ORGANIZATIONAL STRUCTURE, AGENCY COSTS, MONITORING, AND FINANCIAL INSTITUTIONS

by

Licheng Jin

A dissertation submitted to the faculty of
The University of North Carolina at Charlotte
in partial fulfillment of the requirements
for the degree of Doctor of Philosophy in
Business Administration

Charlotte

2019

Approved by:

_____
Dr. Gene Lai

_____
Dr. I-Hsuan Ethan Chiang

_____
Dr. Tao-Hsien Dolly King

_____
Dr. Artie Zillante

ABSTRACT

LICHENG JIN. Organizational structure, agency costs, monitoring, and financial institutions. (Under the direction of DR. GENE LAI)

This dissertation focuses on the general research topic: organizational structure, agency costs, and monitoring in financial institutions. The first topic is on the organizational structure change in the insurance industry. Using data of demutualized insurers in the property-liability insurance industry from 1997 to 2009, this paper examines whether the benefits following demutualization are consistent with the motivations suggested by the literature. First, the findings support the access to capital motivation; however, the requirement of capital differs between demutualized insurers with and without surplus notes. Demutualized insurers with surplus notes show the long-term need of capital to maintain high growth; those without surplus notes indicate the weak need of capital. Second, this paper finds that organizational flexibility post demutualization facilitates demutualized stock insurers to involve in merger and acquisition activities which provide an important channel to raise capital and to pursue growth and diversification. Third, this paper finds evidence that demutualized insurers increase premiums written in commercial lines, lower underwriting expenses, but take more investment risks post demutualization. The second topic is on the benefits and costs of using bank loans. Using a unique sample of firms that make their initial public straight bond offerings from 1987 to 2015, this paper finds support for both the monitoring effect and the hold-up problem of using bank loans. This paper finds a significant decrease on the at-issue yield spread of initial public bond offerings for firms with higher strength of bank monitoring. On the other hand, this paper finds that banks hold-up low credit quality firms but not high credit quality

firms before they enter the public bond market. After issuing initial public bonds, low credit quality firms experience a significant decrease of loan spread; this is not found in high credit quality firms.

ACKNOWLEDGMENTS

I would like to express my deepest gratitude to my dissertation chair, Dr. Gene Lai, for his continuous support and guidance. His caring spirit and persistent inspiration are always there for me and my research. He will always remain my role model for my later career. I also want to extend my enormous thankfulness to all my dissertation committee members, Dr. I-Hsuan Ethan Chiang, Dr. Tao-Hsien Dolly King, and Dr. Artie Zillante, for their precious advice, valuable insights and endless support.

In addition to my dissertation committee, I am also thankful to all the faculty members in the Department of Finance and Department of Economics at the Belk College of Business who taught me and helped me during the program.

I would like to thank my parents for their understanding and support. I also want to thank my dearest grandmother for her priceless love and generous support. She is a great woman who is both soft and powerful. She gives me the courage to face all the difficulties in life. Moreover, many thanks to my friends, Shuangshuang Ji, Dhara Shah, Ziye Nie, and Siqi Wei, who make the Ph.D. experience more joyful.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

This dissertation has two topics in regard to organizational structure, agency costs, and monitoring in financial institutions. The first topic analyzes demutualization in the property-liability insurance industry and the second topic investigates the roles of bank in terms of monitoring and hold-up.

The first topic is an analysis of post demutualization in the property-liability insurance industry. Demutualization was popular in the 1990s and 2000s in the United States and all over the world (Erhemjamts and Phillips, 2012). It is the organizational structure change from a mutual insurer into a stock insurer. A mutual insurer is owned by the policyholders while a stock insurer is owned by the stockholders. Demutualization is both costly and time-consuming with the involvement of the actuarial, accounting, investment banking advisors, and regulators (Viswanathan and Cummins, 2003). Thus, it is important to understand the motivations of demutualization.

Different from the prior literature which mainly focuses on the ex-ante analysis, this study examines whether the evidence following demutualization in the property-liability insurance industry is consistent with the motivations suggested by the literature. Three motivations investigated in this study are: access to capital, organizational structure change to facilitate operating activities, and the reduction of agency costs.

Access to capital is a widely accepted motivation; however, the literature does not distinguish the different needs of capital within demutualized insurers and the channels through which the demutualized stock insurers use to raise capital. Furthermore, this study investigates the role of merger and acquisitions which are feasible post demutualization due to organizational flexibility in raising capital and in pursuing growth. This paper also

examines operating changes including premiums in commercial lines, underwriting expenses, and risk-taking activities post demutualization using multivariate analysis.

The second topic investigates the roles of bank in terms of monitoring and hold-up using a sample of firms who made their initial public straight bond offerings. The advantages for this sample are free of monitoring effects from other bondholders and free of potential conflicts between bondholders.

Banks can monitor firms with lower costs and more efficiency than the capital markets. Firms benefit from bank monitoring (Mikkelson and Partch, 1986; Almazan and Suarez, 2003; Ahn and Choi, 2009). Bondholders can also benefit from bank monitoring. First, bank monitoring provides value to firms by reducing agency costs and provides value to creditors by reducing managers' risk-taking behaviors. Second, bondholders benefit from cross-monitoring. Thus, the first part of this study investigates the effect of the strength of bank monitoring on bondholders. Specifically, it explores the effect of bank monitoring on the at-issue yield spread of initial public bonds while the literature uses the existence of bank loans or not. Studying the effect on public bonds based on the strength of bank monitoring is more informative since almost all firms use some forms of bank loans in modern days.

Banks can also hold-up firms because banks acquire information advantage during their lending. Hold-up problem is especially severe for opaque borrowers with fewer financing alternatives. Raising capital from the public bond market can reduce bank hold-up problem because it provides an important alternative source of financing to firms. However, the impact could be very different based on the financial conditions and the credit qualities of the firms. Thus, the second part of this study investigates the bank hold-up

problem for firms with different credit qualities. Specifically, it examines loan spread changes at the issuance level before and after initial public bond offerings for different credit quality firms.

The dissertation is organized as follows: Chapter 2 presents the analysis of post demutualization in the property-liability insurance industry. Chapter 3 examines bank monitoring and hold-up using the sample of firms made their initial public bond offerings. Chapter 4 concludes.

CHAPTER 2: AN ANALYSIS OF POST DEMUTUALIZATION IN THE PROPERTY-LIABILITY INSURANCE INDUSTRY

2.1. Introduction

Demutualization was popular in 1990s and 2000s in the United States and all over the world (Erhemjamts and Phillips, 2012). From 1920 to 2009, approximately 157[1] mutual insurers went through the demutualization process and became stock insurers in the U.S. property-liability (P-L) insurance industry. Mutual insurer and stock insurer are two primary forms of organization in the insurance industry (Ho, Lai, Lee, 2013). A mutual insurer is owned by the policyholders while a stock insurer is owned by the stockholders. Demutualization is the process of organizational structure change from a mutual insurer to a stock insurer.

This paper examines whether the evidence post demutualization is consistent with the motivations behind demutualization decisions suggested by the literature. Three motivations investigated in this paper are: access to capital, organizational structure change to facilitate operational activities, and the reduction of agency costs.

The first purpose of this study is to analyze the access to capital motivation. Surplus, the difference between total admitted assets and total liabilities, supports underwriting capacities and is a measure used by regulators to assess the solvency status of insurers. Unlike stock insurers who can raise equity capital through issuing stocks, mutual insurers cannot sell stocks in the capital markets. Thus, mutual insurers in need of equity capital have the incentive to demutualize. Mayers and Smith (2002) and Viswanathan and Cummins (2003) document that demutualized insurers in the P-L

[1] Include reciprocals. 1920-1988: 98 cases (Mayers and Smith, 2002); 1989-1990: 1 case (*Best's Insurance Report*); 1991-1999: 34 cases (Viswanathan and Cummins, 2003); 1997-2009: 45 cases in my sample.

insurance industry exhibit capital constraints, i.e. significantly lower surplus-to-assets ratios, in the years before demutualization. Similarly, Erhemjamts and Phillips (2012) find lower surplus ratio prior to conversion in the life insurance industry; however, this result holds only for insurers choosing full demutualization but not mutual holding company (MHC) conversion. The literature examines the access to capital motivation on surplus constraints prior to demutualization, while this paper focuses on the surplus change post demutualization. Further, we investigate the ways demutualized insurers use to raise capital.

In addition, the literature does not distinguish demutualized insurers with surplus notes from demutualized insurers without surplus notes. This paper distinguishes these two types of insurers for the reasons below. Issuing surplus notes suggests that insurers are actively seeking external capital. Demutualized insurers with surplus notes before conversion are more likely in immediate needs of capital to maintain surplus level and/or to support their high growth. Issuing surplus notes is the only way to raise external equity capital for mutual insurers and the amount cannot exceed 15% of the insurer's surplus (Belth, 1996). In fact, the existence of a surplus note in an insurer's financial statement is a red flag indicating that the insurer is in financial trouble[2] (Belth, 2015). On the other hand, demutualized insurers without surplus notes before conversion may demutualize due to the precautionary and/or other motivations rather than the immediate need of capital. Moreover, this study finds demutualized insurers with surplus notes are much smaller in size and experience faster business growth post demutualization. Thus, this paper distinguishes these two types of insurers for the analysis.

[2] Except for investor surplus notes which are usually issued by financially strong insurers. There is only one insurer issuing investor surplus note in our sample.

The second purpose of this paper is to investigate the organizational flexibility post demutualization and the benefits to operational activities resulting from the newly converted stock form. Stock form of organization post demutualization has more flexibility and plays an important role in raising capital. Information asymmetry leads stock insurers, especially financially vulnerable insurers, to have limited ability to raise capital quickly from external capital markets and to face substantial transaction costs (Cummins and Xie, 2008). Demutualized insurers with surplus notes before conversion face more severe information asymmetry problem since they are, in general, smaller in size and more in need of capital. Prior to demutualization, state statutes often prohibit the merger of a mutual insurer into a stock insurer (NAIC, 1998) and mutual acquisitions involving the exchange of surplus notes are usually complicated. The restriction is eliminated for newly converted stock insurers who can become targets and receive capital infusion from parents. Additionally, parents who hold surplus notes of targets can ease the surplus notes redemption process.

