat the specification in equation (2). To ease interpretation, we perform the regressions for the heavily exposed stock and mutual insurers separately. Column 3 of Table 5 shows that for the heavily exposed stock insurers, the

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[18] While the choice of 25% seems ad hoc, we repeat our analysis using the continuous variable, the share of the state's written premium over the insurer's total written premium in a year, and find the same results. To facilitate interpretation, we report the results using the dummy variable based on the 25% cutoff in the paper.

increase in customer complaints after the disaster shock is driven by the top one or two underwriting states of the insurer; complaints increase by 27.9% (=exp(0.246)-1) in these states in the one year following the disaster event. The effect is both economically large and statistically significant at the 5% level. In comparison, there is no difference between the *Important state* and the rest for mutual insurers; the coefficient estimate is small (0.003) and statistically indistinguishable from zero.[19] In sum, these results cast a causal interpretation that relative to their mutual peers, stock insurers engage in more aggressive customer treatment ex post to counterbalance the impact of a large negative profitability shock. Alternatively, stock insurers could be less prepared ex ante for customer service, due to their cost cutting incentives, which result in insufficient resources to respond to customer needs after large natural disasters. Either mechanism highlights the service quality issues that financial service consumers endure, which become more prominent after natural disaster shocks.

Lastly, as a further verification of our empirical design, it is useful to study whether insurers are indeed affected by the natural disasters in those six hit states, and whether stock insurers and mutual insurers are affected in a similar way. To the extent that severe natural disasters cause claim requests to increase, probabilistically we would also expect a corresponding increase in customer complaints (whether insurer's service quality in the hit states change or not). In Table A1 in the Online Appendix, we indeed observe such a pattern. Customer complaints in those six states increase in the year following the natural disaster, and the increase is substantially greater for insurers that are heavily exposed, i.e., those with a significant underwriting business in the hit states. In addition, both heavily-exposed mutual and stock insurers experience an equally significant increase in complaints, suggesting that the shock intensities in stock and mutual insurers are comparable. In addition, there is no change in complaints in the disaster year relative to the pre-disaster period, further validating our empirical identification.

III.E. Can Competition Mitigate Insurers' Conflict of Interest with Customers?

A natural question follows as to whether any market mechanism could alleviate the conflicting interest against customers (and thus work as a (partial) substitute for regulatory oversight). One appealing argument stems from the effect of reputational concerns among

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[19] To formally test the statistical difference, we also include both stock and mutual insurers in the same regression and conduct an F-test of the incremental effect of important state in stock insurers in the post-disaster year relative to the important states of their mutual counterparts in the post-disaster year. The F-stats are highly statistically significant, supporting a strong and positive incremental effect in the stock insurers.

(potential) customers, which would encourage particularly stock insurers to internalize customer welfare into their objective function. Arguably such reputational concerns manifest stronger in an environment in which insurers face more competition for underwriting. While the policy rates are heavily regulated at the state level in the property and casual insurance industry, market entry proves very competitive (Joskow, 1973). These features suggest that insurers have a strong incentive to attend to service quality in the presence of entry threat, as to a large extent they cannot compete on price. On the other hand, greater competition for the same pool of customers also implies a smaller underwriting business for each insurer on average, which further weakens insurers' incentives, especially for stock insurers, to serve their customers. The net effect remains an empirical question, which we test in this section.

We measure the extent of competitive pressure at the state level using two proxies. The first one resembles the canonical Herfindahl index to capture the concentration of underwriting insurers in a given state. Specifically, we construct a *State Herfindahl index* as the sum of the squares of the market shares of insurers underwriting within a given state in a year, where the market share for each insurer is equal to the insurer's written premium in the state divided by the state's total written premiums (by all insurers underwriting in the state). A large *State Herfindahl index* suggests high concentration (and low competition) in underwriting in the state. The second proxy simply counts the number of insurers underwriting in each state in a given year (*Insurer presence*). The more insurers underwrite in a state, the greater competition each insurer faces from rivals. To take into account the differential size effect across insurers, we weight each insurer by the share of the particular state's written premium relative to the insurer's total written premium across all states in that year. Put differently, we give a higher weight for insurers with a significant share of their total underwriting business in the state. The two measures have a correlation coefficient of -0.30, suggesting that they capture correlated but differential aspects of the competition in underwriting.

Then we study, in the matched sample, how an insurer's customer complaints in a particular state, in a year, vary with the level of competition in the state. We include the same control variables—insurer-level variables and insurer-state level characteristics—as in Table 4. In addition to insurer fixed effects, we include state-year fixed effects to control for any time varying effects at the state level that might correlate with our competition measures. As a result, the coefficient of the interactive term between the *stock* dummy variable and competition measures captures the *within-in* insurer complaint differential between states with varying degree of competition in a given year in stock insurers (relative to their mutual peers).

We report the results in Table 6. Column 1 shows that the complaint differential between a state of low *State Herfindahl index* (more competitive) and a state of high *State Herfindahl index* (less competitive) is more positive for a stock insurer, relative to the complaint differential in a comparable mutual insurer. To facilitate interpretation, we construct a dummy variable for the states in the bottom 10th percentile of the *State Herfindahl index* distribution (low concentration) for each year and repeat the analysis (column 2). Complaints in low concentration states are 8.8% (=exp(0.084)-1) higher than the other states within the *same* stock insurer, relative to the complaint difference between the low concentration states and others for a comparable mutual insurer. Tests based on the measure *Insurer presence* deliver the same message. Specifically, states with high insurer presence (i.e., states in the top decile distribution of *Insurer presence* in a given year) are associated with 8.7% more complaints than other states about a stock insurer, compared to the complaint difference in high insurer presence states and the rest within a comparable mutual insurer (column 4).

These findings reveal that the increased conflicting interest in the presence of greater competition prevails in explaining stock insurers' customer practice, despite the potential reputational costs. While puzzling at first glance, slow consumer learning in such experience goods can explain in part the stock insurer's lack of response to the reputational incentive. Israel (2005) documents that customers of a car insurance company are overoptimistic about the product (or company) quality at the time of purchase and slow in learning due to the infrequent nature of claims. Agarwal et al. (2016) also find that consumer learning about quality occurs through informal networks and in a much localized context. Consequently, these results highlight the importance of regulators (and yet their limited efficacy) in protecting consumers when market mechanism fails to function properly likely due to informational or behavioral frictions.

IV. Impact of the Regulatory Environment

The results in section III establish that stock insurers record more customer complaints, especially after negative profitability shocks or when facing more competitive pressure in the local underwriting business. Furthermore, the strong and persistent pattern in the complaint gap between stock and mutual insurers underscores the limited role regulators serve in mitigating protecting financial consumers through improved service quality. In this section, we focus on the variation in the regulatory strength as well as an anatomy of the regulatory objectives to further gauge the regulatory efficacy in protecting consumer interest.

IV.A. Does the Complaint Difference Decrease in a Strong Regulatory Environment?

First, we study whether and to what extent variation in the complaint wedge between stock and mutual insurers relates to the strength of the regulatory environment. Insurance companies are regulated at the state level, and each state practices regulatory control largely to its discretion. Perhaps a strong regulatory environment in a particular state is associated with better regulatory oversight over consumer interest. While a typical insurance insurer operates in more than one state, regulatory oversight is delegated to the state of its domicile arguably to avoid duplication of regulatory activities across states (Grace and Phillips, 2008). Therefore, to test the idea, we examine the relationship between the insurer-level complaint difference between stock and mutual insurers and the regulatory environment of the home state of the insurers. Econometrically, we add an interactive term between the *stock* dummy and various measures of regulatory strength to the specification in Table 3 and run the analysis in the matched sample.

First, we use the staff and budget size of each state's insurance department to measure the amount of the expendable regulatory resources. From the NAIC 2010 Insurance Department Resources Report, we obtain the staff size of each state's insurance department during the period between 2006 and 2010, and the dollar value of budget for each state's insurance department during the period between 2008 and 2011.[20] The first two columns of Table 7, Panel A show the results with respect to these two measures. Surprisingly, states with more regulatory staff or with a larger regulatory budget in a given year are associated with a greater, rather than a smaller, complaint difference between the stock and mutual insurers. The effects are consistent for both measures of regulatory resource and both coefficients are highly statistically significant (either at the 1% or the 5% level).

