Advising Sophisticated Customers: Evidence from Health Insurance Brokers

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Abstract

This paper examines how brokers advise sophisticated customers and whether these customers are affected by brokers' incentive changes. Focusing on the employer-sponsored health insurance market, where firms purchase group health insurance plans for their employees, brokers are associated with lower plan premium growth during normal times. However, a reduction in brokers' kickbacks can adversely affect broker-intermediated plans, resulting in higher premiums and worse plan qualities, likely due to brokers' decreasing effort in information acquisition. Better-governed firms control premium increases by discontinuing the brokerage service. The negative effect on premiums occurs for public firms, but not for private firms that are less sophisticated and receive lower-quality advice even before. Overall, regulations on brokers' compensation can have unintended consequences on sophisticated customers.

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Keywords: Healthcare; insurance; employer-sponsored health benefits; brokerage; advice; consumer sophistication

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1. Introduction

Brokers play an important role in many types of financial service transactions and facilitate the searching, matching and bargaining process. Concerns about brokers' incentive misalignment with customers and bias advising have received much attention (e.g., Bergstresser, Chalmers, and Tufano, 2008; Del Guercio, Reuter, and Tkac, 2010). Notably, the use of brokers is not only prevalent among individual consumers, but also common at the organization level. For example, employers often delegate retirement assets management to investment management firms (Goyal and Wahal, 2008); innovative firms use brokers to facilitate technology diffusion and transfer (Howells, 2006). Although there is rich evidence on how brokers interact with individuals and households (Bertrand and Morse, 2011; Mullainathan, Noeth, and Schoar, 2012; Anagol, Cole, and Sarkar, 2017; Egan, 2019), evidence on how brokers advise more sophisticated customers such as organizations is limited. Therefore, this paper looks at firm-level use of brokers in the health insurance market, and examines how brokers' incentive changes impact these sophisticated customers.

Customers' level of sophistication is important in studying brokers' behavior because of the different implications on customer outcomes. Sophisticated consumers are those who are aware of brokers' incentives and understand the effect of commissions and rebates on equilibrium outcomes; naive consumers are the ones who believe the advisor is unbiased or are vulnerable to brokers' selling pressure. Theoretically, Stoughton, Wu, and Zechner (2011) find that fund managers' kickbacks to financial advisers can serve as an aggressive marketing tool and lower net returns, but only for unsophisticated investors. If all customers are sophisticated, kickbacks can subsidize smaller players, and increase overall participation. Similarly, Inderst and Ottaviani (2012) show that due to the differences in customers' financial sophistication, changes to brokers' compensation structure can have opposite effects for sophisticated versus naive customers. The paper argues that broker commissions can be an incentive device to acquire information, but a means of exploitation for naive customers who believe they receive unbiased advice.

However, empirical evidence on how brokers' incentive changes affect sophisticated customers is scarce. One key challenge is to obtain information on sophisticated customers which

the customer-broker relation is observable and customers' sophistication can be evaluated. An additional challenge is to have a setting in which brokers' incentives change exogenously. I therefore look at the group health insurance market, where employers shop for their employees' health plans, and explore the effect of a regulatory change applied to some brokers, using an insurer-broker-employer matched dataset.

The global health insurance market is valued at $1.98 trillion in 2020. In the US, employers sponsor health care for nearly 60 percent of the working-age population. In 2018, US employers spent $727 billion to provide health coverage for 175 million people.[1] Employers provide health benefits by purchasing insurance policies from the group health insurance market and setting up firm-specific health plan menu. Although employers are sophisticated customers, given the complexity of the health insurance product and search frictions (Cebul, Rebitzer, Taylor, and Votruba, 2011), they often use brokers and benefits consultants in the process of navigating health plans, designing benefit packages, and understanding underwriting rules. In return, brokers are usually compensated by insurers via commissions. Early survey evidence shows that a significant portion of employers uses brokers for their health plans (Marquis and Long, 2000).

To examine how employers interact with insurance brokers, I construct a novel dataset on insurer-broker-employer matched data gathered from Form 5500 welfare benefit plan data maintained by the U.S. Department of Labor (DOL). These data contain health-plan level information such as the number of participants, type of plan, and other bundled fringe benefits for welfare plans with more than 100 participants. The data also have insurer and broker information such as name, address and total expense. I aggregate the plan-level information to firm-level using the Employer Identification Number (EIN). I focus on public firms for the availability of financial information, but also look at private firms for comparison.

I first look at patterns in employer decisions to hire a broker for their health benefit plans. On average, 76.3% of the public firms in the sample use brokers for one or more of their health plans. Within public firms, smaller firms are more likely to use brokers than larger ones. This trend is likely because brokers often charge for their service at a per participant

[1]National Health Expenditure Data, Centers for Medicare and Medicaid Services, Sponsor Highlights, 2018.

level, and larger firms have more resources to internalize the searching process, creating more cost-saving to rely on internal staff. Another observation from the data is that the probability of using brokers is higher in more recent years, possibly due to the increased complexity of plans and regulations. Overall, firm size is the determining factor of whether or not to hire an external broker. Looking at the health insurance premium growth and actual premium paid by firms with and without brokers, I find that the plans with brokers experience lower premiums and a lower premium growth rate. The results provide suggestive evidence that brokers can benefit employers by potentially lowering their health care costs.

To examine the effect of change in brokers' incentives on health plan outcomes, I look at a quasi-experimental change in brokers' compensation schemes. The event is New York State Attorney General Eliot Spitzer's investigation on bid-rigging in the property and casualty insurance industry in 2004 ("The 2004 investigation"). One outcome of the investigation is that three prominent brokerage companies: Marsh & McLennan, Aon, and Willis (hereafter referred to as *Spitzer brokers*) discontinued receiving contingent commissions. Contingent commissions are performance-based compensation to brokers paid by the insurer, often based on profitability, relationship duration or other metrics. The ban was lifted in 2010, and the three brokers resumed receiving contingent commissions. Since contingent commission is an important source of brokers' income, this investigation has material impacts on the involved brokers. Most studies looking at this investigation (Cummins et al., 2006; Cheng et al., 2010; Ghosh and Hilliard, 2012) focus on brokers and insurers, but rarely look at the effect on customers. Because this investigation originated from the property and casualty insurance industry, which has a completely different set of players and industry outlook from the health insurance industry, the investigation only affects health insurance policy outcomes via brokerage activities.

The effect of the ban on brokers' compensation can take either direction. On one hand, the change in incentive and the ban of contingent commissions can positively affect customers. If the ban can deter steering towards particular insurers that offer kickbacks but less efficient, customers' welfare can be improved with higher quality or lower price health plans. On the other hand, plans intermediated by affected brokers might be worse, for the following reasons:

Brokers no longer transmit all information about employers to insurers, and therefore insurers assume higher risk (Cummins and Doherty, 2006); brokers make less effort in information acquisition, and therefore they do not find the best deal (Inderst and Ottaviani, 2012); or brokers lose the income from contingent commissions and try to make it up through premium-based commissions by seeking higher-premium plans.

I use a difference-in-differences research design approach and look at the differences in insurance premium between health plans that use the Spitzer brokers (Marsh, Aon or Willis) versus plans that use other brokers, three years before and after the 2004 investigation. Since a firm can have several health plans, I control for firm fixed effects and compare the premium changes resulting from using different brokers within the firm. I find that the health plans with Spitzer brokers have higher total premiums as well as premiums per participant after the ban of contingent commissions, controlling for a wide range of firm and plan characteristics. The results are still significant after adding the insurer fixed effects, indicating that the premium hike is unlikely to be driven by increased insurer-level risks for some particular insurers. Looking at the expense ratio of broker-to-insurer payment, I find that Spitzer-brokered plans decrease the expense ratio after the treatment, ruling out the mechanism that brokers seek more expensive plans to extract profit through premium-based compensations. I also look at firms that always use and never use Spitzer brokers as the treatment and control group, respectively, and exclude the ones that switch, and the results consistently show a higher premium increase for plans intermediated by Spitzer brokers. As robustness checks, I find the opposite effect when the ban was relieved in 2010 —plans with Spitzer brokers experience lower insurance premiums compared to their peers.

Changes in broker incentives not only raise the price for a health plan, but also have a negative effect on plan quality. Using health insurance plan ratings from the National Committee for Quality Assurance (NCQA), which focus on customer experience, I find that firms' health insurance policies that brokered by Spitzer brokers also have worse ratings after the 2004 investigation. Specifically, the ratings for overall healthcare, family doctor and specialist, as well as the health care experience, are all lower for the plans intermediated by Spitzer brokers. Affected brokers also tend to find plans from insurers with worse financial

conditions after the 2004 investigation. Insurer financial condition is measured using A. M. Best's Financial Strength Ratings, which evaluate insurers' ability to meet insurance policy obligations. I find that affected brokers are less likely to pair with insurers with superior ratings or with recent rating upgrades.

Will the same effect on plan premium applies to less sophisticated customers? Theories (Stoughton et al., 2011; Inderst and Ottaviani, 2012) predict an opposite effect on sophisticated and naive customers when brokers receive kickbacks, so one might expect similar patterns when kickbacks are banned. To represent less sophisticated customers, I look at private firms, which are less resourceful and less likely to detect brokers' misbehavior than public firms. Carrying out the baseline difference-in-differences analysis for private firms,[2] surprisingly, the treated group (plans that use Spitzer brokers) experience no change in insurance premiums after the 2004 investigation, in sharp contrast to the treated group from public firm sample. This is likely because private firms were unable to monitor biased advising or force brokers to exert more efforts before the 2004 investigation, and therefore the changes in broker incentive have no time-varying impact on private firms. The results confirm that a change in brokers' compensation structure and a ban on kickbacks can cause detrimental effects solely for sophisticated customers.

It is natural to ask whether more sophisticated firms take any actions against brokers' incentive changes. To differentiate firms based on the level of sophistication, I look at if a firm is well-governed. Although public firms are sophisticated in general, they still vary in their ability to detect biased advising and monitor brokers, and well-governed firms are better in doing so. Using board data from BoardEx, I construct several measurements (diversity, level of commitment, personal connection and compensation) of board dynamics which reflect different dimensions of governance, and categorize firms into relatively better- or less well-governed according to these dimensions. I find that among broker-intermediated health plans, there is no significant difference between better- and less well-governed firms for insurance premiums after the 2004 investigation. However, across all health plans, better-governed firms have a lower probability of using any brokers or using Spitzer brokers after the 2004

[2]From Form 5500 dataset, these private firms would have at least 100 participants on their benefit plans, and therefore at least 100 employees.

investigation. The results indicate that more sophisticated firms respond to biased advising by discontinuing the brokerage service and internalizing the search cost. Comparing firms that stop using brokers and those that continue using brokers after the investigation, I find that the ones that terminate brokerage service experience lower premiums post-2004. Together, these findings suggest that when broker incentive changes and adversely affect customers, most sophisticated customers react by terminating their relationship with the brokers to curb the price hike in insurance premiums.

Lastly, studies show that competition can discipline brokers' behavior and improve consumer outcomes (Bolton, Freixas, and Shapiro, 2007; Karaca-Mandic, Feldman, and Graven, 2018), because competition enhances information provision and reduces conflict of interests. Alternatively, intense competition in the intermediary market might lead to more aggressive use of kickbacks and rebates, causing a greater loss of consumer welfare. To look at the effect of competition on consumer outcomes, I measure local competitiveness by calculating the Herfindahl index based on brokers' market share at the congressional district level. I find that health plans with Spitzer brokers in areas with more broker competition experience a lower increase in premiums compared to the firms in less competitive areas, after the 2004 investigation.

This paper is first related to the literature studying biased advising and conflict of interests between agents and their clients. Anagol, Cole, and Sarkar (2017) find that life insurance agents in India give biased advice and steer customers towards products that maximize their commissions. Bergstresser, Chalmers, and Tufano (2008) find that broker-sold mutual funds do not improve customer outcomes, and, in fact, deliver lower risk-adjusted returns. Foerster, Linnainmaa, Melzer, and Previtero (2017) use Canadian household data, and show that financial advisors have a strong influence over clients' asset allocation and, yet, they do not customize their advice. Christoffersen, Evans, and Musto (2013) and Egan (2019) convey a similar message, that brokers steer customers to high-fee products for investment products. This paper explores an under-studied market of employer-sponsored health insurance, and demonstrates that the use of broker and biased advising is still prevalent. In contrast to the studies on mutual fund and retail brokers, I find that brokers are associated with lower price

growth during normal times in the employer-sponsored health insurance market.