This paper argues that organizational flexibility also serves as an important means in increasing growth, diversification and efficiency, which is another motivation to demutualize. One way to achieve growth, diversification, and efficiency is going through merger and acquisitions (M&As). Unfortunately, M&As are not easy when they involve mutual insurers as discussed above. The CEO survey to mutual insurers by Butler, Cui and Whitman (2000) documents that demutualization serves as a means to pursue growth through acquisitions, business combinations, and other strategic alliances.

The third purpose of this paper is to investigate the motivation of agency costs reduction. The agency costs between managers and owners are higher for mutual insurers

than stock insurers (e.g., Ho, Lai and Lee (2013)). Mutual insurers cannot use stock-based compensation to align managers' incentives with the interests of owners (policyholders). Additionally, policyholders in mutual insurers are more likely to consent to manager's interests since very few of them attend annual meetings. Thus, mutual insurers focus on business lines requiring less discretion in underwriting and pricing. Mutual insurers who plan to enter lines requiring more discretion such as commercial lines with the concern of agency problem are more likely to demutualize to reduce agency cost.

Managers of mutual insurers are not able to transfer policyholders' wealth to owners because policyholders are owners. The wealth transfer problem caused by the separation of shareholders and policyholders post conversion may induce more risk-taking activities of demutualized insurers because policyholders are no longer owners.

The sample of this paper consists of 39 demutualized insurers in the P-L insurance industry from 1997 to 2009[3]. Some important empirical results are summarized below. This paper finds demutualized insurers experience significantly higher cumulative surplus growth over five years post demutualization compared with the matching mutuals. The evidence is consistent with the access to capital motivation. This paper also finds demutualized insurers with surplus notes have higher surplus growth and net premiums written growth compared with those without surplus notes, implying demutualized insurers with surplus notes are in long-term need of capital to maintain high growth. Demutualized insurers without surplus notes, however, only experience significant surplus growth in the year of demutualization, indicating their weak need of capital.

[3] There is no recent demutualization.

Next, this paper reports the evidence of organizational flexibility post demutualization and the benefits associated with the organizational flexibility. The evidence shows 51% demutualized insurers (80% of those with surplus notes before demutualization) choose to become targets in the year of demutualization and most of them receive capital infusion from parents immediately. This paper also finds 15.4% demutualized stock insurers become acquirers within five years post demutualization using the funds from initial public offerings (IPOs) or stocks as currency. The evidence also shows 7.7% demutualized insurers merge with other mutual holding companies.

This paper finds the new organizational form enables demutualized insurers to increase their growth, diversification, and efficiency. Specifically, the evidence shows demutualized insurers experience faster net premiums written growth and expand into more new lines and states compared with the matching mutuals. Demutualized insurers who become targets improve on technical, allocative efficiency and cost efficiency post acquisition. This paper also finds demutualized targets improve less on total factor productivity than non-target demutualized insurers. In short, organizational flexibility post demutualization facilitates demutualized stock insurers to involve in M&A activities and to increase growth, diversification, and efficiency. This paper also finds evidence on the motivation of agency costs reduction. Specifically, demutualized stock insurers increase premiums written in commercial lines and lower underwriting expenses. Finally, they take more investment risks post demutualization.

This study provides several important contributions to the literature. First, this paper focuses on ex-post analyses to investigate the benefits behind the motivations of demutualization while the previous literature mainly focuses on ex-ante analyses. Second,

this paper helps to better understand demutualized insurers' needs of capital by classifying demutualized insurers into insurers with and without surplus notes. Prior findings about the need of surplus to maintain high growth in the literature (e.g., Mayers and Smith, 2002) are more in line with demutualized insurers with surplus notes but not consistent with those without surplus notes. Third, this paper is the first to empirically investigate organizational structure changes post demutualization and the associated benefits. Demutualized insurers with surplus notes who are small and suffer from severe information asymmetry choose to become targets to raise capital and maintain high growth. Fourth, this paper empirically tests the motivation to reduce agency costs by examining the operating changes such as growth in commercial lines, expense ratio reduction and investment risks post demutualization using multivariate analyses. Previous literature uses only univariate analysis.

The remainder of the paper is organized as follows. Section 2.2. presents literature and hypotheses development. Section 2.3. provides model specifications. Section 2.4. describes the sample generation process and descriptive statistics. Section 2.5. provides empirical results. Section 2.6. concludes. Appendix A lists the demutualized insurers and Appendix B reports detailed variable definitions.

2.2. Literature and Hypotheses Development

Demutualization is the process of organizational structure change from mutual insurers to stock insurers in the insurance industry. Mayers and Smith (2002, 2004) suggest four ways to demutualize: full demutualization, mutual holding company (MHC) conversion, merger with stock insurer and bulk reinsurance[4].

[4] This paper focuses on the prior two methods since only these two are observed in the sample.

A full demutualization creates a stock holding company which wholly owns the converted downstream stock insurance subsidiary. Forming a stock holding company facilitates investment in and acquisition of both insurance and noninsurance subsidiaries (Viswanathan and Cummins, 2003).

A MHC conversion creates a MHC which controls a downstream stock holding company, the direct parent of the converted stock insurer. Policyholders' ownership interests transfer to the MHC and their insurance contracts are assigned to the stock insurer. MHC conversion saves time and costs due to no needs of surplus allocations. It prevents potential takeovers since the MHC retains a majority of the voting rights when selling stocks of the stock holding company to raise funds. A MHC can time the market when making initial public offerings.

Demutualization is both costly and time-consuming with the involvement of the actuarial, accounting, investment banking advisors, and regulators. Viswanathan and Cummins (2003) state the MHC conversion process takes six months to one year while full demutualization needs an average of two years to complete due to complex surplus allocations. Thus, demutualization is essentially an ex-ante cost-benefit consideration and the insurer's rationale to convert must be based on the assumption that the benefits from demutualization outweigh the costs.

This paper next discusses the motivations and benefits of demutualization and then develops hypotheses and empirical models to examine whether the motivations and expected benefits in the literature are realized post demutualization. These motivations are not necessarily mutually exclusive since they may work interactively to result the

demutualization decision. Thus, the ex-post analyses based on the motivations are not mutually exclusive.

2.2.1. Access to Capital

The most cited reason for demutualization is the access to capital (Mayers and Smith, 2002; Viswanathan and Cummins, 2003; Erhemjamts and Phillips, 2012). Unlike stock insurers who can raise capital through issuing debt as well as stocks, mutual insurers cannot sell stocks to the capital markets to raise surplus. Without the ability to raise equity capital (surplus), insurers have disadvantages in a competitive market. Surplus supports insurers' underwriting capacities as well as the ability to take risks. It also helps to reduce leverage after high growth or to pursue high growth and to be more competitive in the market (e.g., Xie, 2010). Based on the above discussions, this paper proposes the hypothesis as follows.

Hypothesis 1a: Demutualized insurers should experience surplus growth post demutualization.

Mutual insurers generally raise surplus through the retention of net income and the issuance of surplus notes. Surplus notes are contingent subordinated debt issued by insurers. The payment of interests and/or principle is contingent on the issuer's surplus level as well as the regulatory approval. Surplus notes are treated as non-admitted liabilities. The dollar amount of surplus notes issued is recorded as surplus. Additionally, the liability for surplus notes is not recognized until the insurer's surplus is beyond the surplus hurdle specified in the contract. Belth (1996) reports that surplus notes cannot exceed 15% of the insurer's surplus. Reasons to issue surplus notes are typically to satisfy regulatory capital requirements (e.g., risk-based capital standards for P-L insurers were

implemented in 1994), to fund acquisitions, or to provide a source of funding for future growth. Usually, the existence of a surplus note in an insurer's financial statement is a red flag indicating that the insurer is in financial trouble (Belth, 2015).

Since the issuance of surplus notes is the only way to raise surplus externally for mutual insurers and there is an upper limit on the amount, demutualized insurers with surplus notes before conversion are more likely in an immediate need of capital than demutualized insurers without surplus notes. In addition, demutualized insurers without surplus notes may demutualize because of the precautionary motive to access capital markets and/or other motivations. Based on the above discussions, this paper proposes the following hypothesis.

Hypothesis 1b: Demutualized insurers with surplus notes should experience faster surplus growth post demutualization than demutualized insurers without surplus notes.

2.2.2. Organizational Flexibility, Growth, Diversification, and Efficiency

Merger and acquisitions are important in the P-L insurance industry. Like non-financial industries, the purposes of merger and acquisitions in the P-L insurance industry include: improving growth, expanding business lines and geographical areas, and enhancing efficiency. Unfortunately, simple M&As involving mutual insurers cannot achieve these purposes because mutual form of organization is difficult to be a target or acquirer. In other words, mutuals need to convert to the stock form first to become targets or acquirers.

Next, this paper discusses the reasons why mutuals need to demutualize before they become targets. Mutual insurers are difficult to become targets due to regulations. According to National Association of Insurance Commissioners (NAIC, 1998), state

statutes often prohibit the merger of a mutual insurer into a stock insurer. In addition, mutual acquisitions are often complicated due to the exchange of surplus notes which are debt instruments but are treated as equity capital for regulatory purposes. After demutualization, the restriction is eliminated for newly converted stock insurers and it is feasible for them to become targets. Additionally, parents who own surplus notes of the targets can ease the surplus notes redemption process.

To demutualize and then become a target provides an important channel to raise capital. At first glance, a newly demutualized stock insurer can raise capital through IPOs; however, the empirical evidence shows that many small P-L insurers may have difficulties raising capital through IPOs. Viswanathan (2006) documents that only 24 demutualized insurers (approximately 40%) go IPOs from 1986-2001 for both P-L and life-health insurance industries. One possible reason is the information asymmetry between the demutualized insurers and the outside investors. Outside investors in general have limited information on the quality of private insurers' assets and the value of reserve estimates for unpaid losses, especially in long-tail lines (Chamberlain and Tennyson, 1998; Cummins and Xie, 2008; and Xie, 2010). To demutualize and then become a target avoids the information asymmetry when entering the capital markets to raise funds. Additionally, due to the size of acquisitions and state regulations, the majority of acquisition transactions are paid in cash in the insurance industry while some are paid by the mixture of stocks and cash (Xie, 2008; Cummins and Xie, 2009). Cash injection from parents eases the capital constraint of demutualized stock targets immediately. MHC conversion retains a majority of the voting rights in the newly formed mutual holding company to protect the stock

insurer from potential takeover; thus, demutualized stock targets are more likely to use full demutualization.

