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Market Reaction to Regulatory Action in the Insurance Industry: The Case of Contingent Commission

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Abstract

We examine the market's reaction to New York Attorney General Eliot Spitzer's civil suit against mega-broker Marsh for bid rigging and inappropriate use of contingent commissions within a generalized autoregressive conditionally heteroskedastic (GARCH) framework. Effects on the stock returns of insurance brokers and insurers are tested. The findings are: (1) GARCH effects are significant in modeling broker/insurer returns; (2) the suit generated negative effects on the brokerage industry and individual brokers, suggesting that contagion dominates competitive effects; (3) spillover effects from the brokerage sector to insurance business are significant and mostly negative, demonstrating industry integration; and (4) information-based contagion is supported, as opposed to the pure-panic contagion.

Introduction

On October 14, 2004, New York Attorney General Eliot Spitzer filed a civil suit in the New York State Supreme Court against Marsh & McLennan Cos. (MMC), the world's largest insurance broker, for bid rigging and inappropriate use of contingent commissions. The suit alleged that MMC had guided clients through fictitious bidding processes with preselected insurance company "winners." The driving force behind this flawed process is considered to be contingent commissions, an arrangement in which an insurance intermediary receives a percentage of the premiums realized by

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the insurer, if it can meet certain goals in terms of volume, persistency, and profitability in the business it places with the insurer.[1]

The suit against MMC resulted in considerable loss of wealth for the insurance industry. The MMC stock price dropped 44.4 percent in 2 days, MMC Chairman and CEO Jeffrey Greenberg resigned within days, and MMC discontinued its practice of receiving contingent compensation and agreed to pay $850 million in restitution to buyers as part of the settlement. Several other leading brokers, including Aon and Willis (the second and third largest) followed suit, discontinuing the practice of contingent commissions. The investigation then broadened to include property–liability and life–health–accident insurers, resulting in serious repercussions.[2] In the aftermath of the event, both market and regulatory advocates proposed increased emphasis on transparency in firm operating behavior, and the National Association of Insurance Commissioners (NAIC), the organization of state insurance regulators, developed a set of requirements for brokers' disclosure of compensation.[3]

Although the event study technique has been used to examine numerous corporate events, these studies generally limit themselves to the standard market model, in spite of the fact that stock return data often exhibit generalized autoregressive conditionally heteroskedastic (GARCH) properties (Engle, 1982; Lamoureux and Lastrapes, 1990). We contribute to the literature by adopting the GARCH framework to account for these data properties. We examine the effects of the Spitzer suit ("the event") on three aggregate portfolios, insurance brokers, property–liability insurers and life–health–accident insurers, and on the individual firms in these sectors of the industry. The purpose is to determine whether the effect of the event was limited in scope to the target firm (firm specific), whether it was also transmitted to other brokerage firms (intra-sector effects), and/or whether it spilled over to other sectors of the insurance industry as well (inter-sector effects). We also investigate whether the effects on the nontarget firms are of a "contagion" or "competitive" nature and whether intersectoral effects are pure contagion or information based.[4]

[1] The Spitzer suit alleged that MMC had solicited inflated price quotations from insurers, which were then presented to buyers as legitimate offers. Through this bid-rigging process, MMC received contingent commissions from insurers, over and above the ordinary commissions, based on the volume of the business it steered to the company. For details, see *Wall Street Journal*, October 15, 2005.

[2] For example, in early 2006, Spitzer negotiated a $2 million settlement with life insurer broker Universal Life Resources (ULR) over the alleged steering of group life business to insurers in exchange for commissions (*Business Insurance*, January 8, 2006, p. 3).

[3] For details, see "Timeline and Chronology of Events and Issues," by Insurance Information Institute, available at: http://server.iii.org/yy_obj_data/binary/774209_1_0/TimelineAndChronology.doc

[4] Aharony and Swary (1996) divide contagion into two types: pure panic and information based. Brewer and Jackson (2002) find that in information-based contagion cases, the returns of announcing and nonannouncing firms tend to behave differently based on their financial conditions. Pure-panic contagion is more likely when investors cannot effectively differentiate among nonannouncing firms. In such cases, investors tend to assume that all nonannouncing firms are in conditions similar to the failed firms, regardless of their true conditions.

We find that the information conveyed by the Spitzer suit event contains all three elements (firm, sector, and industry effects), demonstrating evidence of spillover among the insurance brokerage, property–liability, and life–health–accident insurance sectors. This is an indication that the target firm's (MMC's) loss of reputation due to the event did raise public doubts about the integrity of the entire brokerage enterprise and the insurance industry as a whole. An alternative explanation is that since contingent commissions are valuable to insurers as well as brokers, the possibility of their discontinuation created negative wealth effects for both groups. Our results also show that the Spitzer suit event contained both contagion and competitive effects within the insurance brokerage industry, with the former being more common and stronger. Our tests of the pure-panic versus information-based spillover hypothesis provide evidence in support of the latter categorization. Overall, the event may have changed the competitive positions of the target firm and its peer group and the competitive structure of the three sectors of the insurance industry. For example, some large brokers and insurers no longer receive/pay contingent commissions, while others do, though more prudently. The findings here can shed light on the debate over alternative insurance marketing systems, the efficacy of market discipline in insurer–agent compensation systems, and the wealth effect of the removal of contingent commission arrangements on the insurance industry. They can also help regulators understand investor behavior and make better public policies (Flannery, 1998).

The remainder of this article is organized as follows: the second section describes the marketing and contingent commission systems and their relationship with the event, the third section develops the hypotheses, the fourth section presents the sample, the fifth section provides the results, and the sixth section presents the conclusion.

INSURANCE MARKETING SYSTEMS AND CONTINGENT COMMISSION

We divide insurers into two types based on their marketing systems and involvement of contingent commissions. Direct marketing insurers (DMIs) market their products through their employees and exclusive agents with minimal use of contingent commissions, while insurers with independent intermediaries (IIIs) market through independent agents or brokers with considerable use of contingent commissions.[5] The contingent commission system contributes a significant portion of income, especially in the case of large brokers. Hence, if the market service agreements (MSAs) or the contingent compensation system is abolished, brokers will suffer, unless increases in other types of broker compensation neutralize the loss.