This paper is also relevant to the studies of customers sophistication and regulation of the broker industry. Bhattacharya, Hackethal, Kaesler, Loos, and Meyer (2012) find that retail investors often ignore unbiased investment advice. Agarwal, Ben-David, and Yao (2017) show that consumers have limited ability to choose the optimal mortgage product and lack sophistication. Because retail investors and customers are, in general, unsophisticated, regulators have proposed various policies to discipline brokers' behavior, with mixed outcomes. Egan, Ge, and Tang (2020) estimate that high-expense variable annuity sales fell sharply after DOL imposed fiduciary duties on brokers. Robles-Garcia (2019) looks at the UK mortgage market and estimates that a complete ban on broker commissions leads to a 25% decrease in consumer welfare. This paper is closely related to the theoretical framework proposed by Inderst and Ottaviani (2012) and Stoughton et al. (2011), which predicts that regulation on broker commissions will result in different responses for sophisticated and naive customers. I show empirically that when customers are sophisticated, a ban on commission can backfire and lead to higher expense for customers, while at the same time leaving the unsophisticated customers intact.

This paper also contributes to the literature studying firm-level use of intermediaries (Goyal and Wahal, 2008; Agarwal, Nanda, and Ray, 2013; Pool, Sialm, and Stefanescu, 2016). One key difference is that, for the role of institutional investors or retirement plan sponsors, firms are essentially another layer of intermediary between the final customers and the product; in this paper, firms are direct customers when purchasing health insurance plans, since they pay for the majority of health expense themselves. This paper also further explores the role of corporate governance in coping with brokers' behaviors.

This paper adds to the literature on the employer-sponsored health insurance market by looking into broker activities. There are currently very few papers exploring the topic (one exception is Karaca-Mandic et al. (2018)). This paper looks at an important market where intermediaries play a significant role. This paper furthers the discussion in Tong (2021) on questioning the role played by private firms in the provision of health care in the US and the impact of the health care system on private business.

The rest of the paper is organized as follows. Section 2 provides background information on employer-sponsored health benefits and the New York State Attorney General's investigation in 2004. Section 3 describes the data and the sample selection procedure. Section 4 describes the empirical methodology and presents the main results and robustness checks. Section 5 concludes.

2. Background

2.1. Employer-Sponsored Health Benefits

In the US, employers play a crucial role in the provision of health care. Employer-sponsored health benefits cover more than 150 million employees and their dependents. Employer plans have the highest enrollment among all existing plan types, followed by Medicaid and Medicare, which cover 60 million and 40 million individuals respectively. Affordable Care Act (ACA) marketplaces and the individual market cover 20 million people. If consumers have a choice, they usually prefer health plans offered by their employers over ones from the individual market because employer-sponsored health benefits have pricing advantages as a result of economies of scale and favorable tax treatment.

The cost of employer-sponsored health benefits has increased sharply in the past twenty years. In 2018, the average family plan premium was \$19,616, up from \$5,791 in 1999.[3] Because health benefits are important tools for firms to attract and retain talent, employers, especially large ones, are reluctant to reduce benefits out of concern for their firm's reputation and employee morale. Therefore despite the cost rise, large employers continue to offer generous plan benefits.

Evidence of this is the employer contribution, which has been steady over the past twenty years; a typical large employer contributes 80% or more of the cost for single premiums and 75% for family premiums. Anecdotal evidence shows that employers explicitly state their contribution ratio when introducing health plan offerings to employees, and it reflects badly on the employer if the ratio decreases.

Although offering health benefits is voluntary, large employers rarely cancel their plans.

[3]Kaiser Family Foundation Employer Health Benefits Survey (KFF Survey), 2018.

In the period 1999 to 2018, more than 98% of firms with 200 or more employees offered health benefits; for firms with 10-199 employees, however, the offering rate dropped from 81% to 70%.[4] In other words, big employers are not likely to use contribution ratio adjustments or termination of plans to buffer health care price hikes.

Employers may choose a number of methods to sponsor a health care plan. A plan can be fully insured, self-insured, or a combination of these two plan funding methods. In a traditional fully insured plan, the employer purchases health policies from outside health insurance companies. In self-insurance, the employer pays employees' medical claims directly, setting up tax-exempt reserves for claim payouts and making regular contributions to the reserve. Insurance companies are still hired by self-insured firms as third-party administrators (TPAs) for network access, plan design, and medical claim processing, but insurers earn less per deal because they extract mark-up only through administrative services. Some employers also buy stop-loss insurance for catastrophic losses.

Firms usually offer a menu of health plan options to employees, varying in the restrictiveness of the provider network, or in the ratio between out-of-pocket expenses and annual premiums. HMO (health maintenance organization), POS (point of service), PPO (preferred provider organization), and indemnity plans are the most common traditional plans. Their restrictiveness ranges from HMOs, the most restrictive, covering only in-network providers, to indemnity plans, with no restrictions on the network status of providers. Besides those traditional plans, high deductible health plans (HDHPs) gained popularity in the mid-2000s, but employers have to provide higher incentives for employees to take HDHPs.

2.2. The 2004 New York State Attorney's Investigation

In October 2004, New York State Attorney General Eliot Spitzer filed suit against Marsh & McLennan Companies (Marsh or MMC) for bid rigging and steering customers toward their own interests by accepting contingent commissions from insurance companies. Contingent commissions are kickbacks paid by the insurance company to brokers for bringing large volume or profit. Several property-casualty insurance companies, such as American International

[4]KFF Survey, 2018.

Group were also sued. Marsh was alleged to have paid more than $1 billion in contingent commissions, which steer customers and distort market competition. The lawsuit had a profound impact on the insurance and insurance brokerage industry. Marsh's stock price dropped about 45 percent in one day, and CEO Jeffrey Greenberg resigned soon after the allegation. Marsh agreed to pay $850 million as part of the settlement in January 2005, and Aon Corps agreed to pay $190 million in March 2005. Industry leading players, such as Marsh, Aon, and Willis Group, announced that they would terminate the practice of receiving contingent commissions from insurance carriers in the same month the investigation started.[5] The ban was lifted in 2010 and those brokers resumed receiving contingent commissions.[6] The detailed timeline is shown in Figure 1.

Insurance brokers generally receive two types of commissions: premium-based commissions, which as a fixed percentage of the premium paid; and contingent commission, which is performance-based, and depends on profitability, duration or other metrics. In 2004, premium-based commission is about 10.5% of the total premium for the property-casualty insurance industry. At that time, contingent commissions accounted for 2.0% of Aon's revenue, 7.3% for Marsh & McLennan and 4.0% for Willis (Cummins and Doherty, 2006).

Contingent commissions could affect consumer welfare and market efficiency either positively or negatively. Attorney General Spitzer claimed that contingent commissions might cause brokers to mismatch insurers and insureds, and steer the consumers to suboptimal contracts that do not fit consumers' general profile and risk preferences (Schwarcz, 2006). Since contingent commission can be awarded based on profit, it is possible that brokers steer high-risk customers away from those insurers that offer contingent commissions, to maintain a high profit level. On the other hand, supporters of contingent commissions argue that since brokers have better knowledge about customers and have more information on their clients from their interactions, contingent commissions help to facilitate the communication

[5]For other notable brokers, USI Holdings Corp stated in their 2006 10-K filing that they had not discontinued receiving contingent commissions since the 2004 investigation. In January of 2005, Arthur J. Gallagher announced they would stop receiving contingent commissions only for the retail market (therefore not including the group benefits market).

[6]https://www.wsj.com/articles/SB10001424052748704684604575381143146598092; https://www.bloomberg.com/news/articles/2010-02-17/spitzer-fee-ban-lifted-for-insurance-brokers-aon-marsh-willis

between brokers and insurers to reveal customers' type, and therefore reduce adverse selection (Cummins and Doherty, 2006). Since contingent commissions can only be offered by the more efficient firms with higher margins because of lower costs, it is beneficial to steer recommendations towards the efficient ones. Regulation on banning commissions can therefore reduce market efficiency (Inderst, 2015).

Spitzer's investigation has national-level and industry-wide implications. It was a high-profile case; numerous brokers and insurers experienced short-run negative abnormal returns after the investigation was announced (Cheng et al., 2010). Several other states followed New York and initiated similar suits. New York enforces an extraterritorial application, which requires carriers writing business in that state to comply with New York regulations in other states where they do business, and therefore the effects of the lawsuit were not confined to the state of New York (Ghosh and Hilliard, 2012).

3. Data and Variable Construction

3.1. Employer-Sponsored Health Benefits

To investigate the relation between health care costs and corporate investment, I first extract employee health benefits information from Form 5500 welfare benefit plan data maintained by the Department of Labor. The Employee Retirement Income Security Act of 1974 requires firms with 100 or more participants on their welfare benefits plan to file Form 5500 to report plan coverage and characteristics. A firm may submit multiple filings for each benefit plan it sponsors. Each plan contains information about the type of benefits (e.g., health, dental, vision, life insurance), number of participants, and other plan characteristics such as funding method. Several schedules serving various purposes may be attached to the main form; the one relevant for my study is Schedule A, "Insurance Information," which contains insurer information and insurance expense. Each plan may attach multiple Schedule A forms for each insurer it hires. Data are available by filing year from 1999 onward.

I retain the plans for health benefits and drop plans containing only non-health benefits, such as dental, vision, and life insurance. After collapsing Form 5500 plan-level filing information to firm level, I merge the data with the Compustat universe using the employer

identification number (EIN). A firm might have separate EINs for its subsidiaries, but Compustat keeps only one EIN at the consolidated firm level. I therefore manually match Compustat and Form 5500 data by company name, industry and address. I also retrieve the subsidiary list for US public firms from Bureau van Dijk and match by subsidiary names, again restricting on address and industry.

Insurer and broker information is gathered using Form 5500, Schedule A. To be included in the sample, the Form 5500 filing must have a Schedule A attached. Schedule A is required for benefit plans that are provided by an insurance company. Each insurance contract requires a separate Schedule A. Insurers are identified by the insurance carrier name, EIN and National Association of Insurance Commissioners (NAIC) code filed in Schedule A.[7] For individual insurers, I cross-validate with NAIC data on national-level insurer affiliation and link the local branches to their parent firms. Broker's name, as well as total amount of fees and commissions are required in Part I of Schedule A. Multiple brokers can be reported for one Schedule A. I use fuzzy matching to further consolidate insurer and broker names.

Two key variables on brokers are constructed: *I(Has Broker)* is a dummy variable that equals one if the health plan uses any brokers, and *Spitzer Brokers* is a dummy variable that equals one if the broker belong to one of the following brokerage companies: Marsh, Aon, and Willis Group. The funding status of fully, self, or mixed insured is determined by several factors, including premium per participant, third-party administrator (TPA) status, stop-loss status, and funding source (see the Appendix for more details). Funding status indicates to what extent insurance expenses from Form 5500 represent total health care costs. I create two main datasets. The first one is at plan-level (at each Schedule A level), and the second aggregates plan-level information to firm level.

Table 1 shows the summary statistics at the firm-year level. Panel A shows that 76.3% of the firms in the sample use brokers for one or more of their plans in a given firm-year. On average, 17.9% of the firms use the brokers involved in Spitzer's investigation. Note that the average premium per participant is lower than the ones from other sources (e.g., KFF survey); this is because firms are only required to report their *insurance* expense in Form 5500, not

[7]NAIC code is the unique insurance company identifier assigned by NAIC.

the part they pay out of their own pocket if they choose to self-insure part of their plan. Panel B reports the summary statistics of non-missing key Compustat variables from the Form 5500-Compustat merged sample and the Compustat universe for the period 1999-2016.

[Insert Table 1 Here.]

