NETWORKS FINANCIAL INSTITUTE
At Indiana State University

Working Paper

2011-WP-14
July 2011

Institutional Ownership Stability and Risk Taking: Evidence from the Life-Health Insurance Industry

Jiang Cheng, Elyas Elyasiani and Jingyi (Jane) Jia

Abstract: We investigate the relationship between risk taking of life-health (LH) insurers and stability of their institutional ownership within a simultaneous equation system model. Several results are obtained. First, stable institutional ownership is associated with lower total risk of LH insurers, supporting the prudent-man law hypothesis. Second, when investors are sorted in terms of stringency of the prudent-man restrictions, their negative effect on risk holds for all, except insurance companies, as owners of LH insurers. Third, large institutional owners do not raise the riskiness of the investee-firms, as proposed by the large shareholder hypothesis. Fourth, institutional owners reduce riskiness of the investees through reduction of their leverage and underwriting risks, though they increase their investment risk, in which they have greater expertise. These findings have important regulatory, managerial and investment implications.

About the Authors: **Jiang Cheng** of Shanghai Jiao Tong University has taught actuarial science, corporate governance, international corporate finance and economics for several years in the United States and in China. He received B. S. in Economics & Applied Mathematical Statistics from the Shanghai University of Finance and Economics, and MBA from Fudan University, China. He earned his Ph.D. degree in Risk Management and Insurance from Temple University at Philadelphia. Prof. Cheng's research has been published by leading insurance journals in the United States, such as *Journal of Risk and Insurance*. He specializes in insurance regulation, corporate governance, financial market and institution, and accounting manipulation. Cheng joined the Scott College of Business at Indiana State University for the 2011 Spring semester as a visiting scholar for Networks Financial Institute. Dr. **Elyas Elyasiani** joined the Fox School of Business at Temple University in 1980. His main area of expertise is banking and financial institutions. Dr. Elyasiani has done research in bank and insurance company stock return modeling, risk exposure, efficiency, international spillover of shocks, and minority and foreign ownership effects, as well as quantitative finance, debt maturity, and monetary economics. His publications have appeared in the *Journal of Money*, *Credit and Banking*, *Journal of Banking and Finance*, *Journal of Financial Research*, *Journal of Accounting, Auditing and Finance*, and *Journal of Financial Services Research*. Dr. Elyasiani has taught at Michigan State University, Temple University, and Bar Ilan University in Israel at the Ph.D., MBA, and undergraduate levels. He was also a visiting scholar at the Hebrew University in Jerusalem, Israel. He also serves as an editor of the *Journal of Economics and Business*. **Jingyi (Jane) Jia** is an assistant professor of economics and finance in the Southern Illinois University Edwardsville School of Business. Prior to joining the SIUE faculty, Dr. Jia taught financial markets and institutions at Temple University. Dr. Jia's research interests include institutional ownership and financial institutions. She is working on the influence of institutional ownership on firm performance and the cost of debt in both corporate and financial firms. She is also interested in risk management and regulation of financial institutions. Dr. Jia is a member of Financial Management Association and Eastern Finance Association.

Keywords: Life Insurance, Institutional Ownership, Monitoring, Risk Taking.
JEL codes: G22, G32, G12.

This paper was presented at the ARIA meetings 2009 in Providence, Rhode Island. The authors would like to thank the session participants and in particular, Kili C. Wang, the discussant, as well as David J. Cummins, Laureen Regan, and Mary Weiss for comments and suggestions. Jiang Cheng gratefully acknowledges financial support from Networks Financial Institute in the Scott College of Business at Indiana State University and the Shanghai Pujiang Talent Fund Program. This paper is forthcoming in *the Journal of Risk and Insurance*. Thanks are also due to three anonymous referees of the *Journal* who offered wide ranging, detailed and constructive comments for the improvement of the paper. Author names appear in alphabetic order.

Institutional Ownership Stability and Risk Taking: Evidence from the Life-Health Insurance Industry

1. Introduction

The main objective of this study is to investigate the association between the risk-taking behavior of the life-health (LH) insurers and the stability of their institutional ownership. We make several contributions. First, we examine the relationship between LH insurers' risk-taking and institutional ownership stability; a dimension of institutional ownership which can have a major impact on firm behavior (Elyasiani and Jia, 2010) but has been overlooked in the insurance literature. Second, we test the validity of the prudent-man law and the large shareholder hypotheses (described in sections 2.1 and 2.2) concerning the relationship between insurer firms' risk-taking and institutional ownership stability in order to determine which of these hypotheses better explains the risk patterns of the insurer firms. Third, we study the channels through which institutional ownership stability influences investee firm risk. These include capital ratio (surplus to assets ratio), investment risk and underwriting risk.

Several interesting results are obtained. First, stable institutional ownership is associated with lower total risk, as measured by standard deviation of monthly stock returns, at the aggregate sample level.[1] Second, when institutional investors are sorted into subsets of banks, pensions and endowments, insurance companies and investment advisors, the effect of institutional ownership stability on riskiness of the investee-firms continues to be negative for all institutional investor types, except for insurance companies as owners, as will be discussed in section 4.4. These findings are in favor of the prudent-man law hypothesis purporting that prudent-man laws compel investors to curtail risk. Third, the large

[1] Downs and Sommer (1999) also use standard deviation of stock returns as a measure of total risk. We will refer to this measure as total risk throughout the paper.

shareholder hypothesis claiming that the largest institutional investors tend to raise investee-firm risk, (Galai and Masulis, 1976; Jensen and Meckling, 1976; Saunders et al., 1990) is opposed.

Fourth, institutional ownership stability is associated with a higher capital ratio (lower leverage), a lower underwriting risk and a higher investment risk, as the three main components of investee-firm risk altered by institutional investors. It may be reasonably argued that institutional investors such as banks, pension endowment, and investment advisors (mutual funds, hedge funds, etc.) have greater expertise in the area of investment while they possess lesser skills in insurance underwriting. Hence, these investors may direct and encourage investee-firms to adopt more risk in the former area and discourage it in the latter area, altering the mix while still maintaining a reasonable overall risk level. If stable institutional ownership is indeed associated with lower total risk, regulators need not be seriously concerned about increased ownership of insurers by institutional investors because this phenomenon is not risk increasing, as long as institutional ownership is stable.[2] The rest of the paper is organized as follows: Section 2 presents the literature review and the hypotheses. Section 3 discusses the data and methodology and Section 4 provides the results. Section 5 summarizes and concludes.

2. Hypotheses Development

Two main hypotheses are considered here in relating firm risk and institutional ownership stability; the prudent-man law and the large shareholder hypotheses.

2.1 The Prudent-Man Law Hypothesis

[2] Along these lines, the FDIC has recently proposed that private-equity investors who buy bank stocks must satisfy a higher capital requirement than banks (a 15% Tier 1 capital ratio for at least three years) and to hold onto the acquired banks for three years, unless the FDIC grants them permission to sell (*Wall Street Journal*, July 3-5, 2009). Long-term holding is intended to avoid the detrimental effects of "short-termism" on performance and risk.

Prudent-man laws protect investors by requiring fiduciaries such as banks, pension funds, insurance companies, and investment advisors to invest as a "prudent man" (Del Guercio, 1996). Given these laws, investors can seek damages in court from the fiduciaries who fail to protect their interest. However, court judgments on prudent investment are based mainly on the assets in isolation and ignore the role of diversification in reducing idiosyncratic risk (Del Guercio, 1996).[3] As a result, fiduciaries subject to these laws, including institutional investors, tend to tilt their portfolios toward assets which are easy to defend as prudent investments in court. This mode of operation engenders a negative relationship between institutional ownership and investee-firm risk. We propose this relationship as the prudent-man law hypothesis.

Potential effects of the prudent-man laws on firm risk originate from at least two sources. First, restricted by prudent-man laws, institutional investors are motivated to influence investee-firm managers to curtail risk in order to avoid lawsuits from the investors and negative actions from the regulators (Pound, 1988; Del Guercio, 1996; Cebenoyan et al., 1999).[4] Second, investee-firms may reduce their risk taking due to an institutional investor clientele effect. Stable and large shareholding of institutional investors is known to be associated with better firm performance in industrial and banking firms (Elyasiani and Jia, 2008, 2010). Hence, managers of insurance companies are motivated to attract these investors and, knowing that the latter are subject to the prudent-man laws, they curtail their risk taking in order to achieve this goal.

Institutional investors can be classified into four legal categories in terms of stringency

[3] An implication of this is that institutional investors do care about unsystematic risk, even when they can diversify it, because courts do not look at the diversification feature; they look at the asset risk in isolation.
[4] Badrinath et al. (1989) suggest if the investment decisions of institutional portfolio managers are perceived to be sound, well-informed and "prudent", they will have a "safety-net" in the eyes of the investors and regulators. Hence, they desire to show that their choices are defendable and shared by others, when the return on investments is unfavorable.

of the prudent-man law restrictions (Del Guercio, 1996; Abarbanell et al., 2003): banks, pensions and endowments, insurance companies and investment advisors (mutual funds and independent investment advisors). This classification is also used in other studies (e.g., Bushee, 2001; Bushee and Goodman, 2007). Banks manage equities on behalf of individuals and other institutions through their trust departments. The strict fiduciary requirements faced by bank trust departments motivate them to avoid investments which may be regarded as imprudent by courts. Pensions and endowment are also subject to strict fiduciary responsibilities while, comparatively, insurance companies and investment advisors face less intense fiduciary restrictions and, hence, they need not be as concerned about the riskiness of their investee-firms (Ryan and Schneider, 2002).[5]

Although, based on the strength of fiduciary restrictions, we may expect banks and pensions and endowment sub-samples to show a stronger negative relationship between institutional ownership stability and investee risk, at least three countervailing effects may alter the order of the strengths. First, different types of institutional investors may demonstrate dissimilar degrees of activism depending on the extent of their business relationship with the investee-firms (Brickley et al., 1988; Elyasiani and Jia, 2010). For example, banks are generally inactive monitors of the investee-insurer-firms because they do not want to lose businesses such as deposits and fee income that they receive by serving as a distribution channel for the latter firms' products such as annuities.[6] Banks' reluctance to monitor the investee-insurers weakens their impact on risk reduction of the latter firms, despite

[5] In practice, Del Guercio (1996) finds that banks significantly tilt their portfolios towards stocks with high S&P ranking and lower total risk, while mutual funds do not. Similarly, Abarbanell et al. (2003) find that banks and pension funds decrease their holdings in spin-off subsidiaries which are regarded as risky, while among investment advisors, only those following large-value investment styles take this step.

[6] For a discussion of bank selling life insurance and long-term care products see the following: http://www.ababj.com/techtopics-plus/state-life-expands-distribution-channels-to-include-banks.html and http://www.soa.org/library/newsletters/newsdirect/2008/june/ndn-2008-iss58-leary.aspx.

their high fiduciary responsibility. In addition, banks do not necessarily have to reduce the riskiness of the investee-insurer firms because publicly listed LH firms are often high quality companies and investment of banks in these companies can be easily defended in court.