The key problem with contingent commission schemes is the potential conflict of interest. Theoretically, brokers should receive commissions only from the buyers whom they represent. However, it is common for brokers to also receive some kind of payment, such as contingent commissions, from insurers without its being disclosed to buyers. If contingent commissions represent a significant portion of a broker's revenues, the broker will be tempted to ensure that business goes to the insurer who

[5] An exclusive agent represents a single insurer yet is not technically the firm's employee. An independent agent represents more than one insurance company. A broker represents the customer and negotiates with multiple insurers (Kim, Mayers, and Smith, 1996).

pays the highest fees.[6] Obviously, this creates a conflict of interest for brokers and against the buyers if they are not aware of the practice. Further, since the consolidation of the brokerage industry in the 1990s afforded some brokers substantial market power, they may be tempted to extract illegitimate profits by bid rigging and misusing contingent commissions. This is the bid-rigging issue in the Spitzer suit.

Advocates of contingent commissions argue that incentive-compensation plans are defensible and an essential part of almost any business that relies on sales, including insurance. In particular, insurers want to provide incentives to independent brokers to act in their best interests. However, brokers' level of effort and ability are difficult to be measured. Tying compensation to sales through the commission helps alleviate the information asymmetry problem. Specifically, contingent commissions help provide incentive for brokers to provide the insurers with accurate information about their customers and to align brokers' interests with those of the insurer. This alignment of interests gives insurers more confidence in the selection of risks and encourages them to bid more aggressively. This, in turn, helps reduce information asymmetry between insurers and buyers, limiting adverse selection and making the market more efficient (Cummins and Doherty, 2006).

Doherty and Muermann (2004) have also indicated that policyholders can benefit from purchasing insurance through brokers due to the brokers' bargaining power with insurers. This is especially true when several large national and international brokers dominate the market. Carson, Dumm, and Hoyt (2006) suggest that the use of contingent commission helps to make insurance available and affordable to insurance consumers. Thus, the contingent commission system may indeed enable insurers to offer better pricing, terms and conditions, as well as better services to policyholders. Overall, contingent commission arrangements have both positive and negative effects and do not necessarily harm the buyers. The Spitzer suit event provides an opportunity to test the effects of contingent commissions on the insurance industry.

HYPOTHESES DEVELOPMENT

A number of studies apply the event study methodology to investigate specific events in the insurance industry.[7] We examine the effect of the Spitzer suit event on the stock returns of three aggregate portfolios of insurance brokers, property–liability insurers,

[6] MMC has reported that in 2003 its revenue from MSAs amounted to $845 million (12 percent of its risk and insurance revenues). J.P. Morgan has reported that contingent commissions accounted for more than 5 percent of brokerage revenues and nearly 20 percent of earnings for the publicly traded U.S. brokers (J.P. Morgan Report, January 2004). Similarly, the Swiss Re report of 2004 shows that some brokers generated as much as one fourth to one third of their revenues from contingent commissions (Swiss Re, 2004). Willis, the third largest broker, declared that on a global basis, its contingent commissions were expected to generate about $160 million in revenues in 2004.

[7] Examples of event studies in the insurance industry include studies investigating the effects of California's Proposition 103 (Grace, Rose, and Karafiath, 1995; Brockett, Chen, and Garven, 1999), the 1989 California earthquake (Shelor, Anderson, and Cross, 1992), trouble in the investment portfolio of First Executive and Travelers (Fenn and Cole, 1994), Hurricane Andrew (Lamb, 1995; Angbazo and Narayanan, 1996), property–liability insurance market pullout (McNamara et al., 1997), the terrorist attacks of September 11, 2001 (Cummins and Lewis, 2003), and the European Union Insurance Directives (Campbell, Goldberg, and Rai, 2003).

and life–health insurers and the individual firms in these sectors of the industry. The current study differs from prior studies in four ways. First, we demonstrate that the stock return behaviors of the insurance brokers, insurer firms, and portfolios follow a GARCH process and must be modeled accordingly. Second, we investigate the abnormal returns of the three portfolios and the individual firms, in response to Spitzer's civil suit, within this GARCH framework. Third, we investigate both intra- and inter-sector spillover effects and test the hypothesis of contagion versus competitive effects. Fourth, we test the pure-panic hypothesis versus the information-based contagion hypothesis. We then draw policy implications based on our results.

Intra-Sector Contagion and Competitive Effects

Corporate events may reveal information only about the target firm, or also manifest sectorwide and/or industrywide effects, which will alter the competitive structure of the industry (Lang and Stulz, 1992). In particular, the Spitzer suit, which challenged a common practice in the broker industry, may be associated with industrywide wealth effects. The intra-sector spillover effect among brokers can be a "contagion effect," impacting the target and nontarget firms in the same direction, or a "competitive effect," exerting opposite impacts on target and nontarget firms, providing the latter with a competitive advantage (Slovin, Sushka, and Polonchek, 1999).

Lang and Stulz (1992) argue that the contagion effect is likely to dominate the competitive effect in industries with similar cash flow characteristics across firms, while the competitive effect is likely to dominate in highly concentrated industries. Competitive effects can only occur in an industry with imperfect competition because in competitive markets rival firms will not be able to extract rents. The highly concentrated nature of the brokerage industry (the 10 largest firms account for 79 percent of total business revenues) strengthens the possibility of a competitive effect.[8] The income sources of brokers, however, are similar across firms, as they basically consist of commissions from policyholders and service fees from insurers, which is more likely to result in a contagion effect. The question of interest is which of the two effects dominates in the Spitzer suit event.

If brokers cannot produce additional compensation to offset the loss due to discontinuation of contingent commissions, and/or if the event destroys brokers' reputation, leading to their abandonment by their customers, the market values of these firms will decline. In contrast, nontarget brokers may be unaffected or may exhibit positive effects in response to the event because they attract the customers of the targeted firms, as suggested by the competition hypothesis. Insurers may exacerbate this effect by switching from the target firm (e.g., MMC) to other brokers.

The event may exert a greater effect on brokers that concentrate on commercial lines because these brokers produce more large-amount-premium policies and provide incentives for insurers to offer them volume-based contingent commissions. The effect of the event on brokers that concentrate on personal lines of business would be small

A comprehensive analysis of the impact of operational loss events in the U.S. banking and insurance industries is provided by Cummins, Lewis, and Wei (2006) and Cummins, Wei, and Xie (2007).