3.2. Firm-level Consumer Sophistication

In the theoretical framework, sophisticated consumers are defined as the ones who are aware of brokers' incentives and understand the effect of commissions and rebates on equilibrium outcome; naive consumers are defined as the ones who believe the advisor is unbiased or are vulnerable to brokers' selling pressure (Stoughton et al., 2011; Inderst and Ottaviani, 2012). In the empirical setting, consumer sophistication is often associated with financial literacy, age and education level (e.g., Agarwal et al., 2017)

In this study, we are treating firms as consumers who interact with brokers and insurance companies. Although firms are in general complicated and resourceful organizations, they might not have a uniform understanding of health plan purchase. For example, some may lack expertise in provision of health benefits, may be inattentive in plan selection, or have agency problems that exacerbate biased advising when using intermediaries to purchase plans. All these frictions can make firms differ in their sophistication when handling this transaction activity.

To measure firms' sophistication, I focus on corporate governance indicators. More specifically, I look at board characteristics. The first dimension I look at is whether the firm has a gender diverse board. Female board members facilitate board discussion and decision making, and bring new perspectives, experience and expertise to the boardroom (Banerjee et al., 2020). For example, Kim and Starks (2016) find that women directors enhance advisory effectiveness as measured by heterogeneity in functional expertise. They find female directors possess more types of expertise. Compared to their male counterparts, female directors are more likely to possess skills in Human Resources, Regulatory/Legal/Compliance, among four other skills, which are closely related to health plan selection. Adams and Ferreira (2009) find that having a more gender-diverse board mitigates board attendance problems and results in

a greater allocation of effort towards monitoring. Therefore, a gender diverse board is likely to possess more sophistication in making decisions on benefit plan purchases.

Another measure I employ is whether the board members, on average, have multiple appointments ("busy board," hereinafter cited as busy boards). Fama and Jensen (1983) suggest that multiple outside appointments for directors signals director quality. Fich (2005) also finds that CEOs with past good performance are rewarded with outside directorships. Therefore, a "busy board" might indicate higher-quality board. Ferris et al. (2003) do not find evidence that busy boards lack monitoring capability. Field et al. (2013) argue that busy boards are excellent advisors because of their experience and contacts, and this is reflected by their more than proportional presence in newly-IPOed firms, that lack experience. Therefore, busy boards are more likely to have more experience in purchasing firms' health plans, and are more aware of brokers' potential biased advising. Overall, the board's advising ability is much more relevant in our contest in measuring sophistication, than is its monitoring role. In a similar spirit, I also measure firm-level sophistication using whether or not the board members are on average well-connected and whether they receive higher compensation.

I use BoardEx as my main source of director information. I construct variables that use board member characteristics to measure firm-level sophistication. I collect director-year level information on gender, individual network size [8], total compensation, and total current number of other boards a member sits on, and aggregate that information to firm-year level by taking the average. *Diverse Board* measures whether the board is gender-diverse, and is an indicator variable that equals one if the firm has female directors; *Busy Board* equals one if the average number of outside appointments is higher than the full sample median; *Rich Board* equals one if the average compensation of a firm's board is higher than the sample median; *Connected Board* equals one if the average individual network size is higher than the sample median.

[8] Network size of selected individual (number of overlaps through employment, other activities, and education)

4. Empirical Analysis

4.1. Use of Brokers

I start by first examining the prevalence of broker use by firms. Firms can decide for each individual plan whether to hire an external broker, and I aggregate this information to firm level to capture whether the firm hires brokers for *any* of its plans. The trend for using brokers across year and firm size at firm level is shown in Table 2. Panel A shows that the probability of using brokers at the firm-level ranges from 70% to 80% across the years. There is a general increasing trend of using brokers at firm-level from 1999 to 2008, and it falls slightly afterward. In Panel B, I divide the sample firms into ten deciles by their asset size. The tabulation shows that the probability of using brokers decrease monotonically as the size increases. This is likely because larger firms have more resources to internalize the searching and bargaining process. If brokers ever receive compensation from the firm, it is usually on a per month per participant basis. Although larger firms can usually get a discount, it might still be more cost-saving to internalize the intermediation to enjoy larger economies of scale.

The findings in Table 2 Panel B complement those of Marquis and Long (2000), who find that the use of external consultants increases by the number of employees, varying from fewer than 25 (46% use brokers), to 500 employees or more (65%). Aggregating firms of all sizes, there is an inverted U shape trend on whether firms use brokers and consultants for their health benefits plans. This is sensible, as very small firms don't have the financial resources to hire a broker, and the health plan would be more simply-structured; the probability of hiring a broker grows with plan complexity and firms' financial resources, until reaching a threshold where it is more cost-efficient to internalize the service.

[Insert Table 2 Here.]

Next, I look at what type of firms are more likely to use brokers for their health plans. Table A.1 shows the OLS results for plan-level regression. The dependent variable is whether the plan uses one or more brokers in a given year. Column (1) shows that across firms, smaller and younger firms are more likely to use brokers, as well as those who have more cash

and higher book-to-market ratio. The results also show that within a firm, when the firm has fewer employees and lower cash flow, it is more likely to use brokers for health plans. No other firm-level characteristics stand out after controlling for firm fixed effects. Health plan type and funding method also play an important part in whether brokers are involved. The positive sign for *log(participants at plan level)* indicates that, within the firm, the larger plans are more likely to have brokers than the smaller plans. The negative sign on self-insured plans and HMO plans indicate that firms are less likely to use brokers if there are lower payments to insurers.

A natural follow-up question is whether using brokers is welfare-improving. However, without the option of having a setting that changes firms' tendency to use brokers exogenously, it is hard to pin down a causal relationship. Instead, we can look at how having a broker correlates with plan outcomes during normal times. The outcome variable I focus on is how much firms pay for health care and the price trend. The OLS regression therefore looks at the differences in premium growth and premium per participant for the firms that are with and without brokers. Table 3 shows that the firm-year with brokers is associated with a lower premium growth rate as well as average premium. Columns (2) and (4) have additional health plan controls, including dummies of self-insure, mix insure, HMO, PPO, Indemnity, and total number of participants. I control for firm size in the dimensions of asset, age, employment and cash flow, since larger firms might have higher bargaining power and get cheaper deals. For Columns (1) and (2), I also control for baseline total premium, as the premium growth might be higher for those that originally have less expensive plans. The coefficient of *I(Has Broker)* from Table 1 indicates that the firm's total health insurance premium is 12.1% higher than that without brokers. One caveat about this analysis is that although I controlled for various firm-level time-variant characteristics and plan characteristics, it is still possible that the decision to hire a broker and a lower premium are both driven by unobservable factors. My analysis provides suggestive evidence that using a broker positively correlates with lower health plan premiums and premium growth.

[Insert Table 3 Here.]

4.2. Brokers' Incentive Changes

In this section, I focus on the firms that have decided to use a broker, and examine whether brokers' incentive changes have any effects on consumer outcomes. It has been documented that distortion in brokers' incentives can be passed on to consumers, and have adverse effects on consumer welfare. However, it is questionable whether the effect will still be prominent if the consumers are relatively sophisticated, for the reason that these consumers are more aware of those changes and are less likely to be influenced by sales pressure. To look at the effect of brokers' incentive changes, I look at an event that changes some brokers' compensation structure: the 2004 New York Attorney General Spitzer's investigation into the insurance and brokerage industry for bid-rigging and steering consumers via contingent commissions. As discussed in Section 2.2, large brokers of Marsh, Aon, and Willis stopped receiving contingent commissions after the investigation; these commissions had contributed a significant portion to their income.

The effect of this investigation can be taken both ways. On the one hand, the change in incentive and the ban of contingent commissions can have positive effects on consumers. If the ban can deter steering to particular insurers and thereby improve consumer welfare, then we will see employers (consumers) have higher quality and less expensive plans, controlling for plan characteristics. On the other hand, employers might need to pay higher premium after the ban because, (1) brokers do not transmit all information about employers to insurers, and therefore insurers assume higher risk (Cummins and Doherty, 2006); (2) brokers make less effort in information acquisition, and therefore they don't find the best deal (Inderst and Ottaviani, 2012); or (3) brokers lose the income from contingent commissions and try to make it up through premium-based commissions by seeking higher-premium plans.

To look at the effect of brokers' incentive changes, I use a difference-in-differences research design to look at health plan changes from three years prior to three years after the 2004 investigation. The sample contains all health plans that use brokers from 2001 to 2007 at the plan level. Using the seven year's window minimizes the effects of the financial crisis post-2007. The treatment group includes the plans that hire Marsh, Aon, or Willis, and the control group includes the firms that use other brokers. The specification is in Equation 1.

The dependent variable *Health Plan Costs* takes the log form of the total health insurance premium paid for the plan p at year t by firm i (Columns (1)-(2)), the log form of average health insurance premium per plan participant (Columns (3)-(4)), or the ratio between broker compensation and insurance premium (Columns (5)-(6)). *I(Spitzer Broker)* is a dummy variable that equals one if the plan p hires Marsh, Aon, or Willis for that year t. Firm and year fixed effects are included in all specifications. In Columns (2), (4), and (6), insurer fixed effects are also added to control for insurer-level time-invariant characteristics and rule out the possibility that some particular insurers might systematically charge a higher price and are potentially tied to specific brokers and insurers at the national level. I also include firm and plan-level controls to ensure that the results are not driven by firm-level time-varying factors and plan characteristics. Firm-level controls include asset, age, employment, and cash flow. Health plan control includes the dummy of self-insure, mix insure, HMO, PPO, Indemnity, and the log form of total number of participants. Standard errors are clustered at the firm levels to account for potential heteroskedasticity and arbitrary correlation in the error term within the firm over time.

$$\begin{aligned} HealthPlanCost_{ipt} =& \beta_1 \cdot SpitzerBroker_{ipt} \times Post2004_t + \beta_2 \cdot SpitzerBroker_{ipt} \\ &+ \phi_1 \cdot FirmControls_{it} + \phi_2 \cdot PlanControls_{ipt} + \alpha_i + \lambda_t + \epsilon_{ipt} \end{aligned} \tag{1}$$

The results are shown in Table 4. The analysis is conducted at the plan-year level, as firms can use different brokers for each plan. An additional benefit of conducting plan-level analysis is to allow us to explore within-firms across-plan differences for the plan outcome.[9] Looking at Columns (1)-(4), the results show that the plans with Spitzer brokers experience higher premium and higher average premium per person after the lawsuit, from 2005–2007. The coefficient of the interaction term *I(Spitzer Brokers)* $\times$ *I(Post 2004)* in Column 1 indicates that plans using Spitzer brokers experience a 10% higher increase in total health insurance premiums than the ones that use other brokers in the period of 2005–2007. Another thing

[9]Because firms might change their plan name and plan code from time to time, it is not possible to control for plan fixed effects. Instead, I add a rich set of plan characteristics for controls.

to notice is that there is no significant difference between plans that use Spitzer brokers and other brokers in normal times, as the coefficient for *I(Spitzer Brokers)* is statistically insignificant for Columns (1) to (4). The smaller magnitude of *I(Spitzer Brokers)* × *I(Post 2004)* in Columns (2) and (4), after adding insurer fixed effects, indicates that it is possible that some insurers consistently have more expensive plans and are linked to Spitzer brokers. However, the statistical significance and economic magnitude are still large, indicating insurer patterns are not driving the results. The results with insurer fixed effects also indicate that insurer-level higher risk after the ban on contingent commissions is not the driving force behind premium increases.

One explanation for increasing premiums on treated plans is that the Spitzer brokers use premium-based compensation to remedy their loss from the cessation of contingent funds and the fine resulting from the Spitzer investigation. Columns (5)-(6) of Table 4 shed some light on the underlying mechanism. The variable of interest is the ratio of brokers' total compensation to insurers' total premium. If this mechanism is in place, then the coefficient on *I(Spitzer Brokers)* × *I(Post 2004)* for Columns (5) and (6) should be positive or indifferent between Spitzer and other brokers post-2004. However, the coefficient is negatively significant. Given that the broker-to-insurer expense is usually under 10%, it is not likely that brokers are using higher insurance premiums to compensate themselves via premium-based compensation. It is interesting that the coefficient on *I(Spitzer Brokers)* is negatively significant for Column (5), which indicates that, for the period 2001 to 2007, the Spitzer brokers on average have a lower compensation than their peers. The significance disappears in Column (6) after adding insurer fixed effects. The results are stable and robust if controlling for additional firm-level characteristics used in Table A.1 or excluding all firm-level controls.