Ryan and Schneider (2002) argue that insurance companies are also inactive in monitoring investee-firms for several reasons: a) they want to avoid the loss of business relationship with the investee-firms. b) if an insurer equity holder intervenes in an investee-firm and the firm later defaults or files for bankruptcy protection, the insurer can be considered to have overstepped its creditor role, in which case its claims as a bond holder would receive lower priority than other creditors' claims. Thus, equity-based activism by insurance companies could damage their financial claims as bond holders, which is their primary investment role. c) due to strict regulatory restrictions, insurance companies invest a high proportion of their invested assets in long-term bonds and mortgages and a relatively small proportion of it in equity, compared to e.g., pensions and endowments and investment advisors.[7] The resulting weak tradeoff between monitoring costs and associated benefits makes the insurer institutional investors reluctant to take an active role in monitoring the operation of their competitors. Thus, insurers tend to be inactive monitors. Anecdotal evidence is also consistent with the argument that insurers are pressure-sensitive and inactive institutional investors (Abarbanell et al., 2003). Hence, we expect a smaller effect, or no effect, from these investors on insurer investee-firms' risk. Contrary to banks and insurance companies, however, pension funds and investment companies tend to act as active monitors because they do not have significant business relationship with the investee-insurers. This

[7] Insurance companies' proportion of equity holdings is limited to 10 percent of their assets by state regulators. In practice these proportions falls considerably below this limit. Specifically, in our sample the mean (median) ownership level of insurers is 4.619 (4.294) % while those of banks and investment advisors are 12.62 (13.19) % and 34.29(35.60) %, respectively.

gives them more power in reducing investee-firms' risk.

Second, if an institutional investor's investment is highly concentrated in a particular investee-insurer, it may be driven to reduce the investee's risk to a greater extent because it would want to avoid large shocks to its wealth (Sullivan and Spong, 2007). In our sample, investment advisors do indeed have the highest wealth concentration in LH firms, compared to other institutional owners, and, hence, the finding of a sharper risk reduction in their investee-firms would not be surprising.[8] Third, investment advisors whose clients include pension funds may be driven to reduce risk-taking as hard as banks and pension and endowments because of their clients' risk aversion.

Overall, given the counterbalancing forces of the prudent-man law, active versus passive monitoring, dissimilarity of investment concentration in investee firms across institutional investor types and the clientele effect, the order of magnitude of the impact from different institutional investor types on investee-firm risk is an empirical issue. We test these effects using the four disaggregated sub-samples: banks (BANK), pensions and endowments (PNE), insurance companies (INS), and investment advisors (IA).

2.2 The Large Shareholder Hypothesis

It is well-known that limited liability stockholders have the incentive to increase the risk of the firm at the expense of debt-holders (Galai and Masulis, 1976; Jensen and Meckling, 1976). In practice, stockholders can increase the value of their equity *call* options by increasing the risk of the underlying assets of the firm because debt-holders can only monitor

[8] The mean (median) portfolio concentration ratios for banks, pension endowments, insurance companies, and investment advisors are 0.012(0.009), 0.020(0.006), 0.017(0.010), and 0.037(0.030), respectively. To derive these measures, we follow two steps. First, we calculate the portfolio concentration ratio for each investor in an insurer as the ratio of dollar value of the investment by this investor in this insurer to the dollar value of the total investment by this specific investor. Second, we calculate the average portfolio concentration ratio across each type of investors.

and control their actions imperfectly and ex-post (Saunders et al., 1990).[9] Accordingly, institutional owners may encourage the managers to adopt high-risk strategies in order to reap additional profits at a low cost. The largest institutional shareholders will have the greatest incentives to follow this strategy because their gains will be proportionately greater (Shleifer and Vishny, 1986) while they would bear only a portion of any insolvency costs, with state guaranty funds covering the rest (Cummins, 1988).[10] Among the institutional investors, those with longer durations of ownership are likely to have stronger effects because they have greater opportunities to learn about the firm and to effectively monitor them, and they will be there over a longer horizon to reap the benefits.

There is a counterbalancing effect which limits the risk increasing tendency of the large institutional investors. As stated in the last section, when the wealth of the large shareholders is concentrated in the investee-firms, they have incentives to limit the investee-firm risk in order to prevent a great loss to their portfolio at a given point in time (Smith and Stulz, 1985; Sullivan and Spong, 2007). Examples of institutional investors with concentrated wealth include, pension funds, which take large stakes in a small number of firms in order to influence the firm strategy effectively (Del Guercio and Hawkins, 1999), and investment advisors (mutual funds and hedge funds). Indeed, the latter have the highest wealth concentration in our sample (footnote 8).[11]

---

[9] If an insurer engages in a risky project and the outcome is favorable, the insurer's owners reap most of the benefit. If the outcome is unfavorable, the owners' liability is limited to the equity value of its investment in the insurer, even if insolvency does occur. The debt holders and policyholders absorb any shortfall in the insolvency case and state guaranty funds also suffer. Moreover, insurers are not penalized for risk-taking through the guaranty fund system since assessments of premiums for the system are not risk-based. Every state generally uses an ex post assessment on healthy insurers to fund any insurable loss not payable by the bankrupt insurer, except for New York which has a FDIC-like pre-loss insurance fund.

[10] Brewer et al. (1997) find that life insurers have higher asset risk when they write more business in states where guaranty fund assessments against surviving insurers are offset against state premium taxes and, thus, borne by taxpayers.

[11] According to Del Guercio and Hawkins (1999), internally and actively managed pension funds such as College Retirement Equities Fund (CREF) and State of Wisconsin Investment Board Fund (SWIB) hold large

Based on this discussion, the net effect from large institutional investors is indeterminate. However, given the prevalence of the view that shareholders tend to increase risk, we propose the large shareholder hypothesis as follows: Ownership of firms by institutional investors holding a large proportion of the company in a steady manner is associated with higher, rather than lower risk. Data will determine whether this hypothesis will be rejected or will hold up. We define largest institutional investors either as the five largest institutional investors or institutional investors holding 5% or more of the stocks of an insurance firm. If ownership of the largest institutional investors results in higher riskiness of the investee-firms, the regulators, shareholders, and investors in the market place must account for this effect in their respective decisions.

2.3 Channels of Association between Institutional Ownership Stability and Risk

Institutional investors can influence the behavior of the investee-firms through several mechanisms. First, they can advise the management on a specific matter by suggesting the steps and supporting them to achieve the goal. Second, they can provide additional capital to make the implementation of certain plans feasible while withholding capital in other cases. Third, they can use their voting power to support or to oppose the management itself or its plans, if the management does not cooperate. Finally, they can vote with their feet. These mechanisms can be used to bring about changes in the overall riskiness of the investees as well as their mix of different risk categories.

Three main channels of altering investee risk are considered in this study: changes in the capital ratio (surplus to total assets ratio), underwriting activities, and investments (Staking and Babbel, 1995; Cummins and Sommer, 1996; Baranoff and Sager, 2002, 2003). If the

---

shares in target firms. CREF also reports that 16% of its portfolio was devoted to big shares in 100 to 150 companies in 1995.

prudent-man law hypothesis is operational, we expect greater and more stable institutional ownership to be associated with higher capital ratios, and lower underwriting and investment risks. However, if institutional owners have greater expertise in one of the latter types of risk, e.g., investment, they may follow a risk substitution strategy in the sense that they may raise the category of risk in which they have greater expertise, namely investment, while lowering the other type, namely underwriting. In this scenario, even under the prudent-man laws, the former risk category would increase. The large shareholder hypothesis predicts that institutional investors increase risk in general, with the possibility that they, in addition, substitute the risk category of their expertise area for other risk categories.

Stable and large institutional owners may motivate insurers to maintain a safer capital margin, than desired by the managers, in order to satisfy the constraints due to their fiduciary responsibilities, as well as achieving better ratings and, thereby, attracting more business. Higher capital ratios help satisfy the safety requirements of the regulators as well as the large insurer clients, who are generally risk-sensitive, and very likely to seek alternative insurers if the determinants of the Best Rating, including capital cushions, do not meet their standards (Epermanis and Harrington, 2006). Under this scenario, we expect a positive relationship between institutional ownership and capital ratio (a negative relationship with leverage).[12]

Similarly, the direction of the effect from institutional ownership on insurers' underwriting risk is likely to be negative because institutional owners are subject to prudent-man laws and also may have less than adequate expertise in insurance underwriting, while they do have the "know how" to manage investments and can advise the investee-firms

[12] Commensurate with this, insurance prices decline when the capital strength of insurer firms is deteriorating and probability of insolvency is rising (Sommer, 1996; Cummins and Danzon, 1997; Phillips et al., 1998). Also consistent with this, following declines in the market values of the LH-firms' high-yield bond and real estate portfolios, life insurance policyholders and annuitants withdrew funds prior to regulatory actions against First Executive Corporation, First Capital Holdings, and Mutual Benefit Life in 1991 (DeAngelo et al., 1994, 1996).

on the subject. The effect of institutional ownership on insurers' investment risk taking is less clear because on the one hand institutional owners want to reduce investment risk, as with other types of risk, due to the prudent-man laws, and on the other hand, they may want to increase it because they have greater expertise in engaging in financial investment and managing its risk. In particular, some institutional owners such as banks and investment advisors have greater access to financial and derivative markets and possess much more expertise and experience in managing investment risk than other investors do, so that this area may be indeed considered their niche and their zone of strength. These investors are, thus, likely to concentrate on the firm's financial investments, elevating investment risk to a higher scale at the expense of other risk categories (risk substitution). Overall, the direction of the effect of institutional investors on each type of investee risk is an empirical issue.

3. Data and Methodology

3.1. Data and Sample

We extract institutional ownership data from Thomson Financial 13f database and managerial ownership data and CEO incentive-compensation data from Compustat Executive Compensation database. Stock returns, trading volume and other related information are from the Center for Research in Security Prices database (CRSP). Insurer characteristics are from A.M. Best's Insurance Reports, and Best's Aggregates and Averages for 1993-2008.[13] Other insurer information is from COMPUSTAT. In addition, we use the Institutional Investor Classification Data provided by Brian J. Bushee to divide institutions into four legal types for fiduciary restriction analysis.[14] We include all the observations for which data on a

[13] The accounting data from A.M. Best's report provide the aggregate figures for insurer subsidiaries of the holding company; i.e., these data are constructed from the Best's Aggregate & Average data for individual insurers. This approach has the advantage of excluding holding company assets that are not directly related to the underlying insurers.

[14] Thomson Financial 13f database provides the CDA Spectrum classification. However the type-code variable on Spectrum is not reliable after 1998. Bushee has reorganized the investor types to make the classification

complete list of variables are available for the primary test model of total risk and institutional ownership persistence (IOP), to be defined later, for life-health (LH) insurers during 1992-2007. We choose the LH firms primarily based on their SIC codes.[15] The final sample includes 365 firm-year observations from 40 listed LH insurers. The sample includes primarily the larger licensed public LH insurers and it is likely to exclude small insurers.