In the insurance industry, New York is a state considered to have the most stringent regulation (Pottier and Sommer, 1998).[21] Next, we test whether the complaint difference between stock and mutual insurers is weaker in the state of New York. Again to our much surprise, the stock insurers based in New York experience 36.3% (=exp(0.310)-1) higher complaints than New York-based mutual insurers, relative to the complaint difference for insurers based in other states (column 3 in Table 7, Panel A). The effect is economically large and statistically significant at the 5% level. Lastly, we exploit the variation across states in the means of state commissioner's promotion. It is a

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[20] The budget information for year 2011 is the projected amount at the time of the report.
[21] For example, it is the only state that requires all insurers licensed in New York to meet New York laws both in New York and other states.

popular belief that an appointed commissioner is less subject to regulatory capture (for example by the insurers) compared to an elected state commissioner (Grace and Phillips, 2008). The result in column 4 of Table 7, Panel A suggests no difference in the complaint difference in states with an appointed commissioner and states with an elected commissioner. Although the coefficient is negative, it is not statistically distinguishable from zero.

A potential explanation for the above surprising result could stem from customers' rational responses, reflected in their higher propensity to complain, in states with strong regulators. In addition, customers of the stock insurers may be particularly responsive compared to those of mutual insurers. To investigate this explanation, we compare the complaint outcome difference between stock and mutual insurers across states. If customers of stock insurers are more likely to complain to "tougher" regulators in anticipation of a higher likelihood of their concerns being addressed, we would observe a corresponding increase in the difference in complaint success rates between stock and mutual insurers in states with strong regulators. Panel B of Table 7 shows the results regarding the complaint success rates. Across all four specifications, we do not observe the difference in complaint success rates between stock and mutual insurers to be greater in states with greater regulatory strength. Coefficients are either of the wrong sign or economically small, and more importantly all of them are statistically indistinguishable from zero. Thus, the greater complaint difference between stock and mutual insurers in states with strong regulators cannot be attributable to a (differential) increase in the inclination to complain among customers in the stock insurers.

IV.B. When Insurers Approach the Regulatory Threshold of Financial Insolvency

To understand the puzzling finding in Table 7 that strong regulators are associated with even higher complaints about stock insurers relative to their mutual peers, we consider the regulator's dual goals. In addition to promoting service quality, financial intermediary regulators are charged with guarding the financial health and solvency of the intermediaries in the insurance industry. In principle, regulators should exert equal effort in achieving goals in both dimensions. However, it remains a possibility that financial regulators place uneven focus on their two objectives by spending most of their resources to achieve the financial solvency objective. As a result, we will not observe a positive link between a strong regulatory environment and better service quality, or equivalently lower customer complaints (especially among stock insurers). Furthermore, regulators' emphasis on the financial solvency aspect may imply fewer resources available for supervising insurers' service

quality, and at the same time a stronger incentive for insurers to maintain their financial performance at the cost of their customers. The findings in Table 7 are indeed consistent with this interpretation.

We also explicitly test the hypothesis by exploiting the variation in the level of the risk-based capital ratio across insurers. Insurers with a level of the risk-based capital ratio equal to or below 2 will be subject to regulatory intervention. As a result, insurers near this insolvency threshold would face stronger regulatory scrutiny in maintaining their financial health, which may exacerbate the tension between the profit objective and consumer interest, particularly in stock insurers. Empirically, we capture these insurers as those whose risk-based capital ratio is equal to or below 2.5 (*High insolvency risk*).[22] Then we study, in the matched sample, the incremental complaint difference between stock insurers and their mutual peers when they face high financial insolvency risk.

In column 1-2 of Table 8, Panel A, we find that stock insurers experience 129% (=exp(0.827)-1) additional increase in complaints and 16.8% lower complaint success rate when they approach the regulatory insolvency threshold, relative to their high insolvency risk mutual counterparts. Both coefficients are significant at the 10% level. These results support our hypothesis that regulators put (much) more weight on insurers' financial health than on promoting service quality, especially when insurers' financial health is at risk.

We further gauge the types and nature of the incremental increase in the complaint difference. We use the specification in Table 4 in the matched sample by adding an interactive term between the *stock* dummy and the *High insolvency risk* dummy variable. Results in Panel B and C of Table 8 reveal that the incremental increase in the complaint difference is more strongly related to the insurer's marketing and sales and underwriting practices, with the dominant complaint reasons concerning policy termination and pricing and other contract term issues. These findings thus suggest that stock insurers become more aggressive in selling new policies and terminating existing policies, likely in an effort to increase their revenue when they become inadequately capitalized.

IV.C. The Impact of Stringent Regulatory Laws on Policy Rates

Regulators' constraints and the resulting uneven focus may also manifest in the multiple aspects of their goal to promote service quality. As mentioned earlier, policy rates are heavily regulated at the (underwriting) state level and the extent of rate regulation varies across states. In particular, under stringent regulatory laws on policy rates, insurers are required to file for prior

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[22] The choice of 2.5 arises from the need to capture imminent insolvency risk while ensuring a sufficient sample size (i.e., power of the test).

approval to charge a different rate from that filed by a rate advisory organization (Grace and Leverty 2010). Arguably the objective of a (stringent) rate control is to promote affordable insurance policies to a broad consumer population. However, unless coupled with a comparable level of regulatory scrutiny over insurers' non-underwriting service, such a stringent rule may have unintended consequences as regulated prices limit profit margins and therefore intensify the conflict between profit objectives and consumer interest.

To examine the implication of stringent regulatory laws on policy rates, we compute, for each insurer, the fraction of its written premium in a given year that is written in a state with stringent regulatory laws on policy rates (% *Rate Regulated*). Then we study whether the customer complaint difference between stock and mutual insurers varies when a higher fraction of their premiums is subject to stringent rate control. Econometrically, we add an interactive term between the *stock* dummy and % *Rate Regulated* to the specification in Table 3 and run the analysis in the matched sample. Results are reported in Table 9.

Results in Panel A of Table 9 show that the complaint difference between stock and mutual insurers becomes larger when insurers are subject to stringent rate control to a greater extent. Stock insurers experience 5.7% (=exp(0.449*0.1)-1) increase in complaints for a 10 percentage point increase in the fraction of written premium subject to stringent rate control, relative to a mutual insurer with the same increase in the fraction of premium subject to rate control. At the same time, there exhibits no relationship between the difference in the complaint success rates and the extent of the stringent rate control.

Looking into the types of complaints that contribute to the divergence of the complaint difference, we find that the incremental increase in the complaint difference is in the marketing and sales, policyholder service, and most prevalently the claim handling experience (Table 9, Panel B). Consistently, the most prominent reason for the greater number of complaints among stock insurers when they encounter stricter rate control is the denial, delay, and underpayment of claims, followed by concerns over misconduct, customer care, as well as policy pricing and other (contract) terms (Table 9, Panel C).

Taken together, these results are consistent with the interpretation that the regulatory focus on supervising policy rates is not accompanied with equal scrutiny over other aspects of insurers' service quality. Consequently, stock insurers, which are more sensitive to the profit pressure induced by the rate control, respond to the restriction in underwriting by aggressively dealing with customers

in other aspects, particularly reflected in a large increase in customer concerns over denial, delay, and underpayment of claims.

V. The Incidence of Personal Bankruptcy

To estimate the social impact of service quality by insurers, we examine the incidence of personal bankruptcy in each state after increase or decrease in the complaint wedge between stock and mutual insurers (e.g. Gross and Notowidigdo, 2011; Gross et al., 2014). Across a wide spectrum of annual incomes, a significant portion of U.S. households faces severe liquidity constraints, effectively living paycheck to paycheck (Lusardi and Bassa Scheresberg, 2013; Kaplan et al., 2014). These financially fragile consumers, which insurers reputedly delay their claims and reduce their settlement offers, could potentially suffer greater incidences of bankruptcy. To test this issue, we investigate whether changes in the complaint wedge between stock and mutual insurers leads to subsequent changes in the incidence of personal bankruptcy in each state.