[Insert Table 4 Here.]

Figure 2 shows the effect of banning contingent commissions on health plan costs by the difference in years relative to the event. The specification is the same as in Table 4, Column 2, except for breaking down the pre- and post-period into individual years. The Y-axis shows the magnitude of the coefficient estimate as well as the 95% confidence interval. The X-axis

is the year relative to 2004. As shown by the graph, before 2004 the estimated difference between control plans and treatment plans is not statistically significant from zero, showing that there is no pre-trend. Following the 2004 investigation, the health plan price increases significantly in the affected plans relative to the control plans that do not use Spitzer brokers.

[Insert Figure 2 Here.]

4.2.1. Quality of Health Plans and Insurers

Quality of Health Plans The previous section shows that a change in a broker's compensation scheme affects consumers' outcomes by changing the total premium consumers pay. Some might wonder if a higher expense is an indication of a better plan, which would mean that consumers are not necessarily worse off. Table 4 controls for plan type, number of participants and firm level characteristics, which broadly control for the plan's generosity. To further investigate the differences in health plan characteristics intermediated by Spitzer brokers and other brokers, I look at health plan and insurer quality.

To measure plan quality, I use the survey-based health plan ratings compiled by the non-profit organization National Committee for Quality Assurance (NCAQ) (Thompson et al., 1998). NCQA compiles multi-dimensional metrics to accredit health plans and measure health plan quality. The overall rating and its individual components are based on several programs, including HEDIS (Healthcare Effectiveness Data and Information Set), CAHPS^{TM} (Consumer Assessment of Healthcare Providers and Systems) scores and NCQA Accreditation standards scores. NCAQ ratings have a meaningful influence on consumer choices (Jin and Sorensen, 2006). Since NCQA rating is survey-based and reflects consumers' sentiments, it is a good approximation of employees' level of satisfaction in their health benefit plans. The electronic version of historical data is available from 2005 onwards. In 2005, it covers 264 commercial plans from 252 individual insurance companies. The coverage increases to 400 plans from 281 insurers in 2015.

I retrieve the NCQA data and aggregate plan-level ratings to insurer level weighted by the number of participants. Because commercial plans are distinct from employers' health plans, it is not possible to match on plan level. However, because all plans of an insurer

share the same financial fundamentals and risk management ability of the insurers, as well as characteristics such as bargaining power with health providers, a broker's plan-selecting ability can be reflected by their ability to pick the insurer. I then match the rated NCAQ insurers to insurers in my Form 5500 data using NAIC code. The variation of health plan rating therefore is at insurer-year level.

The results are shown in Table 5. Since the NCAQ data are only available from 2005 onwards, which is after the 2004 Spitzer investigation, I therefore focus on two dummy variables: the indicator of whether the plans use Spitzer brokers, and whether the plan has a broker at all. The sample is from 2005 to 2007 for all plans with an insurer that can be matched to the NCQA database. The dependent variable is the insurer-level health plan rating that runs from 0 to 100, with an average of around 80. These ratings include composite ratings that correspond to overall rating of health care, overall rating of personal doctor, overall rating of specialist seen most often, getting needed care composite, getting care quickly composite and how well doctors communicate composite. Since health plans vary tremendously by the network and accessibility (e.g. what type of hospital and physicians the patient can visit), these ratings capture most important dimensions of health plan quality that consumers care about. Year fixed effects are added to control for the changes in the NCQA survey structure and trend over the years.

Table 5 shows that, in the period of 2005–2007, having a broker does not correlate with lower plan quality. However, if the broker is one of the Spitzer brokers, then the insurers from these plans are more likely to have a lower rating for overall health care, doctor rating, getting the care needed and communication of health professionals. Overall, this indicates that Spitzer brokers not only find customers more expensive plans, but also those with lower qualities after 2004.

[Insert Table 5 Here.]

Financial Strength of Insurers When shopping for insurance plans, insurers' ability to meet ongoing policy obligations is a fundamental consideration. This is because no matter how good the customer service that the insurance policy can provide, if the insurer cannot

pay for the claim, the policy is worthless. If brokerage service is value-adding, then the broker should help customers to find plans from insurers that are financially sound and stable. Therefore, in this part, we look at whether the 2004 investigation changes the type of insurers that affected brokers find for their customers, with regards to insurers' financial strength.

Insurers' financial strength data is from A. M. Best's Financial Strength Rating (FSR) database. A. M. Best is the leading rating agency for insurance companies and is commonly used by practitioners and in finance research (e.g., Ge and Weisbach, 2021). It covers 2,050 health insurers from 2000 to 2020. The rating varies from A++, which indicates that the insurance company has a superior ability to meet their ongoing insurance obligations, to D, which means the financial strength of the insurer is extremely vulnerable to changes in underwriting and economic conditions.[10]

I merge the A. M. Best FSR data with the main dataset used in the baseline analysis by NAIC identifier, for the period of 2001 to 2007. I construct several variables to measure the level and changes of insurers' financial strength. *Superior Rating* equals one if the insurer receives A++ or A+ rating for the year; $Vulnerable\ Rating$ equals one if the insurer receives a rating that is below B+. Both terms are defined by A. M. Best. In the FSR data, 2.2% and 30.9% of the companies receive *Superior Rating* and $Vulnerable\ Rating$ respectively during 2001 to 2007. Variables $Rating\ Upgrade(Downgrade)$ are constructed to capture the dynamics in the rating over time, which equals one if the insurer receives a higher (lower) rating from last year. 12.1% and 10.9% of the companies' rating are upgraded or downgraded respectively from 2001–2007.

The analysis is done on all health plans that can be merged with the FSR data. The results on how the use of broker and brokers' incentive changes would affect plan selection, reflected by insurers' financial strength, is shown in Table 6. The table first shows that using a broker is positively associated with better ratings for insurers, as shown by the coefficients on *I(has broker)* for Columns (1) and (2). From the coefficient on *I(has broker)* for Columns (3) and (4), using brokers is associated with lower probability of both rating upgrade and downgrade, possibly because brokers would help to choose insurers that are more stable in

[10] *Guide to Best's Financial Strength Ratings*, https://www.ambest.com/ratings/guide.pdf

their rating and therefore in their financial condition. Importantly, the coefficient on *I(Spitzer Brokers)* × *I(Post 2004)* show that after the investigation, using Spitzer brokers is associated with insurers that are less likely to have superior ratings, more likely to have vulnerable ratings, and less likely to experience a recent rating upgrade. However, Spitzer brokers do not systematically find insurers with weaker financial strength, as shown by the coefficient on *I(Spitzer Brokers)*. This set of results complements the previous findings that after brokers' incentive change, broker-intermediated plans are not only more expensive, but with worse quality in the aspects of customer experience and insurers' financial strength.

[Insert Table 6 Here.]

4.2.2. Robustness

Post-2010 Contingent Commission Ban Lift In 2010, the ban on Marsh, Aon and Willis that stopped them from receiving contingent commissions was lifted by officials in New York, Illinois and Connecticut, effective from the first of January in 2010. Soon after the lifting of the ban, Aon and Marsh announced that they would resume accepting contingent commissions in early 2010.[11] Willis announced that they would begin to take contingent commissions in 2012.[12] As a robustness test, I test whether the lifting of the ban has an opposite effect to the 2004 ban. The results are shown in Table 7. The setting is similar to Table 4, but for the period of 2007 to 2013. The treated group is composed of those banned from contingent commissions in 2004. I use 2010 as my event time despite Willis' announcement in 2012 as, legally speaking, they were allowed to receive contingent commission starting in 2010.

The coefficients on *I(Spitzer Brokers)*×*I(Post 2010)* for Columns (1) - (4) of Table 7 show opposite signs to Table 4. The plans using Spitzer brokers experience lower premiums compared to their peers after the 2010 ban lifting. This confirms that the baseline results of premium increase after banning contingent commission is not driven by other contemporaneous events. The statistical significance of the coefficients is weaker than what is in Table 4,

[11] https://www.wsj.com/articles/SB10001424052748704684604575381143146598092
[12] http://m.pianet.com/issues-of-focus/compensation/2012/02-22-12-08

probably because some brokers take action later than others to resume receiving contingent commissions. The magnitude is comparable to Table 4. Also, Spitzer brokers were receiving higher compensations, expressed as a percentage of total insurance premiums after 2010, as shown by Columns (5) and (6). Interestingly, the coefficients on *I(Spitzer Brokers)* for Columns (1) - (4) are positively significant for this analysis. This indicates that Spitzer brokers on average are linked to more expensive health plans in the period of 2007–2013. This indicates that the 2004 ban might have a permanent effect on the operation of those brokers that were banned from contingent commissions.

[Insert Table 7 Here.]

The subsample of firms that always use Spitzer brokers An alternative explanation for the baseline results in Table 4 is that this is driven by the firms that did not choose Spitzer brokers pre-2004, but chose those brokers after 2004. Given the high profile nature of the investigation, the firms that "join" Spitzer brokers post-2004 might be of lower quality, and therefore they experience higher increase in premiums for their own inability in cost control. To rule out this possibility, I use the subsample of firms that always use Spitzer brokers during the sample period of 2001 to 2007, and the treatment group is set to be the ones that never use Spitzer brokers within this period of time, and perform the same analysis as in Table 4. The results are shown in Table A.2. The negative effect on premiums for Spitzer brokers still holds after focusing on this subsample. When compared to Table 4, the economic magnitude and statistical significance are stronger with regard to changes in premiums. This set of results shows that the increase in premiums is not driven by firms that select Spitzer brokers after 2004.

4.3. Consumer Sophistication

4.3.1. Private Firms

The previous section shows that a change in brokers' incentives can have adverse effects on firms' outcomes. In this section, we are going to explore more on whether the level of consumer sophistication will make a difference in outcomes. Studies show that brokers' biased

advising behavior can be disciplined by customer sophistication. For example, Inderst and Ottaviani (2012) argue that kickbacks can only lead to biased advising for naive customers. In this part, we are going to look at whether there are effects of the 2004 investigation on private firms. Private firms have fewer resources and experiences than public firms, and are less likely to be able to detect brokers' biased advising.

The private firm sample is also obtained from Form 5500. Firms with more than 50 participants for their welfare plans are required to fill Form 5500 (See Appendix for more details), and therefore the private firm sample contains firms with more than 50 employees enrolled in their health plans. A firm is treated as a private firm if it cannot be matched to Compustat via EIN and name match. I then run the same analysis as in Table 4 using the private firm sample. The only difference is that there are no firm-level controls. Table 8 shows the results. Health plan controls are added to all regressions, which include the dummy of self-insure, mix insure, HMO, PPO, Indemnity, and the log form of total number of participants to control for plan characteristics.

The coefficients of *I(Spitzer Brokers)* × *I(Post 2004)* are statistically insignificant for all columns, and drastically contrast to the results for the public firm sample. This indicates that the banning of contingent commissions has no effect on private firms. The coefficient on *I(Spitzer Brokers)* is positively significant, indicating that the Spitzer brokers systematically find more expensive plans than their peers. This set of results shows that a sudden change in brokers' incentives and compensation structure can sometimes only harm more sophisticated consumers and leave the naive ones intact.

[Insert Table 8 Here.]

4.3.2. Within Public Firms

Next, I go back to our main sample of publicly traded firms. Public firms are complicated and resourceful by nature. Since most firms' main business is not about selecting health plans, there is heterogeneity with some firms are better than others at detecting biased advising. I will approximate sophistication by measurements of corporate governance. Better-governed firms are more likely to be "sophisticated" as they are more motivated to choose an optimal

plan for the firm, and appoint the right personnel for the task. When brokers' incentives change, more sophisticated firms have a better ability to control for premium price increases.

I use several measures of board characteristics to represent firm sophistication. Section 3.2 provides more details on the rationale for using those measurements. *Diversed Board* measures whether the board has female representation; *Busy Board* whether the board member has more than the median number of outside appointments; *Richer Board* whether the average compensation of the board member is higher than sample median; *Connected Board* whether the number of board member connections is higher than the median. Variable definitions can also be found in the Appendix.