3.2. Variable Construction

We construct three sets of variables: risk measures (market and accounting-based), institutional and managerial ownership measures, and control variables.

3.2.1. Risk Measures

Three measures of market risk and three measures of accounting risk are employed. As in, Downs and Sommer (1999), total risk is proxied by stock return's total volatility (standard deviation of monthly stock return). Systematic risk is the standard deviation of the predicted value of returns in a regression model of monthly stock returns on market returns. Unsystematic risk is the standard deviation of the residuals of the market model. Accounting measures of risk include surplus to assets ratio (surplus/total assets), underwriting risk and investment risk. The underwriting risk of LH insurers is proxied by the proportion of premiums written in health business because, compared to other LH insurance products such as life insurance, annuities and pensions which can be predicted reliably based on mortality

---

accurate. The organized institutional investor types are available on his website given below. We use his classification in this study: (http://acct3.wharton.upenn.edu/faculty/bushee/IIclass.html).

[15] SIC code classification of insurers is not always reliable. We manually cross check with A.M. Best's report to correct some errors. It is still difficult to clearly classify some insurers such as Nationwide because it operates in multiple areas of insurance activity. Thus, we classify all the insurers with any level of life-health (LH) business as LH insurers and add a dummy variable for insurers with significant business in property-casualty (PC) area. For example, Nationwide is included in LH as indicated by SIC code, but we add a PC dummy variable which equals one for Nationwide because its mean net premiums written on PC business is comparable to its net premiums written in LH business.

tables, health products are prone to more uncertainties (Baranoff and Sager, 2002).[16] Following the existing literature, our measure of investment risk is calculated as the Risk-Based-Capital (RBC)-factor- weighted investment proportions of stocks, bonds, mortgages, real estate, and loans scaled by total admitted assets (Baranoff and Sager, 2002, 2003; Baranoff et al., 2007).[17]

3.2.2. Ownership Measures

Following Elyasiani and Jia (2008, 2010), we employ institutional ownership persistence (IOP) as the primary measure of institutional ownership stability and check the robustness of our findings using some alternative measures of ownership including the level (proportion) of institutional ownership, number of institutional investors (#investors), and two ownership duration measures; non-zero-points duration, and maintain-stake-points duration (Bohren et al., 2005). Institutional ownership persistence (*IOP*) for a specific institutional investor j in a specific firm i, is computed as the ratio of the average ownership proportion of investor j to the standard deviation of its ownership proportion, both measured over a three-year period including the current and the previous two years.[18] The *IOP* measure for a particular firm i is then calculated as the average *IOP* across all institutional investors in that particular firm.

[16] LH insurance business is defined to include the following nine product lines based on Best's Aggregates and Averages: ordinary life, individual annuity, credit life, group life, group annuity, group accident and health, credit accident and health, other accident and health and industrial business. Carr et al. (1999) consider annuities the least risky. Baranoff and Sager (2002) consider health products the riskiest line for life insurers and use the ratio of health writings to total writings to proxy for product risk. We also use the ratio of group business writings to total writings and the ratio of group health writings to total writings as proxies for underwriting risk for our robustness tests. Results remain qualitatively the same.

[17] Specifically, investment risk variable for LH firms is measured as 0.1072*bond investment + 0.023*preferred stocks + 0.3*common stocks + 0.03*mortgage +0.0067*real estate + 0.03*loans divided by total admitted assets, where the weights are chosen by the regulators based on perceived riskiness of the assets. Admittedly, however, this is only an approximate measure of investment risk because, as the financial crisis of 2007-2009 has clearly demonstrated, the mortgage-related assets can be very risky for insurers in spite of the fact that they are subject to low capital requirement due to their collateralized nature.

[18] The choice of the three years is reasonable because the maximum non-zero-points duration for LH insurers is 8.87 quarters which is shorter than three years (Table 1).

Specifically, $$IOP_i = \sum_{j=1}^{J_i}[(\sum_{t=1}^{12} p_{i,t}^j / 12) / Std(p_{i,t}^j)] / J_i, \quad (1)$$

Where $p_{i,t}^j$ is the proportion of firm i held by investor j at time t, J_i is the number of institutional investors in firm i, and $Std(p_{i,t}^j)$ is the standard deviation of $p_{i,t}^j$ across the 12 quarters. The IOP metric is unitless and the reciprocal of the coefficient of variation (standard deviation/absolute value of the mean). The rationale for the choice of this measure is that monitoring incentives of institutional investors are mainly determined by the level and volatility of their shareholding. Monitoring by large shareholders is likely to be more intense and more effective because they benefit proportionately more from improvements in firm performance (Shleifer and Vishny, 1986). Similarly, institutional investors maintaining a stable shareholding have greater opportunities to learn about the investee-firms and, hence, they are more likely to be effective monitors. The IOP variable combines these two dimensions of institutional ownership (the level and variation of shareholding proportion) into one measure. It follows that for insurers with large-stake and stable institutional investors, *IOP* will be large. Alternatively, for each investor in a stock, IOP can be regarded as a standard-deviation- adjusted shareholding proportion. For a specific firm i, IOP is the average of these standard-deviation-adjusted shareholding proportions across all investors in the firm.

Non-zero-points duration is the number of quarters in which an institutional investor has non-zero holdings out of the 12 quarters over the three-year period defined above. Maintain-stake-points duration is the average number of quarters in which institutional investors maintain their stake (keep the same proportion or increase the holding). The number of institutional investors is the number of institutional investors that invested in the

firm over the 3-year period. Institutional ownership level (share holding proportion) is measured by the aggregate ownership proportion of institutional owners computed over a three-year period as: $Prop = (\sum_{t=1}^{12} \sum_{j=1}^{J_i} p_{i,t}^{j}) / 12$ (2)

3.2.3. Managerial Ownership Variables

The relationship between risk and managerial ownership is theoretically indeterminate because increased managerial stock ownership engenders two counterbalancing effects; an alignment-of interests effect and a financial portfolio effect. According to the agency theory, separation of ownership and control leads to agency conflicts between shareholders and managers, where managers tend to engage in opportunistic behavior driven by self-interest (Jensen and Meckling, 1976; Amihud and Lev, 1981; Stein, 1989; Shleifer and Vishny, 1989). Examples include empire building, protection of own human capital from firm risk, focusing on projects with short-term payoffs (managerial myopia), and entrenchment. Managerial ownership is considered to be an effective method for mitigating agency conflicts as higher shareholding of managers can align their interests with those of the shareholders leading to a reduction in opportunistic managerial behavior. This effect, call it an alignment-of-interest effect, results in higher risk-taking, as explained in the large shareholder hypothesis (section 2.2). Empirical evidence in manufacturing industry generally supports the presence of this effect (Morck, Shleifer, and Vishny, 1988; McConnell and Servaes, 1990). However, there is a counterbalancing effect which can limit the risk-increasing tendencies of managers when their shareholding increases. This effect, call it the financial portfolio effect, is supported by the work of Sullivan and Spong (2007) who find that bank risk falls when bank managers have more of their wealth concentrated in their banks.

Overall, based on the existing studies, evidence on the effect of managerial ownership on

risk in the banking and insurance industries is mixed. For example, Saunders, Stock, and Travlos (1990) and Downs and Sommer (1999) find a positive effect from managerial ownership, while Houston and James (1995) and Laeven and Levine (2009) find an insignificant effect. It is noteworthy that studies finding significant managerial ownership effect on risk use different sample firms, sample periods and/or models and control variables from those used here. For example, Downs and Sommer (1999) use a sample of property and liability insurers over the 1989-1995 period. Saunders et al. (1990) use banking data during 1978-1985 and fail to include year dummies. Further, none of these studies control for the effect of institutional ownership.

Managerial ownership is measured by the managerial shareholding level (percentage shareholding of all of the managers in total), and its squared value. The latter is intended to capture possible non-linearities in the relationship between managerial ownership and risk. Managerial compensation structure is proxied by the incentive-compensation ratio (total incentive-compensation (total compensation minus salary minus bonus)/total compensation of the CEO) and is included to account for the effect of management's incentives to take risk. CEOs paid with high proportions of stock-related incentive-compensation are more motivated to take risk (Guay, 1999, Chen et al., 2006). In support of this view, Coles et al. (2006) find that higher sensitivity of CEO wealth to stock volatility (called vega) does indeed lead to riskier policy choices including higher investment in R&D, less investment in property, plant and equipment, less diversification and higher leverage. We construct two other alternative managerial incentive compensation measures: Delta is the change in the dollar value of the CEO's wealth for a one percentage point change in the stock price and vega is the change in the dollar value of the CEO's wealth for a one percentage point change

in the annualized standard deviation of stock return.[19]

3.2.4. Control Variables

We also include several control variables to complete the model. Large insurer firms are expected to exhibit lower risk for several reasons. First, they have greater access to the markets for derivatives for hedging and other risk-taking strategies and may be able to hedge at a lower cost due to their scale.[20] Second, they have stronger incentives to protect their franchise values and to maintain their reputation for safety because this enables them to market products such as guarantee services (e.g., performance bond guarantees, and default guarantees for commercial papers and municipal revenue bonds (standby letters of credit)) and to achieve more favorable pricing in their products. Third, investors may believe that regulators are unwilling to let larger insurers fail, in which case the value of the implicit guaranty fund option increases with insurer size. This is similar to the notion of "Too Big to Fail" in the banking industry. Hence, we include the natural log of total assets as a control variable for size. Following Bushee and Noe (2000), we also include the annualized market-adjusted firm return, measured by the lagged annualized market-adjusted returns (annualized monthly stock returns minus annualized monthly market index returns), to

---

[19] We follow Guay (1999) and Core and Guay (2002) in construction of Delta and Vega. The CEO wealth includes option and stock holdings. CEO's Delta and Vega are the sum of Delta and Vega of both option and stock holdings. For the option grant, Delta=e^{-dT}*N(Z)*(S/100)*number of options, where Z= $[\ln(S/X)+T(r-d+\sigma^2/2)]/\sigma T^{1/2}$ and Vega= e^{-dT}*N'(Z)*S* $T^{1/2}$ *number of options, where N'(Z)=$(1/\sqrt{2\pi})$* $e^{-Z^2/2}$. N ( ) represents the standard normal cumulative distribution function. N'() is the standard normal density function. S and X are the underlying stock price and exercise price, respectively, d is dividend yield, and T is the time to maturity for the option. σ is the expected stock-return volatility. r is the risk-free rate. For CEO's stock wealth, Delta = 1% * stock price * number of shares and Vega = 0 which is an approximation. Guay (1999) shows that option vega of option portfolio is many times higher than stock vega. So Coles et al. (2006) use the vega of the option portfolio to measure the total vega of the stock and option portfolio. It means that the vega of stocks is approximately equal to zero.