The Bankruptcy Abuse Prevention and Consumer Protection Act of 2005 requires the clerks of the bankruptcy courts to report statistics on personal bankruptcies to the administrative office of the US Court. Each year the US Federal Judiciary Administrator compiles these statistics into a report on the number of Chapter 7, 11 and 13 bankruptcies for every federal district. [23] The BAPCPA reports are then disseminated on the federal judicatory website (www.uscourts.gov).[24] The compiled reports provide the number of cases in each district for each type of bankruptcy. For instance, during the 2007 individuals in the US filed over 820,000 bankruptcy cases. We collect all bankruptcy cases from the BAPCPA for each state during our sample period. For our analysis, we aggregate all categories of personal bankruptcies for each state that are started in a given year. To control for the differences in state size, we scale the number of bankruptcy petitions by the size of the state population in the same year.

The key independent variable, *Complaint wedge,* captures the extent to which service quality differs between stock and mutual insurers at the state level. We also include the total level of complaints in a state, *Total complaint ratio,* to control for the differences in consumers' overall propensity to complain across states. Then we study how the complaint wedge between stock and

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[23] Chapter 7 petitions form the majority of bankruptcy cases (60%) and seek to liquidate the debt and assets of the individual (Buckley and Brinig, 1998). Chapter 13 petitions comprise 39% of the petitions and typically lead to installment payment plans, while Chapter 11 comprise of petitions to delay and reorganize the individuals assets.

[24] http://www.uscourts.gov/statistics-reports/analysis-reports/bankruptcy-abuse-prevention-and-consumer-protection-act-report

mutual insurers in year t is related to the state-level bankruptcy rate in year $t+1$. Table 10 reports the regression results.

In column 1, we regress the bankruptcy rate on the complaint wedge, without any controls or fixed effects. There is a strong positive relationship between the complaint difference between stock and mutual insurers in a given state and the subsequent year's personal bankruptcy rate in the same state. The coefficient is statistically significant at the 5% level, and the R-square indicates that the complaint wedge explains 4% of the variation in the state bankruptcy rate. Next, we control for the total complaint ratio at the state level (column 2), and continue to find a significant positive relationship between the complaint wedge and the state bankruptcy rate. On the other hand, a higher level of total complaints in a state bears no association with the bankruptcy rate in the state.

To better control for the time trend as well as the level difference in personal bankruptcy across states, we include year fixed effects in column 3 and both year and state fixed effects in column 4. The coefficients of the complaint wedge become slightly smaller but remain statistically significant. The effect is also economically meaningful: from the estimate in column 4, a one standard deviation increase in the complaint wedge (=0.026) within a given state is followed by a 0.017 percentage point increase in the state bankruptcy rate, which is equivalent to 6.9% of the average bankruptcy rate in our sample. In sum, these results suggest that financially fragile consumers endure substantial costs from poor service quality in the insurance industry.

VI. Conclusion

Regulators aim to protect consumers from poor service quality by financial intermediaries. To provide insights into this regulatory goal, our analysis exploits a unique database of customer complaints about 522 mutual and 1,224 stock insurance companies. We find that stock financial intermediaries receive over 20-25% more customer complaints than their matched, mutual intermediary peers. Further tests reveal these complaint differences arise from concerns about issues such as claim delay, reduced settlement offers, and misconduct. Importantly, we do not find any differences in the complaint success rates of customers by independent arbitrators in either stock or mutual insurers, which we interpret to suggest these differing complaint incidences reflect service quality distinctions. To provide causal evidence on this correlational evidence, we exploit random, state-level disasters, and gauge insurer responses in the affected states and in unaffected states. We find a substantial increase in customer complaints in unaffected states by customers about stock insurers but not in those about mutual insurers. Thus, when a stock insurer receives a negative

profitability shock in one state, it subsequently receives more customer complaints in other unaffected states.

To further gauge regulatory efforts to protect consumers and promote service quality, we focus on customer complaints in states with strong regulators. Remarkably, we document greater complaint differences between stock and mutual intermediaries in states with stronger regulatory oversight. To evaluate regulatory constraints due to the dual goals of intermediary solvency and service quality, we focus on risk-based capital thresholds. We find substantially greater complaints about stock insurers relative to similar mutual insurers as they approach capital requirement thresholds. Moreover, when regulators seek to promote insurance availability by specifying stringent rate rules, we document greater customer complaints about stock relative to mutual insurers. Overall, our findings suggest the need for further improvement in regulatory oversight and in particular greater service quality disclosure.

Our analysis provides three important contributions. First, our paper focuses on a much-ignored aspect of financial intermediary regulatory goal, namely financial service quality. To this end, the study provides compelling evidence that customers experience substantial problems with insurance intermediaries regarding settlement delay, reduced settlement offers, and misconduct. Second, our approach provides evidence on how consumer actions reveal evidence about their perspectives on regulatory efficiency regarding financial intermediaries. Finally, we add to the limited literature on the regulatory oversight of financial intermediary service quality by highlighting the impact of multiple regulatory objectives. Consumers appear to bear substantial costs from poor service quality in the form of greater personal bankruptcies. In summary, our analysis indicates the need for improvements in regulatory oversight and transparency of financial intermediary service quality.

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Appendix A. Variable Definitions.

Complaint variables

Customer complaints are the number of formal complaints insurance customers file to the state regulators, aggregated at the insurer-year level.

State-level customer complaints measure the number of formal customer complaints in a state in which an insurer underwrites in a given year.

Type of complaints

Marketing & sales refer to the number of customer complaints for a given insurance company that captures customers' concerns about that particular company's practice in the marketing and selling of insurance policies in a given year.

Underwriting refers to the number of customer complaints for a given insurance company that captures customers' concerns about that particular company's practice in underwriting insurance policies in a given year.

Policyholder service refers to the number of customer complaints for a given insurance company that captures customers' concerns about that particular company's practice in serving policyholders in a given year.

Claim handling refers to the number of customer complaints for a given insurance company that captures customers' concerns about that particular company's practice in handling policyholders' claim requests in a given year.

Nature of the complaint reason

Policy termination refers to the number of customer complaints for a given insurer in a year that cites policy cancelation, policy non-renewal, refusal to insure, or involuntary policy termination as the reason(s).

Policy pricing & other terms refer to the number of customer complaints for a given insurer in a year that cites premium rating, surcharge, endorsement rider or other coverage issues as the reason(s).

Denial, delay & underpayment refer to the number of customer complaints for a given insurer in a year that cites claim denial, claim delay, unsatisfactory settlement offer, or clauses on comparative negligence, subrogation, or medical necessity that result in underpayment as the reason(s).

Misconduct refers to the number of customer complaints for a given insurer in a year that cites misleading advertising, fiduciary theft, misrepresentation, misappropriation of premium, duplication of coverage, fraud forgery, fraud, misstatement on application, premium misquotation, redlining, or unfair discrimination as the reason(s).

Customer care refers to the number of customer complaints for a given insurer in a year that cites adjuster handling, delay in underwriting, audit dispute, high-pressure tactics, failure to submit application, (late) premium billing notice, delayed or no response (to inquiry), (deficiency in) policy delivery or premium refund, payment not being credited, abusive service, as the reason(s).

Complaint outcome

Complaint success (%) is the percentage of an insurer's closed customer complaints in a year that is resolved in compromised settlement (with the customer), company's position being overturned, fine or disciplinary actions against the insurer.

Insurer characteristics

Insurer-level

Stock is a dummy variable equal to one if the insurance company has stock ownership, and zero otherwise.

ROA is the ratio of net income divided by assets for a given insurance company in a year. It is winsorized at the top and bottom 0.5% level.

Underwriting profitability is the ratio of the direct premium earned by an insurance company in a year divided by the sum of the direct loss incurred, direct defense expenses incurred, commission and taxes paid by the same insurer in the same year. It is winsorized at the top and bottom 0.5% level.