First, I look at whether more sophisticated firms will experience differently when brokers' incentive change by running the baseline analysis on the subsamples split by firms' sophistication level. Table 9 shows the results of splitting the sample by various board measurements. The interaction terms *I(Spitzer Brokers)×I(Post 2004)×I (Sophisticated)* are not statistically significant for all governance measures. For the interaction analysis, to allow for full flexibility, I make all other control variables interact with the dummy indicating high sophistication. The coefficient on *I(Spitzer Brokers)×I(Post 2004)* and the untabulated subsample analysis show that the effect of treatment is significant on the subsamples with a high/low sophistication measure (except for *Richer Board*, which has a smaller sample size), but there is no statistically significant difference between high and low sophistication subsamples. The results might indicate that more sophisticated firms do not act differently in dealing with brokers and biased advice. Alternatively, more sophisticated firms might be taking a different approach from unsophisticated firms.

[Insert Table 9 Here.]

The previous analysis is carried out on the sample restricted to plans with brokers. To explore sophisticated firms' actions further, I look at the extensive margin of the decision to hire brokers between sophisticated and less sophisticated firms for the period of 2001 to 2007. Table 10 shows the results. *I(Sophisticated)* is the same indicator variable as in the last analysis, and represents whether the firm has a higher than median diverse board, a

board with more commitments, a higher than median board average compensation and a more connected board. The interaction term *I(Sophisticated)×I(Post 2004)* shows that more sophisticated firms are much less likely to use brokers after the 2004 investigation compared to their peers. Therefore, rather than be exposed to brokers' potential distortions, sophisticated firms choose to internalize the search process and stop using brokers. *I(Sophisticated)* itself does not carry a negative sign, and is even marginally positive in Column (4), indicating that sophisticated firms are not less likely to use brokers during normal times.

[Insert Table 10 Here.]

It is still an open question whether stopping the use of brokers is a good strategy after contingent commissions were banned, and whether "exiting" is welfare improving. To test this, I look at the difference in post-2004 premiums for the firms that use Spitzer brokers throughout the period of 2001 to 2007, and compare the premiums with the ones who use Spitzer brokers pre-2004, but either (1) stop using Spitzer brokers, or (2) no longer use any brokers at all during the post event period of 2005 to 2007. The results are shown in Table A.3. The analysis is done for the post investigation period of 2005–2007. It is evident that those with Spitzer brokers experience a much higher premium compared to those that no longer use brokers or Spitzer brokers during this period.

Combining the results in this part indicates that although there is no difference in premium between sophisticated and less sophisticated firms for those that continue to use brokers, sophisticated firms are more likely to opt out from hiring brokers after the 2004 investigation. The ones that quit using Spitzer brokers or any brokers at all are more likely to have a lower premium than the ones that stay with the brokers.

4.4. Broker Competition

Studies have shown that a more competitive broker market helps to facilitate the purchase of health plans and leads to better consumer outcomes (Karaca-Mandic et al., 2018; Bolton et al., 2007), as competition enhances information provision and reduces conflict of interest. On the other hand, it is also possible that competition in the intermediary market leads to

more aggressive use of kickbacks and rebates, causing a greater drop in consumer welfare in a more competitive market after the banning of contingent commissions. Therefore, it is not clear whether firms in a more competitive broker market will be affected more or less by the 2004 investigation.

To test whether local broker market competitiveness affects the extent to which the ban on contingent commissions affects health plan outcome, I first derive the measure of local market competitiveness. Using all Schedule A of Form 5500 filed each year, including the ones by private firms, I aggregate each brokers' total premium underwritten at the congressional district (CD) level using provided zipcode information. There are 381 congressional districts with non-missing brokers premium shares. I then calculate CD-level broker market Herfindahl index (HHI) for each year using the market share by brokers in each CD. I then split the sample by whether the plan originated from an above median broker competitiveness market or a below median market, as measured by HHI at CD level.

Table 11 shows the results of running the baseline regression on subsamples split by median broker HHI. Dependent variables are total premium at the plan level for all columns. Columns (4) - (6) have additional insurer fixed effects. Columns (1), (2), (4) and (5) show the subsample analysis and Columns (3) and (6) show the interaction exercise. The results show that the positive effect on the premium is exclusively in the area where the broker concentration is high (high HHI), i.e., less competitive markets. Firms in less competitive markets experience a 14.2% increase in total premium compared to those in competitive markets. The results hold and remain stable if insurer fixed effects are added, indicating that the results cannot be explained away by systematic selection of a highly concentrated broker market with particular insurers, alleviating the concern that it is some particular insurers that drive the results. The results demonstrate that when the broker market is more competitive, it can help to alleviate the distortion caused by brokers' biased advising.

[Insert Table 11 Here.]

5. Conclusion

This paper examines the role of brokers in the employer-sponsored health insurance market, and looks at employers' outcomes with regard to their health plans after brokers' incentives change. The paper first finds that the use of brokers is prevalent in this market, with an average of 76.3% of firms using brokers for one or more of their plans. Controlling for a wide range of firm-level and plan-level characteristics, I find that plans that use brokers are associated with lower insurance premium growth. More importantly, higher insurance premiums are observed for the plans that experience a ban in part of brokers' compensation. Those plans are also of worse quality. This increase in premium applies to public firms, but not to private firms, which are less sophisticated. Within the public firms, more sophisticated firms respond to the changes in brokers' incentives by not using brokers at all. Furthermore, I find that greater broker competition helps to alleviate the biased advising caused by brokers' incentive changes.

Financial consumer protection is a critical issue faced by regulatory bodies in many countries. This paper demonstrates that consumer sophistication plays a vital role in how regulations, which intend to discipline agents' behavior, can adversely affect consumer outcomes. Health care issues have received much attention in recent years from both the public and policymakers. Due to employers' heavy involvement in health care provision in the US, policies imposed on the health care industry to protect consumers might have unintended consequences on firms' outcomes.

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Figure 1. Timeline for the 2004 Investigation

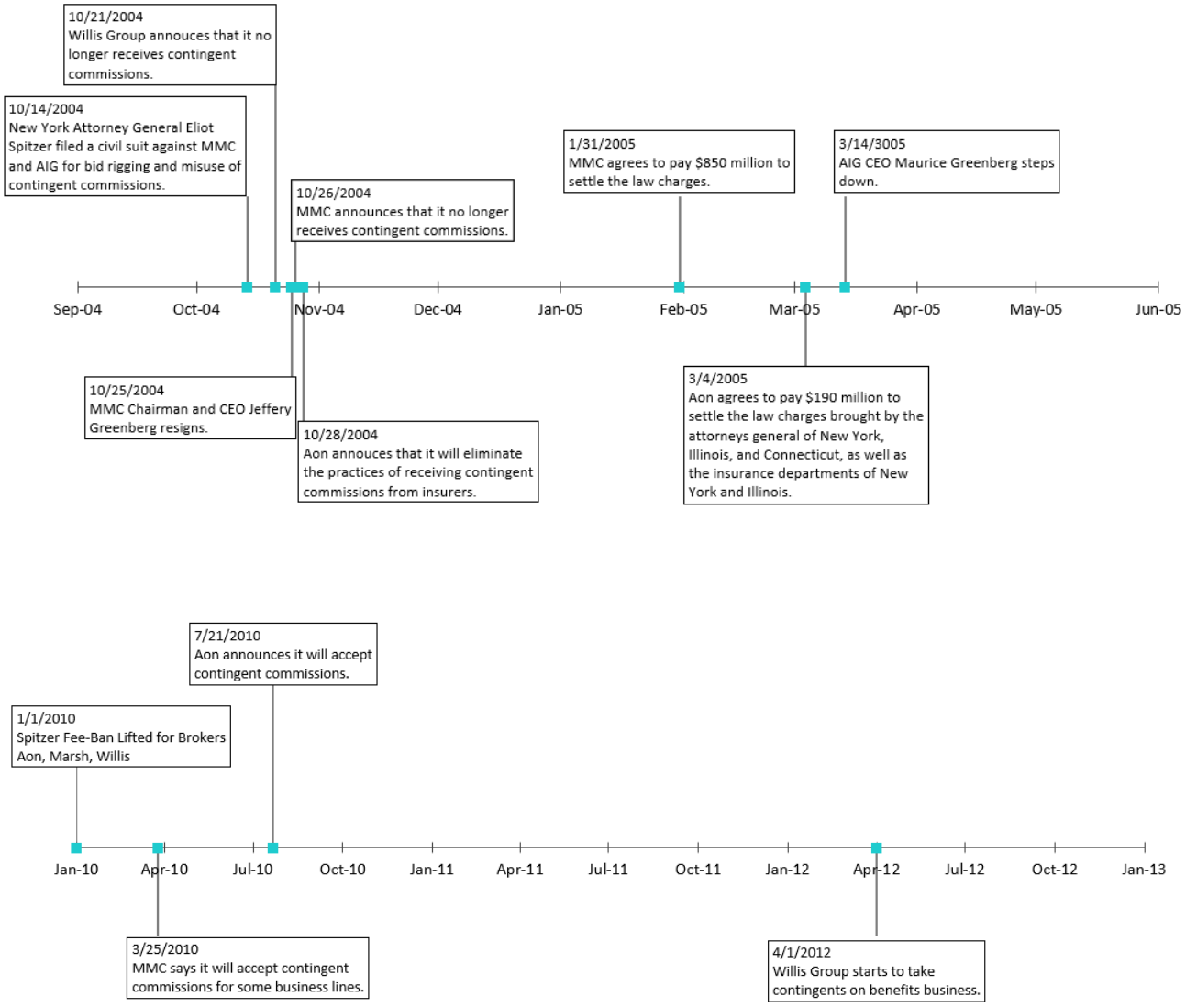

Figure 2. The Difference in Health Plan Price by Year to the 2004 Investigation

This figure presents the dynamics of change in health plan price from 2001 to 2007, i.e. three years before to three years after the 2004 Investigation. The coefficient estimate and 95% confidence intervals are estimated using the following specification:

$$Health\ Plan\ Cost_{ipt} = \sum_{k=-3}^{3} \beta_k \left\{SpitzerBroker_{ipt} \times I(year = 2004 + k)\right\} + \phi_1 \cdot Firm\ Controls_{it} + \phi_2 \cdot Plan\ Controls_{ipt} + \alpha_i + \lambda_t + \epsilon_{ipt}$$

The dependent variable $log(Premium)$ is the log form of health plan price for the plan. Independent variables are the set of year dummies interacting with the indicator variable of whether the plan uses a Spitzer broker. I plot the β_k coefficients, which are the estimates representing the differences in $log(Premium)$ between the treated plan and plans that do not use Spitzer brokers during the sample period. The indicator variable of Spitzer broker is omitted. The specification includes firm, year and insurer fixed effects, as well as firm and plan-level controls.

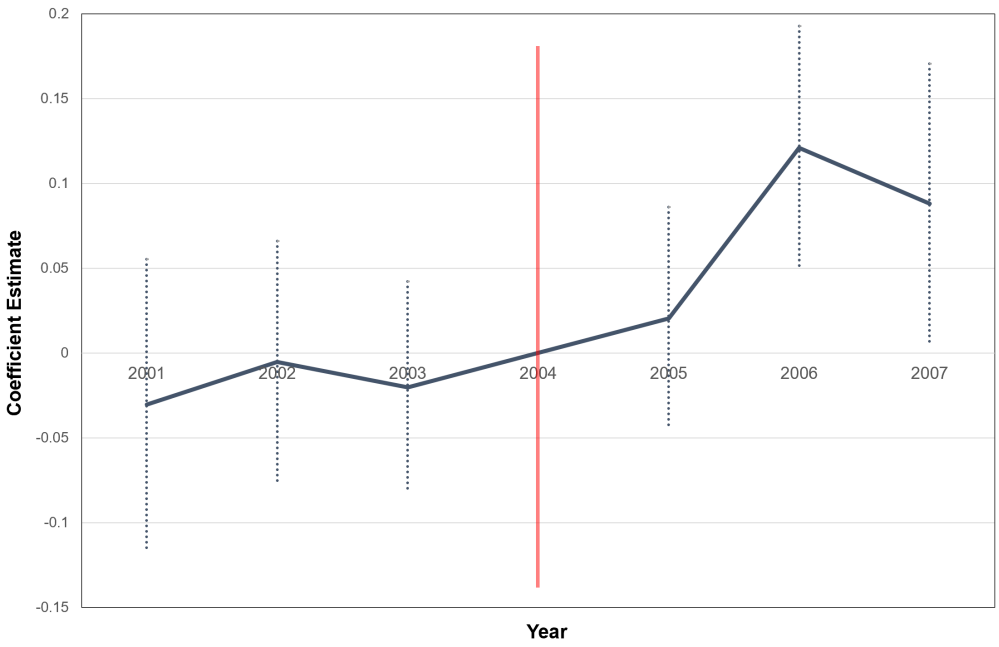

Table 1
Form 5500-Compustat Merged Sample Summary Statistics

This table provides the summary statistics of the sample of employer-sponsored health benefits data linked to the Compustat universe. Employer-sponsored health benefit data come from Form 5500 filings maintained by the Department of Labor. The sample covers all public firms from 1999 to 2016 that filed at least one Form 5500 and can be linked to Compustat via an Employer Identification Number (EIN) or name matching, excluding all utility and financial firms.