[20] Colqitt and Hoyt (1997) find that larger life insurers are more likely to use futures, supporting the information economies hypothesis that "larger firms are more likely to have the necessary resources and potential trading volume to warrant an investment in the technical expertise needed to properly manage a portfolio of derivatives." (Nance et al., 1993).

control for the effect of stock performance on risk. Stock's daily turnover, measured as the ratio of trading volume to total shares outstanding, is used to proxy for liquidity and transaction cost. We also include the industry-adjusted Tobin' Q, and earning-price ratio (E/P) to control for the effect of growth opportunities on risk (Bushee and Noe, 2000).

3.3. Sample Descriptive Statistics

Table 1 presents the descriptive statistics. Panels A and B describe the risk measures and the ownership variables, respectively. Institutional ownership persistence (IOP), non-zero-points and maintain-stake-points durations are used as measures of institutional ownership stability. The mean (median) value of the *IOP* measure is 2.026 (1.913). The mean (median) for non-zero-points duration is 6.388 (6.712), indicating that out of the 12 quarters over the three-year rolling sample period, institutional investors held the insurer's stocks for about six quarters on average. The mean (median) of institutional shareholding proportion is 59% (61%). The managerial ownership proportion is comparatively much lower than that of institutional ownership, with mean (median) at 13% (4.6%). Panel C presents the descriptive statistics on other firm-specific variables. Panel D shows the correlations among major variables of interest.

3. 4. The Model

3.4.1. Total Risk and IOP

Following Elyasiani and Jia (2008, 2010), we employ a simultaneous equation system model, described by equations 3A-3B, to test the relationship between insurers' total risk and stability of their institutional ownership. The system model is superior to a single equation framework because it accounts for mutual interdependencies between risk and institutional ownership stability variable, addresses the possible endogeneity problem, and provides more accurate measures of the model coefficients.

$$TotalRisk = A_0 + A_1 IOP + A_2 FirmSize + A_3 AjustedQ + A_4 Turnover + A_5 Stock\ \mathrm{Re}turn + A_6 E/P + A_7 PCdummy + YearDummies + \upsilon \quad (3\text{-A})$$

$$IOP = B_0 + B_1 TotalRisk + B_2 AjustedQ + B_3 Turnover + B_4 Capitalization + B_5 LaggedIOP + B_6 PCdummy + YearDummies + \zeta \quad (3\text{-B})$$

In this model, Total risk and IOP are the endogenous variables and market capitalization and lagged IOP are used as instruments for IOP. In equation 3A, the dependent variable is also defined alternatively as the systematic risk and unsystematic risk to determine whether changes in risk are due to systematic, idiosyncratic or both components. The independent variables of major interest are the institutional ownership measures (IOP, non-zero-points and maintain-stake-points durations, shareholding proportion, and number of institutional investors). The control variables include firm size, industry-adjusted Tobin's Q, stock turnover, firm-specific stock return, E/P ratio, dummy for engagement in property-casualty (PC) activities and year dummies.

3.4.2. The Channel Effect Model

To test the channels of institutional ownership impact on risk taking, we estimate an extended four-equation system model (equations 4A-4D) including the channels and the institutional ownership stability variable (IOP). The three channels include the surplus to assets (capital) ratio, underwriting risk and investment risk. In this model, the IOP measure is included as a regressor in the three channel equations in order to test the relationship between IOP and the insurers' disaggregate risk proxies. Similarly, in each of the three channel equations, the other two channels are included as regressors in order to test the interactions of the three channels.

$$SurplustoAssets = \alpha_0 + \alpha_1 IOP + \alpha_2 UnderwritingRisk + \alpha_3 InvestmentRisk + \alpha_4 FirmSize + \alpha_5 Tobin'sQ + \alpha_6 ROA + \alpha_7 PCdummy + YearDummies + \lambda \quad (4\text{-A})$$

$$UnderwritingRisk = \beta_0 + \beta_1 IOP + \beta_2 SurplustoAssets + \beta_3 InvestmentRisk + \beta_4 FirmSize + \beta_5 AdjustedQ + \beta_6 HerfindahlIndex + \beta_7 \text{Premium}toAssets + \beta_8 PCdummy + YearDummies + \nu \quad (4\text{-B})$$

$$InvestmentRisk = \gamma_0 + \gamma_1 IOP + \gamma_2 SurplustoAssets + \lambda_3 UnderwritingRisk + \gamma_4 FirmSize + \gamma_5 AdjustedQ + \gamma_6 HerfindahlIndex + \gamma_7 TBill + \gamma_8 Mkt\,\text{Return} + \gamma_9 PCdummy + YearDummies + \eta \quad (4\text{-C})$$

$$IOP = \delta_0 + \delta_1 SurplustoAssets + \delta_2 UnderwritingRisk + \delta_3 InvestmentRisk + \delta_4 AdjustdQ + \delta_5 Turnover + \delta_6 Capitalization + \delta_7 LaggedIOP + YearDummies + \tau \quad (4\text{-D})$$

Following Coles et al. (2006), we include a profitability measure, (return on assets, ROA), as a control variable in the surplus to assets ratio equation (4A). We proxy intra-industry product diversification by a Herfindahl index based on premiums in different LH product lines in order to control for the effect of diversification strategy on investment and underwriting risks (Hoyt and Trieschmann, 1991; Elango et al., 2008; Liebenberg and Sommer, 2008). The (net premiums written/assets) ratio is added as a regressor in the underwriting risk equation to investigate possible interdependence between returns and risk on underwriting activity. Insurers may choose more risky investments when the entire market is performing well. Therefore, we also include two macroeconomic variables, 3-month T-Bill return, and the overall stock market index (value-weighted NYSE market index) in the investment risk model in order to control for the market conditions (Grace and Hotchkiss, 1995; Browne et al., 1999). Since LH insurers often operate also in PC business, we include a dummy if the firm has business in the PC sector as well.

4. Empirical Results

4.1. Total, Systematic and Unsystematic Risks and Ownership Structure

We use the two-stage least square (2SLS) technique to estimate the two-equation system model describing the relationship between LH insurers' total risk and institutional ownership stability (IOP). The standard errors of estimates are adjusted using Newey-west specification with Bartlett kernel function (Newey and West, 1987) to obtain heteroskedasticity- and autocorrelation-consistent (HAC) estimators. Two versions of the model are estimated; a basic model (equations 3A-3B) and an extended model which expands the basic model to include managerial ownership, its squared values and the CEO incentive-compensation ratio as additional explanatory variables. The extended model will help determine whether the results drawn from the basic model are due to failure to account for managerial variables. To save space, we only report the results of the risk equation 3A.[21] Results of the two models for total, systematic and unsystematic risk are given in Columns 1-2, 3-4 and 5-6 of Table 2, respectively. Dependent variables appear at the top of the columns.

In both models, total and unsystematic risks are negatively associated with IOP at the 5 or 1 percent level while systematic risk is unassociated with it. These findings indicate that the effect on total risk is driven by that on unsystematic risk and that institutional investors exert limited influence on systematic risk. In terms of the magnitude of the effect, we find that a one standard deviation increase in IOP is associated with a decrease of 70 basis points

[21] In brief, results for equation 3B show that the coefficients of market capitalization and lagged IOP are positive and significant while those of total, systematic and unsystematic risks are generally negative and insignificant. Coefficient of turnover is negative and significant at the 10 percent level in the model of idiosyncratic risk and insignificant in other models. The negative signs for total risk and turnover, when significant, indicate a decline in institutional ownership stability when investee-firm stocks become riskier or illiquid. The coefficient of the Adjusted-Tobin's Q is negative and significant. The results of Sargan-Hansen test show that the instruments chosen for IOP are valid. It may be argued that managerial variables exert an effect on risk by affecting IOP through equation 3B. To address this concern, we included three managerial variables (managerial ownership, its squared term, and CEO incentive compensation) in both equations 3A and 3B and estimated the system model again. The results show that the coefficients of these three variables are insignificant in all equations. IOP is still significant as before.

in total risk, or the equivalent of a 9.33% (0.007/0.075) decline relative to the mean of the total risk (reported to be 0.075 in table 1).[22] Comparatively, one standard deviation increase in firm size (2.446) or earning-price ratio (0.118) is associated with 73 (2.446×0.003) or 97 (0.082×0.118) basis points decrease in total risk, indicating that the risk-reducing effect of IOP is comparable to that of firm size and earning price ratio which serve as important determinants of firm risk. Thus, IOP is both statistically and economically significant in reducing insurers' total risk.

The results for the extended model, presented in Columns 2, 4, and 6 of table 2, show that the signs and significance of IOP in the total, systematic and unsystematic risk models remain unchanged, compared to those of the basic model, indicating that the latter are robust to the inclusion of the managerial and incentive-compensation variables.[23, 24] The lack of significance of the managerial ownership effect in the LH industry may indicate that financial portfolio effect offsets the alignment-of-interest effect, resulting in insignificant coefficients.

[22] The effect of one standard deviation change in an explanatory variable on the dependent variable is calculated by multiplying the coefficient of the former variable by the standard deviation of that variable.

[23] We do not include managerial ownership variables in the primary model because doing so would dramatically reduce the number of observations (from 365 to 292). However, even in this narrower sample, the coefficients of the managerial ownership measure are insignificant indicating that once institutional ownership is accounted for, risk-taking of LH insurers is unrelated to inside ownership. As an alternative procedure to test the effect of managerial ownership, we divide the sample into two or three sub-samples according to the median, and 33th or 67th percentile points of managerial ownership, respectively, and conduct the test again for each sub-sample. In these models, the coefficient of managerial ownership and its squared value remain insignificant. In another specification, we replace the managerial ownership with a dummy which equals one when managerial ownership is larger than the median and zero otherwise, or dummies equaling one when managerial ownership is larger than 33th or 67th percentile points, and zero otherwise. The coefficients of these dummies are also found to be insignificant. In order to address the multicollinearity issue between managerial ownership level and its squared value, we have orthogonalized the former by regressing it on the latter and using the residuals as the regressor. In this model, VIFs of these two variables decrease to the levels below 2. We also replace managerial ownership variables with CEO ownership variables (shareholding of CEO instead of that of all managers) and find that both CEO ownership and its squared term have insignificant coefficients.

[24] In order to address the concern that IOP may pick up the effect of managerial ownership, we did several tests. First, we checked the correlation between IOP and managerial ownership and CEO incentive-compensation. IOP is insignificantly related to managerial ownership and its squared term as well as CEO ownership and its squared terms while it is negatively related to CEO incentive-compensation (Panel D of Table 1). Hence, we orthogonalized IOP on CEO incentive-compensation ratio by regressing the former on the latter. The residual of IOP is still highly significant and the coefficients of the managerial variables are still insignificant.

With an increase in their shareholding level, managers may prefer higher risk (section 2.2) but they may also become more risk averse because their wealth becomes more concentrated in the firm (Sullivan and Spong, 2007) and may choose a "quiet life". These forces are counterbalancing.[25] Empirically, Laeven and Levine (2009) also found insignificant coefficients for managerial ownership in the study of bank risk proxied by Z-score.