Independent is a dummy equal to one if the insurance company is not part of an insurance group (or belongs to an insurance group comprising of only one company), and zero otherwise.

 # States is the number of states in which a given insurance company has underwriting business in a given year.

Insurer-state level

State underwriting profitability is the ratio of the direct premium earned by an insurance company for a particular state in a given year divided by the sum of the direct loss incurred, direct defense expenses incurred, commission and taxes paid by the same insurer for that state in the same year. It is winsorized at the top and bottom 0.5% level.

State policy premium is the direct policy premium written for a particular state of an insurance company in a given year.

No-disaster state post is a dummy variable defined as follows. For the six states (WI, CA, IA, OK, TX, and TN) that have a single local disaster with over $500 million loss in a year during the period from 2006-2010, insurers underwriting more than 5% of their total policy premium in (one or more of) the six hit states in the disaster year *t* are defined as *heavily exposed*. A state is defined to be *unaffected* if it is not subject to $500 million loss in local disasters in year *t and* if it is not one of the top five highest loss states in the same year. ***No-disaster state post*** is equal to one for the *unaffected* states in year *t* of the *heavily exposed* insurers, and zero otherwise.

No-disaster state pre is a dummy variable defined as follows. For the six states (WI, CA, IA, OK, TX, and TN) that have a single local disaster with over $500 million loss in a year during the period from 2006-2010 insurers underwriting more than 5% of their total policy premium in (one or more of) the six hit states in the disaster year *t* are defined as *heavily exposed*. A state is defined to be *unaffected* if it is not subject to $500 million loss in local disasters in year *t and* if it is not one of the top five highest loss states in the same year. ***No-disaster state pre*** is equal to one for the un-hit states in year *t*-1 of the *heavily exposed* insurers, and zero otherwise.

Important state is a dummy variable equal to one for a state of an insurance company if that state's written premium comprises over 25% of the insurance company's total written premium in that year, and zero otherwise.

State Herfindahl index is the sum of the squares of the market shares of insurers underwriting within a given state in a year, where the market share for each insurer is equal to the insurer's written premium in the state divided by the state's total written premium.

Low concentration is a dummy variable equal to one if the state falls in the bottom decile of the ***State Herfindahl index*** distribution among all states in a given year, and zero otherwise.

Insurer presence is the weighted sum of the number of insurers underwriting in a state in a given year, with the weight for each insurer equal to the share of the state's written premium relative to that particular insurer's total written premium in that year.

High insurer presence is a dummy variable equal to one if the state falls in the top decile of the ***Insurer presence*** distribution among all states in a given year, and zero otherwise.

Regulatory environment variables

 # State regulatory staff is the total number of full-time staff in the state insurance department (excluding contractual employees). We obtain the data from the *2010 Insurance Department Resources Report* by NAIC for the period from 2006 to 2011.

State regulatory budget is the dollar value of the budget for each state's insurance department. We obtain the data from the *2010 Insurance Department Resources Report* by NAIC for the period from 2008 to 2011.

New York-based is a dummy variable equal to one if an insurance company's state of domicile is New York, and zero otherwise.

State commissioner appointed is a dummy variable equal to one if a state's commissioner is appointed, and zero if elected.

High insolvency risk is a dummy variable equal to one when an insurance company's risk-based capital ratio, defined as the total adjusted capital divided by the risk-based capital, is equal to or below 2.5, and zero otherwise (note that the threshold value of the risk-based capital ratio for regulatory intervention is 2).

% Rate regulated is the percentage of an insurance company's total written premium in a year that is subject to stringent control over policy rates. Specifically, we follow Grace and Leverty (2010) and compute **% Rate regulated** for insurer i (that has insurance lines denoted by l) in year t to be $\sum_{s,l} Premium_{i,s,l,t} \times Stringent_{s,l,t} / \sum_{s,l} Premium_{i,s,l,t}$, where $Stringent_{s,l,t}$ is equal to one if the underwriting state s has stringent rate regulatory law for the insurance line l in year t. According to *Compendium of State Laws and Regulations on Insurance Topics,* a state is considered to have stringent rate regulatory law if it has either state-made rates or a law that requires the insurer to file for prior approval in order to charge a rate that deviated from rules set by a rate advisory organization.

State-level variables

Bankruptcy rate is the number of started personal bankruptcy cases in a given state in a given year, divided by the state's population in the same year. We obtain the bankruptcy data from the BAPCPA reports disseminated on the federal judicatory website (www.uscourts.gov).

Complaint wedge is computed as follows. We aggregate all complaints filed in a given state against stock (mutual) insurers in each year as well as the total premiums written in the state by stock (mutual) insurers in each year. Then we compute the complaint ratio as (1,000,000 times) the aggregated complaints divided by the aggregated written premium, for mutual and stock insurers respectively. **Complaint wedge** is the difference in the complaint ratios between stock and mutual insurers for a given state and year.

Total complaint ratio is computed as follows. We aggregate all complaints filed in a given state in each year as well as the total premiums written in the state in each year. **Total complaint ratio** is (1,000,000 times) the total # of complaints divided by the total written premium for a given state and year.

Figure 1. Wedge in Customer Complaints between Stock and Mutual Insurers

This figure plots the heat map of the customer complaint difference between stock and mutual insurers across 51 states (including DC). For each state (or district), we run the regression as in Column 3 of Table 3 in the full sample, and obtain the regression coefficient on *Stock*. Based on the coefficient estimates, all states (and DC) are grouped into eight categories, with the darkest color corresponding to states with the largest difference in customer complaint between stock and mutual insurers in our sample. Note that gray is used to indicate states for which we do not have enough data for estimation.
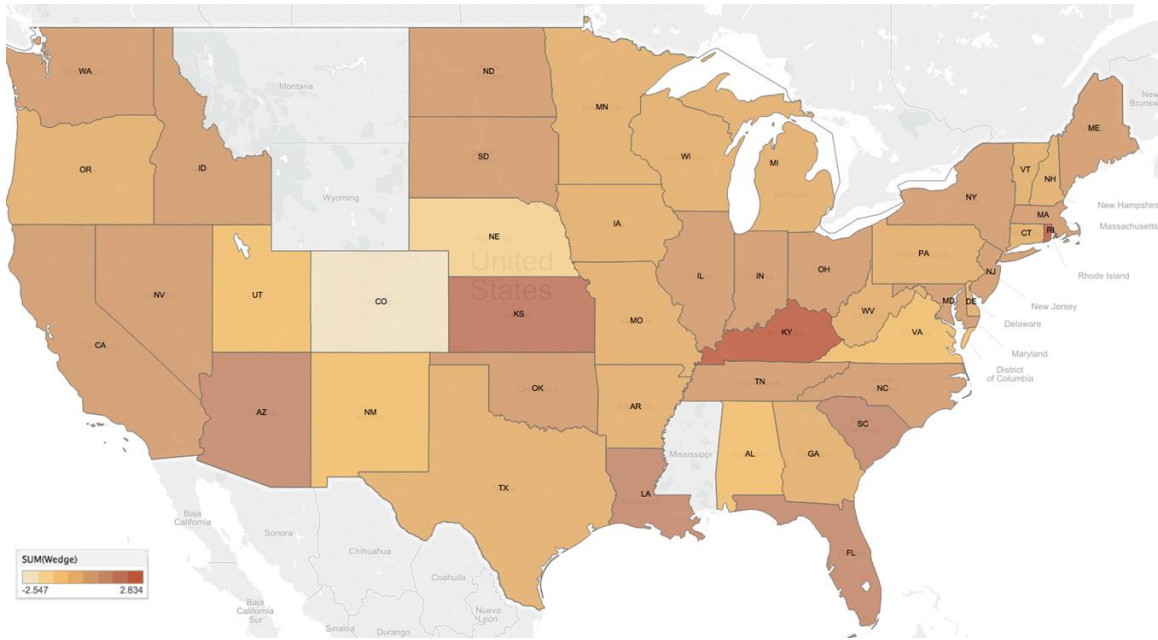
Table 1. Nature of Customer Complaints

This table provides a breakdown of the 136,232 customer complaints in our full sample according to the types and nature of the complaints. Panel A presents a frequency breakdown of the types—whether the complaints reflect concerns over marketing and selling of insurance policies, underwriting of insurance policies, policyholder service, or claim handling. Panel B presents a frequency breakdown of the top ten reasons cited in the customer complaints. Panel C presents the complaint outcome, i.e., the fraction of the total complaints that are resolved in favor of customers, i.e., compromised settlement (to the customer), company's position being overturned, and fine or disciplinary actions against the insurer. For variable definitions and details of their construction, see Appendix A.