Panel A reports firm-level information on Form 5500 variables. Panel B reports firm-level information on Compustat variables on the Form 5500-Compustat Merged Sample. Panel C reports the summary statistics of variables in Panel B for the Compustat universe from 1999 to 2016 with non-missing key variables. Standard errors are clustered at the state and firm level. Variable definitions can be found in Section 3 of the paper and the Appendix. For each variable, I report the mean, standard deviation, and 25th, 50th, and 75th percentiles.

Panel A: Form 5500 Variables (N=33,297)

	Mean	Std.Dev	p25	p50	p75
Premium per Participant	4273.95	6360.53	1942.79	3642.65	5520.38
Fully Insure	0.542	0.498	0.000	1.000	1.000
Self-Insure	0.148	0.355	0.000	0.000	0.000
Mix Insure	0.310	0.462	0.000	0.000	1.000
HMO Plan	0.552	0.497	0.000	1.000	1.000
PPO Plan	0.393	0.488	0.000	0.000	1.000
Indemnity Plan	0.098	0.298	0.000	0.000	0.000
I (Has Broker)	0.763	0.425	1.000	1.000	1.000
I (Spitzer Broker)	0.179	0.384	0.000	0.000	0.000
Broker-to-insurer Expense	0.045	0.124	0.000	0.020	0.044

Panel B: Compustat Variables – Form 5500-Compustat Merged Sample (N=33,297)

	Mean	Std.Dev	p25	p50	p75
Assets($mil)	3807.56	13243.78	155.46	555.56	2181.76
Age	21.73	16.15	9.00	17.00	31.00
Employment(thousand)	11.45	25.73	0.55	2.30	8.80
log(MV)	6.353	2.101	4.994	6.390	7.731
Cash Flow	0.041	0.250	0.019	0.081	0.135
Leverage	0.276	0.507	0.019	0.189	0.363
Profit Margin	-0.379	4.456	-0.034	0.028	0.073
Cash	0.242	0.442	0.035	0.119	0.309
Book-to-market	0.527	1.144	0.245	0.443	0.746

Table 2
Probability of Having Broker by Year and Firm Size

This table provides an overview of the sample of Form 5500-Compustat merged firms and the status of whether they use a broker in purchasing health benefits. The sample covers all Compustat firms that can be merged to Form 5500 by employer identification number and name matching, from 1999 to 2016. All financial and utility firms are excluded. The sample is tabulated by year (Panel A) and by firm size (Panel B). Panel B divides the sample firms into ten equal number bins by their asset size. Decile 1 has the smallest average size, and Decile 10 has the largest.In each panel, I report the number of firms in each year/size bin, and the proportion of firms that use brokers for one or more of their health plans.

Panel A: By Year

Year	N	I(has broker)
1999	1,503	0.649
2000	2,206	0.71
2001	2,275	0.737
2002	2,210	0.748
2003	2,151	0.737
2004	2,065	0.75
2005	2,038	0.773
2006	1,975	0.786
2007	1,961	0.803
2008	1,844	0.811
2009	1,814	0.798
2010	1,758	0.797
2011	1,715	0.788
2012	1,661	0.781
2013	1,644	0.779
2014	1,573	0.769
2015	1,513	0.763
2016	1,391	0.758

Panel B: By Size

Decile	N	Mean(size)	I(has broker)
1	3,340	36.86	0.907
2	3,326	94.07	0.890
3	3,332	173.64	0.846
4	3,329	291.64	0.825
5	3,327	490.61	0.803
6	3,329	804.21	0.743
7	3,333	1,332.26	0.712
8	3,328	2,372.93	0.671
9	3,330	4,905.24	0.639
10	3,323	27,629.66	0.590

Table 3
Use of Broker and Health Premium Growth

This table presents the relationship between the firm-level decision on hiring a broker and health plan costs. The analysis is conducted on a firm-level data set. The sample period is from 1999 to 2016. Dependent variable *PremiumGrowth* is the difference in log form of the aggregated total health insurance premium of a firm between the current year and the previous year. Dependent variable *Premium Per Participant* is the log form of average health insurance premium per participant. Independent variable $I(has\ broker)$ is a dummy variable indicating whether any health plans of firm i use brokers for year t. Firm-level controls include total asset, age, employment, and cash flow. Health plan control includes the dummy of self-insure, mix insure, HMO, PPO, Indemnity, and the log form of total number of participants. Columns (1) and (2) also control for the log form of total premium. Standard errors are clustered at firm level. The t-statistics are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) Premium Growth	(2) Premium Growth	(3) Premium Per Participant	(4) Premium Per Participant
I(Has Broker)	-0.121***	-0.121***	-0.126***	-0.129***
	(-5.185)	(-5.166)	(-5.636)	(-5.646)
Firm-level Controls	Y	Y	Y	Y
Health Plan Controls		Y		Y
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Observations	28,764	28,081	33,401	31,904
Adjusted R^2	0.182	0.186	0.726	0.728

Table 4
Broker Incentive Change and Health Plan Price

This table presents how employers' health plan prices are affected by changes in brokers' incentives, which is induced by banning of contingent commissions for some brokers following the New York Attorney General Eliot Spitzer's 2004 investigation. The analysis is conducted on a health plan-level data set, and each observation is a health plan p for a Compustat firm i in the year of t. The sample includes all health plans that use brokers in a given year in the period of 2001 to 2007. The dependent variable $TotalPremium$ is the log form of plan-level health insurance plan premium; $Premium\ Per\ Participant$ is the log form of average health insurance premium per participant; $Broker-to-Insurer\ Expense$ is the ratio of total broker compensation to total insurance premium. Independent variable $I(Spitzer\ broker)$ is a dummy variable that equals one if the plan hires one of three brokers (Marsh, Aon and Willis) that banned contingent commissions after 2004. $I(Post\ 2004)$ is a dummy variable that equals one if the time is after 2004. $I(Spitzer\ Brokers) \times I(Post\ 2004)$ is the interaction term of the two. Firm and year fixed effects are included in all analysis. Insurer fixed effects are included in Columns (2), (4) and (6). Firm-level controls include total asset, age, employment, and cash flow. Health plan control includes the dummy of self-insure, mix insure, HMO, PPO, Indemnity, and the log form of total number of participants. Standard errors are clustered at firm level. The t-statistics are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) Total Premium	(2) Total Premium	(3) Premium Per Participant	(4) Premium Per Participant	(5) Broker-to-Insurer Expense	(6) Broker-to-Insurer Expense
I(Spitzer Brokers) × I(Post 2004)	0.100***	0.082***	0.097***	0.080***	-0.009*	-0.010**
	(3.191)	(2.970)	(3.112)	(2.890)	(-1.770)	(-2.028)
I(Spitzer Brokers)	-0.003	-0.008	-0.000	-0.005	-0.012**	-0.007
	(-0.091)	(-0.254)	(-0.007)	(-0.184)	(-2.217)	(-1.441)
Firm-level controls	Y	Y	Y	Y	Y	Y
Health plan controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Insurer FE		Y		Y		Y
Observations	27,380	26,933	27,380	26,933	27,380	26,933
Adjusted R^2	0.769	0.816	0.610	0.684	0.419	0.478

Table 5
Broker Incentive Change and Health Plan Quality

This table presents how employers' health plan quality are affected by changes in brokers' incentives, which is induced by banning of contingent commissions for some brokers following the New York Attorney General Elliot Spitzer's 2004 investigation. The analysis is conducted on a health plan-level data set, and each observation is a health plan p for a Compustat firm i in the year of t. The sample includes all health plans in a given year which has an insurer that can be merged to the NCQA health plan quality data. The sample period is between the period from 2005 to 2007. The dependent variables are health plan quality measures from NCQA survey data. Each measure ranges from 0 to 100 with an average of about 80. See Section 4.2.1 for more details on NCQA data. Independent variable $I(Spitzer\ Broker)$ is a dummy variable that equals one if the plan hires one of three brokers (Marsh, Aon and Willis) that banned contingent commissions after 2004. Independent variable $I(has\ broker)$ is a dummy variable indicating whether the health plan uses broker for the given year. Firm and year fixed effects are included in all analysis. Firm-level controls include total asset, age, employment, and cash flow. Health plan control includes the dummy of self-insure, mix insure, HMO, PPO, Indemnity, and the log form of total number of participants. Standard errors are clustered at firm level. The t-statistics are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) Healthcare Rating	(2) Doctor Rating	(3) Specialist Rating	(4) Get Care Needed	(5) Communication	(6) Get Care Quickly
I(Has Broker)	0.115	-0.122	0.123	0.046	0.025	0.192
	(0.819)	(-1.215)	(1.030)	(0.343)	(0.438)	(1.495)
I(Spitzer Brokers)	-0.519**	-0.371**	-0.371*	-0.476*	-0.265**	-0.333
	(-2.018)	(-2.018)	(-1.700)	(-1.947)	(-2.527)	(-1.415)
Firm-level controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Observations	12,722	12,722	12,718	12,722	12,722	12,722
Adjusted R^2	0.376	0.395	0.279	0.383	0.283	0.508

Table 6
Broker Incentive Change and Insurer Quality

This table presents how employers' health plan quality are affected by changes in brokers' incentives, which is induced by banning of contingent commissions for some brokers following the New York Attorney General Elliot Spitzer's 2004 investigation. Employers' health plan quality is measured by the financial strength of the insurance company involved. The analysis is conducted on a health plan-level data set, and each observation is a health plan p for a Compustat firm i in the year of t. The sample includes all health plans in a given year which has an insurer that can be merged to the A. M. Best's insurer financial strength rating (FSR) data. The sample period is between the period from 2001 to 2007. The dependent variables are dummy variables indicating the rating status. *Superior Rating* equals one if the insurer receives A++ or A+ rating for the year (defined by A. M. Best); *Vulnerable Rating* equals one if the insurer recives below B+ rating (defined by A. M. Best); *Rating Upgrade*(*Downgrade*) equals one if the insurer's rating is upgraded (downgraded) from last year. Independent variable $I(Spitzer\ Broker)$ is a dummy variable that equals one if the plan hires one of three brokers (Marsh, Aon and Willis) that banned contingent commissions after 2004. Independent variable $I(has\ broker)$ is a dummy variable indicating whether the health plan uses broker for the given year. $I(Post\ 2004)$ is a dummy variable that equals one if the time is after 2004. $I(Spitzer\ Brokers) \times I(Post\ 2004)$ is the interaction term of the two. Firm and year fixed effects are included in all analysis. Firm-level controls include total asset, age, employment, and cash flow. Health plan control includes the dummy of self-insure, mix insure, HMO, PPO, Indemnity, and the log form of total number of participants. Standard errors are clustered at firm level. The t-statistics are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) Superior Insurer Rating	(2) Vulnerable Insurer Rating	(3) Insurer Rating Upgrade	(4) Insurer Rating Downgrade
I(has broker)	0.018***	-0.052***	-0.009*	-0.008**
	(5.490)	(-6.404)	(-1.920)	(-1.990)
I(Spitzer Brokers)	-0.009	-0.045***	0.028***	-0.004
	(-1.343)	(-3.272)	(2.933)	(-0.408)
I(Spitzer Brokers) × I(Post 2004)	-0.025***	0.043***	-0.056***	-0.001
	(-3.371)	(2.915)	(-4.349)	(-0.133)
Firm-level controls	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Observations	81,159	81,159	81,159	81,159
Adjusted R^2	0.223	0.185	0.121	0.147