The lack of significance of the incentive-compensation measure in all risk categories stands in contrast to that of Chen et al. (2006), but is consistent with Houston and James (1995) who fail to find a significant relationship between CEO ownership (stocks owned by the CEO/total stock outstanding), CEO incentive-compensation (the value of options granted/cash compensation) and bank risk. The supporting argument offered by Houston and James (1995) is that banking firms have fewer growth opportunities, than nonbanking firms, and, as a result, managerial ownership and equity-based compensation are not very effective in promoting risk-taking in this industry. This argument is also applicable for the insurance industry because it, too, is highly regulated.

The control variables in the model generally have the expected signs: firm size has a negative and significant sign in the total and unsystematic risk equations, suggesting that larger insurers diversify more extensively and have lower total and unsystematic risks. The effect on systematic risk is insignificant. Adjusted-Tobin's Q is significantly and positively related to systematic risk in the basic model but not in the extended model. The former results indicate that LH insurers take more systematic risk, e.g., by entering riskier lines of products, when they have greater growth opportunities. Total, systematic and unsystematic risks are all positively associated with Stock turnover in both basic and extended models,

[25] Given the lack of data on the value of manager's portfolio and the degree of manager's concentration of wealth in the firms, we cannot formally test these views (Sullivan and Spong, 2007).

suggesting that high frequency of stock transaction (e.g., due to lower transaction costs or higher speed of transaction owing to technological advancement) increases stock volatility. Lagged stock return shows an insignificant relationship with total, systematic and idiosyncratic risks. This is consistent with Bushee and Noe (2000) who find insignificant coefficients for lagged market-adjusted stock return in the model of stock volatility.

Earnings/price ratio (E/P) is negative and significant for total and unsystematic risks (Columns 1-2, and 5-6), suggesting that higher cash flows reduce unsystematic risk. There is no effect found on the systematic risk from this variable. Cross-industry diversification by LH insurers, measured by a dummy variable for engagement in both LH and PC lines of activity, is associated with an increase in systematic risk probably because LH firms are entering a line of business outside their own niche, where they have less expertise, and because PC products may be riskier and less predictable than LH products. To elaborate, the PC industry may be more exposed to the sources of systematic risk (overall market, economic and natural condition) such as recessions, wars, terrorist attacks and hurricanes, at least in the short run. It is noteworthy, however, that the coefficient of PC dummy is only marginally significant at the 10 percent level in the systematic risk equation. The coefficient of the PC dummy is negative for unsystematic risk, implying that LH firms do diversify their idiosyncratic risk by entering into the PC product lines.

4.2. Other Measures of Institutional Ownership

To investigate the robustness of our findings to the choice of IOP as the measure of institutional ownership, we also estimate the model using four other institutional ownership variables: the institutional ownership level (proportion), number of institutional investors, non-zero-points duration, and maintain-stake-points duration. Results, reported in Table 3,

are similar to those reported for IOP in Table 2. Total risk is significantly negatively associated with two duration measures but not the institutional ownership level and the number of institutional investors (Columns 1-4). The insignificant coefficients of institutional ownership proportion and number of institutional investors indicate that a single dimension of ownership, shareholding level or the number of institutional investors, is not sufficient to capture the overall effect of institutional ownership on risk. In particular, these variables do not account for duration of shareholdings; even if ownership level or the number of institutional investors is large, investors may be short-term investors whose influence on management is limited.

In terms of the magnitude of the effect, we find that one standard deviation increase in the two institutional ownership variables with significant coefficients (non-zero-points duration, and maintain-stake-points duration) is, respectively, associated with 6.6%, and 7.9% decrease in total risk.[26] The economic magnitudes of these two duration measures are comparable to that of firm size which is regarded as an important factor in determining risk.[27] Thus, we conclude that IOP and non-zero-points and maintain-stake-points durations, which measure institutional ownership stability, are all statistically and economically significant in reducing LH insurers' total risk, a result supporting the prudent-man hypothesis.[28]

4.3. Total Risk and IOP of the Largest Institutional Investors

To investigate the large shareholder hypothesis discussed earlier, we replace the IOP

[26] We use the same method as used earlier in calculation of the IOP effect: (1.234×0.004)/0.075=6.6%; (0.739×0.008)/0.075=7.9%

[27] In Columns 3 and 4 of Table 3 one standard deviation increase in firm size (2.446) is associated with 6.5% ((2.446×0.002)/0.075) and 9.8% ((2.446×0.003)/0.075) decrease in total risk.

[28] Results for the association between these institutional ownership variables and systematic and unsystematic risk are not reported due to space limitation. The coefficients of the duration measures for both systematic and unsystematic risks are negative and significant. The coefficient of institutional ownership proportion is negative and significant for systematic risk and insignificant for unsystematic risk. The coefficient of number of institutional investors is insignificant for both.

measure in the basic model (equations 3A-3B) with IOP of the largest institutional investors because this measure shows the incentives of the latter investor group. We calculate the IOP of the largest investors in two steps. First, we derive the IOP of each large investor by dividing its average holding level over the standard deviation of its holding level over the past 12 quarters. Second, we derive the IOP for each firm as the average IOP across its largest investors. Large investors are defined in two ways; the 5 largest investors, and investors with 5% or more of the total shares. In the former case, the sample size decreases from 365 to 361 while in the latter case it falls from 365 to 222 because some of the firms do not have investors holding 5% or more.

The estimation results, presented in Table 4, show that IOPs of the largest institutional investors, as proxied either by IOP of the top 5 investors, or IOP of investors with at least 5% ownership, is insignificantly associated with total risk. It is possible that, for these largest shareholders, the positive effect on risk from increased call option value to the investors is offset by the negative effect of investor wealth concentration. Generally speaking, our results indicate that, based on the risk measures used here, regulators need not be particularly concerned about large institutional investors taking ownership of a significant portion of the LH firms because this phenomenon is not associated with increased riskiness of the investee-firms, as long as institutional investors' holdings are stable.

4.4. Total Risk and IOP According to Fiduciary Duty Restrictions

As discussed in section 2.1, if the prudent-man law hypothesis prevails in the strict sense, we expect to find that institutional investors with more restraining fiduciary restrictions such as banks, pensions and endowments, are associated with greater risk reduction in investee-firms, than insurance companies and investment advisors. However, given the

counterbalancing forces such as business relationships between the investor and the investees, regulatory factors, concentration of ownership in the investees and clientele effect, also discussed in section 2.1, the order of magnitudes of the effects from these institutional investors on investee-firm risk is an empirical question.

To investigate this issue, we construct IOP measures for these four groups of institutional investors and test their relationship with total risk employing a standardized regression model. In these models, the coefficients of *IOP* can be interpreted as the expected standard deviation change in the total risk, given a one standard deviation change in IOP. According to the estimation results reported in Table 5, IOPs of banks (BANK), pensions and endowments (PNE) and investment advisors (IA) are negatively and significantly related to total risk, confirming the support found earlier for the prudent-man hypothesis. The coefficient of IOP of insurance companies is negative but insignificant. The rationales for this latter finding were detailed in section 2.1 and center on the passive nature of monitoring by insurance companies as institutional owners of the LH firms.

In terms of the order of the magnitude of the effects, it is difficult to render decisive judgments because the coefficient estimates for the four groups of institutional investors are produced within different models and, hence, their differences cannot be tested for statistical significance. The absolute value of the coefficients of IOP for the investment advisors (IA) is found to be slightly larger than those of the pensions and endowments, and banks in the sample, despite the fact that their prudent-man law restrictions are less stringent. This indicates that the portfolio concentration, active versus passive monitoring and the clientele effect of the institutional investors do play a significant role in the extent of risk reduction of the investee-firms. Consistent with active monitoring function of the investment advisors,

they are found to exert the greatest effect on risk reduction of the investee-firms while banks, which are passive monitors, exert a smaller impact, and insurance companies which are also passive monitors (Ryan and Schneider, 2002) and face limited fiduciary restrictions (Abarbanell et al., 2003) exhibit insignificant impacts on riskiness of the investee-firms.

In terms of magnitude, in this model one standard deviation increase in IOP of banks is associated with 47 basis point decrease in total risk (0.121×0.039, standard deviation of total risk is 0.039) while the corresponding magnitudes for pensions and endowments and investment advisors are 33 and 61 basis points, demonstrating that the more active type of monitoring does reduce risk to a greater extent.[29]

4.5. Channels of Association between Total Risk and IOP

The system model described by equations 4A-4D portrays the association between each channel of risk and IOP. This system is estimated using the two-stage least squares technique (2SLS). The estimates, reported in Table 6, follow Newey-West specification and are heteroskedasticity- and autocorrelation-consistent (HAC).[30] In this model, IOP is found to be positively related to surplus to assets (capital) ratio and negatively related to underwriting risk (Columns 1-2), indicating that institutional ownership reduces risk by increasing capital (lowering leverage) and reducing underwriting risk. These effects are consistent with the

[29] When we divide investment advisors into investment companies and independent advisors, we find that IOPs of both types of investment advisors are negatively related to total risk at the 1 percent level. Decomposition of pensions and endowments shows that IOP of public pension funds is negatively related to total risk at the 1 percent level while IOPs of private pension funds and university and foundation endowments have insignificant relationship with it. This difference can be explained by the incentives of institutional investors to engage in activism. According to Ryan and Schneider (2002), public pension funds are more likely to engage in activism to influence the managers because of their larger shareholdings and long investment horizons. Comparatively, private pension funds are less likely to be activists because under ERISA, private pension funds must be able to demonstrate to the U.S. Department of Labor that the benefits of engaging in activism with investee-firms are likely to out-weigh the costs of the intervention. The influence of university and foundation endowments is limited by their very low shareholding level (the lowest among all categories of institutional investors).

[30] We also tried two other estimation methodologies which can generate heteroskedasticity- and autocorrelation-consistent estimates (3SLS and GMM with Newy-west adjustment). The main results are consistent with reported 2SLS estimation: IOP is associated with surplus to asset ratio, underwriting risk and investment risk, positively, negatively and positively, respectively.

prudent-man law suggestions.

The effect on investment risk, however, is a different story; IOP is significantly and positively associated with investment risk (Column 3) indicating that institutional owners actually increase investee-firm risk through this channel. One explanation is that institutional investors have greater expertise in financial investment, than in insurance underwriting, and, thus, they can provide valuable information to the investee-firm managers and encourage them to advance their activity level in this area, where their expertise resides. In effect, institutional investors seem to engage in risk substitution by focusing on financial investment, which is their niche, and curtailing risk in other areas. A similar phenomenon occurs in commercial bank risk decisions. Banks engage in risk substitution by trading off tradable interest rate and exchange rate risk for an increased level of credit risk because they can extract higher rents in the latter area. (Diamond, 1984; Deng et al., 2010). The comparative advantage of institutional investors in financial investments results in a more aggressive investment portfolio for their investee insurers.[31]

In terms of economic significance of the channel effects, one standard deviation increase in IOP is found to increase the surplus to asset ratio by 5.10% (0.038×1.341) while the same increase in IOP decreases underwriting risk by 13.81% (0.103×1.341) and still the same increase in IOP increases investment risk by 2.82% (0.021×1.341). Comparatively, the effects of one standard deviation change in the firm size on surplus to asset ratio, underwriting risk and investment risk is 9.78%, 7.09% and 2.45%, respectively. These results suggest that the three channels are all operational as well as statistically and economically significant. These risk components are found not to exert a significant effect on IOP,

[31] This may have been reinforced during the 1990s because the stock market produced spectacular returns during some years.

indicating that institutional investor decisions about the duration of their ownership are unaffected by the levels and the mix of these risk components.