	Fraction (%) (N=136,232)
Panel A: Types of customer complaints	
Marketing & sales	3.9
Underwriting	24.4
Policyholder service	13.5
Claim handling	72.9
Panel B: Top 10 complaint reasons	
Delay of claim	31.0
Unsatisfactory settlement offer	20.3
Denial of claim	11.3
Policy cancellation	7.3
Premium pricing	6.4
Premium refund	5.0
Surcharge	4.1
Nonrenewal of policy	4.1
(Late) premium billing notice	2.7
Adjuster handling	2.5
Panel C: Complaint outcome	
Complaint success	59.6

Table 2. Summary Statistics

This table provides the summary statistics of insurer characteristics and customer complaints for the stock and mutual insurers respectively. The first three columns present the comparison in the full (unmatched) sample, and columns (4)-(6) present the comparison in the matched sample, which is constructed using the nearest neighboring matching algorithm based on the insurer's (log) assets, ROA, and affiliation status. For variable definitions and details of their construction, see Appendix A. We also perform a two-sided t-test for means, and use ***, **, and * to denote significance at the 1%, 5%, and 10% level, respectively.

	(1) Stock	(2) Mutual	(3) Difference	(4) Stock	(5) Mutual	(6) Difference
		Full sample			Matched sample	
Log assets	18.616	18.039	0.577***	18.362	18.373	-0.011
ROA	0.024	0.019	0.005***	0.021	0.021	-0.000
Underwriting profitability	1.684	1.643	0.041	1.696	1.669	0.026
Independent (%)	26.5	43.6	-17.1***	34.2	34.2	0.0
# States	21.0	7.8	13.1***	19.0	8.7	10.3***
Log # customer complaints (per annum)	1.339	0.963	0.376***	1.247	1.026	0.221***
Complaint success (%)	62.9	62.8	0.1	61.1	62.9	-1.8
N	1,224	522		939	498	

Table 3. Customer Complaints about Stock vs Mutual Insurers

The table reports the OLS regression estimates of the relationship between the stock status and insurer-level customer complaints as well as the complaint outcome. Columns 1-2 present the results for the (baseline) matched sample, constructed using the nearest neighboring matching algorithm based on the insurer's (log) assets, ROA, and affiliation status. Columns 3-4 present results in an alternative matched sample, constructed using the nearest neighboring matching algorithm based on the insurer's (log) assets, ROA, the number of states in which an insurer underwrites insurance policies, and insurer's independent status. Columns 5-6 report the full (unmatched) sample results. The dependent variables in columns 1, 3, and 5 are the natural logarithm of 1 plus the number of customer complaints for a given insurer in year $t+1$, and the dependent variables in columns 2, 4, and 6 are the fraction of the insurer's complaints in year $t+1$ that is resolved successfully (i.e., in favor of customers). The independent variables are measured in year t. For variable definitions and details of their construction, see Appendix A. All regressions include the home state (i.e., state of domicile)-year fixed effects. Standard errors are clustered at the home state-year level. Robust t-statistics are reported in brackets. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level respectively.

	(1) Log customer complaints	(2) Complaint success (%)	(3) Log customer complaints	(4) Complaint success (%)	(5) Log customer complaints	(6) Complaint success (%)
	Matched sample		(Alternative) matched sample (based on size, profitability, # of states and affiliation status)		Full sample	
Stock	0.188***	-0.036	0.220***	-0.020	0.157***	-0.019
	(3.34)	(-1.52)	(3.72)	(-0.73)	(4.44)	(-1.44)
Log assets	0.325***	-0.005	0.358***	0.004	0.314***	0.001
	(15.73)	(-0.64)	(12.82)	(0.53)	(22.88)	(0.17)
ROA	-0.819	-0.106	-1.404***	-0.180	-0.371	-0.079
	(-1.57)	(-0.55)	(-2.76)	(-0.90)	(-1.29)	(-0.86)
Underwriting profitability	-0.053***	0.020	-0.044***	0.024**	-0.077***	0.017**
	(-3.70)	(1.52)	(-3.47)	(2.29)	(-8.10)	(2.08)
Independent	-0.131***	-0.011	-0.098	-0.006	-0.120***	-0.015
	(-2.65)	(-0.45)	(-1.64)	(-0.17)	(-4.27)	(-1.12)
Log # states	0.033	0.029***	-0.006	0.027**	0.001	0.021***
	(1.34)	(2.83)	(-0.19)	(2.54)	(0.03)	(3.85)
Constant	-4.822***	0.621***	-5.329***	0.437***	-4.486***	0.537***
	(-12.89)	(4.73)	(-10.76)	(3.23)	(-18.52)	(8.33)
Home state*year FE	Y	Y	Y	Y	Y	Y
Observations	2,895	1,672	2,397	1,355	9,116	5,379
R-squared	0.384	0.241	0.433	0.254	0.325	0.126

Table 4. Type and Nature of Customer Complaints

The table reports the OLS regression estimates of the relationship between the stock status and the different types (Panel A) and nature (Panel B) of the customer complaints in the matched sample. In Panel A, the dependent variables are the natural logarithm of 1 plus the number of complaints for a given insurer in year $t+1$ concerning marketing and sales (column 1), underwriting (column 2), policyholder service (column 3), and claim handling (column 4) respectively. In Panel B, the dependent variables are the natural logarithm of 1 plus the number of complaints for a given insurer in year $t+1$ concerning policy termination (column 1), policy pricing & other contract terms (column 2), denial, delay and underpayment (of claims) (column 3), misconduct (column 4), and service quality (column 5) respectively. The independent variables are measured in year t. For variable definitions and details of their construction, see Appendix A. All regressions include home state (i.e., state of domicile)-year fixed effects. Standard errors are clustered at the home state-year level. Robust t-statistics are reported in brackets. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% level respectively.

Panel A: Types of complaints

	(1)	(2)	(3)	(4)
		Log customer complaints		
	Marketing & sales	Underwriting	Policyholder service	Claim handling
Stock	0.031	0.029	0.109***	0.139**
	(0.96)	(1.49)	(3.67)	(2.57)
Log assets	0.193***	0.062***	0.145***	0.273***
	(12.07)	(6.30)	(10.34)	(13.74)
ROA	-0.862***	-0.281*	-0.659**	-0.817*
	(-3.26)	(-1.94)	(-2.47)	(-1.80)
Underwriting profitability	-0.019**	-0.001	-0.005	-0.060***
	(-2.18)	(-0.18)	(-0.69)	(-4.69)
Independent	-0.102***	-0.051***	-0.051*	-0.104**
	(-3.16)	(-3.01)	(-1.90)	(-2.01)
Log # states	-0.072**	0.024	-0.035	-0.099**
	(-2.28)	(1.37)	(-1.35)	(-2.14)
Constant	0.018	0.047***	0.031**	0.032
	(1.32)	(5.07)	(2.52)	(1.34)
Home state-year FE	Y	Y	Y	Y
Observations	2,895	2,895	2,895	2,895
R-squared	0.327	0.210	0.284	0.327