Proposition 1: Instead of being independent, some demutualized stock insurers choose to be a target post demutualization.

Next, this paper discusses why mutuals become acquirers. Mutual insurers are less likely to be acquirers since they have limited access to capital and they cannot use stocks as currency. While mutuals can use surplus notes to finance acquisitions, they need to obtain regulatory approval. Thus, surplus notes are much less flexible than shares of stock in the acquisition market (Cummins and Xie, 2008). The constraints are eliminated post demutualization since demutualized stock insurers can issue stocks or use stocks as currency. Thus, it is easier for newly converted stock insurers to become acquirers.

Proposition 2: Some demutualized stock insurers become acquirers post demutualization.

Organizational flexibility post demutualization facilitates demutualized insurers to pursue growth through acquisitions, business combinations, and other strategic alliances (Belth, 1996; Butler, Cui, and Whitman, 2000). This additional flexibility should better position demutualized insurers to take advantage of diversification opportunities where legal barriers exist before demutualization (Belth, 1996).

Hypothesis 2: Demutualized insurers should expect higher net premiums written growth and expand into more lines and states.

Cummins and Xie (2008) document merger and acquisitions are value-enhancing in the P-L insurance industry. They find that target insurers achieve more in cost and allocative efficiency improvement compared with non-targets. Demutualized stock targets

are part of the target insurers investigated by Cummins and Xie (2008). Based on the above discussion, this paper proposes the following hypothesis.

Hypothesis 3: Demutualized stock targets should experience improvement on efficiency.

2.2.3. Agency Costs Reduction

Mutual insurers have limited tools to monitor and control management behaviors. Mutual insurers cannot include stocks and stock options in the executive compensation package; thus, it is hard to align manager's incentives with the interests of policyholders. Boose (1990) documents mutual managers are less successful in minimizing costs because of agency problem. Mayers and Smith (2004) document managers manipulate surplus preceding conversion to lower policyholder compensation. Specifically, converting insurers manage accounting information by adjusting liabilities and selectively establishing investment losses. Mayers and Smith (2005) indicate that the agency cost between managers and policyholders (owners) is higher than that between managers and stockholders (owners). The reason is that it is very difficult for policyholders to control managers because every policyholder has only one vote. What makes the situation worse is that policyholders of mutual insurers consent to having management vote their interests since very few of them attend the annual meetings (Hetherington, 1969; Schiff, 1998; Viswanathan and Cummins, 2003). As a consequence, mutual insurers focus on lines requiring less managerial discretion in underwriting and pricing. For example, mutual insurers are more likely to underwrite in personal auto lines and less likely to underwrite in commercial lines than stock insurers. Mutual insurers also conduct operations over a narrow geographical area. Stock insurers, on the other hand, perform better in activities requiring greater managerial discretion, i.e., decision-making authority (Mayers and Smith,

1981, 1988). Thus, mutual insurers who decide to pursue business in lines requiring more managerial discretion may choose to demutualize.

Hypothesis 4: Demutualized stock insurers increase their underwriting in lines requiring more managerial discretion such as commercial lines post demutualization.

Mutual insurers do not transfer wealth from policyholders by increasing the riskiness of assets, increasing leverage, or taking on riskier projects because policyholders are owners. Stock insurers, however, take more underwriting risks than mutual insurers and write more in risky lines and states (Lamm-Tennant and Starks, 1993).

Hypothesis 5: Demutualized stock insurers will increase their risk-taking post demutualization.

2.3. Methodology

This section discusses the methodologies used in this study.

2.3.1. Regressions

To measure the impact of demutualization on surplus growth, net premiums written growth, and other underwriting changes, this paper estimates the following regressions,

$\Delta Surplus$ /ΔNPW /other underwriting changes = $f(I(Dem)$ or $I(Dem*SN)$, Controls),

Where

$\Delta Surplus$, surplus growth, is the growth rate of surplus measured over five windows: year -1 to year t, where t equals 1, 2, 3, 4, and 5 (the same below);

ΔNPW, net premiums written growth, the growth rate of net premiums written measured over five windows;

Other underwriting changes include the change of percentage of net premiums written in commercial lines ($\Delta Comm$), change of expense ratio ($\Delta Expense$), underwriting risk ($Risk$)

measured by the standard deviation of loss ratios, total risk (*totRisk*) measured by the volatility of return on assets, and investment risk (*invRisk*) measured by the standard deviation of return on investments. All variables are measured over five windows;

Controls stands for a vector of control variables.

This paper estimates the above models using the ordinary least squares (OLS) method. The variables of interest are *I(Dem)*, a dummy variable equal to 1 for demutualized insurers, and *I(Dem*SN)*, a dummy variable equal to 1 for demutualized insurers with surplus notes (SN) in year -1, where the notation "year -t/t" refers to the *t*th year prior to/after the demutualization year. To the extent that demutualized insurers have the motivation to access capital and facilitate growth, this paper expects the coefficients on *I(Dem)* to be positive when the dependent variables are surplus growth (Δ*Surplus*) and net premiums written growth (Δ*NPW*). Additionally, this paper expects the coefficients on *I(Dem*SN)* will also be positive because demutualized insurers with surplus notes before conversion are more in need of capital. This paper expects a positive (negative) relation between *I(Dem)* and Δ*Comm* (Δ*Expense*) because demutualized insurers would increase premiums in commercial lines and lower underwriting expenses due to reductions in agency costs. The separation of shareholders and policyholders post demutualization may result in more risk-taking activities; thus, this paper expects a positive relation between *I(Dem)* and *Risk, totRisk,* and *invRisk,* respectively.

To estimate the regressions, this paper also controls for several variables associated with the dependent variables. Some control variables are different for different dependent variables. For control variables of surplus growth estimation, this paper mainly follows Shiu (2011). This paper includes the natural logarithm of net total assets (*Size*) in year -1

to control for insurer size. In addition, this paper also controls for direct premiums written growth (ΔDPW), reinsurance ratio change ($\Delta Reins$), and underwriting risk (*Risk*). This paper also considers the effect of average profitability (*Ave. ROA*) on surplus growth. Since tax payment and dividend payment reduce surplus level, this paper includes the average federal tax rate (*Ave. tax rate*) and a dummy variable for dividend payment (*I(Dividends)*).

For net premiums written growth equation, surplus growth is included as a control variable since surplus supports underwriting capacity and growth. 1-year lagged surplus growth is used to deal with endogeneity problem. For other underwriting changes, this paper considers insurers' diversification in business lines. Specifically, this paper includes the average of Herfindahl index of premiums in business lines (*Ave. HHI*) over windows. All continuous variables are pooled winsorized at the 1% and 99% levels to mitigate the influence of outliers. Appendix B provides detailed definitions of variables included in the models.

2.3.2 The Data Envelopment Analysis Approach

This paper uses the nonparametric mathematical linear programming approach of data envelopment analysis (DEA) to measure efficiency change post demutualization for demutualized insurers who become targets (Cummins, Tennyson and Weiss, 1999; Jeng and Lai, 2005; Cummins and Xie, 2008; Huang et al. 2011). The advantage of the DEA approach is that multiple inputs and outputs are considered when estimating efficiency. This paper uses both the value-added approach as well as the Malmquist methodology, where the latter is used to measure efficiency change over time.

Outputs: Pooling losses and providing insurance services are the main functions of insurers; thus, loss incurred is defined as insurance output (e.g., Cummins and Weiss, 1993;

Berger et al., 1997; Huang et al., 2011). Loss is further disaggregated into four categories: short-tail personal lines, long-tail personal lines, short-tail commercial lines, and long-tail commercial lines. Losses are deflated to the base year 1999 using the Consumer Price Index (CPI). Insurers also perform as financial intermediaries since they attract funds from policyholders and invest in financial securities. Thus, total invested assets deflated in 1999 dollar are used as the output for the intermediation function.

Inputs and input prices: Following Cummins et al. (1999) and Huang et al. (2011), labor, business services, and equity capital are defined as three inputs. This paper measures the price of labor cost using average weekly employee wages for the North American Industry Classification System (NAICS) code 52412. The price of business services is measured by the average weekly wages for the NAICS code 52421. Since the number of employees or hours worked and material used in the insurance industry are not available, this paper imputes the input quantity from the dollar value of related expenses. The quantity of labor input is defined as labor costs divided by labor price where labor costs is the sum of salaries, payroll taxes, and other employment-related costs. The quantity of business services input is defined as business services costs divided by price. Business services costs consist of outside service costs and material costs measured by direct commissions and loss adjustment expenses, respectively. Following Jeng and Lai (2005) and Huang et al. (2011), equity capital is measured by current surplus and the price equals the debt-equity ratio of the previous year.

2.4. Data and Descriptive Statistics

2.4.1. Sample Generation

Demutualized insurers in the P-L insurance industry are identified using the "Name Changes and Retired Companies and Associations" section of *Best's Insurance Report*. The sample period is from 1997 to 2009 since SNL starts from 1996 and the study needs financial data one year before and five years after demutualization.[5] In addition, no insurers demutualize after 2009. This study relies on SNL when this database is available because it has more complete data. Supplementary data are obtained from various publications of the A.M. Best Company, an insurance financial ratings company, and National Association of Insurance Commissioners (NAIC) database.

Forty-five insurers[6] demutualized during 1997-2009 according to *Best's Insurance Report*. However, five of them are dropped from our sample due to incomplete information. Another insurer in rehabilitation status who demutualized pursuant to the orders of the superior court is also excluded. The final sample is composed of 39 demutualized insurers in the P-L insurance industry over the period 1997-2009.

To control for the industry change, this study finds three matching insurers similar to each of the demutualized insurers in year -1, where the notation "year -t/t" refers to the *t*th year prior to/after the demutualization year. The matching insurers are mutuals in the P-L insurance industry with surplus and direct premiums written within the 70%-130% range of those of demutualized insurers in year -1. Moreover, the matching mutuals should issue surplus notes if the demutualized insurers issue surplus notes and not otherwise. If

[5] The sample starts in 1996 because no electronic database is available before 1996. It would be very difficult to find matching firms without electronic database.
[6] Include reciprocals since they are now not distinguishable from mutuals (Cummins and Weiss,1992)

more than three mutuals meet the above criteria, the mutual insurers with the nearest surplus are chosen.