In regards to the relationship between capital ratio and the two accounting risk measures (underwriting and investment risk), we find that, in equation 4A, surplus to assets ratio is positively related to underwriting risk but negatively related to investment risk (Column 1 in Table 6). These results are consistent with the argument that, in order to engage in greater underwriting risk levels, institutional investors feel a need to increase their capital level to be able to receive better ratings e.g., from Best rating, and to thereby attract more and larger clients. For increasing investment risk, however, they seem not to need a boost in capital. Indeed, in such cases capital is lower (leverage is higher), indicating that to increase investment risk, insurers increase their leverage (reduce their capital ratio) and reallocate their investments toward riskier asset categories. In the underwriting risk and investment risk equations, capital is positively related to the former but negatively associated to the latter (Columns 2 and 3 in Table 6). This indicates that increased capital allows insurers to engage in underwriting activities with greater risk (e.g., health insurance) while insurers with higher capital levels become less interested in taking investment risk. This reflects a dynamics of risk substitution by the insurers in response to changes in their capital levels.[32]

4.6. Robustness Check

We carry out some additional estimation based on alternative samples and models to further investigate the robustness of the relationship between total risk and institutional ownership stability (IOP). As described in the data section, our earlier tests are based on a

[32] It is possible that managerial ownership affects IOP through equation 4D and thereby affects investee-firm risk. Hence, we also included the managerial variables (managerial ownership, its squared term, and CEO incentive-compensation ratio) into all equations (4A-4D). The results show that the coefficients of these three variables in all equations are insignificant. IOPs are still significant as before.

sample which is not drawn strictly based on SIC classification. The reason for the choice of that sample was to obtain the largest number of observations, and the fact that the boundaries between LH and PC insurers are blurring. Here, we estimate our model based on a sample strictly defined by the SIC code (SIC code = 6311, Life insurance). Results (not reported) show that our institutional ownership stability measure (IOP) continues to be significantly and negatively related to insurers' total risk. Similarly, in the primary test sample, some earning/price ratios were negative. Here, we conduct the tests also for the sample excluding these observations. Again, results (not reported) indicate robustness of our earlier findings.

In the primary tests, we find that institutional ownership stability is not significantly related to systematic risk proxied by standard deviation of predicted value in the regression model of monthly stock return on market return. Here, we use another commonly used measure of systematic risk, Beta, which is derived as the coefficient of the market excess return from 1-index or 4-index market models. In the 1-index model, monthly firm stock excess returns are regressed on market excess return. The 4-index model adds the size, the book to market ratio and the momentum factors (Carhart, 1997). The coefficients of IOP in the model with Beta used as the systematic risk proxy are all insignificant, supporting the results of our primary tests. Finally, we extend our risk model to include two commonly used CEO compensation variables Delta and Vega, and surplus to asset ratio to investigate their effects on risk. Unreported results show that when these variables are added to the risk equation all of the IOP coefficients remain negative and significant confirming our earlier results.

5. Conclusion

In this study, we explore the association between institutional ownership stability and

risk taking of life-health insurer investee-firms. We find that institutional ownership stability is associated with lower total risk, supporting the prudent-man law hypothesis. The data fail to support the proposition that large institutional shareholders increase, rather than decrease, risk. When the investors are sorted in terms of stringency of the prudent-man restrictions, the negative effect of institutional investor stability on risk continues to hold for banks, pensions and endowments and investment advisors but it becomes insignificant for insurance companies as institutional owners of other insurers. The magnitude of the institutional ownership stability effect of different types of investors on risk can be explained by a combination of the prudent-man laws, active versus passive monitoring function of institutional investors, their portfolio concentration in the investee-firms and their clientele. Moreover, we estimate a four-equation model including three channels through which the effect of institutional ownership stability (IOP) is transmitted to total risk. We find that greater IOP is associated with higher capital ratio (lower leverage), lower underwriting risk and higher investment risk. These findings manifest a risk shifting pattern by the institutional investors through which they switch from insurance underwriting where they have little expertise, as outsiders to the insurance industry, to financial investment, where their expertise resides. Our results on risk reduction suggest that regulators can strengthen the prudent-man laws in order to curtail insurer risks by encouraging stable institutional ownership in the insurance industry. Robustness tests are conducted and results are found to continue to hold.

References

Amihud, Y., and B. Lev, 1981, Risk Reduction as a Managerial Motive for Conglomerate Mergers, *The Bell Journal of Economics*, 12(2): 605-617.

Abarbanell, J.S., B.J. Bushee, and J.S. Raedy, 2003. Institutional Investor Preferences and Price Pressure: The Case of Corporate Spin-offs. *Journal of Business*, 76: 233-261.

Badrinath, S. G., G. D. Gay and J. R. Kale, 1989, Patterns of Institutional Investment, Prudence, and the Managerial "Safety-Net" Hypothesis, *Journal of Risk and Insurance*, 56: 605-629.

Baranoff, E. G.., and T. W. Sager, 2002, The Relations among Asset risk, Product risk, and Capital in the Life Insurance Industry, *Journal of Banking and Finance*, 26: 1181-1197.

Baranoff, E. G., and T. W. Sager, 2003, The Relations among Organizational and Distribution Forms and Capital and Asset Risk Structures in the Life Insurance Industry, *Journal of Risk and Insurance*, 70: 375-400.

Baranoff, E. G., S. Papadopouls and T. W. Sager, 2007, Capital and Risk Revisited: A Structural Equation Model Approach for Life Insurers, *Journal of Risk and Insurance*, 74: 653-681.

Bohren, O., R. Priestley, and B. A, Odegaard, 2005, The Duration of Equity Ownership, *Norwegian School of Management Working Paper.*

Brewer, Elijia III, T. S. Mondschean, and P. E. Strahan, 1997, The Role of Monitoring in Reducing the Moral Hazard Problem Associated with Government Guarantees: Evidence from the Life Insurance Industry, *Journal of Risk and Insurance*, 64: 302–322.

Brickley, J. A., R. C. Lease, and C. W. Smith, Jr., 1988, Ownership Structure and Voting on Antitakeover Amendments, *Journal of Financial Economics* 20, 267-291.

Browne, M. J., J. M. Carson, and R. E. Hoyt, 1999, Economic and Market Predictors in the Life-Health Insurance Industry, *Journal of Risk and Insurance*, 66: 643-659.

Bushee, B.J., 2001, Do Institutional Investors Prefer Near-Term Earnings over Long-Run Value? *Contemporary Accounting Research* 18, 207-246.

Bushee, B. J. and Goodman, T., 2007, Which Institutional Investors Trade on Private Information about Earnings and Returns?, *Journal of Accounting Research* 45: 289-321.

Bushee, B., and Noe, C., 2000, Corporate Disclosure Practices, Institutional Investors, and Stock Return Volatility, *Journal of Accounting Research*, 38: 171-202.

Carhart, M., 1997, On Persistence in Mutual Fund Performance, *Journal of Finance*, 52: 57-82.

Carr, R. M., J. D. Cummins, and L. Regan, 1999, Efficiency and Competitiveness in the U.S. Life Insurance Industry: Corporate, Product, and Distribution Strategies, in: J. D. Cummins, and A. M. Santomero, eds., *Changes in the Life Insurance Industry: Efficiency, Technology, and Risk Management* (Boston: Kluwer).

Cebenoyan, A. S., E. S. Cooperman and C. A. Register, 1999, Ownership Structure, Charter Value and

Risk-Taking Behavior for Thrifts, *Financial Management*, 28: 43-60.

Chen, C. R., Steiner, T.L., and A. M. Whyte, 2006, Does Stock Option-based Executive Compensation induce Risk-Taking? An Analysis of the Banking Industry, *Journal of Banking and Finance*, 30: 915 - 945.

Coles J. L., N. D. Daniel, and L. Naveen, 2006, Managerial Incentives and Risk-Taking, *Journal of Financial Economics*, 79: 431-468.

Colquitt, L.L. and R. E. Hoyt, 1997, Determinants of Corporate Hedging Behavior Evidence from the Life Insurance Industry, *Journal of Risk and Insurance*, 64: 649-671.

Core, J., and W. Guay, 2002, Estimating the Value of Employee Stock Option Portfolios and Their Sensitivities to Price and Volatility, *Journal of Accounting Research* 40, 613-630.

Cummins, J. D., and D. W. Sommer, 1996, Capital and Risk in Property-Liability Insurance Markets, *Journal of Banking and Finance*, 20: 1069-1092.

Cummins, J. D., 1988, Risk-Based Premiums for Insurance Guaranty Funds, *Journal of Finance*, 43: 823-839.

Cummins, J. D., and P. M. Danzon, 1997, Price, Financial Quality, and Capital Flows in Insurance Markets, *Journal of Financial Intermediation*, 6: 3–38.

DeAngelo, H., L. DeAngelo, and S.G. Gilson, 1994, The Collapse of First Executive Corporation: Junk Bonds, Adverse Publicity, and the 'Run on the Bank' Phenomenon, *Journal of Financial Economics*, 36: 287–336.

DeAngelo, H., L. DeAngelo, and S.G. Gilson, 1996, Perceptions and the Politics of Finance: Junk Bonds the Regulatory Seizure of First Capital Life, *Journal of Financial Economics*, 41: 475–512.

Del Guercio, D., 1996, The Distorting Effect of the Prudent-man Laws on Institutional Equity Investments, *Journal of Financial Economics*, 40: 31-62.

Del Guercio, D., J. Hawkins, 1999, The Motivation and Impact of Pension Fund Activism, *Journal of Financial Economics*, 52: 293-340.

Deng, S, E. Elyasiani, and X. Mao, 2010, Bank Holding Company Derivatives Usage, Cost of Debt, and Lending Patterns, presented at the Financial Management Association Meetings, New York, NY.

Diamond, D., 1984, Financial Intermediation and Delegated Monitoring, *Review of Economic Studies*, 51: 393-414.

Downs, D. H., and D. W. Sommer, 1999, Monitoring, Ownership, and Risk-Taking: The Impact of Guaranty Funds, *Journal of Risk and Insurance*, 66: 477-497.

Elango, B., Y. Ma, and N. Pope, 2008, An Investigation into the Diversification-Performance Relationship in the U.S. Property-Liability Insurance Industry, *Journal of Risk and Insurance*, 75(3): 567-591.

Elyasiani, E., and J. J. Jia, 2008, Institutional Ownership Stability and BHC Performance, *Journal of Banking and Finance*, 32 (9): 1767-1781.

Elyasiani, E., and J. J. Jia, 2010, Distribution of Institutional Ownership and Corporate Firm Performance, *Journal of Banking and Finance*, 34 (3): 606-620.