Panel B: Nature of complaints

	(1)	(2)	(3)	(4)	(5)
			Log customer complaints		
	Policy termination	Policy pricing & other terms	Denial, delay & underpayment	Misconduct	Customer care
Stock	0.007	0.026	0.136***	0.024**	0.103***
	(0.29)	(1.01)	(2.66)	(2.07)	(3.65)
Log assets	0.136***	0.133***	0.260***	0.026***	0.150***
	(9.83)	(10.50)	(13.58)	(5.06)	(10.49)
ROA	-0.482**	-0.379*	-0.467	-0.049	-0.477*
	(-2.08)	(-1.85)	(-1.09)	(-0.65)	(-1.77)
Underwriting profitability	-0.009	-0.005	-0.051***	-0.001	-0.006
	(-1.55)	(-0.89)	(-4.23)	(-0.55)	(-0.72)
Independent	-0.044*	-0.032	-0.090**	0.013	-0.008
	(-1.81)	(-1.43)	(-2.02)	(1.28)	(-0.30)
Log # states	0.016	0.025**	0.033	0.021***	0.040***
	(1.48)	(2.39)	(1.44)	(3.92)	(3.02)
Constant	-2.162***	-2.168***	-3.890***	-0.456***	-2.466***
	(-8.65)	(-9.34)	(-11.16)	(-4.99)	(-9.55)
Home state-year FE	Y	Y	Y	Y	Y
Observations	2,895	2,895	2,895	2,895	2,895
R-squared	0.279	0.271	0.328	0.136	0.299

Table 5. Natural Disasters as Negative Profitability Shocks

This table reports the regression results on the complaint response in the unaffected states of insurers heavily exposed to natural disasters in the matched sample. We obtain natural disaster events in the U.S. from SHELDUS and focus on six events, corresponding to the states (WI, CA, IA, OK, TX, and TN) that have a single local disaster with over $500 million loss in a year during the period from 2006-2010. Insurers underwriting more than 5% of their total policy premium in (one or more of) the six hit states in the disaster year *t* are defined as *heavily exposed*. A state is defined to be a *no-disaster state* if it is not subject to $500 million loss in local disasters in year *t and* if it is not one of the top five highest loss states in the same year. The dependent variable is the natural logarithm of one plus the number of customer complaints for a given insurer in a particular state in year *t*+1, and the independent variables are measured in year *t*. For variable definitions and details of their construction, see Appendix A. All regressions include insurer, state, as well as year fixed effects. Standard errors are clustered at the insurer level. Robust t-statistics are reported in brackets. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
	Log state-level customer complaints of no-disaster states			
	Combined sample		Stock	Mutual
No-disaster state pre	-0.002	-0.003	0.022	-0.028
	(-0.14)	(-0.25)	(1.21)	(-1.40)
No-disaster state post	-0.020	-0.034*	0.008	-0.044*
	(-1.19)	(-1.76)	(0.31)	(-1.94)
No-disaster state post x For profit		0.025*		
		(1.69)		
Important state			0.163*	0.296***
			(1.77)	(3.20)
No-disaster state post x Important state			0.246**	0.003
			(2.02)	(0.04)
Log assets	-0.017	-0.017	-0.015	0.031
	(-0.79)	(-0.78)	(-0.69)	(0.61)
ROA	-0.033	-0.049	0.035	-0.635*
	(-0.36)	(-0.52)	(0.34)	(-1.87)
Underwriting profitability	0.001	0.001	-0.002	0.004*
	(0.40)	(0.67)	(-0.62)	(1.72)
State underwriting profitability	0.000	0.000	-0.000***	0.000*
	(0.70)	(0.64)	(-4.56)	(1.94)
Log state policy premium	0.025***	0.025***	0.017***	0.032***
	(6.69)	(6.70)	(5.84)	(3.44)
Log # states	-0.093***	-0.092***	-0.058	-0.111***
	(-3.87)	(-3.70)	(-1.45)	(-2.88)
Constant	0.421	0.413	0.352	-0.642
	(1.00)	(0.98)	(0.80)	(-0.63)
State FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Insurer FE	Y	Y	Y	Y
Observations	15,644	15,644	10,635	5,009
R-squared	0.517	0.517	0.340	0.620

Table 6. Competition and Customer Complaints

This table reports the regression results on the effect of the level of competition within each state on the relationship between customer complaint and stock status in the matched sample. We construct two proxies (continuous and discrete variables for each proxy), *State Herfindahl index* and *Insurer presence,* to measure the level of competition for each state. The dependent variable is the natural logarithm of one plus the number of customer complaints for a given insurer in a particular state in year t+1, and the independent variables are measured in year t. For variable definitions and details of their construction, see Appendix A. All regressions include insurer as well as state-year fixed effects. Standard errors are clustered at the insurer level. Robust t-statistics are reported in brackets. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
	Log state-level customer complaints			
Stock x State Herfindahl index	-1.120**			
	(-2.12)			
Stock x Low concentration		0.084**		
		(2.38)		
Stock x Insurer presence			0.001**	
			(2.04)	
Stock x High insurer presence				0.083***
				(2.81)
Log assets	0.016	0.016	0.016	0.016
	(0.73)	(0.73)	(0.72)	(0.73)
ROA	-0.034	-0.035	-0.035	-0.034
	(-0.56)	(-0.58)	(-0.57)	(-0.57)
Underwriting profitability	-0.000	-0.000	-0.000	-0.000
	(-0.19)	(-0.20)	(-0.23)	(-0.19)
State underwriting profitability	0.000***	0.000***	0.000***	0.000***
	(3.55)	(3.34)	(3.52)	(3.39)
Log state policy premium	0.029***	0.029***	0.029***	0.029***
	(13.84)	(13.72)	(13.68)	(13.72)
Log # states	-0.108***	-0.108***	-0.107***	-0.107***
	(-6.38)	(-6.38)	(-6.34)	(-6.34)
Constant	-0.187	-0.224	-0.238	-0.226
	(-0.43)	(-0.52)	(-0.55)	(-0.52)
State-year FE	Y	Y	Y	Y
Insurer FE	Y	Y	Y	Y
Observations	41,761	41,761	41,761	41,761
R-squared	0.543	0.543	0.543	0.543

Table 7. Regulatory Environment and Customer Complaints

The table reports the matched-sample regression results on the role of regulatory environments across states in explaining the difference in insurer-level customer complaints between the stock and mutual insurers. Panel A presents results on the number of customer complaints, and Panel B presents results on the complaint outcome. The dependent variables are constructed in the same way as in Table 3 and 4 and measured in year t+1, and the independent variables are measured in year t. For variable definitions and details of their construction, see Appendix A. We include the same controls as in Table 3. All regressions include home state (i.e., state of domicile)-year fixed effects. Standard errors are clustered at the home state-year level. Robust t-statistics are reported in brackets. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Complaints

	(1)	(2)	(3)	(4)
		Log customer complaints		
Stock	-0.702**	-0.184	0.157***	0.261**
	(-2.40)	(-0.87)	(2.81)	(2.37)
Stock x Log # state regulatory staff	0.162***			
	(3.20)			
Stock x Log state regulatory budget		0.121**		
		(2.14)		
Stock x New York-based			0.310**	
			(2.27)	
Stock x State commissioner appointed				-0.087
				(-0.71)
Controls	Y	Y	Y	Y
Home state-year FE	Y	Y	Y	Y
Observations	2,411	1,430	2,895	2,895
R-squared	0.388	0.398	0.385	0.385

Panel B: Complaint outcomes

	(1)	(2)	(3)	(4)
		Complaint success (%)		
Stock	0.115	-0.044	-0.030	-0.056
	(0.76)	(-0.41)	(-1.33)	(-1.10)
Stock x Log # state regulatory staff	-0.026			
	(-0.96)			
Stock x Log state regulatory budget		0.009		
		(0.29)		
Stock x New York-based			-0.054	
			(-0.52)	
Stock x State commissioner appointed				0.023
				(0.44)
Controls	Y	Y	Y	Y
Home state-year FE	Y	Y	Y	Y
Observations	1,392	822	1,672	1,672
R-squared	0.240	0.248	0.241	0.241