2.4.2. Descriptive Statistics

Figure 2.1 plots surplus as well as net premiums written level in the P-L insurance industry from 1997 to 2016. Surplus for the entire industry decreased from 1998 to 2002 and gained the trend of increasing ever since except for 2008. Net premiums written, on the other hand, kept increasing from 1999 to 2004. Net premiums written was always smaller than surplus in terms of dollar amount since 2005, and the difference enlarged over time (except for 2008). The larger amount of surplus relative to net premiums written partially explains why there is no demutualization after 2009.

Table 2.1 reports the distribution of demutualized insurers by year and state. Demutualization mainly occurs around year 1999 and is more concentrated in the states of Pennsylvania, Florida, Iowa and Michigan.

Table 2.2 reports the descriptive statistics of the demutualized insurers and the matching mutuals in year -1, respectively. Continuous variables are pooled winsorized at 1% and 99% levels to reduce the influence of outliers. As is evident from Table 2.2, firm characteristics of the demutualized insurers and the matching mutuals are similar based on the means and medians tests of all variables except the expense ratio. The expense ratio of demutualized insurers is 9.8% higher than that of the matching mutuals and it is statistically significant. Demutualized insurers are slightly lower in direct premiums written and net premiums written but higher in net premiums written growth compared with the matching mutuals; however, none of them are statistically significant. Table 2.2 also shows 38.5% demutualized insurers use surplus notes in year -1.

Figure 2.2 plots surplus change in event time for demutualized insurers. The mean surplus growth rate is 71.39% in year 0 while the median is only 20.41% and the median increases less than 6% post demutualization. Excluding one outlier with surplus growth 999% in year 0 leads to the mean and median surplus growth 45.99% and 18.42%, respectively. Figure 2.3 separates demutualized insurers based on the existence of surplus notes or not in year -1 and plots the average surplus change in the event time. Panel A includes all 39 demutualized insurers while Panel B excludes the outlier. This paper focuses the discussion on Panel B due to the impact of outlier. Panel B of Figure 2.3 shows demutualized insurers with surplus notes in year -1 experience consistently higher surplus growth since the year before demutualization until five years post demutualization. These two figures suggest the need of capital differs within demutualized insurers. Demutualized insurers with surplus notes show strong long-term need of capital while those without surplus notes indicate weak one-time capital requirement.

2.5. Empirical Results

2.5.1. Organizational Flexibility Post Demutualization

Table 2.3 reports the involvement of IPOs and M&A activities for demutualized insurers post demutualization. Only five out of 39 (12.8%) demutualized insurers go IPOs. Four of them issue IPOs in year 0 and choose full demutualization. This is in contrast to the common belief that a demutualized insurer undergoes a full demutualization will issue an IPO at the time of conversion. One of them goes public in year 2 and chooses MHC conversion, which supports the argument that MHC conversion provides more discretion on the timing of IPOs to benefit from favorable market conditions.

Organizational flexibility of stock charter facilitates the participation of demutualized stock insurers in M&A activities. Table 2.3 shows that 20 out of 39 (51%) demutualized stock insurers become targets post demutualization and one gets acquired twice. All demutualized targets choose full demutualization which facilitates acquisitions. All demutualized targets are acquired by stock companies in the year of demutualization. Half deals involve surplus notes redemption, i.e. half acquirers, who are also the surplus notes holders before, exchange surplus notes for common stocks. Since the acquirers have certain information about the demutualized targets, this process reduces the information asymmetry between demutualized targets and acquirers.

Importantly, being a target serves as an important channel to raise capital, especially those with surplus notes. Twelve out of fifteen demutualized stock insurers with surplus notes in year -1 are acquired and seven of them have surplus growth above median in year 0. Five demutualized stock targets do not experience immediate surplus growth since their parents mainly redeem surplus notes. Only eight out of twenty-four demutualized insurers without surplus notes in year -1 are acquired and five of them have surplus growth above median in year 0. These results are consistent with Proposition 1. It complements the fact that only 12.8% demutualized insurers issue IPOs to raise capital.

Another aspect of increased organizational flexibility for demutualized stock insurers is their ability to become acquirers since they have more access to capital and they can use common stocks as currency. Table 2.3 reports 6 out of 39 (15.4%) demutualized insurers become acquirers, which supports Proposition 2. Among them, two demutualized insurers go IPOs, one uses common stocks as collateral for bank loans, and the rest involve common stocks to some extent in the deals.

Increased organizational flexibility is also reflected in demutualized insurers' involvement in merger deals. Table 2.3 also shows that there are 3 merger deals (7.7%). The newly formed upstream mutual holding company merges into the counterparty's mutual holding company. Since MHC conversion retains a majority of the voting rights to protect policyholders' control power, demutualized insurers who avoid becoming targets are more likely to choose MHC conversion.

2.5.2. Access to Capital

This section focuses on the access to capital motivation associated with demutualization. This paper first reports univariate statistics on surplus changes and surplus related variables post demutualization. Since surplus supports underwriting capacity, this paper also provides evidence on underwriting related activities.

Table 2.4 presents year-by-year means and *t*-test statistics of surplus change, net premiums written change, and surplus notes usage and amount for 39 demutualized insurers and the matching mutuals. It also provides year-by-year means and *t*-test statistics of net total assets for demutualized insurers with and without surplus notes.

Panel A of Table 2.4 shows the surplus growth rate of demutualized insurers is 21.9% higher than that of the matching mutuals in year 0 and it is statistically significant. The surplus growth rates of demutualized insurers in year 2, 4, and 5 are higher than those of matching mutuals, although none of them are statistically significant. Panel B of Table 2.4 reports that demutualized insurers have higher growth in net premiums written prior to and post conversion compared with the matching mutuals, although only statistically significant in year 0 and 1.

Panel C of Table 2.4 reports that demutualized insurers substantially reduce the usage of surplus notes from 38.5% to 10.3% in year 0. Surplus notes usage for demutualized insurers continues to decrease to 5.7% as in year 4, while that for the matching mutuals decreases slightly to 34.6%. The differences in surplus notes usage are statistically significant for the two groups. The dollar amount of surplus notes drops sharply for demutualized insurers post demutualization but not for the matching mutuals (Panel D of Table 2.4).

This paper also finds demutualized insurers with surplus notes are much smaller in net total assets compared with demutualized insurers without surplus notes and the differences are statistically significant from year -1 to year 4 as reported in Panel E of Table 2.4. Net total assets for demutualized insurers with surplus notes are less than 14% of those of demutualized insurers without surplus notes in year -1. However, demutualized insurers with surplus notes increase net total assets substantially post conversion. Their net total assets experience a significant 185% increase from year -1 to year 5, while demutualized insurers without surplus notes experience a 7.6% decrease.

The results of Table 2.4 indicate that demutualized insurers with surplus notes and without surplus notes are very different. Thus, Table 2.5 splits the demutualized insurers into two groups based on the existence of surplus notes in year -1. Panel A of Table 2.5 shows the mean surplus changes of demutualized insurers with surplus notes are significantly higher than those of demutualized insurers without surplus notes. Specifically, the surplus growth rates of demutualized insurers with surplus notes are 18.3%, 24.7%, 10.9%, and 11.8% higher in year -1, 1, 2, and 3, respectively. The differences are statistically significant. Demutualized insurers with surplus notes also have higher surplus

growth compared with their matching mutuals from year 0 to year 5 although the difference is only statistically significant in year 0 and 2 probably due to the small sample size.

This paper finds demutualized insurers without surplus notes experience a high surplus growth (22.1%) only in year 0. Their surplus growth rates are -3.5%, -0.1%, -6.8%, 6.4%, and 2.5% from year 1 to year 5. In fact, the growth rates of demutualized insurers without surplus notes are not higher than those of their matching insurers from year 1 to year 3 post conversion. Taken together, the evidence indicates that only demutualized insurers with surplus notes need capital in the long run. The common belief mainly applies to demutualized insurers with surplus notes that access to capital is the major reason for demutualization.

Panel B of Table 2.5 shows significantly higher net premiums written change (growth) for demutualized insurers with surplus notes post conversion. The growth rates are higher than 20% post demutualization with one exception (12%). Specifically, demutualized insurers with surplus notes have higher net premiums written changes than those without surplus notes from year 0 to year 5 except for year 2. And the differences are statistically significant in year 1 and year 4. Demutualized insurers with surplus notes also have higher net premiums written growth compared with their matching mutuals since year 0 and the differences are statistically significant in years 0, 1, 4, and 5.

But demutualized insurers without surplus notes tell a somewhat different story. Demutualized insurers without surplus notes experience higher net premiums written growth from year 0 to year 2 but lower net premiums written growth from year 3 to year 4 compared with their matching mutuals and the difference is statistically significant in year 4. In short, surplus growth rates and net premiums written growth rates are higher for

demutualized insurers with surplus notes compared with demutualized insurers without surplus notes.

Above analyses show demutualized insurers with and without surplus notes are very different in insurer characteristics and premium growth, indicating their motivations to demutualize may be different. Demutualized insurers with surplus notes are smaller in size, have higher growth in surplus and net total assets, and need long-term capital to maintain high premiums growth. Demutualized insurers without surplus notes, on the other hand, show one-time increase of capital and short-term premiums growth. Thus, it is important to examine whether the impacts of insurers with and without surplus notes on surplus growth are different. Next, this paper examines the impact of demutualized insurers on surplus and then examines whether the impacts of insurers with and without surplus notes on surplus growth are different.

Table 2.6 reports the ordinary least squares regression of cumulative surplus growth post demutualization on demutualization dummy using the sample of demutualized insurers and their matching mutuals. The dependent variable is the cumulative surplus growth from year -1 to year t, where t equals 1, 2, 3, 4, and 5, corresponding to columns (1) to (5), respectively. The variable of interest, *I(Dem)*, is a dummy variable equal to 1 for demutualized insurers and 0 otherwise. This paper controls for the levels as well as the changes of insurers' characteristics. Specifically, this paper not only controls for insurers' direct premiums written growth, the reinsurance usage change, dividend payment and risks from year -1 to year t but also includes insurer size in year -1 and the average yearly tax rate and return on assets from year 0 to year t.