[8] Source: *Business Insurance*, July 2005.

or negligible. We expect the wealth effects of the event to be largely attributable to the signaling of new information about the target broker's operation, namely, MMC. This event may affect the valuation of the other individual brokers positively (competitive effect) or negatively (contagion effect). For the aggregate portfolio, what we measure is the net effect of these two forces with the sign to be determined empirically. If stock prices of the broker portfolio and individual brokers have insignificant abnormal return, either the event is specific to MMC, or the contagion and competitive effects offset one another exactly. Based on the above discussion, we propose H_1 and H_2. Rejection of H_1 would provide support for the information spillover hypothesis and sector-wide effects, indicating that the event altered the competitive structure of the insurance brokerage enterprise. Evidence against H_2 will indicate that the contagion effects dominate the competitive effects.

H_1: *Announcement of the Spitzer suit event has no intra-sector effect; contagion and competitive effects offset one another exactly.*

H_2: *Announcement of the Spitzer suit event produces competitive effects, which dominate the contagion effects.*

Inter-Sector Effects

Given the business relationship between brokers and insurers, the Spitzer suit event may generate inter-sector spillover effects on the latter. In addition, the event may prompt regulators to impose regulatory constraints on insurers as well as brokers, thus affecting the values of the brokers. Market perceptions play a crucial role in determining the effect of events. If, as suggested by Cummins and Doherty (2006), the market believes that the contingent commission system helps to align the interest of brokers and insurers, the potential removal of it may bring about negative abnormal returns for the insurer sector. However, if the market assumes that mega-brokers use this system to take advantage of their market power, its removal may assist insurers as they will no longer need to pay contingent commissions to compete for business from the brokers.[9] Accordingly, the possibility of a positive abnormal return for the insurers' portfolio, though slim, does exist. Lastly, if the market remains neutral to the event or if the contagion effect and the competitive effects on different insurance firms cancel out, the abnormal returns to insurers will be insignificant. Hence, we propose H_3 below. Rejection of H_3 would indicate the prevalence of inter-sector information spillover effects.

H_3: *Announcement of the Spitzer suit event has no effect on insurers.*

Pure-Panic Versus Information-Based Contagion

Aharony and Swary (1983) argue that bank failures due to common industry problems show contagion effects while those caused by firm-specific factors do not. To test the

[9] The average contingent commission for the top 50 payers is 2.3 percent of the premiums and the average premium-based commission is 11.5 percent. Industrywide contingent commissions averaged 1.1 percent of the premiums in 2004 (A.M. Best Company, *Best's Aggregates and Averages*, 2005).

pure-panic versus the information-based contagion, we propose hypotheses H_4–H_7 below.

The Effect of Insurers' Marketing System. We posit that the Spitzer suit exerted differential effects on property–liability insurers with different marketing systems, with the negative effect on the stock returns of IIIs being greater because the event revealed negative information about the common characteristic of these firms.[10] The effect of the event on DMIs is expected to be either negative but smaller in magnitude, or even positive, because they were not paying substantial contingent commissions. Thus, we propose H_4 below. Rejection of H_4 implies that insurers using IIIs and DMIs show dissimilar responses to the event.

H_4: *The response of insurers' stock returns to announcements of the Spitzer suit event is independent of the insurers' marketing system.*

The Effect of Insurer Size. Large insurers have an advantage over mid- and small-size insurers in using MSAs because their greater market power and capital induce brokers to bring them business. Cummins and Doherty (2006) suggest that a minimum volume of business and profitability is required to be eligible for the incentive commission and that the percentage of the commission rate increases with higher profit or volume (size). Thus, we expect that the loss of wealth suffered in response to the event will increase in proportion to the size of the insurance firm. In contrast, mid- or small-size insurers may benefit, rather than suffer, because they are no longer implicitly barred from some business just due to the fact that their business volume cannot reach the threshold to pay MSAs.[11] Indeed, the Spitzer suit may have given smaller insurers a window of opportunity to gain market share. A different situation will prevail if the market cannot determine the differential effect of contingent commissions on large and small insurers. In this case, only the pure-panic contagion effect will be manifested.

If larger insurers have better capital cushions to alleviate the shock of the event, the pure-panic contagion effect might be lessened. Further, large insurers might not be affected if brokers continue to bring them large clients. Large insurers are able to write business more easily and to absorb losses due to their greater capital. Directing clients to a large, multiline insurer requires less effort from the broker due to the insurer's

[10] We use a sample of property–liability insurers for which we have access to key data related to the event. Ideally, one should analyze brokers' behavior. However, there are insufficient data for brokers to allow us to draw reliable results. We do provide basic analysis on brokers to show an overall picture.

[11] As long as a small insurer's capital is sufficient to support the policies it writes, it will be able to bid for any business it is interested in but in the same time it may be unable to pay MSAs due to its small business size to reach the required threshold. Of course, even in the absence of contingent commissions, small insurers will be at a disadvantage if brokers direct business to large insurers due to the latter's reputation and capital strength. We would like to thank an anonymous referee for making this point.

reputation.[12] Thus, we propose H_5 below. Evidence against H_5 would suggest that the suit event has differential wealth effects on large and small insurers.

H_5: *Announcement of the Spitzer suit event does not differentially affect stock prices of insurers with respect to their size.*

The Size of Contingent Commissions. The Spitzer suit event relates to whether or not the contingent commission plans in the insurance industry are appropriate. Accordingly, a significant association between the insurer's *absolute* abnormal stock returns and the use of contingent commissions is consistent with the information-based contagion hypothesis. Hence, the greater the use of contingent commissions, the greater the anticipated impact of the event on the insurer's return and, thus, the stronger the information-based contagion effect is expected to be. If insurers' businesses are expected to be harmed by the event, their stock should show negative abnormal returns. This might be due to the possible removal of the contingent commission plans, which align their interests with those of the brokers, and/or they have to pay other types of fees to agents. In this case, the larger the ratio of payment of contingent commissions, the larger the negative wealth effect will be. However, insurers will benefit if they can save the cost of contingent commission without risking their business. Thus, we propose H_6. Evidence against H_6 indicates that insurers paying more contingent commissions suffer a larger loss of wealth, or enjoy a greater cost saving, depending on the sign of the ratio of the payment of contingent commissions.