Table 7
Broker Incentive Change and Health Plan Price: 2010 Ban Lift

This table presents how employers' health plan prices are affected by changes in brokers' incentives, which is induced by the lift of ban on receiving contingent commissions in 2010. The analysis is conducted on a health plan-level data set, and each observation is a health plan p for a Compustat firm i in the year of t. The sample includes all health plans that use broker in a given year between the period of 2007 to 2013. The dependent variable $TotalPremium$ is the log form of plan-level health insurance plan premium; $Premium\ Per\ Participant$ is the log form of average health insurance premium per participant; $Broker-to-Insurer\ Expense$ is the ratio between total broker compensation to total insurance premium. Independent variable $I(Spitzer\ broker)$ is a dummy variable that equals one if the plan hires one of three brokers (Marsh, Aon and Willis) that banned contingent commissions after 2004. $I(Post\ 2010)$ is a dummy variable that equals one if the time is after 2010. $I(Spitzer\ Brokers) \times I(Post\ 2010)$ is the interaction term of the two. Firm and year fixed effects are included in all analysis. Insurer fixed effects are included in Columns (2), (4) and (6). Firm-level controls include total asset, age, employment, and cash flow. Health plan control includes the dummy of self-insure, mix insure, HMO, PPO, Indemnity, and the log form of total number of participants. Standard errors are clustered at firm level. The t-statistics are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) Total Premium	(2) Total Premium	(3) Premium Per Participant	(4) Premium Per Participant	(5) Broker-to-Insurer expense	(6) Broker-to-Insurer expense
I(Spitzer Brokers) × I(Post 2010)	-0.091**	-0.083**	-0.096***	-0.087**	0.010**	0.010**
	(-2.450)	(-2.399)	(-2.606)	(-2.521)	(2.149)	(2.167)
I(Spitzer Brokers)	0.184***	0.166***	0.194***	0.174***	-0.003	-0.001
	(4.367)	(4.335)	(4.590)	(4.534)	(-0.660)	(-0.153)
Firm-level controls	Y	Y	Y	Y	Y	Y
Health plan controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Insurer FE		Y		Y		Y
Observations	22,628	22,628	22,628	22,628	22,628	22,628
Adjusted R^2	0.821	0.849	0.660	0.713	0.365	0.406

Table 8
Broker Incentive Change and Health Plan Price: Private Firms

This table presents how employers' health plan prices are affected by changes in brokers' incentives, which is induced by banning of contingent commissions for some brokers following the New York Attorney General Elliot Spitzer's 2004 investigation. The analysis is conducted on a health plan-level data set, and each observation is a health plan p for a private firm i in the year of t. The sample includes all health plans from non-Compustat firms that use broker in a given year between the period of 2001 to 2007. The dependent variable $TotalPremium$ is the log form of plan-level health insurance plan premium; $Premium\ Per\ Participant$ is the log form of average health insurance premium per participant; $Broker-to-Insurer\ Expense$ is the ratio between total broker compensation to total insurance premium. Independent variable $I(Spitzer\ broker)$ is a dummy variable that equals one if the plan hires one of three brokers (Marsh, Aon and Willis) that banned contingent commissions after 2004. $I(Post\ 2004)$ is a dummy variable that equals one if the time is after 2004. $I(Spitzer\ Brokers) \times I(Post\ 2004)$ is the interaction term of the two. Firm and year fixed effects are included in all analysis. Insurer fixed effects are included in Columns (2), (4) and (6). Health plan control includes the dummy of self-insure, mix insure, HMO, PPO, Indemnity, and the log form of total number of participants. Standard errors are clustered at firm level. The t-statistics are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) Total Premium	(2) Total Premium	(3) Premium Per Participant	(4) Premium Per Participant	(5) Broker-to-Insurer expense	(6) Broker-to-Insurer expense
I(Spitzer Brokers) × I(Post 2004)	-0.018	-0.010	-0.016	-0.009	0.003	0.003
	(-1.287)	(-0.820)	(-1.180)	(-0.709)	(1.081)	(1.224)
I(Spitzer Brokers)	0.121***	0.081***	0.121***	0.081***	-0.015***	-0.012***
	(7.033)	(5.543)	(7.079)	(5.564)	(-4.952)	(-4.138)
Health plan controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Insurer FE		Y		Y		Y
Observations	201,184	193,398	201,184	193,398	201,184	193,398
Adjusted R^2	0.782	0.816	0.649	0.702	0.597	0.619

Table 9
Broker Incentive Change and Health Plan Price – Role of Firm-level Sophistication

This table presents how employers' health plan prices are affected by changes in brokers' incentive, conditional on firms' sophistication level. Firm-level sophistication is proxied by various corporate board measures (Diverse Board, Busy Board, Richer Board, and Connected Board). Corporate board data are from BoardEx. See Section 3.2 for more details. The analysis is conducted on a health plan-level data set, and each observation is a health plan p for a Compustat firm i in the year of t. The sample includes all health plans that use broker in a given year between the period of 2001 to 2007. The dependent variable $TotalPremium$ is the log form of plan-level health insurance plan premium. Independent variable $I(Sophisticated)$ is a dummy variable that equals one if the corporate board measures are higher than zero (Diverse Board) or the sample median (Busy Board, Richer Board, Connected Board). $I(Spitzer\ broker)$ is a dummy variable that equals one if the plan hires one of three brokers (Marsh, Aon and Willis) that banned contingent commissions after 2004. $I(Post\ 2004)$ is a dummy variable that equals one if the time is after 2004. $I(Spitzer\ Brokers) \times I(Post\ 2004)$ is the interaction term of the two. Firm, year and insurer fixed effects are included in all analysis. Firm-level controls include total asset, age, employment, and cash flow. Health plan control includes the dummy of self-insure, mix insure, HMO, PPO, Indemnity, and the log form of total number of participants. Standard errors are clustered at firm level. The t-statistics are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) Diverse Board	(2) Busy Board	(3) Richer Board	(4) Connected Board
I(Spitzer Brokers)	0.072	0.032	0.036	0.005
	(1.398)	(0.623)	(0.537)	(0.086)
I(Spitzer Brokers) × I(Post 2004)	0.118**	0.177***	0.035	0.153***
	(2.480)	(2.911)	(0.462)	(2.904)
I(Post 2004) × I (Sophisticated)	-0.117*	-0.041	-0.079	-0.017
	(-1.832)	(-0.649)	(-0.853)	(-0.239)
I(Spitzer Brokers) × I(Post 2004) × I (Sophisticated)	0.004	-0.080	0.115	-0.067
	(0.061)	(-1.138)	(1.099)	(-1.024)
Firm-level & Health plan controls	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Insurer FE	Y	Y	Y	Y
Observations	18,085	18,085	6,583	18,085
Adjusted R^2	0.828	0.828	0.817	0.828

Table 10
Probability of Using Brokers after the 2004 Investigation – Role of Firm-level Sophistication

This table presents how the propensity of using brokers is affected by the 2004 investigation and firms' sophistication level. Firm-level sophistication is proxied by various corporate board measures ((Diverse Board, Busy Board, Richer Board, and Connected Board). Corporate board data are from BoardEx. See Section 3.2 for more details. The analysis is conducted on a health plan-level data set, and each observation is a health plan p for a Compustat firm i in the year of t. The sample includes all health plans between the period of 2001 to 2007. The dependent variable $I(Has\ Broker)$ is a dummy variable that equals one if the health plan use a broker. Independent variable $I(Sophisticated)$ is a dummy variable that equals one if the corporate board measures are higher than zero (Diverse Board) or the sample median (Busy Board, Richer Board, Connected Board). $I(Post\ 2004)$ is a dummy variable that equals one if the time is after 2004. $I(Sophisticated) \times I(Post\ 2004)$ is the interaction term of the two. Firm, year and insurer fixed effects are included in all analysis. Firm-level controls include total asset, age, employment, and cash flow. Health plan control includes the dummy of self-insure, mix insure, HMO, PPO, Indemnity, and the log form of total number of participants. Standard errors are clustered at firm level. The t-statistics are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) Diverse Board	(2) Busy Board	(3) Richer Board	(4) Connected Board
I (Sophisticated) × I(Post 2004)	-0.021***	-0.024***	-0.053**	-0.048***
	(-2.740)	(-3.283)	(-2.425)	(-3.244)
I (Sophisticated)	0.002	0.009	0.012	0.028*
	(0.204)	(1.343)	(0.985)	(1.849)
Firm-level & Health plan controls	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Insurer FE	Y	Y	Y	Y
Observations	60,604	60,604	35,582	60,604
Adjusted R^2	0.542	0.542	0.469	0.542

Table 11
Broker Incentive Change and Health Plan Price – Role of Broker Market Competition

This table presents how employers' health plan prices are affected by changes in brokers' incentive, conditional on broker competition in the local market. Broker competition in the local market is measured by the Herfindahl-Hirschman Index (HHI), which is calculated using total premium written at the congressional district level. Total premium written is gathered using all health plans in Form 5500, including both public and private firms, for a given year. The analysis is conducted on a health plan-level data set, and each observation is a health plan p for a Compustat firm i in the year of t. The sample includes all health plans that use brokers in a given year between the period of 2001 to 2007. The dependent variable $TotalPremium$ is the log form of plan-level health insurance plan premium. Independent variable $I(High\ HHI)$ is a dummy variable that equals one if the local market broker HHI is higher than the sample median. $I(Spitzer\ broker)$ is a dummy variable that equals one if the plan hires one of three brokers (Marsh, Aon and Willis) that banned contingent commissions after 2004. $I(Post\ 2004)$ is a dummy variable that equals one if the time is after 2004. Columns (1), (2), (4), and (5) are the subsample analysis, and Columns (3) and (6) show the interaction exercise. Firm and year fixed effects are included in all analysis. Insurer fixed effects are included in the last three columns. Firm and year fixed effects are included in all analysis. Firm-level controls include total asset, age, employment, and cash flow. Health plan control includes the dummy of self-insure, mix insure, HMO, PPO, Indemnity, and the log form of total number of participants. Standard errors are clustered at firm level. The t-statistics are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
			Broker HHI			
	High	Low	Interaction	High	Low	Interaction
I(Spitzer Brokers) × I(Post 2004)	0.134***	-0.008	-0.008	0.136***	0.023	0.023
	(2.764)	(-0.161)	(-0.161)	(3.086)	(0.615)	(0.615)
I(Spitzer Brokers)	0.008	0.074	0.074	-0.033	0.044	0.044
	(0.152)	(1.174)	(1.174)	(-0.692)	(1.163)	(1.162)
I(Spitzer Brokers) × I(Post 2004) × I (High HHI)			0.142**			0.112*
			(2.066)			(1.942)
Firm & plan-level controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Insurer FE				Y	Y	Y
Observations	12,205	12,335	24,540	12,199	12,332	24,531
Adjusted R^2	0.785	0.790	0.787	0.826	0.846	0.835

Appendix (Not For Publication)