Table 2.6 shows the coefficients on *I(Dem)* are positive and statistically significant, consistent with Hypothesis 1a that demutualized insurers experience higher surplus growth compared with the matching mutuals post demutualization. Column (1) reports average surplus growth rate for demutualized insurers is 36 percentage points higher than that of matching mutuals from year -1 to year 1. Demutualized insurers consistently cumulate more surplus from year 1 to year 5. For example, the surplus growth rate of demutualized insurers is 57 percentage points higher than that of the matching mutuals in year 5 (Column (5)).

The coefficients on direct premiums written growth are positive and statistically significant, indicating business expansion is positively associated with surplus growth. This paper also finds that surplus growth is positively associated with profitability which is proxied by *Ave. ROA*.

Table 2.7 compares the cumulative surplus growth for demutualized insurers with surplus notes (*I(Dem*SN)*) with that of demutualized insurers without surplus notes and the matching mutuals. The coefficient on *I(Dem*SN)* is statistically significant and positive in columns (4) and (5), which supports Hypothesis 1b that demutualized insurers with surplus notes should experience higher surplus growth post demutualization. As mentioned above, this study observes demutualized insurers with surplus notes need to have capital in the long run; thus, this paper focuses on the result of year 5. This paper finds the difference between insurers with surplus notes and the rest enlarges to 74.2 percentage points. The result is consistent with univariate analysis (see Panel A of Table 2.5).

2.5.3. Organizational Flexibility, Growth, Diversification, and Efficiency

Section 2.5.1 shows demutualized stock insurers increase organizational flexibility which supports insurers to pursue growth. Table 2.8 reports the results of ordinary least squares regression of cumulative net premiums written growth post demutualization on demutualization dummy using the sample of demutualized insurers and their matching mutuals. The dependent variables for columns (1) to (5) are the net premiums written growth rates from year -1 to year 1, 2, 3, 4, and 5, respectively. Note that the surplus growth is 1-year lagged to reduce the endogeneity problem. The coefficients on *I(Dem)* are positive and statistically significant after controlling for surplus growth, which is consistent with Hypothesis 2 that demutualized insurers should experience higher net premiums written growth compared with the matching mutuals. For example, net premiums written growth of demutualized insurers is 22.5, 32.3, and 68.1 percentage points higher than those of the matching mutuals in years 1, 3, and 5, respectively. The increasing difference in net premiums written growth indicates demutualized insurers continually expand business during the five years post demutualization. These results are different from Viswanathan and Cummins (2003) who find lower but insignificant premiums growth rates after conversion. They argue that the demutualized insurers do not use the capacity for growth in the initial years. However, their results are based on univariate analysis.

This paper also finds that surplus growth supports net premiums written growth since the coefficients on 1-year lagged surplus growth ($\Delta Surplus_{-1,t-1}$) are positive and statistically significant for columns (2) to (4). For example, one percent increase in surplus growth leads to 0.19 percentage point increase in net premiums written growth over year 2, i.e. an actual 0.87% increase on average in net premiums written growth.

Further, this study investigates the cumulative net premiums written growth for demutualized insurers with surplus notes in Table 2.9. The coefficients on *I(Dem*SN)* are positive and statistically significant, which indicates demutualized insurers with surplus notes always have higher cumulative net premiums written growth compared with demutualized insurers without surplus notes in the following five years post conversion. The average difference enlarged from 73.3 percentage points in year 1 all the way up to 190.3 percentage points in year 5, holding others equal. Demutualized insurers without surplus notes, on the other hand, have higher cumulative net premiums written compared with the matching mutuals with surplus notes but lower cumulative net premiums written compared with the matching mutuals without surplus notes, although none of them are statistically significant. It indicates that demutualized insurers with surplus notes are the main driver of net premiums written post demutualization.

Next, this paper examines whether demutualized insurers strategically change lines and states they underwrite. Panel A of Table 2.10 shows demutualized insurers add lots of new lines and states from year 0 to year 5. The results hold after adjusting for the matching mutuals as reported in Panel B of Table 2.10. While demutualized insurers add more new lines, they also drop existing lines. Demutualized insurers drop more lines compared with the matching mutuals since year 1. Panel B of Table 2.10 shows demutualized insurers drop more existing states since year 0 (except for year 3) compared with the matching mutuals but they add many more new states starting from year 1. Above analyses indicate demutualized insurers strategically adjust their underwriting in lines and states.

Demutualized insurers who become targets experience significant organizational structure change post acquisitions. This section investigates the efficiency change for

demutualized stock targets versus non-targets to provide more information on the incentives of acquisitions. Value-added DEA approach as reported in Panel A of Table 2.11 presents demutualized stock insurers who become targets improve on allocative efficiency and cost efficiency. This result is consistent with Cummins and Xie (2008) who find targets gain in cost efficiency and allocative efficiency, indicating that M&As lead to synergies such as technology sharing and information sharing. The results of Malmquist index analysis as reported in Panel B of Table 2.11 show the cumulative total factor productivity of demutualized stock targets increases over time but is less compared with non-targets. Total factor productivity has two main components: technical change and technical efficiency change (the product of pure technical efficiency and scale efficiency). Technical change measures the shift in the production frontier over time. Although all demutualized insurers improve on technical change over time, non-targets improve more. This is the same for technical efficiency change which measures the shift in the insurer's location relative to the production frontier over time. Above analyses indicate efficiency improvement is not the main purpose for demutualized stock targets. Rather, it could be the strategic movement of acquirers who want to increase geographical or product line diversity.

2.5.4. Agency Costs Reduction

Table 2.12 reports the ordinary least squares regression of cumulative growth of net premiums written in commercial lines on the demutualization dummy using the sample of demutualized insurers and their matching mutuals. The dependent variables are the changes of the percentage of net premiums written in commercial lines from year -1 to year t, where t stands for 1, 2, 3, 4, and 5, corresponding to columns (1) to (5), respectively. The

coefficients on *I(Dem)* are significantly positive in columns (3), (4), and (5), indicating demutualized insurers increase underwriting in commercial lines which require more manager's discretion (Hypothesis 5). Specifically, demutualized insurers are 4.5, 8.7, and 7.4 percentage points higher in the change of net premiums written in commercial lines compared with the matching mutuals in year 3, 4, and 5, respectively. The control variables show that insurers who cumulate surplus faster and are more concentrated in business lines underwrite less in commercial lines while those with higher profitability underwrite more in commercial lines. This paper does not include surplus level since it is highly correlated with insurer size. These results are different from Viswanathan and Cummins (2003) who do not find demutualized insurers expanding into lines requiring higher managerial discretion and making strategic moves according to univariate analyses.

Table 2.13 shows the results of expense ratio change. The coefficients on *I(Dem)* are significantly negative except for column (3), indicating demutualized insurers are more efficient in lowering underwriting costs. For example, the change of expense ratio for demutualized insurers are 4.4 and 9.2 percentage points lower compared with the matching mutuals in year 1 and 5, respectively. The results are consistent with the prediction that one reason of demutualization is to reduce agency costs between managers and policyholders (owners). Once insurers demutualize, new owners (stockholders) are in a much better position to monitor managers and to align managerial incentives.

Agency problem from the separation of policyholders and stockholders will lead demutualized stock insurers to take on more risks. Following Ho, Lai, and Lee (2013), this paper investigates demutualized insurers' risk-taking activities by investigating the total risk, underwriting risk, and investment risk. This paper finds evidence that demutualized

insurers take more investment risk compared with the matching mutuals post demutualization as reported in Table 2.14. Table 2.14 shows the regression results of investment risk. The coefficients on *I(Dem)* are all positive and statistically significant except for column (5), suggesting demutualized insurers take more investment risk post demutualization. For example, the coefficient of *I(Dem)* in column (3) is 0.186 representing a 32% (0.186/0.58) increase from the mean value of the standard deviation of investment yield. However, this paper does not find evidence that they take more underwriting risk and total risk. These results are consistent with Viswanathan and Cummins (2003) who also do not find significantly higher total risk post conversion indicating the steady underwriting results but are different from Mayers and Smith (2002) who find higher volatility of loss ratio post conversion. Prior findings are all based on univariate analyses while these results are based on multivariate analyses.

The gradual increase of net premiums written in commercial lines and the decrease of expense ratio support that reducing agency costs is one of the motivations to demutualize. Better monitoring mechanisms as well as incentive alignments allow newly converted stock insurers to underwrite more in commercial lines requiring greater managerial discretion and to lower underwriting costs. However, policyholders may suffer from wealth transfer problem since demutualized insurers increase risk-taking on investment post demutualization.

2.6. Summary and Conclusions

Using a sample of 39 demutualized insurers in the P-L insurance industry from 1997 to 2009, this paper examines whether the benefits following demutualization are consistent with the motivations behind the demutualization decisions suggested by the

literature. This paper finds evidence for all the three motivations investigated in this paper, i.e. access to capital, growth and diversification due to increased organizational flexibility, and the reduction of agency costs.

This paper finds demutualized insurers have higher cumulative surplus growth from the event year to five years post demutualization. Cumulative surplus growth and net premiums written growth are stronger for demutualized insurers with surplus notes in the year before demutualization, indicating that they are in long-term need of capital to pursue or maintain high business growth. Demutualized insurers without surplus notes show weak one-time need of capital.

Demutualized insurers increase organizational flexibility post demutualization which facilitates business growth and diversification through M&As and other business combinations. Demutualization eliminates legal barriers on mutual insurers who are very difficult to become targets and serves as a channel to raise capital. Fifty-one percent demutualized insurers (eighty percent of those with surplus notes in year -1) choose to become targets and most of them receive capital infusion from parents immediately. Additionally, 15.4% demutualized stock insurers become acquirers within five years post demutualization using funds from IPOs or stocks as currency and 7.7% demutualized insurers merge with mutual holding companies. In terms of business growth, this paper finds demutualized insurers have faster net premiums written growth over time compared with the matching mutuals. Demutualized insurers strategically adjust premiums written in lines and states, i.e. they enter more new lines and states and at the same time drop more existing lines and states.

This paper also finds the motivation of demutualized insurers to reduce agency costs. Demutualized insurers lower underwriting costs and gradually increase premiums written in commercial lines which need more managerial discretion. However, demutualized stock insurers take more investment risk to transfer wealth from policyholders to stockholders.

In summary, access to capital, growth and diversification due to increased organizational flexibility, and the reduction of agency costs are important motivations behind the demutualization decisions. They are not necessarily mutually exclusive and may work together to lead to the demutualization decisions.