H_6: *Announcement of the Spitzer suit event does not differentially affect stock prices of insurers with respect to the ratio of the payment of contingent commission to net premiums written.*

Concentration in Commercial Business. Insurers with large commercial lines of business are the leading payers of contingent commissions (Cummins and Doherty, 2006). Therefore, the higher the concentration of the firm in the commercial business lines, the more negative the impact on its stock returns is expected to be. Thus, we propose H_7. Rejection (nonrejection) of H_7 would be consistent with the information-based (pure-panic) contagion hypothesis. Indeed, the greater the subset of hypotheses within H_4–H_7, which is rejected, the stronger the support for the information-based spillover.

H_7: *Announcement of the Spitzer suit event does not differentially affect stock prices of insurers with respect to business concentration.*

Tests of Subsequent Events

A number of additional suits and events involving brokers and insurers occurred following the Spitzer suit. To draw more reliable conclusions on intra-sector and

[12] We would like to thank an anonymous referee for bringing this alternative scenario to our attention.

inter-sector information spillover effects, we derive the abnormal returns on the three portfolios in response to 10 additional events that occurred after the Spitzer suit. These events are detailed in the "Tests of Subsequent Events" section.[13]

SAMPLE DATA AND METHODOLOGY

Sample and Data

We examine stock return responses to the announcement of the Spitzer suit event on October 14, 2004 for property–liability and life–health–accident insurers and insurance brokers traded on the New York Stock Exchange (NYSE), American Stock Exchange (ASE), or NASDAQ. [14] Daily stock returns for these firms are obtained from the Center for Research in Securities Prices (CRSP). Firms are included in the sample if their stock price data are available at the time of the event. We identify the publicly held stock property–liability, life–health–accident insurers, and insurance brokers by the Standard Industrial Classification (SIC) codes. We then cross-check with individual company websites, Yahoo Finance, Google Finance, and A.M. Best's Aggregates and Averages (Property & Casualty 2004 version) and correct any misspecifications based on the SIC codes. If a SIC code changes in the middle of the sample period, or if the firm is not an insurance company according to A.M. Best, we drop the firm from the sample. We also drop firms that conducted an IPO or merger during the sample period.[15]

In order to control for other market distortions, we drop any firms with confounding events, such as proposed tender offers, litigation, stock split, takeover defense, or unexpected financial statement disclosure, within 3 months of the Spitzer suit event date. The final sample consists of 74 property–liability insurers (excluding AIG, ACE, and Hartford, which were also mentioned in the *Wall Street Journal* (*WSJ*) report of the civil suit on October 15, 2004), 40 life–health–accident insurers, and 10 insurance brokers (excluding MMC).

The market return is measured using the CRSP equally weighted index. Information on Spitzer suit and related events is obtained from articles in the *WSJ*. The property–liability insurers' data are from the Best's Key Rating Guide and A.M. Best's Aggregates and Averages. Companies listed on the CRSP are mostly group companies but many of the property–liability firms listed on Best's are subsidiaries of a group (parent holding company). As in Cummins, Lewis, and Wei (2006), the parent firms' stock prices are used in the analysis and group financial data are calculated by summing up those of the individual subsidiaries, if group data are not directly available from Best's.

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[13] We would like to thank an anonymous referee for suggesting these tests.

[14] It is notable that there were subpoenas prior to the announcement of the October 14 civil suit (see footnote 3). However, we argue that although markets did assess a probability of the suit on MMC, the formal announcement of the suit created a large enough shock to the market to provide a clear test of the event. Thus, we focus on the October 14 announcement instead of investigating a series of "information leakage" events. Further, we do not find a significant abnormal return associated with any individual subpoena event prior to the Spitzer suit event. The market seems neutral to these subpoenas.

[15] The SIC codes used are: 6331 (property–liability), 6311 (life), 6320-6321 (health and accident) insurers, and 6411 (brokers). There are 10 IPOs during the sample period. Only one company (Travelers Property-Casualty) is dropped due to merger, making the possible selection bias almost nil.

Models and Methodology

The study is conducted in two steps. In the first step, abnormal returns on the three portfolios and the individual firms are calculated. In the next step, tests of the hypotheses about the determinants of the wealth effects on firms are carried out.

Event Study Analysis. Brockett, Chen, and Garven (1999) demonstrate that application of classical event study methodology may potentially distort findings if GARCH effects are not accounted for when appropriate. Thus, we adopt the GARCH specification to avoid potential misspecification and misleading results. The GARCH (1, 1) model is used to derive the abnormal stock returns and to test for wealth effects due to the event. In cases where GARCH effects are insignificant, the standard market model is used. The event date, $t = 0$, is the announcement date (October 14, 2004). Expected returns are derived from the model estimated over a period beginning 210 days before and ending 5 days after the announcement. The event window includes the event days -1 and 0. We choose this narrow window because broader window may confound the results due to the proximity of the other events (see the section "Tests of Subsequent Events"). However, our primary results do not change when we replicate the analyses for broader windows. The GARCH (1, 1) model can be specified as:

$$R_{i,t} = \beta_{i,0} + \beta_{i,1} R_{m,t} + \gamma_1 D_{-1} + \gamma_2 D_0 + \mu_{i,t} \tag{1}$$

$$h_{i,t} \equiv Var(\mu_{i,t}) = c_i + a_i \mu_{i,t-1}^2 + b_i h_{i,t-1} + \varepsilon_{i,t} \tag{2}$$

$$\mu_{i,t} \,|\Omega_{t-1} \sim N(0, h_{i,t}), \tag{3}$$

where $R_{i,t}$ is rate of return on security i, $R_{m,t}$ is the rate of return on the CRSP equally weighted index of all common stocks in the NYSE and ASE (the market), and D_{-1} and D_0 are dummy variables for the event days October 13 and 14, 2004. In this model γ_1 and γ_2 measure the magnitudes of the abnormal returns for event days (-1) and (0), μ_{it} is an error term with mean zero and variance h_{it}, ε_t is white noise, and a_i and b_i are the ARCH and GARCH parameters. The sum of the ARCH and GARCH parameters is a measure of persistence of shocks to the system; the larger the value of this sum, the greater the persistence of shocks to volatility.[16]

Determinants of Abnormal Returns. The second stage of the analysis tests the pure-panic versus information-based contagion hypotheses. To this end, we regress the estimated abnormal returns against firm-specific variables explaining the differential impact of the event across individual insurers.[17] Following Kim, Mayers, and Smith

[16] For more detailed properties and applications of GARCH models, see Elyasiani and Mansur (1998, 2003), Elyasiani, Mansur, and Pagano (2007), and Brewer et al. (2007). The standard market model assumes the variance of the return equation is constant. Hence, Equation (2) disappears.