Table A.1
Probability of Using Brokers by Firm Characteristics

This table presents how the probability of using a broker is correlated with firm-level financial and health plan characteristics. The analysis is conducted on a health plan-level data set, and each observation is a health plan p for a Compustat firm i in the year of t. The sample time period is from 1999 to 2016. The dependent variable $I(Has\ Broker)_{ipt}$ is a dummy variable indicating whether the plan p of firm i uses a broker for year t. Independent variables $log(Assets)$, $log(Age)$, $log(Employment)$, $log(MV)$, $Cash\ Flow$, $Leverage$, $Profit\ Margin$, $Cash$, $Book\ to\ market$ are constructed based on Compustat variables; independent variables $log(participants\ at\ plan\ level)$, $I(self\ insure)$, $I(mix\ insure)$, $I(HMO)$, $I(PPO)$, $I(Indemnity)$ are from Form 5500. See Appendix for details about variable construction. Columns (1) and (3) include year fixed effects; Columns (2) and (4) include both firm and year fixed effects. Standard errors are clustered at the firm level. The t-statistics are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
log(Assets)	-0.067***	0.007	-0.058***	0.004
	(-8.192)	(0.630)	(-7.067)	(0.372)
log(Age)	-0.049***	-0.009	-0.043***	-0.014
	(-4.899)	(-0.414)	(-4.685)	(-0.625)
log(Employment)	-0.037***	-0.039***	-0.034***	-0.044***
	(-5.473)	(-3.083)	(-5.122)	(-3.446)
log(MV)	0.010**	0.003	0.011*	0.002
	(2.008)	(0.630)	(1.951)	(0.359)
Cash Flow	-0.053***	-0.030**	-0.066***	-0.031**
	(-2.851)	(-2.181)	(-3.672)	(-2.212)
Leverage	-0.007	-0.002	-0.006	-0.004
	(-0.581)	(-0.461)	(-0.624)	(-0.898)
Profit Margin	-0.001	-0.000	-0.001	-0.000
	(-1.504)	(-0.664)	(-1.447)	(-1.057)
Cash	0.040***	-0.006	0.029**	-0.010
	(3.119)	(-0.726)	(2.380)	(-1.307)
Book-to-market	0.013***	-0.001	0.012***	-0.002
	(3.591)	(-0.566)	(3.409)	(-0.665)
log(participant at plan level)			0.043***	0.038***
			(17.987)	(15.508)
I(self-insure)			-0.092***	-0.076***
			(-8.509)	(-8.049)
I(mix insure)			-0.092***	-0.078***
			(-7.257)	(-8.190)
I(HMO)			-0.054***	-0.041***
			(-6.903)	(-6.504)
I(PPO)			0.046***	0.026***
			(4.055)	(2.862)
I(Indemnity)			-0.013	-0.002
			(-0.783)	(-0.134)
Year FE	Y	Y	Y	Y
Firm FE	N	Y	N	Y
Observations	162,109	162,109	161,283	161,283
Adjusted R^2	0.233	0.457	0.279	0.482

Table A.2
Broker Incentive Change and Health Plan Price: Firms That Always Use Spitzer Brokers

This table presents how employers' health plan prices are affected by changes in brokers' incentives, which is induced by banning of contingent commissions for some brokers following the New York Attorney General Elliot Spitzer's 2004 investigation. The analysis is conducted on a health plan-level data set, and each observation is a health plan p for a Compustat firm i in the year of t. The sample includes health plans that use broker in a given year between the period of 2001 to 2007, with the condition that they either always use Spitzer broker before and after 2004, or never use Spitzer brokers. The dependent variable $TotalPremium$ is the log form of plan-level health insurance plan premium; $Premium\ Per\ Participant$ is the log form of average health insurance premium per participant; $Broker-to-Insurer\ Expense$ is the ratio between total broker compensation to total insurance premium. Independent variable $I(Spitzer\ broker)$ is a dummy variable that equals one if the plan hires one of three brokers (Marsh, Aon and Willis) that banned contingent commissions after 2004. $I(Post\ 2004)$ is a dummy variable that equals one if the time is after 2004. $I(Spitzer\ Brokers) \times I(Post\ 2004)$ is the interaction term of the two. Firm and year fixed effects are included in all analysis. Insurer fixed effects are included in Columns (2), (4) and (6). Firm-level controls include total asset, age, employment, and cash flow. Health plan control includes the dummy of self-insure, mix insure, HMO, PPO, Indemnity, and the log form of total number of participants. Standard errors are clustered at firm level. The t-statistics are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Total Premium	Total Premium	Premium Per Participant	Premium Per Participant	Broker-to-Insurer expense	Broker-to-Insurer expense
I(Spitzer Brokers) × I(Post 2004)	0.107***	0.103***	0.104***	0.100***	-0.007	-0.010*
	(3.183)	(3.475)	(3.113)	(3.410)	(-1.272)	(-1.846)
I(Spitzer Brokers)	0.011	-0.009	0.013	-0.007	-0.011	-0.005
	(0.226)	(-0.213)	(0.284)	(-0.161)	(-1.494)	(-0.789)
Firm-level controls	Y	Y	Y	Y	Y	Y
Health plan controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Insurer FE		Y		Y		Y
Observations	18,000	17,993	18,000	17,993	18,000	17,993
Adjusted R^2	0.762	0.810	0.593	0.671	0.378	0.445

Table A.3
Health Plan Price for Ones Who Quit Using Brokers

This table presents how employers' health plan price is correlated with whether the firm does not use a broker or uses a non-Spitzer broker. The analysis is conducted on a health plan-level data set, and each observation is a health plan p for a Compustat firm i in the year of t. The sample includes all health plans that use Spitzer brokers in the period of 2001 to 2003. The sample period for the analysis is 2005 to 2007. The dependent variable $TotalPremium$ is the log form of the plan-level health insurance plan premium. *Premium Per Participant* is the log form of average health insurance premium per participant. Independent variable $I(No\ Broker\ or\ Other\ Borkers)$ is a dummy variable that equals one if the plan is no longer using Spitzer brokers (i.e. switching to other brokers, or using no brokers at all) after 2004. Firm and year fixed effects are included in all analysis. Insurer fixed effects are added in Columns (2) and (4). Firm-level controls include total asset, age, employment, and cash flow. Health plan control includes the dummy of self-insure, mix insure, HMO, PPO, Indemnity, and the log form of total number of participants. Standard errors are clustered at firm level. The t-statistics are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	Total Premium		Premium Per Participant	
I(No Broker or Other Brokers)	-0.221***	-0.176***	-0.207***	-0.159***
	(-4.738)	(-4.222)	(-4.604)	(-3.973)
Firm-level & health plan controls	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Insurer FE		Y		Y
Observations	10,580	10,578	10,580	10,578
Adjusted R^2	0.835	0.877	0.513	0.626

Key Variable Definitions

Variable	Definition and Construction
	Financial variables
Assets	Total book assets in millions, adjusted to 2004 US dollars. The natural logarithm of this variable is used in the paper.
Age	Number of years since IPO. The natural logarithm of this variable is used in the paper.
Employment	Compustat Employment. The natural logarithm of this variable is used in the paper.
Profit Margin	Income before extraordinary items divided by sales.
Book-to-market	The book value of the common equity scaled by the market value of common equity.
Cash	Cash and short-term investment scaled by total assets.
Cash Flow	Income before extraordinary items plus depreciation and amortization, scaled by total assets.
Leverage	The sum of long-term debt and debt in current liability scaled by total assets
MV	Price-close multiplied by common shares outstanding. The natural logarithm of this variable is used in the paper.
	Form 5500 variables
Total Premium	The natural logarithm of total insurance expense. Information is from Schedule A. For firm level, the value is aggregated to firm level by Employer Identification Number (EIN).
Premium per Participant	The natural logarithm of (total insurance expense/total number of participants covered by insurance contract). Information from Schedule A. For firm level, total insurance expense and number of participants are aggregated to firm level by Employer Identification Number (EIN).
Self-/Mix/Fully insure	An indicator variable that takes a value of one if a firm's health benefits funding method is self-/mix/fully insured. For details, see Appendix "Form 5500 Data."
HMO/PPO/Indemnity Plan	An indicator variable that takes a value of one if the insurance contract is indicated as HMO/PPO/Indemnity. Information is from Schedule A.
I(Has Broker)	An indicator variable that takes a value of one if the insurance contract fills broker information on Schedule A Part I.
I(Spitzer Brokers)	An indicator variable that takes a value of one if the broker is under the three brokerage companies: Marsh, Aon, and Willis.
Broker-to-insurer Expense	Total broker compensation scaled by total insurance expense. Information is from Schedule A.
	Other variables

Healthcare Rating	Insurance company level overall rating of health care. Aggregated from plan-level by number of participants. Value ranges from 0 to 100. Data from NCAQ CAHPS program. (Same for other NCAQ ratings below)
Doctor Rating	Insurance company level overall rating of personal doctor.
Specialist Rating	Insurance company level overall rating of specialist seen most often.
Get Care Needed	Insurance company level composite measure on whether it is easy to get necessary care, test or treatment; and get appointment with specialist as soon as needed.
Communication	Insurance company level composite measure on whether the doctor explains thing clearly, listens carefully, shows respect to patient and spends enough time with the patient.
Get Care Quickly	Insurance company level composite measure on whether the patient can get care as soon as needed for illiness, injury, condition and non-urgent appointment.
Diverse Board	An indicator variable that takes a value of one if the firm has female directors. Data is from BoardEx.
Busy Board	An indicator variable that takes a value of one if the average number of outside appointments that a firm's board has is higher than the sample median. Data is from BoardEx.
Richer Board	An indicator variable that takes a value of one if the average compensation of a firm's board is higher than the sample median. Data is from BoardEx.
Connected Board	An indicator variable that takes a value of one if the average individual network size is higher than the sample median. Data is from BoardEx.
Broker HHI	The Herfindahl-Hirschman Index calculated using total premium written by the insurer at congressional district level.

A. Form 5500 Data

A.1. Overview

The Employee Retirement Income Security Act ("ERISA") and the Internal Revenue Code ("Code") establish disclosure requirements for the private-sector employee benefit plans. The Department of Labor ("DOL"), the Internal Revenue Service, and the Pension Benefit Guaranty Corporation jointly developed the Form 5500 series in 1975 to allow private firms that sponsor benefit plans for their employees to report and satisfy ERISA and Code requirements. Most Form 5500s are filed for employee pension plans. Welfare plans with certain size and characteristics are exempt from reporting. Exceptions include plans with fewer than 100 participants, plans for highly compensated employees only, government plans, church plans, and overseas plans that serve mainly nonresident aliens.

I retrieve and download all available Form 5500 welfare plan filings data using the EFAST2 system of the DOL. To clean up the data, I first drop all retirement plans, direct filing entities, voluntary filings with fewer than 100 participants, and duplicate filings. I keep plans that indicate they are for health benefits, and therefore exclude stand-alone welfare plans for other non-health benefits such as dental, life insurance, and long-term disability. I aggregate plan level information to firm level using Employer Identification Numbers ("EIN") reported in Form 5500. I then merge the Form 5500 data to Compustat universe using EIN as well as name match.

A.2. Imputation of Variables

How the plan is funded – whether fully insured, self-insured, or a mix of the two (mixed insured) – is not reported and must be imputed using available information. I follow the algorithm created by the Department of Labor and described in Form 5500 Group Health Plan Research File User Guide ("User Guide") to sort plans into fully, mixed or self-insure. Generally speaking, if the per capita premium amount reported is below \$1,800[13] or the filing indicates that the insurance policy could be for stop-loss coverage or payments to a third party administrator (TPA), and if the plan is funded through trust or general assets or reports benefit payments, then it will be treated as self-insured. Mixed insure is defined as plans that do not meet the requirements for self-insure; the number of individuals covered under insurance contracts as reported on Schedule A is less than half of the total number

[13]This is used in the User Guide, I also use 0.35 multiplied by the annual average single premium for robustness.

of participants as of the end of the plan year; the filing indicates that the plan is funded through a trust or general assets of the sponsor; or the filing has an attached Schedule H or I that indicates benefit payments. Fully insure is defined as plans that do not satisfy the above criteria. For firm-level funding status, if all plans of a firm are fully insured, then the firm is labeled as a fully insured firm; if all plans are self-insured, then the firm is self-insured; otherwise, the firm is mix insured.

For total premium, as suggested by the User Guide, the maximum of the values in the following items is used as the premium for that contract. Part I, 2(a), total amount of commissions paid; Part I, 2(b), total amount of fees paid; Part II, 6(b), premiums paid to carrier; Part III, 9(a)(4), earned premium; Part III, 9(b)(3), incurred claims; Part III, 9(b)(4), claims charged; and Part III, 10(a), total premiums or subscription charges paid to carrier. For total number of participants, I use the number of individuals covered under insurance contracts from Schedule A.

A.3. Broker-related Variables

The status of whether brokers are involved for an insurance contract can be found in Schedule A. For each Schedule A, it is required to report the name and address of all brokers and agents that receive commissions and fees via the insurance contract in Part I, 3(a). The total amount of commissions and fees paid are reported in Part I, 2(a) and (b). Total broker compensation on an insurance contract is calculated as the sum of Part I 2(a) and (b).