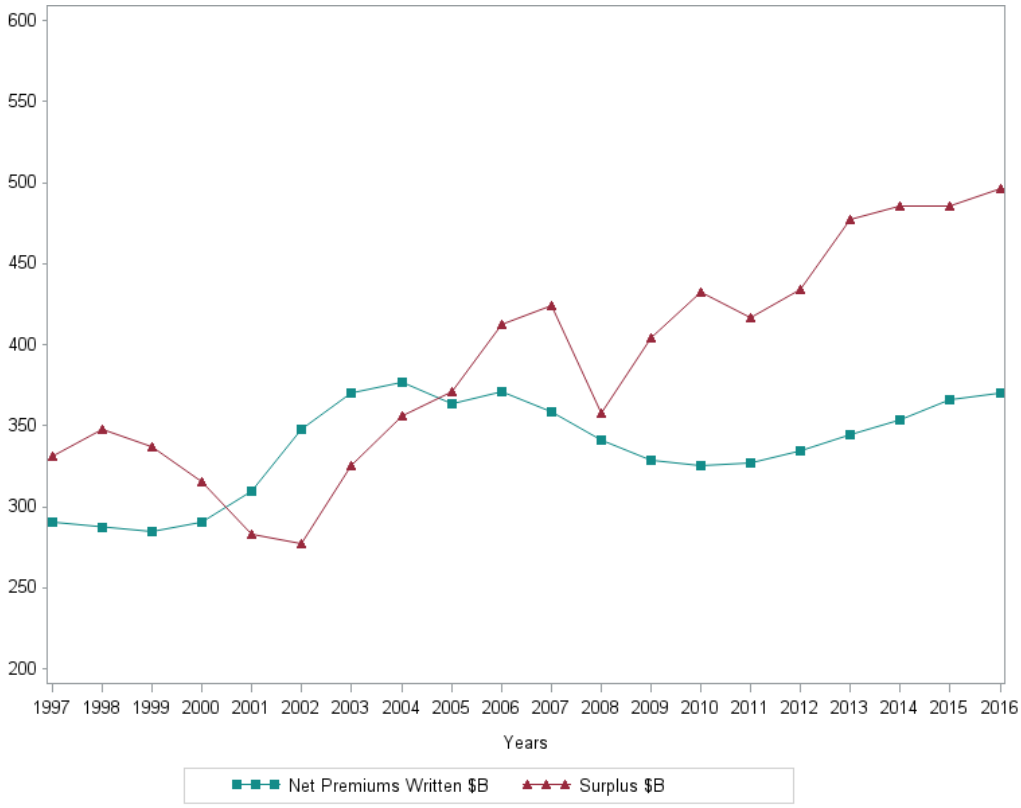

Figure 2.1: Surplus and net premiums written in the property-liability insurance industry. This figure plots the aggregate surplus and net premiums written in the property-liability insurance industry from 1997 to 2016. The unit is billion dollars. All dollar amounts are in 1999-dollar value.

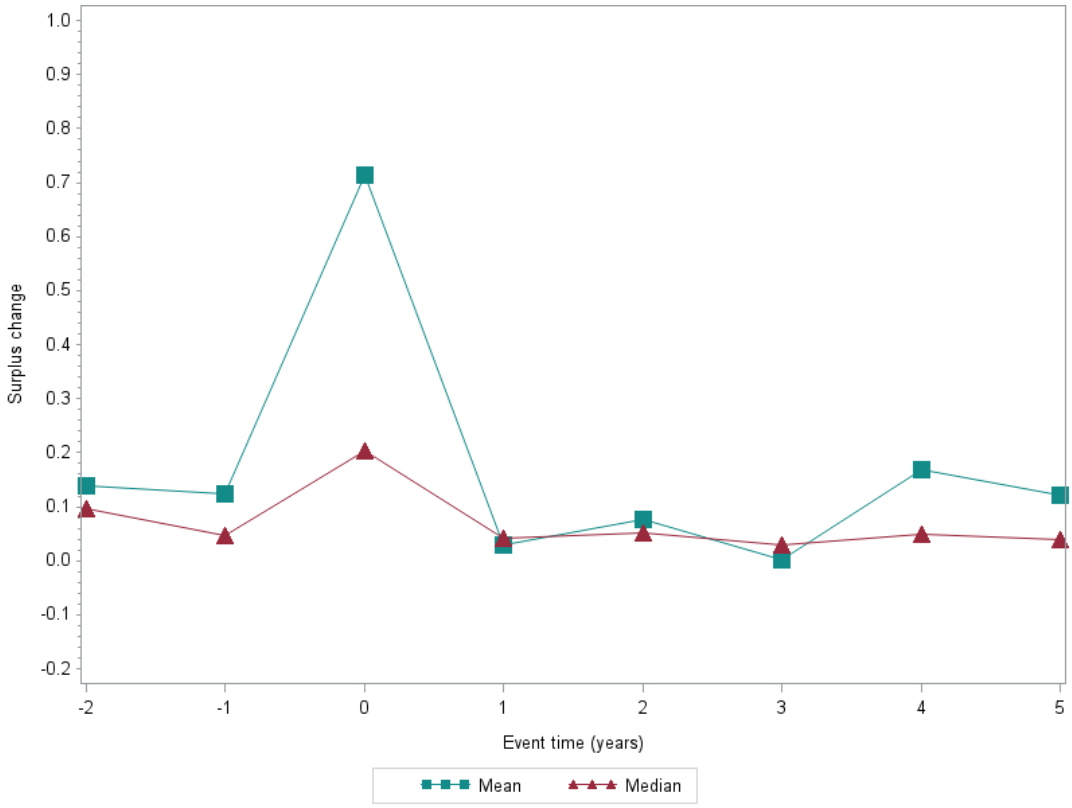

Figure 2.2: Surplus change around demutualization. This figure plots the percent change of surplus for 39 demutualized insurers two years before and five years after demutualization. Surplus is in 1999-dollar value.

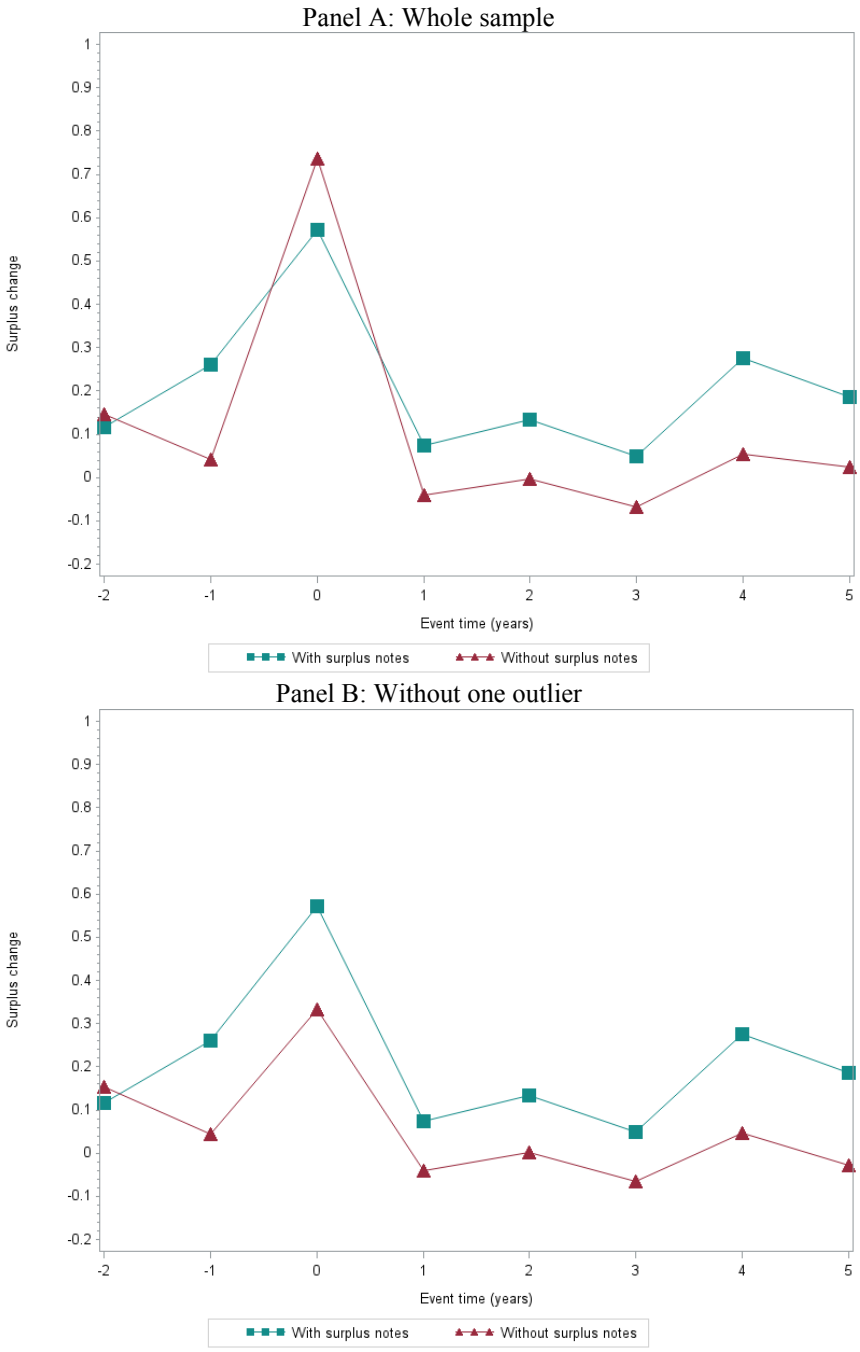

Figure 2.3: Surplus change across time for demutualized insurers with and without surplus notes. This figure splits 39 demutualized insures into two subgroups based the existence of surplus notes or not in year -1 and plots the mean surplus change two years before and five years post demutualization. Panel A plots the whole sample while Panel B excludes one outlier with surplus change 999% in year 0. Surplus is in 1999-dollar value.

Table 2.1: The distribution of demutualized insurers by year and state

This table provides the distribution of 39 demutualized insurers by the effective years of demutualization and the states of headquarter.