[17] Following the existing studies, we regress all the estimated abnormal returns, statistically significant or otherwise, against the explanatory variables. This method assumes that the estimated signs of the abnormal returns, irrespective of their statistical significance, represent deviations of a fitted line that represents the true population fit. An alternative would be to

(1996), we define an insurer's business in homeowner and farm-owner multiple peril and automobile liability and physical damage lines as personal line business and all other lines as commercial lines.

The control variables include leverage, return on policyholders' surplus, multiline operation and regulation location. According to the financial distress theory, high-leverage insurers are more vulnerable to unexpected negative events because they have a higher risk of failure. Lang and Stulz (1992) find that the contagion effect is indeed greater for more highly leveraged industries. In contrast, the deep-pocket theory of liability implies that insurers with low leverage are more likely to become targets of future lawsuits and, hence, they may be expected to suffer bigger losses.[18] The financial distress theory predicts that the Spitzer suit event will have more damaging effects on insurers with high leverage, while the deep-pocket theory predicts the opposite. The actual effect will depend on the relative magnitudes of these opposing forces. The premium to surplus ratio is used as a proxy for the company's leverage.

Insurers' return on policyholders' surplus (net income/average surplus for the year) proxies for firm's profitability. Fields et al. (1990) find that the decrease in insurers' value in response to California's Proposition 103 was negatively related to profitability. However, the deep-pocket theory suggests a direct relationship between profitability and the size of the loss. Return on policyholders' surplus provides a proxy for return to investors. If the return is inadequate, investors' commitment to provide more capital and to continue the investment forward may falter.

We include a dummy variable to indicate single- versus multiline activity (operating solely in property–liability or in both property–liability and life–health–accident lines). Since the event was directly related to the payment of contingent commission by the property–liability insurers to MMC, property–liability firms may be affected more severely than life–accident–health insurers but this distinction may be weakened by the fact that both types of insurers share similar commission structures. Overall, we expect a positive sign for the multiline dummy variable. We also include a dummy variable for companies headquartered in New York because different states may have differential regulatory flexibilities. The model takes the following form and is estimated using ordinary least squares (OLS):[19]

$$\begin{aligned}\gamma_2 = {} & \delta_0 + \delta_1 (Size) + \delta_2 (Marketing) + \delta_3 (Contingent) + \delta_4 (Commercial) \\ & + \delta_5 (Contingent * Commercial) + \delta_6 (Leverage) + \delta_7 (ROE) \\ & + \delta_8 (Multiline) + \delta_9 (Location) + \mu_{i,t}. \end{aligned} \tag{4}$$

limit the sample to observations with significant abnormal returns (Campbell, Goldberg, and Rai, 2003).

[18] Bolton and Scharfstein (1990) define a firm as having a "deep pocket" if it has "a stock of internally generated funds which it can use to finance this (fixed) cost" and a "shallow pocket" if "it must raise all funds from capital market" for this purpose.

[19] If stock returns are cross-sectionally correlated and heteroskedastic, the OLS results will be biased. Karafiath, Mynatt, and Smith (1991) suggest that the use of the generalized least squares (GLS) can address the problem of biased standard errors. However, Karafiath (1994) demonstrates that correcting the OLS estimator to account for heteroskedasticity and cross-sectional correlation shows no marginal benefits. Our GLS results (not reported) are virtually identical to the OLS results.

In this model, *Size* is the log of the total admitted assets for the insurer, *Marketing* equals one if the insurer is an III and zero for a DMI, *Contingent* is the ratio of insurer's total payment of net contingent commission to its net premium written, and *Commercial* is the ratio of insurers' premium written in commercial lines to total premiums written. All independent variables take the values in year 2003. The interaction term $(Contingent) * (Commercial)$ measures the change in the effect of *Contingent* commission for firms focusing in *Commercial* lines. *Leverage* is the ratio of insurers' premium written to surplus, and *ROE* is the insurer's return on policyholders' surplus. The *Multiline* dummy equals one if the insurer has business in both property–liability and life–health–accident lines. The *Location* dummy equals one if the insurer's regulatory location is New York.

EMPIRICAL RESULTS

Intra-Sector Contagion and Competitive Spillover Effects

Table 1 shows the estimation results for brokers, property–liability insurers, and life–health–accident insurers. All three portfolios show significant ARCH/GARCH effects, which supports the generalized specification adopted here and casts doubt on the results based on the traditional models. The Spitzer suit event is found to have a significant negative effect on the market value of the broker portfolio as the coefficient of the abnormal return on the event day is significantly negative, rejecting the hypothesis of no intra-sector effect (H_1). Moreover, the negative coefficients of the dummy variables D_{-1} and D_0 for the event days (-1) and (0) indicate that the contagion effect on the portfolio is stronger than the competitive effect, even if the latter is nonzero. This finding leads us to reject H_2.[20] The negative coefficient for the broker portfolio on the day before the event suggests that there were some information leaks regarding the event.

Table 2 presents the broker revenues from U.S.-based clients, their rankings based on their revenues; abnormal returns on October 14, 2004, copied from Table 1; market shares; and contingent commissions as a percent of revenues. All large brokers with ranks within the top 12 are found to show significant negative abnormal returns during the event window.[21] Brokers with no significant abnormal returns, or with positive abnormal returns, are relatively small and/or concentrated in personal lines of business. Although the sample for brokers is too small to run further regressions (10 firms), the negative and significant abnormal returns of most of the mega-brokers provide evidence of significant contagion effects.

Inter-Sector Spillover Effects

Table 1 also shows the sensitivity of the property–liability and life–health–accident insurer portfolios to the Spitzer suit event. The abnormal returns on both portfolios

[20] To further investigate the prevalence of a competitive effect in the brokerage sector, we also study the stock returns for the individual brokers. Seven out of 10 brokers are found to show significantly negative abnormal returns on the event day, suggestive of contagion; two brokers show no significant abnormal returns; and one broker shows a significant positive abnormal return, indicating competitive effects. These results are consistent with the aggregate results discussed above (Table 1).

[21] Brokers ranked 5, 6, 9, and 11 are not reported here because they are not publicly traded.