Table 8. The Role of Regulatory Threshold of Financial Insolvency

The table reports the matched-sample regression results on the role of the regulatory threshold of financial insolvency in explaining the difference in insurer-level customer complaints between the stock and mutual insurers. Panel A presents the results on the number of complaints and complaint outcome. Panel B presents the results on the different types of complaints, and Panel C presents results on the different reasons of complaints. The dependent variables are constructed in the same way as in Table 3 and 4 and measured in year $t+1$, and the independent variables are measured in year t. For variable definitions and details of their construction, see Appendix A. We include the same controls as in Table 3. All regressions include home state (i.e., state of domicile)-year fixed effects. Standard errors are clustered at the home state-year level. Robust t-statistics are reported in brackets. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Complaint and outcome

	(1) Log customer complaints	(2) Complaint success (%)
Stock	0.151***	-0.032
	(2.84)	(-1.37)
High insolvency risk	0.035	0.133
	(0.09)	(1.62)
Stock x High insolvency risk	0.827*	-0.168*
	(1.77)	(-1.84)
Controls	Y	Y
Home state-year FE	Y	Y
Observations	2,895	1,672
R-squared	0.391	0.242

Panel B: Complaint types

	(1) Marketing & Sales	(2) Underwriting	(3) Policyholder Service	(4) Claim Handling
Stock	0.021	0.006	0.096***	0.105**
	(1.09)	(0.19)	(3.21)	(2.05)
Low capital	-0.072	-0.177	-0.018	0.194
	(-1.39)	(-1.01)	(-0.10)	(0.50)
Stock x High insolvency risk	0.181**	0.589***	0.266	0.613
	(2.31)	(2.72)	(1.22)	(1.33)
Controls	Y	Y	Y	Y
Home state-year FE	Y	Y	Y	Y
Observations	2,895	2,895	2,895	2,895
R-squared	0.210	0.329	0.285	0.333

Panel C: Nature of complaints

	(1) Policy termination	(2) Policy pricing & other terms	(3) Denial, delay & underpayment	(4) Misconduct	(5) Customer care
Stock	-0.011	0.014	0.105**	0.021*	0.094***
	(-0.41)	(0.53)	(2.22)	(1.82)	(3.25)
Low capital	-0.136	-0.065	0.199	-0.012	-0.061
	(-1.06)	(-0.55)	(0.54)	(-0.34)	(-0.44)
Stock x High insolvency risk	0.486***	0.316*	0.601	0.076	0.239
	(2.76)	(1.94)	(1.35)	(1.50)	(1.23)
Controls	Y	Y	Y	Y	Y
Home state-year FE	Y	Y	Y	Y	Y
Observations	2,895	2,895	2,895	2,895	2,895
R-squared	0.284	0.273	0.335	0.137	0.300

Table 9. The Impact of Regulatory Requirement on Policy Rates

The table reports the matched-sample regression results on the role of the regulatory requirement on insurance policy rates in explaining the difference in insurer-level customer complaints between the stock and mutual insurers. Panel A presents the results on the number of complaints and complaint outcome. Panel B presents the results on the different types of complaints, and Panel C presents results on the different reasons of complaints. The dependent variables are constructed in the same way as in Table 3 and 4 and measured in year $t+1$, and the independent variables are measured in year t. For variable definitions and details of their construction, see Appendix A. We include the same controls as in Table 3. All regressions include home state (i.e., state of domicile)-year fixed effects. Standard errors are clustered at the home state-year level. Robust t-statistics are reported in brackets. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Complaint and outcome

	(1) Log customer complaints	(2) Complaint success (%)
Stock	0.003	-0.016
	(0.04)	(-0.42)
% Rate regulated	0.180	-0.035
	(1.60)	(-0.57)
Stock x % Rate regulated	0.449***	-0.036
	(3.28)	(-0.52)
Controls	Y	Y
Home state-year FE	Y	Y
Observations	2,895	1,672
R-squared	0.394	0.242

Panel B: Complaint types

	(1) Marketing & sales	(2) Underwriting	(3) Policyholder service	(4) Claim handling
Stock	-0.011	-0.001	0.009	-0.054
	(-0.48)	(-0.03)	(0.23)	(-0.76)
% Rate regulated	-0.002	0.015	0.113	0.187
	(-0.06)	(0.20)	(1.64)	(1.63)
Stock x % Rate regulated	0.100**	0.073	0.237***	0.461***
	(2.24)	(0.84)	(2.94)	(3.63)
Controls	Y	Y	Y	Y
Home state-year FE	Y	Y	Y	Y
Observations	2,895	2,895	2,895	2,895
R-squared	0.211	0.325	0.294	0.338

Panel C: Nature of complaints

	(1) Policy termination	(2) Policy pricing & other terms	(3) Denial, delay & underpayment	(4) Misconduct	(5) Customer care
Stock	-0.003	-0.026	-0.044	-0.003	0.022
	(-0.09)	(-0.80)	(-0.66)	(-0.24)	(0.56)
% Rate regulated	-0.015	0.093	0.182	-0.006	0.118*
	(-0.28)	(1.55)	(1.64)	(-0.34)	(1.85)
Stock x % Rate regulated	0.029	0.120**	0.437***	0.073***	0.189**
	(0.43)	(1.98)	(3.66)	(3.40)	(2.39)
Controls	Y	Y	Y	Y	Y
Home state-year FE	Y	Y	Y	Y	Y
Observations	2,895	2,895	2,895	2,895	2,895
R-squared	0.279	0.275	0.340	0.139	0.307

Table 10. Complaint Wedge and State-level Bankruptcy Rates

The table studies how the complaint wedge between stock and mutual insurers relates to the personal bankruptcy rates at the state level. The dependent variable, *Bankruptcy rate,* is measured in year $t+1$, and the independent variables are measured in year t. For variable definitions and details of their construction, see Appendix A. Robust t-statistics are reported in brackets. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
	Bankruptcy rate (%)			
Complaint wedge	0.886**	0.786**	0.681**	0.670**
	(2.16)	(2.14)	(2.05)	(2.36)
Total complaint ratio		0.165	0.203	-0.132
		(0.79)	(1.09)	(-0.76)
Constant	0.245***	0.236***	0.235***	0.161***
	(39.54)	(17.76)	(19.75)	(11.00)
Year FE	N	N	Y	Y
State FE	N	N	N	Y
Observations	306	306	306	306
R-squared	0.038	0.040	0.245	0.909

Internet Appendix

(Not Intended for Publication)

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This table reports the results of complaint response in states hit by the natural disaster events. We obtain natural disaster events in the U.S. from SHELDUS and focus on six events, corresponding to the states (WI, CA, IA, OK, TX, and TN) that have a single local disaster with over $500 million loss in a year during the period from 2006-2010. Insurers underwriting in one or multiple of these states are defined as exposed insurers, and exposed insurers which underwrite more than 5% of their total policy premium in these six state(s) in the disaster year are defined as heavily exposed. Column 1 includes all insurers, which are either exposed or unaffected (i.e., those which do not underwrite in any of the hit states). Column 2 includes all exposed insurers, and column 3 and 4 include the heavily exposed insurers. *Pre hit* is a dummy variable equal to one for any of the six states mentioned above in the year prior to the disaster event. *Hit* is a dummy variable equal to one for any of the six states mentioned above in the disaster event year. The dependent variable is the natural logarithm of one plus the number of customer complaints for a given insurer in a particular state in year $t+1$, and the independent variables are measured in year t. In other words, given a natural disaster event in year t, we study the customer complaints in those six states in year $t+1$. For other variable definitions and details of their construction, see Appendix A. All regressions include insurer, state, as well as year fixed effects. Standard errors are clustered at the insurer level. Robust t-statistics are reported in brackets. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
		Log state-level customer complaints		
Sample	All insurers	Exposed insurers	Heavily exposed insurers	Heavily exposed insurers
Pre hit	-0.012	-0.001	0.002	0.001
	(-0.71)	(-0.05)	(0.05)	(0.03)
Hit	0.040**	0.048***	0.087**	0.100**
	(2.43)	(2.90)	(2.55)	(2.00)
Hit x Stock				-0.019
				(-0.39)
Log assets	0.016	0.003	-0.106***	-0.106***
	(0.68)	(0.13)	(-4.37)	(-4.36)
ROA	-0.048	-0.045	-0.012	-0.012
	(-0.76)	(-0.75)	(-0.30)	(-0.30)
Underwriting profitability	-0.001	-0.001	-0.001	-0.001
	(-0.41)	(-0.42)	(-0.42)	(-0.41)
State profitability	0.000***	0.000***	-0.000	-0.000
	(3.76)	(3.10)	(-1.59)	(-1.59)
Log state policy premium	0.028***	0.027***	0.026***	0.026***
	(13.56)	(11.61)	(7.90)	(7.90)
Log # states	-0.096***	-0.088***	-0.062***	-0.062***
	(-5.76)	(-5.28)	(-4.68)	(-4.65)
Constant	-0.246	-0.013	2.046***	2.046***
	(-0.54)	(-0.03)	(4.30)	(4.29)
State FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Insurer FE	Y	Y	Y	Y
Observations	39,943	34,450	12,224	12,224
R-squared	0.541	0.510	0.528	0.528