Panel A. Distribution by year

Year	No. of demutualized insurers	Year	No. of demutualized insurers
1997	5	2004	2
1998	4	2005	2
1999	6	2006	3
2000	3	2007	3
2001	3	2008	1
2002	2	2009	1
2003	4	Total	39

Panel B. Distribution by state

State	No. of demutualized insurers	State	No. of demutualized insurers
PA	9	NY	2
FL	4	AR	1
IA	4	LA	1
MI	4	MN	1
ME	3	MT	1
TX	3	NJ	1
IL	2	NV	1
WI	2	Total	39

Table 2.2: Descriptive statistics of demutualized insurers and matching mutuals

This table reports the descriptive statistics for demutualized insurers and the matching mutuals in year -1 (*Risk* is from year -2 to -1). There are 39 demutualized insurers in the P-L insurance industry from 1997 to 2009. Every demutualized insurer is matched by three mutual insurers based on surplus, direct premiums written, and the existence of surplus notes or not in year -1. Continuous variables are pooled winsorized at the 1% and 99% levels. All dollar amounts are in 1999-dollar value. Variables are defined in Appendix B. The two-sample *t*-test and the Wilcoxon rank sum test *p*-values are used for tests of differences in means and medians. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Demutualized insurers				Matching mutuals				*p*-Values	
Variable	N	Mean	Median	Std. Dev.	N	Mean	Median	Std. Dev.	*t*-test	Wilcoxon
Assets ($MM)	39	147.600	37.001	324.000	117	122.100	37.013	255.000	0.615	0.867
Surplus ($MM)	39	46.440	14.837	84.133	117	46.414	13.972	87.404	0.999	0.854
Surplus/Assets	39	0.450	0.383	0.197	117	0.473	0.440	0.197	0.534	0.366
Surplus growth	38	0.104	0.028	0.268	101	0.142	0.051	0.336	0.534	0.653
SN dummy	39	0.385	0.000	0.493	117	0.385	0.000	0.489	1.000	1.000
SN amount ($MM)	39	1.996	0.000	3.844	117	1.567	0.000	2.998	0.527	0.867
DPW($MM)	38	40.867	19.091	58.628	117	49.788	22.370	89.401	0.481	0.773
NPW ($MM)	38	35.816	12.266	61.580	117	41.931	13.580	85.601	0.633	0.827
NPW growth	36	0.072	0.014	0.407	94	0.052	0.046	0.192	0.774	0.237
Reinsurance ratio	37	0.346	0.248	0.280	116	0.334	0.261	0.281	0.825	0.805
ROA	38	0.006	0.014	0.059	117	0.019	0.018	0.051	0.174	0.346
Expense ratio	35	0.446	0.373	0.230	110	0.348	0.317	0.193	0.0137**	0.006***
Loss ratio	36	0.641	0.665	0.237	110	0.720	0.702	0.289	0.142	0.487
Risk	31	0.065	0.024	0.080	96	0.089	0.045	0.121	0.189	0.198
Dividends dummy	39	0.154	0.000	0.366	117	0.205	0.000	0.406	0.485	0.486
Tax rate	39	0.157	0.147	0.170	117	0.181	0.159	0.271	0.517	0.815
% commercial lines premiums	36	0.580	0.569	0.389	111	0.617	0.724	0.378	0.605	0.487
% long-tail lines premiums	36	0.741	0.802	0.268	111	0.746	0.794	0.289	0.936	0.598
Line of business Herfindahl	36	0.493	0.343	0.338	111	0.559	0.441	0.325	0.295	0.295
State of business Herfindahl	36	0.719	0.903	0.319	116	0.719	1.000	0.348	0.992	0.899

Table 2.3: M&A activities post demutualization

This table describes the demutualized insurers who participate in merger and acquisition (M&A) activities five years post demutualization.

Role of insurers	Event Time	No. of insurers	Demutualization type		Counterparty type	Sources of financing	No. of insurers
			Full	MHC			
Target	0	20*	20		Stock	Surplus notes redemption	2
						Surplus notes redemption and injection	8
						Parent injection	10
Acquirer	0	1	1		Stock	IPO	
	1	2	1	1	Stock	Common stocks as bank loan collateral	
	2	1		1	Stock	N/A	
	3	1		1	Stock	IPO	
	4	1	1		Stock	Capital infusion from upstream holding company	
Merger	0	1		1	MHC		
	1						
	2						
	3						
	4	1		1	MHC		
	5	1		1	MHC		
None		10	7	3		IPOs	3

*Here is the number of first acquisition since one demutualized stock insurer becomes target twice.

Table 2.4: Some characteristics of demutualized insurers

This table presents year-by-year means and the *t*-test results of variables from year -1 to year 5 for the demutualized insurers and the matching mutuals in the first part and for the demutualized insurers with and without surplus notes in year -1 (Dem. insurers w/ SN and Dem. insurers w/o SN) in the second part. Surplus change is the growth rate of surplus defined as $surplus_t/surplus_{t-1}$ -1. Net premiums written (NPW) change is defined as NPW_t/NPW_{t-1} -1. Surplus notes usage is the fraction of insurers using surplus notes within each group. Surplus notes amount is the dollar amount of surplus notes measured in millions. Net total assets are measured in millions. All dollar amounts are in 1999-dollar value. Continuous variables are pooled winsorized at the 1% and 99% levels. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Demutualized insurers			Matching mutuals			*p*-Value
Year	N	Mean	Std. Dev.	N	Mean	Std. Dev.	*t*-Test
Panel A. Surplus change							
-1	38	0.104	0.268	101	0.142	0.336	0.534
0	39	0.316	0.540	115	0.097	0.283	0.020**
1	38	0.008	0.187	111	0.047	0.165	0.226
2	38	0.052	0.237	111	0.018	0.163	0.409
3	36	-0.022	0.173	111	0.037	0.196	0.107
4	35	0.129	0.368	110	0.054	0.232	0.268
5	34	0.091	0.374	108	0.060	0.247	0.655
Panel B. Net premiums written change							
-1	36	0.072	0.407	94	0.052	0.192	0.774
0	34	0.224	0.336	108	0.079	0.282	0.028**
1	34	0.170	0.321	104	0.071	0.280	0.086*
2	35	0.175	0.401	104	0.079	0.247	0.188
3	34	0.105	0.343	104	0.097	0.273	0.897
4	33	0.103	0.342	101	0.106	0.290	0.959
5	31	0.157	0.411	98	0.049	0.226	0.170
Panel C. Surplus notes usage							
-1	39	0.385	0.493	117	0.385	0.489	1.000
0	39	0.103	0.307	115	0.365	0.484	0.000***
1	38	0.079	0.273	112	0.384	0.489	0.000***
2	38	0.079	0.273	112	0.357	0.481	0.000***
3	36	0.056	0.232	111	0.360	0.482	0.000***
4	35	0.057	0.236	110	0.346	0.478	0.000***
5	34	0.088	0.288	108	0.380	0.488	0.000***
Panel D. Surplus notes amount ($MM)							
-1	39	1.996	3.844	117	1.567	2.998	0.527
0	39	0.372	1.536	115	1.444	2.722	0.003***
1	38	0.138	0.561	112	1.461	2.566	0.000***
2	38	0.294	1.147	112	1.340	2.401	0.001***
3	36	0.281	1.341	111	1.521	2.858	0.001***
4	35	0.503	2.101	110	1.431	2.806	0.074*
5	34	0.890	3.123	108	1.889	3.527	0.141
	Dem. insurers w/ SN			Dem. insurers w/o SN			*p*-Value
Year	N	Mean	Std. Dev.	N	Mean	Std. Dev.	*t*-Test
Panel E. Net total assets ($MM)							
-1	15	30.485	30.863	24	220.700	397.900	0.029**
0	15	39.927	40.482	24	231.600	425.900	0.039**
1	15	40.362	42.748	23	235.900	424.300	0.039**
2	15	47.073	45.625	23	239.400	423.600	0.042**
3	14	58.185	52.939	22	239.400	402.400	0.049**
4	14	72.053	61.861	21	241.500	411.000	0.077*
5	14	86.745	71.074	20	203.900	362.600	0.174

Table 2.5: Surplus and premiums changes: demutualized insurers with vs. without surplus notes

This table splits the demutualized insurers into two groups based on the existence of surplus notes or not in year -1 and presents year-by-year means and the *t*-test results of variables from year -1 to year 5. p-Value$_1$ is the *t*-test results between demutualized insurers with surplus notes (Dem. insurers w/ SN) and demutualized insurers without surplus notes (Dem. insurers w/o SN). p-Value$_2$ is the *t*-test results between demutualized insurers with surplus notes and their matching mutuals. p-Value$_3$ is the *t*-test results between demutualized insurers without surplus notes and their matching mutuals. Surplus change is the growth rate of surplus defined as $\text{surplus}_t/\text{surplus}_{t-1}$ -1. Net premiums written (NPW) change is defined as $\text{NPW}_t/\text{NPW}_{t-1}$ -1. All dollar amounts are in 1999-dollar value. Continuous variables are pooled winsorized at the 1% and 99% levels. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Dem. insurers w/ SN			Dem. insurers w/o SN			p-Value$_1$	Matching mutuals w/ SN			p-Value$_2$	Matching mutuals w/o SN			p-Value$_3$
Year	N	Mean	Std. Dev.	N	Mean	Std. Dev.	*t*-Test	N	Mean	Std. Dev.	*t*-Test	N	Mean	Std. Dev.	*t*-Test
Panel A. Surplus change															
-1	15	0.215	0.329	23	0.032	0.196	0.067*	38	0.265	0.430	0.686	63	0.068	0.239	0.520
0	15	0.468	0.541	24	0.221	0.528	0.167	44	0.166	0.396	0.024**	71	0.054	0.171	0.142
1	15	0.074	0.219	23	-0.035	0.154	0.078*	43	0.076	0.167	0.972	68	0.029	0.163	0.103
2	15	0.134	0.250	23	-0.001	0.218	0.085*	43	-0.007	0.195	0.029**	68	0.033	0.139	0.482
3	14	0.050	0.140	22	-0.068	0.179	0.045**	43	0.046	0.280	0.952	68	0.031	0.119	0.022**
4	14	0.226	0.504	21	0.064	0.234	0.278	42	0.044	0.226	0.212	68	0.061	0.237	0.957
5	14	0.185	0.479	20	0.025	0.272	0.272	42	0.135	0.311	0.715	66	0.013	0.183	0.856
Panel B. Net premiums written change															
-1	13	0.013	0.528	23	0.106	0.330	0.520	33	0.025	0.261	0.936	61	0.066	0.142	0.582
0	14	0.347	0.448	20	0.138	0.200	0.120	38	0.044	0.328	0.010***	70	0.098	0.254	0.525
1	14	0.286	0.336	20	0.089	0.291	0.077*	37	0.081	0.404	0.097*	67	0.065	0.182	0.737
2	14	0.120	0.161	21	0.212	0.502	0.445	37	0.093	0.360	0.710	67	0.071	0.155	0.221
3	13	0.200	0.434	21	0.045	0.267	0.206	37	0.071	0.319	0.259	67	0.112	0.246	0.294
4	14	0.261	0.408	19	-0.014	0.230	0.035**	34	0.049	0.333	0.067*	67	0.134	0.264	0.029**
5	13	0.292	0.475	18	0.060	0.340	0.124	33	0.040	0.306	0.096*	65	0.053	0.175	0.936