TABLE 1
Estimation of Stock Return

Stock Portfolio	Intercept	Market	D_{-1}	D_0	*ARCH0*	*ARCH1*	*GARCH1*	Persistence
Sensitivities of Brokers, and Insurers, Portfolios to the Spitzer Suit Event								
Broker	0.000854	0.7395	−0.0185	−0.0366	0.00003036	0.2490	0.3110	0.5600
	(3.00)**	(21.37)***	(−9.27)***	(−21.90)***	(3.30)***	(6.00)***	(2.07)**	
Property–liability	0.0000288	0.7930	0.00131	−0.0162	0.00000825	0.0377	0.3275	
	(0.19)	(36.25)***	(0.57)	(−6.59)***	(5.36)***	(1.34)	(2.71)***	0.3652
Life–health–accident	0.0000857	0.9382	0.000188	−0.0164	0.00000639	0.01180	0.6915	
	(0.38)	(30.40)***	(0.05)	(−4.47)***	(1.46)	(0.47)	(3.21)***	0.7033
Individual Brokers								
Aon Corp.	0.000852	0.8002***	−0.0188***	−0.1935***	0.0000386***	0.3626***	0.4110***	0.7736
Brooke Corp.	0.004776	1.2433***	0.0041	0.0029				
Brown & Brown Inc.	0.001246	0.6906***	0.0007	−0.0719***				
Gallagher Arthur J & Co.	0.000065	0.4013***	0.00571*	−0.0261***	0.0000402***	0.5157***	0.2388*	0.7545
Hilb Rogal & Hamilton Co.	0.000738	0.9180***	−0.00299	−0.0817***				
Hub Intl. Ltd.	0.000239	0.2611**	0.0021	−0.0258*				
National Fin. Partners Corp.	0.001385	1.0209***	0.0173*	0.0162*	0.000222***	0.3047***	0.0224	0.3271
Quotesmith Com. Inc.	0.000964	0.4933**	−0.0340	0.0041				
US I Holdings Corp.	0.000555	0.6417***	0.0138*	−0.0566***	0.0000638***	0.3052***	0.4658***	0.7710
Willis Group Holdings Ltd.	0.000597	0.5780***	−0.0139	−0.0676***				

Notes: The model estimated is giving below. In this model, the dependent variable, $R_{i,t}$, is the rate of return on portfolio i, $R_{m,t}$ is the rate of market return (CRSP equally weighted index), and D_{-1} and D_0 are dummy variables for event days (−1) and (0), respectively. The dummies take the unit value on October 13 and October 14, 2004. *ARCH0*, *ARCH1*, and *GARCH1* are the constant term, the ARCH coefficient, and the GARCH coefficient. Persistence is the sum of *ARCH1* and *GARCH1*. It indicates the persistence of shocks to volatility. Broker's portfolio has 10 firms (excluding MMC), Property–liability portfolio has 74 insurers, and life–health–accident portfolio has 40 firms. ARCH and/or GARCH effects are significant for all three portfolios. t-values are in parentheses. ***, **, and * represent significance at the 0.01, 0.05, and 0.10 levels, respectively. If ARCH/GARCH effects are not significant for individual firms, we report the results based on the standard market model.

$$R_{i,t} = \beta_{i,0} + \beta_{i,1} R_{m,t} + \gamma_1 D_{-1} + \gamma_2 D_0 + \mu_{i,t} \tag{1}$$

$$h_{i,t} \equiv Var(\mu_{i,t}) = c_i + a_i \mu_{i,t-1}^2 + b_i h_{i,t-1} + \varepsilon_{i,t} \tag{2}$$

$$\mu_{i,t} \mid \Omega_{t-1}. \sim N(0, h_{i,t}) \tag{3}$$

.

TABLE 2
Brokers Ranks, Revenues, Market Share, and Contingent Commissions as Percent of Revenues

Stock	Brokerage Industry Rank	Abnormal Return on 10/14/2004	2004 Revenues ($Millions)	Market Share %	Contingent Commissions/ Revenues %
Aon	2	−0.1935***	3,105.9	16.60	2.00
Brooke Co	32	0.0029	65.907	0.40	3.10
Brown & Brown Inc	7	−0.0719***	638.267	3.40	6.00
Gallagher Arthur J & Co	3	−0.0261***	1,192.68	6.40	3.00
Hilb Rogal & Hamilton Co	8	−0.0817***	601.734	3.20	NA
Hub Intl Ltd	12	−0.0258*	231.44	1.20	6.00
National Financial Partners Co	NA	0.0162*	NA	NA	NA
Quotesmith Com Inc	NA	0.0041	NA	NA	NA
U S I Holdings Co	10	−0.0566***	405.82	2.20	5.00
Willis Group Holdings Limited	4	−0.0676***	1,036.35	5.50	4.00
MMC	1	−0.2395***	5,804.4	31.10	7.30

Source: Revenues are for U.S. business only and are from *Business Insurance*, July 18, 2005. Contingent commissions are from *Business Insurance*, October 25, 2004. Ranking is based on 2004 revenues. Abnormal returns on 10/14/2004 are based on the GARCH model. *** and * represent significance at the 0.01 and 0.10 levels, respectively.

are significantly negative, indicating that these insurers were harmed by the event. An explanation for this effect may be that contingent commissions are crucial for property–liability and life–health–accident insurers, as they are to brokers, and that the potential removal of these commissions was perceived by the market to be detrimental to these insurers in spite of the fact that insurers would save on commissions. This finding is consistent with the argument made by Cummins and Doherty (2006) indicating that the contingent commissions help to align the interests of insurers and intermediaries. Alternatively, if it is the contingent commission that leads to bid rigging, the market may have anticipated that the disallowance of contingent commissions lowers coverage prices and reduces insurer profits, leading to a transfer of wealth from insurers to policyholders.[22] Based on these findings, the null hypothesis of no inter-sector spillover effect (H_3) is rejected.

Property–liability and life–health–accident insurers show similar responses in terms of the magnitude and significance of their abnormal returns on both the event day

[22] For example, while the insurers' bids may decrease because of the removal of the contingent commissions, they may have to pay other fees to the broker in order to attract business and compensate for the broker's services. These fees will be the underwriting expenses instead of the contingent commission, which they can add to the premium charged to corporate clients. We thank an anonymous referee for this alternative explanation of the negative abnormal return of insurers.