Epermanis, K., and S. E. Harrington, 2006, Market Discipline in Property/Casualty Insurance: Evidence from Premium Growth Surrounding Changes in Financial Strength Ratings, *Journal of Money, Credit, and Banking*, 38(6): 1515-1544.

Galai, D. and R. Masulis, 1976, The Option Pricing Model and the Risk Factor of Stock, *Journal of Financial Economics*, 3, 53-81.

Grace, M. F., and J. L., Hotchkiss, 1995, External Impacts on the Property-Liability Insurance Cycle, *Journal of Risk and Insurance*, 62: 738-754.

Guay, W.R., 1999, The Sensitivity of CEO Wealth to Equity Risk: An Analysis of the Magnitude and Determinants, *Journal of Financial Economics*, 53, 43-71.

Hoyt, R. E., and J. S. Trieschmann, 1991, Risk/Return Relationships for Life-Health, Property-Liability, and Diversified Insurers, *Journal of Risk and Insurance*, 58: 322-330.

Houston, J. F. and C. James, 1995, CEO Compensation and Bank Risk: Is Compensation in Banking Structured to Promote Risk-taking? *Journal of Monetary Economics*, 36: 405-431.

Jensen, M. C. and W. H. Meckling, 1976, Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, *Journal of Financial Economics*, 3: 305-360.

Laeven, L. and R. Levine, 2009, Bank Governance, Regulation and Risk Taking, *Journal of Financial Economics* 93(2): 259-275.

Liebenberg, A. P. and D. W. Somer, 2008, Effects of Corporate Diversification: Evidence from the Property-Liability Insurance Industry, *Journal of Risk and Insurance*, 75(4): 893-919.

McConnell, J.J. and H. Servaes, 1990, Additional Evidence on Equity Ownership and Corporate Value, *Journal of Financial Economics* 27(2), 595-612.

Morck, R., A. Shleifer, and R.W. Vishny, 1988, Management Ownership and Market Valuation: An Empirical Analysis, *Journal of Financial Economics* 20, 293-315.

Nance, D. R., C. W. Smith, Jr., and C. W. Smithson, 1993, On the Determinants of Corporate Hedging, *Journal of Finance* 48: 267-284.

Newey, W.K., and K. D. West, 1987, A Simple, Positive Semi-Definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix, *Econometrica* 55, 703–708.

Phillips, R. D., J. D. Cummins, and F. Allen, 1998, Financial Pricing in the Multiple-line Insurance Company, *Journal of Risk and Insurance*, 65: 597–636.

Pound, J., 1988, Proxy Contests and the Efficiency of Shareholder Oversight, *Journal of Financial*

Economics, 20: 237-265.

Ryan, L. V., and M. Schneider, 2002, The Antecedents of Institutional Investor Activism, *The Academy of Management Review*, 27(4): 554-573.

Saunders, A., E. Strock, and N. G. Travlos, 1990, Ownership Structure, Deregulation, and Bank Risk Taking, *Journal of Finance*, 45: 643-654.

Shleifer, A., and R. W. Vishny, 1986, Large Shareholders and Corporate Control, *Journal of Political Economy*, 94: 461-488.

Shleifer, A., and R. W. Vishny, 1989, Management Entrenchment: The Case of Manager-specific Investments, *Journal of Financial Economics*, 25: 123-139.

Sommer, D. W., 1996, The Impact of Firm Risk on Property-liability Insurance Prices, *Journal of Risk and Insurance*, 63: 501–514.

Smith, C.W., and R.M. Stulz, 1985, The Determinants of Firm's Hedging Policies, *Journal of Financial and Quantitative Analysis*, 20: 391-404.

Staking, K. B., and D. F. Babbel, 1995, The Relation between Capital Structure, Interest Rate Sensitivity, and Market Value in the Property-Liability Insurance Industry, *Journal of Risk and Insurance*, 62: 690-718.

Stein, J. C., 1989, Efficient Capital Markets, Inefficient Firms: A Model of Myopic Corporate Behavior, *Quarterly Journal of Economics* 104, 656-669.

Sullivan, R.J., and K. R. Spong, 2007, Managers Wealth Concentration, Ownership Structure, and Risk in Commercial Banks, *Journal of Financial Intermediation*, 16: 229-248.

Table 1: Descriptive Statistics of the Sample: 1992-2007

This table reports summary statistics for our sample. Panels A-C present summary statistics on risk, ownership, and control variables, respectively. Panel D shows the correlations among major variables of interest and p-values are in parentheses. Total risk is the annual standard deviation of monthly stock returns. Systematic risk is the standard deviation of the predicted value in the regression model of monthly stock return on market return. Unsystematic risk is the standard deviation of the residuals from regression of monthly returns on market returns. Surplus to assets ratio is surplus divided by total assets. Underwriting risk is measured as the ratio of premiums written in health business to total net premium. Investment risk is measured as the risk-based-capital-factor-weighted investment proportions of bonds, stocks, mortgage, real estate, and loans scaled by total admitted assets: 0.1072*bond investment + 0.023*preferred stocks + 0.3*common stocks + 0.03*mortgage +0.0067*real estate + 0.03*loan, divided by total admitted assets. Institutional ownership proportion is the average aggregate institutional shareholding proportion across the current and past two years. Institutional ownership persistence (*IOP*) is calculated as the average ratio (across all the institutions) of mean to standard deviation of shareholding proportions over the current and past two years. IOP is calculated also for the 5 largest institutional investors, for investors with 5% or more shares and for bank trusts (Bank), pension fund and endowments (PNE), insurers (INS), and investment advisors (IA). Non-zero-points duration is the average number of quarters in which an institutional investor has non-zero holdings out of the 12 quarters over a 3-year rolling period. Maintain-stake-points duration is the average number of quarters in which institutional investors maintain the stake (keep the same proportion or increase the holding). Number of investors is the number of institutional investors over the current and past two years. Managerial ownership is the shareholding proportion of all managers in a firm. Net premiums written to assets ratio is net premiums written divided by total assets. Firm size is measured by the natural logarithm of total assets. Industry-adjusted Tobin's Q is a firm's Tobin's Q minus the median Q of the firms with the same two-digit SIC code. A firm's Tobin's Q is the sum of the market value of total equity and the book value of total debt divided by book value of total assets. Managerial incentive-compensation ratio is calculated as the incentive-compensation (total compensation-salary-bonus) divided by total compensation of the CEO. Stock turnover is yearly average of stock daily turnover (trading volume/shares outstanding) expressed in thousandths. Stock return is the annualized market-adjusted return (annualized monthly stock return minus annualized market index return). E/P ratio is earning per share divided by fiscal year-end stock price. Within-industry product diversification is measured by the Herfindahl index for premiums written in different life-health product lines. ROA is the ratio of net income to total assets. Market capitalization is the product of the number of shares and year-end stock price.

Panel A. Risk Variables for Life & Health (LH) Insurers					
Variable	Mean	Median	Std	Min	Max
Total risk	0.075	0.064	0.039	0.024	0.311
Systematic risk	0.030	0.026	0.022	0.000	0.169
Unsystematic risk	0.066	0.054	0.038	0.018	0.310
surplus to assets (capital) ratio	0.138	0.066	0.164	0.004	0.939
underwriting risk	0.337	0.171	0.349	0.000	1.000
investment risk	0.072	0.074	0.030	0.000	0.163

Panel B. Ownership Variables for Life & Health (LH) Insurers					
Variable	Mean	Median	Std	Min	Max
institutional holding proportion	0.592	0.610	0.197	0.069	0.995
IOP (ownership persistence)	2.026	1.913	1.341	0.394	14.260
IOP of 5 largest Investors	6.595	5.525	5.902	0.425	46.02
IOP of Investors with 5% or more shares	9.261	5.281	17.330	0.721	216.2
IOPof Bank	2.395	2.349	1.265	0.399	6.291
IOPof INS	2.855	2.582	2.059	0.289	16.507
IOPof IA	1.632	1.614	0.748	0.393	4.281
IOPof PNE	3.114	2.639	2.165	0.335	9.913
institutional non-zero-points duration	6.388	6.712	1.234	1.875	8.873
institutional maintain-stake-points duration	4.182	4.326	0.739	1.564	5.643
Number of institutional investors	435.3	367.0	286.8	48.00	1817
managerial ownership	0.130	0.046	0.214	0.000	0.997

Panel C. Other Control Variables for Life & Health (LH) Insurers					
Variable	Mean	Median	Std	Min	Max
net premiums written to assets ratio	0.331	0.162	0.541	0.000	3.180
firm size (log(assets))	15.990	16.510	2.446	7.366	19.960
Industry- adjusted Tobin’s Q	0.087	0.013	0.294	-0.148	2.250
managerial incentive compensation	0.596	0.637	0.231	0.003	1.000
stock turnover	3.659	3.220	2.232	0.300	12.240
stock return	0.046	0.024	0.310	-0.935	1.526
E/P ratio	0.059	0.071	0.118	-1.939	0.183
Herfindahl index	0.406	0.372	0.259	0.000	1.000
ROA	1.867	1.366	2.236	-17.159	12.582
Market capitalization (Million)	12614.0	4613.0	28961.0	103.7	228227.0

Panel D: Correlations among Major Variables

	Sys. Risk	Idio. Risk	IOP	Managerial Ownership	Incen. Compen	Firm Size	Tobin's Q	Turnover	Stock return	E/P Ratio
Total Risk	0.434	0.962	-0.311	0.169	0.137	-0.268	0.258	0.302	-0.156	-0.408
	<.0001	<.0001	<.0001	0.0025	0.0176	<.0001	<.0001	<.0001	0.0029	<.0001
Sys. Risk	1	0.185	-0.135	0.017	0.053	-0.019	0.099	0.204	-0.078	-0.050
		0.0004	0.0096	0.7618	0.362	0.7221	0.0585	<.0001	0.1374	0.3455
Idio. Risk		1	-0.302	0.186	0.126	-0.295	0.252	0.274	-0.146	-0.420
			<.0001	0.0009	0.0294	<.0001	<.0001	<.0001	0.0055	<.0001
IOP			1	0.038	-0.173	0.126	-0.159	-0.226	-0.071	0.056
				0.4989	0.0027	0.0164	0.0023	<.0001	0.1778	0.2839
Managerial Ownership				1	-0.151	-0.569	0.350	-0.071	-0.080	-0.112
					0.0098	<.0001	<.0001	0.2081	0.157	0.0462
Incen. Compen					1	0.284	0.133	0.365	0.073	-0.001
						<.0001	0.0213	<.0001	0.2092	0.9871
Firm size						1	-0.508	-0.003	-0.023	0.114
							<.0001	0.9486	0.6591	0.0291
Tobin's Q							1	0.199	0.151	-0.021
								0.0001	0.0041	0.6833
Turnover								1	0.060	-0.119
									0.2565	0.0233
Stock return									1	0.138
										0.0088

Table 2: Total, Systematic, and Unsystematic Risk, and Institutional Ownership Persistence (IOP)