Table A2. Full Sample Analysis

This table replicates Tables 4-9 in the main text using the full sample (except Table 5 where the research design requires stock and mutual insurers to be comparable in profitability before the disaster shock). For variable definitions and details of their construction, see Appendix A. Robust t-statistics are reported in brackets. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Types of complaints (Table 4)

	(1)	(2)	(3)	(4)
		Log custome	r complaints	
	Marketing & sales	Underwriting	Policyholder service	Claim handling
Stock	0.019	0.014	0.103***	0.122***
	(0.90)	(1.27)	(5.68)	(3.55)
Home state-year FE	Y	Y	Y	Y
Observations	9,116	9,116	9,116	9,116
R-squared	0.273	0.153	0.269	0.243

Panel B: Nature of complaints (Table 4)

	(1)	(2)	(3)	(4)	(5)
			Log customer complaints		
	Policy termination	Policy pricing & other terms	Denial, delay & underpayment	Misconduct	Customer care
Stock	-0.005	0.042**	0.118***	0.017***	0.085***
	(-0.31)	(2.42)	(3.64)	(2.72)	(5.05)
Home state-year FE	Y	Y	Y	Y	Y
Observations	9,116	9,116	9,116	9,116	9,116
R-squared	0.243	0.212	0.269	0.096	0.256

Panel C: The Role of Competition (Table 6)

	(1)	(2)	(3)	(4)
		Log state-level	customer complaints	
Stock x State Herfindahl index	-1.449***			
	(-2.68)			
Stock x Low concentration		0.083**		
		(2.40)		
Stock x Insurer presence			0.001	
			(1.47)	
Stock x High insurer presence				0.073**
				(2.24)
State-year FE	Y	Y	Y	Y
Insurer FE	Y	Y	Y	Y
Observations	159,652	159,652	159,652	159,652
R-squared	0.509	0.509	0.509	0.509

Panel D: Regulatory Strength (Table 7)

| | Log customer complaints | | | |
	(1)	(2)	(3)	(4)
Stock	-0.485***	-0.187	0.139***	0.105
	(-2.91)	(-1.49)	(3.82)	(1.46)
Stock x Log # state regulatory staff	0.116***			
	(4.14)			
Stock x Log state regulatory budget		0.100***		
		(3.20)		
Stock x New York-based			0.194***	
			(3.19)	
Stock x State commissioner appointed				0.061
				(0.77)
Controls	Y	Y	Y	Y
Home state-year FE	Y	Y	Y	Y
Observations	7,640	4,539	9,116	9,116
R-squared	0.321	0.315	0.326	0.326

	Complaint success (%)			
Stock	0.158*	0.036	-0.015	-0.041
	(1.95)	(0.58)	(-1.08)	(-1.39)
Stock x Log # state regulatory staff	-0.031**			
	(-2.10)			
Stock x Log state regulatory budget		-0.010		
		(-0.55)		
Stock x New York-based			-0.058	
			(-1.57)	
Stock x State commissioner appointed				0.026
				(0.81)
Controls	Y	Y	Y	Y
Home state-year FE	Y	Y	Y	Y
Observations	4,484	2,658	5,379	5,379
R-squared	0.122	0.114	0.127	0.126

Panel E: Approaching Regulatory Threshold of Financial Insolvency (Table 8)

	(1) Log customer complaints	(2) Complaint success (%)
Stock	0.132***	-0.019
	(3.83)	(-1.35)
Low capital	-0.092	0.007
	(-0.46)	(0.09)
Stock x High insolvency risk	0.591***	-0.019
	(2.87)	(-0.21)
Controls	Y	Y
Home state-year FE	Y	Y
Observations	9,116	5,379
R-squared	0.328	0.126

	(1) Marketing & Sales	(2) Underwriting	(3) Policyholder Service	(4) Claim Handling
Stock	0.012	0.008	0.098***	0.100***
	(1.09)	(0.38)	(5.27)	(2.95)
Low capital	-0.040*	-0.130	-0.020	0.011
	(-1.66)	(-1.53)	(-0.24)	(0.05)
Stock x High insolvency risk	0.062*	0.320***	0.133	0.478**
	(1.69)	(3.18)	(1.43)	(2.24)
Controls	Y	Y	Y	Y
Home state-year FE	Y	Y	Y	Y
Observations	9,116	9,116	9,116	9,116
R-squared	0.153	0.274	0.243	0.272

	(1) Policy termination	(2) Policy pricing & other terms	(3) Denial, delay & underpayment	(4) Misconduct	(5) Customer care
Stock	-0.014	0.036**	0.097***	0.016***	0.080***
	(-0.86)	(2.04)	(3.04)	(2.63)	(4.68)
Low capital	-0.093	-0.042	0.028	-0.009	-0.007
	(-1.41)	(-0.78)	(0.14)	(-0.47)	(-0.07)
Stock x High insolvency risk	0.247***	0.155**	0.453**	0.027	0.115
	(3.10)	(2.12)	(2.22)	(0.99)	(1.16)
Controls	Y	Y	Y	Y	Y
Home state-year FE	Y	Y	Y	Y	Y
Observations	9,116	9,116	9,116	9,116	9,116
R-squared	0.244	0.212	0.272	0.097	0.257

Panel F: Impact of Pricing Regulations (Table 9)

	(1) Log customer complaints	(2) Complaint success (%)
Stock	-0.075	0.001
	(-1.37)	(0.04)
% Rate regulated	0.041	-0.002
	(0.56)	(-0.04)
Stock x % Rate regulated	0.562***	-0.043
	(6.65)	(-1.00)
Controls	Y	Y
Home state-year FE	Y	Y
Observations	9,116	5,379
R-squared	0.337	0.127

	(1) Marketing & sale	(2) Underwriting	(3) Policyholder service	(4) Claim handling
Stock	-0.040***	-0.076**	-0.021	-0.129**
	(-3.43)	(-2.31)	(-0.85)	(-2.49)
% Rate regulated	-0.048*	-0.076	0.030	0.050
	(-1.78)	(-1.43)	(0.59)	(0.69)
Stock x % Rate regulated	0.146***	0.253***	0.300***	0.608***
	(5.58)	(4.67)	(5.88)	(6.97)
Controls	Y	Y	Y	Y
Home state-year FE	Y	Y	Y	Y
Observations	9,116	9,116	9,116	9,116
R-squared	0.156	0.276	0.254	0.285

	(1) Policy termination	(2) Policy pricing & other terms	(3) Denial, delay & underpayment	(4) Misconduct	(5) Customer care
Stock	-0.065***	-0.052**	-0.122**	-0.016**	-0.025
	(-2.76)	(-2.21)	(-2.47)	(-2.49)	(-1.05)
% Rate regulated	-0.073*	-0.004	0.059	-0.033**	0.016
	(-1.79)	(-0.08)	(0.83)	(-2.59)	(0.35)
Stock x % Rate regulated	0.165***	0.232***	0.580***	0.090***	0.268***
	(4.08)	(5.43)	(6.95)	(7.77)	(5.68)
Controls	Y	Y	Y	Y	Y
Home state-year FE	Y	Y	Y	Y	Y
Observations	9,116	9,116	9,116	9,116	9,116
R-squared	0.244	0.218	0.285	0.100	0.265