TABLE 3
Descriptive Statistics for Property–Liability Insurers ($N = 74$)

Variables and Definitions	Mean	Std. Deviation
Abnormal return on the event day, October 14, 2004	−0.0154	0.0180
Abnormal return on 1 day before the event day, October 13, 2004	0.0002	0.0124
Cumulative abnormal return of the event day and 1 day before	−0.0075	0.0186
Marketing = one if the insurer is an III, and zero if the insurer is a DMI	0.7973	0.4048
Size = log of the total admitted assets for insurer	14.4319	1.6016
Contingent = ratio of insurer's total payment of net contingent commission to its net premium written	1.0960	1.6773
Commercial = ratio of insurer's premium written in commercial lines to total premiums written from all lines	0.5525	0.3562
The interaction term of the above two ratio: (*Commercial* * *Contingent*)	0.5175	0.8858
Leverage = ratio of insurers' premium written to surplus	1.4951	0.8318
ROE = insurer's return on policyholders' surplus	8.1525	15.4666
Multiline = one if the insurer has business in life–health insurance lines, and zero otherwise	0.2162	0.4145
Location = one if the insurer regulatory location is New York, and zero otherwise	0.0676	0.2528

Note: All variables except for the abnormal return are the values in year 2003.

and the day before. This is consistent with the fact that insurers of both subsectors rely heavily on independent intermediaries to distribute their products, especially in commercial lines, and that both pay MSAs and other contingent commissions. In sum, our results reject H_1–H_3 and provide evidence of both intra- and inter-sector information spillover as a result of the Spitzer suit event.

Pure-Panic Versus Information-Based Contagion Effects

Descriptive statistics for property–liability insurers are given in Table 3 and the OLS results for the determinants of abnormal returns (Equation (4)) are presented in Table 4.[23] There are 74 stock property–liability insurers included in the analysis. Overall, we find evidence in support of the information-based hypothesis. The coefficient of the marketing dummy variable (equal to one for IIIs) is negative and significant at

[23] The correlations between our independent variables are insignificant. To control for heteroskedasticity, we also use the weighted least squares technique to estimate the model. Results remain virtually unchanged. As a further robustness test, we use the cumulative abnormal return on Day_{-1} and Day_0 as the dependent variable. Results do not change materially. Results presented are based on a sample excluding AIG, ACE, and Hartford, which were mentioned in the October 15, 2004 *WSJ* report. Including these three insurers does not alter the results noticeably, except that the variable *ROE* becomes significantly negative at the 10 percent level.

TABLE 4
Determinants of the Size of Abnormal Returns (Cross-Sectional Analysis)

Variables	Coefficient	*t*-ratio
Intercept	0.03002	(1.24)
Marketing = to one if the insurer is an III, and zero if the insurer is a DMI	−0.01450**	(−2.28)
Size = log of the total admitted assets for insurer	−0.00245*	(−1.71)
Contingent = ratio of insurer's total payment of net contingent commission to its net premium written	0.00920***	(2.98)
Commercial = ratio of insurer's premium written in commercial lines to total premiums written from all lines	0.01299	(1.58)
The interaction term of the above two ratio: (*Commercial* * *Contingent*)	−0.01941***	(−3.34)
Leverage = ratio of insurers' premium written to surplus	−0.00219	(−0.77)
ROE = insurer's return on policyholders' surplus	−0.00013	(−0.77)
Multiline = one if the insurer has business in life–health insurance lines, and zero otherwise	−0.00077	(−0.14)
Location = one if the insurer regulatory location is New York, and zero otherwise	−0.00030	(−0.03)
Number of observations	74	
Adj. *R*-square	0.1522	
F-statistic	2.28**	

Note: The model employed is:

$$\gamma_2 = \delta_0 + \delta_1(Size) + \delta_2\,(Marketing) + \delta_3\,(Contingent) + \delta_4\,(Commercial) + \delta_5\,(Contingent) * (Commercial) + \delta_6\,(Leverage) + \delta_7\,(\mathrm{Re}turn) + \delta_8\,(Multiline) + \delta_9\,(\mathrm{Re}gulation) + \mu_{i,t}.$$

The results presented are based on the data set without AIG, ACE, and Hartford. The dependent variable is the estimated abnormal returns on the event day (D_0) from the GARCH model. All independent variables are the values in year 2003.

the 5 percent level, suggesting that the Spitzer suit event was more detrimental for IIIs than for DMIs. This result leads us to reject H_4.[24]

H_5, proposing that the event does not differentially affect stock prices of insurers with respect to their size, is also rejected. The coefficient of the size variable is significantly negative at the 10 percent level, suggesting that larger insurers suffered larger losses from the event. The market seems to believe that the event had a negative impact on the competitive advantage of the larger companies and that the potential restructuring of the independent intermediary's compensation system will harm the value of these firms more strongly than it will those of smaller firms. Under these circumstances, the Spitzer suit event may be said to show a competitive effect by altering the existing competitive position between larger and smaller insurers.

[24] As a robustness test, we also use a broker dummy variable and an agent dummy variable to differentiate 13 insurers mainly using brokers from 47 insurers mainly using independent agents. Both coefficients are significantly negative and similar in magnitude.

H_6, proposing that the Spitzer suit event does not differentially affect insurers with respect to their payment of net contingent commission, is rejected. The coefficient of the variable *Contingent* is significantly positive, suggesting that insurers who pay a larger amount of contingent commissions relative to net premium written are expected to benefit from possible reform in the contingent commission system by saving on the commissions paid to independent intermediaries.[25]

H_7, regarding business concentration, is also rejected, as the coefficient of the interaction term between the two variables *Contingent* and *Commercial* is significantly negative and increases in magnitude with the former. This means that firms that pay more contingent commission and/or have higher concentration in commercial lines suffered more from the event. Thus, we need to differentiate between cases where the contingent commission is principally paid in commercial lines and in personal lines. The rationale is that insurers concentrating in commercial lines pay a larger amount of contingent commission (as they rely heavily on agents to distribute their commercial line products) and may, therefore, be subject to a larger negative impact from the event. This may hold true in spite of the fact that these firms may save on contingent commissions, because the fees they will have to pay to independent intermediaries can more than offset the saving. Insurers paying minimal contingent commissions are unlikely to be affected even if most of their premium comes from commercial lines. Combining this result with the finding that insurers selling commercial lines/paying contingent commissions experience larger negative impacts suggests that the market believes there will be no benefits to competitors but that the corporate customers may benefit through lower costs of coverage.[26] Further, insurers concentrating in personal lines, which used to pay a large amount of contingent commission, may actually benefit from the event. This suggests the market believes that bid rigging occurs primarily in commercial lines and the lawsuit mainly targeted bid rigging in those lines.