This table displays estimation results for total, systematic and unsystematic risk equations within the simultaneous equations model (equations 3A-3B). The instrumental variables/two-stage least squares technique (2SLS) is used to estimate the model. The standard errors of estimates are adjusted using Bartlett kernel function (Newey-west specification). So the estimates are heteroskedasticity and autocorrelation-consistent (HAC). Residual of managerial ownership is the residual from the regression of managerial ownership level on its squared term. Other variables are as defined in Table 1. The dependent variables are listed on the top of the columns. The PC dummy takes the unit value for LH insurers with significant property-casualty business. T-statistics are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Dependent Variables / Explanatory Variables	Total Risk	Total Risk	Systematic Risk	Systematic Risk	Unsystematic Risk	Unsystematic Risk
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.110***	0.116***	0.010	0.026**	0.116***	0.115***
	(7.58)	(5.78)	(1.20)	(1.99)	(8.46)	(6.18)
IOP	-0.005***	-0.006***	-0.001	-0.002	-0.005***	-0.005**
	(-2.77)	(-2.78)	(-0.89)	(-1.40)	(-2.63)	(-2.43)
Residual of managerial ownership		-0.028		-0.015		-0.024
		(-0.99)		(-0.70)		(-0.91)
(Managerial ownership)^2		0.008		-0.002		0.010
		(0.74)		(-0.34)		(0.92)
Incentive compensation ratio		-0.002		-0.001		-0.002
		(-0.21)		(-0.19)		(-0.29)
Firm size	-0.003***	-0.003**	0.001	-0.000	-0.004***	-0.003***
	(-3.18)	(-2.54)	(1.01)	(-0.21)	(-4.10)	(-3.05)
Adjusted Tobin's Q	0.012	0.001	0.007*	-0.009	0.007	0.004
	(1.27)	(0.10)	(1.82)	(-1.39)	(0.93)	(0.35)
Stock turnover	0.004***	0.005***	0.002***	0.002***	0.003***	0.004***
	(4.80)	(5.32)	(4.79)	(4.05)	(4.01)	(4.56)
Stock Return	0.000	-0.003	-0.007	-0.004	0.004	-0.000
	(0.05)	(-0.41)	(-1.64)	(-0.69)	(0.72)	(-0.03)
E/P ratio	-0.082***	-0.134***	-0.006	-0.033	-0.081***	-0.127***
	(-7.75)	(-3.00)	(-0.72)	(-1.40)	(-8.35)	(-3.26)
PC dummy	-0.002	-0.005	0.004*	0.004	-0.004	-0.007**
	(-0.58)	(-1.21)	(1.73)	(1.50)	(-1.36)	(-1.99)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.583	0.570	0.259	0.277	0.617	0.606

Table 3: Total Risk and Alternative Institutional Ownership Measures: Ownership Proportion, # Investors, Non-zero-points and Maintain-stake-points Durations

This table displays estimation results for the total risk equation from the simultaneous equations model (equations 3A-3B). Instrumental Variables/two-stage least squares technique (2SLS) is used to estimate the model. The standard errors of estimates are adjusted using Bartlett kernel function (Newey-west specification). So the estimates are heteroskedasticity- and autocorrelation-consistent (HAC).The alternative institutional ownership variables employed include: institutional ownership proportion (Proportion), number of institutional investors scaled by 1000 ((# Investors)/1000), and non-zero-points and maintain-stake-points durations. Instrumental variables/two-stage least squares technique (2SLS) is used to estimate the model. The variables are as defined in Table 1. The dependent variable is total risk. The PC dummy takes the unit value for LH insurers with significant property-casualty business. T-statistics are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Dependent Variable / Explanatory Variables	Total Risk	Total Risk	Total Risk	Total Risk
	(1)	(2)	(3)	(4)
Intercept	0.108***	0.090***	0.119***	0.128***
	(7.25)	(5.22)	(7.54)	(7.30)
Proportion	-0.013			
	(-1.34)			
(# Investors)/1000		-0.011		
		(-1.36)		
Non-zero-points			-0.004***	
			(-2.81)	
Maintain-stake-points				-0.008***
				(-3.01)
Firm size	-0.003***	-0.002*	-0.002***	-0.003***
	(-3.83)	(-1.96)	(-2.82)	(-3.09)
Adjusted Tobin's Q	0.012	0.016*	0.014	0.013
	(1.31)	(1.68)	(1.54)	(1.39)
Stock turnover	0.005***	0.005***	0.005***	0.004***
	(5.60)	(5.92)	(5.31)	(4.72)
Stock Return	0.001	0.002	0.000	0.000
	(0.24)	(0.26)	(0.08)	(0.05)
E/P ratio	-0.080***	-0.081***	-0.080***	-0.079***
	(-8.51)	(-8.77)	(-8.95)	(-8.95)
PC dummy	-0.003	-0.002	-0.002	-0.003
	(-0.90)	(-0.62)	(-0.71)	(-1.04)
Year Dummies	Yes	Yes	Yes	Yes
Adjusted R-Square	0.579	0.579	0.599	0.605

Table 4: Total Risk, Systematic Risk and IOP for Largest Institutional Investors

This table displays estimation results for total risk equation from the simultaneous equations model of risk and IOP for largest institutional investors. Instrumental Variables/two-stage least squares technique (2SLS) is used to estimate the model. The standard errors of estimates are adjusted using Bartlett kernel function (Newey-west specification). So the estimates are heteroskedasticity- and autocorrelation-consistent (HAC).The variables are as defined in Table 1. The dependent variables are listed on the top of the columns. The PC dummy takes the unit value for LH insurers with significant property-casualty business. T-statistics are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Dependent Variable / Explanatory Variables	Total Risk	Total Risk
	(1)	(4)
Intercept	0.102***	0.101***
	(7.27)	(5.57)
IOP of 5 largest Investors	0.0001	
	(0.66)	
IOP of Investors with 5% or more shares		0.0005
		(1.62)
Firm size	-0.003***	-0.003***
	(-3.86)	(-2.96)
Adjusted-Tobin's Q	0.013	0.021
	(1.40)	(1.41)
Stock turnover	0.005***	0.005***
	(5.60)	(4.16)
Stock Return	0.003	0.007
	(0.42)	(0.77)
E/P ratio	-0.080***	-0.080***
	(-8.71)	(-7.43)
PC dummy	-0.004	-0.006
	(-1.24)	(-1.26)
Year Dummies	Yes	Yes
Adjusted R-Square	0.571	0.626

Table 5: Total Risk and IOP According to Fiduciary Duty Classification

This table reports the estimation results for total risk equation from the simultaneous equations model of risk and IOP (equations 3A-3B) for different types of institutional investors according to their fiduciary duty classification. The dependent variable is total risk. Each variable in the model is standardized by subtracting the cross-sectional mean and then dividing over the cross-sectional standard deviation. This model is estimated using two-stage least squares technique (2SLS). The standard errors of estimates are adjusted using Bartlett kernel function (Newey-west specification). So the estimates are heteroskedasticity and autocorrelation-consistent (HAC). The types of investors are listed on the top of the columns**.** Column (1) is for IOP of bank trusts (Bank), column (2) is for IOP of pension fund and university and foundation endowments (PNE), column (3) is for IOP of insurance companies (INS), and column (4) is for IOP of investment companies and independent advisors (IA). The PC dummy takes the unit value for LH insurers with significant property-casualty business. T-statistics are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Dependent Variable / Explanatory Variables	Total Risk	Total Risk	Total Risk	Total Risk
	(1)	(2)	(3)	(4)
	Bank	PNE	INS	IA
Intercept	-0.285***	0.025	-0.302***	-0.287***
	(-4.77)	(0.20)	(-5.10)	(-4.99)
IOP_Bank	-0.121**			
	(-1.97)			
IOP_PNE		-0.084***		
		(-2.90)		
IOP_INS			-0.086	
			(-1.27)	
IOP_IA				-0.157***
				(-3.16)
Firm size	-0.187***	-0.155**	-0.190***	-0.177***
	(-3.33)	(-2.44)	(-3.14)	(-3.12)
Adjusted Tobin's Q	0.095	0.092	0.102	0.104
	(1.37)	(1.34)	(1.46)	(1.50)
Stock turnover	0.264***	0.283***	0.275***	0.237***
	(5.40)	(5.81)	(5.70)	(4.85)
Stock Return	0.009	-0.009	0.001	-0.001
	(0.18)	(-0.18)	(0.01)	(-0.01)
E/P ratio	-0.247***	-0.254***	-0.247***	-0.245***
	(-8.06)	(-7.90)	(-8.07)	(-7.93)
PC dummy	-0.070	-0.074	-0.048	-0.052
	(-0.81)	(-0.85)	(-0.53)	(-0.62)
Year Dummies	Yes	Yes	Yes	Yes
R-Square	0.581	0.587	0.587	0.590

Table 6: Channels of Association between Total Risk and IOP

This table displays estimation results for a simultaneous equations model of capital ratio, underwriting risk, investment risk, and IOP (equations 4A-4D). This model is estimated using two-stage least squares technique (2SLS). The standard errors of estimates are adjusted using Bartlett kernel function (Newey-west specification). So the estimates are heteroskedasticity and autocorrelation-consistent (HAC). The variables are as defined in Table 1. The dependent variables are listed on the top of the columns. T-statistics are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Dependent Variables / Explanatory Variables	2SLS with Heteroscedasticity and Autocorrelation Consistent Standard Errors			
	Surplus to Assets Ratio	Underwriting Risk	Investment Risk	IOP
	(1)	(2)	(3)	(4)
Constant	0.679***	-0.406***	0.173***	0.688***
	(11.64)	(-2.52)	(5.17)	(4.25)
IOP	0.038***	-0.103***	0.021***	
	(5.18)	(-6.79)	(6.11)	
Surplus to Assets Ratio		0.691***	-0.180***	-0.402
		(2.96)	(-3.29)	(-1.17)
Underwriting Risk	0.265***		0.098***	0.259
	(11.06)		(3.44)	(1.49)
Investment Risk	-1.482***	2.353***		1.428
	(-4.87)	(3.86)		(0.61)
Firm Size	-0.040***	0.029***	-0.010***	
	(-12.48)	(3.04)	(-4.42)	
Adjusted-Tobin's Q	-0.007	0.020	-0.023***	-0.208
	(-0.27)	(0.50)	(-3.84)	(-1.55)
ROA	0.008***			
	(4.62)			
Herfindahl Index		0.646***	-0.026	
		(11.11)	(-1.52)	
3-month T-Bill Return			0.141	
			(1.52)	
Stock Market Index Return			0.104	
			(0.54)	
Net Premiums Written/Assets		0.101***		
		(5.41)		
Stock Turnover				-0.032***
				(-2.22)
Market Capitalization/1000				0.002***
				(2.05)
Lagged IOP				0.706***
				(19.29)
PC dummy	0.050***	-0.187***	0.020***	-0.049
	(4.78)	(-8.84)	(3.07)	(-0.74)
Year Dummies	Yes	Yes	Yes	Yes