The coefficient of the leverage variable is insignificant, implying that either the effects due to financial distress and deep-pocket hypotheses are both insignificant or they cancel out. Similarly, the insignificant coefficient on the insurer's return on policyholders' surplus implies that the loss of insurer's value is not related to the company's profitability as measured by ROE. The coefficients of the multiline and location dummies are also insignificant. This may suggest that since paying contingent commission is a practice popular in both property–liability and life–health–accident insurance industries, the impacts should be similar, regardless of whether the insurer operates only in property–liability or in both lines. The location of the headquarters is found to be insignificant, perhaps because most insurers do business in New York and should, thus, be affected regardless of the location of their headquarters. Furthermore, regulators from other states followed Spitzer's investigation of the insurance industry rather quickly, and the market seems to have predicted the sequence of these investigations.

[25] The effect of the variable contingent is sensitive to the level of insurer concentration in commercial lines due to the interaction term between the two variables. The sign for the effect changes from positive to negative for insurers with more than 47 percent of their premiums coming from commercial lines. We thank an anonymous referee for pointing out this change in the sign.

[26] We thank an anonymous referee for this alternative explanation of the negative abnormal returns.

TABLE 5
List of 10 Additional Events

Event Day	Event Description
10/17/2004	AIG and ACE discontinue making contingent commission payments to brokers.
10/21/2004	Willis Group announces that it is eliminating the practice of accepting contingency commission payments from insurers.
10/25/2004	MMC chairman and chief executive officer Jeffrey Greenberg resigns.
10/26/2004	MMC announces that it is permanently eliminating the practice of receiving any form of contingent compensation from insurance carriers.
10/28/2004	Aon Corp. and U.S.I. Holdings Corp. announce it will terminate contingent commission arrangements.
11/12/2004	Attorney General Spitzer files a second civil suit in State Supreme Court in Manhattan, bringing charges of fraud against ULR.
11/16/2004	The Senate Governmental Affairs Committee's Subcommittee on Financial Management, the Budget, and International Security holds a hearing on insurance brokerage practices and potential conflicts of interest.
01/31/2005	MMC agrees to pay $850 million to compensate its U.S. policyholder clients in settlement of charges against the company by New York Attorney General Spitzer and the New York State Insurance Department.
03/04/2005	Aon Corp agrees to pay $190 million to compensate its U.S. policyholder clients in settlement of charges brought by the attorneys general of New York, Illinois, and Connecticut, as well as the insurance departments of New York and Illinois.
03/14/2005	AIG chief executive officer Maurice Greenberg steps down.

Overall, the regression results disclose significant correlations between the percentage change in market value of insurers and the explanatory variables considered (marketing system, size, the ratio of contingent commission to net premium written, and the contingent commission paid in commercial lines), providing strong evidence for information-based effects, as opposed to pure contagion effects. The market seems to be capable of distinguishing among firms, in this regard, according to their firm-specific characteristics.

Tests of Subsequent Events

Tests are also conducted to determine the effects of 10 additional events subsequent to the Spitzer suit (Table 5). Three sets of models are estimated for both the broker and the insurer portfolios: (1) models including the Spitzer event and one other event, (2) models excluding the Spitzer event but including one other event, and (3) models including the Spitzer event and a set of two or three other major events simultaneously. The estimation results are not reported here to save space. The results show that the ARCH/GARCH parameters are significant in all cases. The results for the broker portfolio show that in both the single-event and multiple-event models, no event other than the Spitzer suit event is significant, with the exception of the event "elimination of accepting contingency commissions by Willis Group (10/21/2004)" in the single-event model when the Spitzer event dates are excluded.

The results for property–liability insurers also show significance only for the event dates very near the Spitzer suit event (October 17, 21, 25). No event after October 25 shows a significant effect. It is clear that the effects observed for the Spitzer suit are not picking up the effect of the events occurring afterward because they were not expected. However, it is quite possible that the significance of the events occurring after the Spitzer event date of October 14, especially the October 17 and 21 events, which occurred within a week of the Spitzer suit, reflect delayed effects of the Spitzer suit. It is also notable that the magnitudes of the coefficients for the Spitzer suit event are not significantly altered when the other events are considered simultaneously.

CONCLUSION

We apply event study methodology to test the market reaction to the Spitzer suit event of 2004 using a GARCH model. Several interesting results are uncovered. First, data show that stock return behaviors of the broker, property–liability, and life–health–accident insurer portfolios and about half of the individual firms follow a GARCH pattern and must be modeled accordingly. This may render the findings based on the traditional models invalid. Second, we find evidence to support both negative contagion and positive competitive effects in the insurance industry with the former being dominant. This finding supports the argument that different sectors of the insurance industry are closely integrated. Third, the information-based contagion hypothesis is supported against the pure contagion hypothesis; the observed abnormal returns, the event's impact, on the firms are highly correlated with firm characteristics.

Our findings can help regulators and investors in the insurance industry better understand the workings of the insurance market and the effect of contingent commission schemes on the efficacy of market operations. In particular, the following implications can be drawn. First, according to our findings, the risk of spillover of shocks across different sectors of the insurance industry does exit and should be taken into account in any regulatory intervention in the form of new regulation or the choice between closing down and bailing out the firms. Second, regulators must take care to distinguish between the wrongdoings of specific brokers and the issue of appropriateness of contingent commission arrangements. Our findings suggest that the market perceives contingent commission mechanisms to be helpful in aligning the interests of insurers and brokers, making the insurance industry more efficient and possibly benefiting policyholders. Hence, hasty steps to eliminate these mechanisms may harm market efficiency and the interests of brokers, insurers, and/or buyers. In this context, Regan and Kleffner (2007) also find that the extent to which contingent commission is utilized is negatively related to the combined ratio in the property–liability insurance industry, suggesting that contingent commission mechanisms improve insurer performance and ultimately benefit policyholders. Third, more stringent regulation of contingent commissions to ensure its appropriate use will likely protect the interest of insurance buyers. Thus, reformers should focus on ensuring appropriate use of the contingent commission mechanism without eliminating the advantages provided to policyholders.

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