Table 2.6: Surplus change post demutualization: demutualized insurers

This table reports the results of cumulative surplus growth post demutualization on demutualization dummy using the sample of demutualized insurers and their matching mutuals (the following equation).

$$\Delta\text{Surplus}_{-1,t} = \text{I(Dem)} + \text{Size} + \Delta\text{DPW} + \Delta\text{Reins} + \text{Ave. tax rate} + \text{Ave. ROA} + \text{Risk} + \text{I(Dividends)}$$

Surplus change ($\Delta Surplus_{-1,t}$) is defined as $Surplus_t/Surplus_{-1}-1$, where t stands for 1, 2, 3, 4, and 5 years post demutualization. *I(Dem)* is a dummy variable equal to one for demutualized insurers and 0 otherwise. *Size* is the natural logarithm of net total assets in year -1. ΔDPW is the change of direct premiums written (DPW) from year -1 to t, defined as $DPW_t/DPW_{-1}-1$. $\Delta Reins$ is the change of reinsurance ratio (Reins) defined as $Reins_t/Reins_{-1}-1$, where reinsurance ratio is defined as reinsurance ceded to direct premiums written and reinsurance assumed. *Ave. tax rate* is the average of tax rate from year 0 to t, where tax rate is defined as federal income tax to taxable income. *Ave. ROA* is the average of return on assets (ROA) from year 0 to t, where ROA is defined as net income to net total assets. *Risk* is measured by the volatility of loss ratio from year 0 to year t, where loss ratio is calculated as loss incurred and loss adjustment expenses to net premiums earned. *I(Dividends)* is a dummy variable equal to 1 if the insurer pays dividends from year 0 to year t and 0 otherwise. All dollar amounts are in 1999-dollar value. Continuous variables are pooled winsorized at the 1% and 99% levels. *t*-statistics are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	$\Delta Surplus_{-1,1}$	$\Delta Surplus_{-1,2}$	$\Delta Surplus_{-1,3}$	$\Delta Surplus_{-1,4}$	$\Delta Surplus_{-1,5}$
	(1)	(2)	(3)	(4)	(5)
I(Dem)	0.360***	0.345**	0.274*	0.457**	0.570**
	(2.80)	(2.55)	(1.84)	(2.44)	(2.51)
Size	-0.106***	-0.130***	-0.140***	-0.131**	-0.106
	(-2.78)	(-3.29)	(-3.12)	(-2.28)	(-1.50)
ΔDPW	0.714***	0.428***	0.377***	0.296***	0.230***
	(9.03)	(7.60)	(6.53)	(4.55)	(3.03)
ΔReins	-0.022	0.014	-0.049	-0.034	-0.108
	(-0.38)	(0.23)	(-0.56)	(-0.35)	(-1.06)
Ave. tax rate	0.393	0.589	0.945**	1.207**	0.936
	(1.38)	(1.61)	(2.13)	(2.11)	(1.36)
Ave. ROA	1.576	3.065*	4.843**	8.549***	10.920***
	(1.20)	(1.97)	(2.45)	(3.15)	(2.82)
Risk	-0.032	-1.765***	-0.575	0.395	1.008
	(-0.05)	(-3.11)	(-0.89)	(0.51)	(1.01)
I(Dividends)	-0.015	-0.082	-0.145	-0.214	-0.347
	(-0.12)	(-0.64)	(-1.03)	(-1.22)	(-1.66)
Intercept	0.392**	0.648***	0.550***	0.361	0.349
	(2.31)	(3.81)	(2.72)	(1.37)	(1.03)
N	123	124	122	119	117
Adj. R^2	0.456	0.425	0.413	0.338	0.265

Table 2.7: Surplus change post demutualization: demutualized insurers with surplus notes

This table reports the results of ordinary least squares regression of cumulative surplus growth post demutualization on the dummy of demutualized insurers with surplus notes in year -1 (the following equation).

$$\Delta\text{Surplus}_{-1,t} = \text{I(Dem} * \text{SN)} + \text{Size} + \Delta\text{DPW} + \Delta\text{Reins} + \text{Ave. tax rate} + \text{Ave. ROA} + \text{Risk} + \text{I(Dividends)}$$

Surplus change ($\Delta Surplus_{-1,t}$) is defined as $Surplus_t/Surplus_{-1}$-1, where t stands for 1, 2, 3, 4, and 5 years post demutualization. *I(Dem*SN)* is a dummy variable equal to one for demutualized insurers with surplus notes in year -1 and 0 otherwise. *Size* is the natural logarithm of net total assets in year -1. ΔDPW is the change of direct premiums written (DPW) from year -1 to t, defined as DPW_t/DPW_{-1}-1. $\Delta Reins$ is the change of reinsurance ratio (Reins) defined as $Reins_t/Reins_{-1}$-1, where reinsurance ratio is defined as reinsurance ceded to direct premiums written and reinsurance assumed. *Ave. tax rate* is the average of tax rate from year 0 to t, where tax rate is defined as federal income tax to taxable income. *Ave. ROA* is the average of return on assets (ROA) from year 0 to t, where ROA is defined as net income to net total assets. *Risk* is measured by the volatility of loss ratio from year 0 to year t, where loss ratio is calculated as loss incurred and loss adjustment expenses to net premiums earned. *I(Dividends)* is a dummy variable equal to 1 if the insurer pays dividends from year 0 to year t and 0 otherwise. All dollar amounts are in 1999-dollar value. Continuous variables are pooled winsorized at the 1% and 99% levels. *t*-statistics are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	$\Delta Surplus_{-1,1}$	$\Delta Surplus_{-1,2}$	$\Delta Surplus_{-1,3}$	$\Delta Surplus_{-1,4}$	$\Delta Surplus_{-1,5}$
	(1)	(2)	(3)	(4)	(5)
I(Dem*SN)	0.189	0.166	0.153	0.456*	0.742**
	(0.99)	(0.84)	(0.69)	(1.70)	(2.24)
Size	-0.099**	-0.125***	-0.140***	-0.131**	-0.100
	(-2.50)	(-3.06)	(-3.05)	(-2.23)	(-1.41)
ΔDPW	0.706***	0.431***	0.382***	0.300***	0.213***
	(8.53)	(7.30)	(6.41)	(4.52)	(2.73)
ΔReins	-0.027	-0.005	-0.039	-0.012	-0.089
	(-0.46)	(-0.08)	(-0.43)	(-0.12)	(-0.86)
Ave. tax rate	0.512*	0.723*	1.098**	1.311**	0.944
	(1.77)	(1.95)	(2.49)	(2.27)	(1.35)
Ave. ROA	0.860	2.316	4.342**	7.768***	9.339**
	(0.65)	(1.47)	(2.18)	(2.84)	(2.44)
Risk	0.216	-1.631***	-0.531	0.233	0.691
	(0.32)	(-2.82)	(-0.81)	(0.30)	(0.69)
I(Dividends)	0.000	-0.057	-0.120	-0.182	-0.321
	(0.00)	(-0.43)	(-0.84)	(-1.03)	(-1.53)
Intercept	0.405**	0.673***	0.571***	0.420	0.455
	(2.29)	(3.84)	(2.78)	(1.58)	(1.36)
N	123	124	122	119	117
Adj. R^2	0.424	0.396	0.398	0.320	0.256

Table 2.8: Premiums change post demutualization: demutualized insurers

This table reports the results of the ordinary least squares regression of cumulative net premiums written growth post demutualization on demutualization dummy using the sample of demutualized insurers and their matching mutual (the following equation).

$$\Delta\text{NPW}_{-1,t} = \text{I(Dem)} + \text{Size} + \Delta\text{Surplus}_{-1,t-1} + \Delta\text{Reins} + \text{Ave. tax rate} + \text{Ave. ROA} + \text{Risk}$$

Net premiums written change ($\Delta NPW_{-1,t}$) is defined as $NPW_t/NPW_{-1}-1$, where t stands for 1, 2, 3, 4, and 5 years post demutualization and NPW is the abbreviation of net premiums written. *I(Dem)* is a dummy variable equal to one for demutualized insurers and 0 otherwise. *Size* is the natural logarithm of net total assets in year -1. $\Delta Surplus_{-1,t-1}$ is the surplus change lagged by one year, defined as $Surplus_{t-1}/Surplus_{-1}-1$. $\Delta Reins$ is the change of reinsurance ratio (Reins) defined as $Reins_t/Reins_{-1}-1$, where reinsurance ratio is defined as reinsurance ceded to direct premiums written and reinsurance assumed. *Ave. tax rate* is the average of tax rate from year 0 to t, where tax rate is defined as federal income tax to taxable income. *Ave. ROA* is the average of return on assets (ROA) from year 0 to t, where ROA is defined as net income to net total assets. *Risk* is measured by the volatility of loss ratio from year 0 to year t, where loss ratio is calculated as loss incurred and loss adjustment expenses to net premiums earned. All dollar amounts are in 1999-dollar value. Continuous variables are pooled winsorized at the 1% and 99% levels. *t*-statistics are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	$\Delta NPW_{-1,1}$	$\Delta NPW_{-1,2}$	$\Delta NPW_{-1,3}$	$\Delta NPW_{-1,4}$	$\Delta NPW_{-1,5}$
	(1)	(2)	(3)	(4)	(5)
I(Dem)	0.225*	0.266*	0.323*	0.461**	0.681**
	(1.85)	(1.86)	(1.70)	(2.14)	(2.41)
Size	-0.005	0.012	0.018	0.075	0.025
	(-0.16)	(0.31)	(0.31)	(1.18)	(0.30)
$\Delta Surplus_{-1,t-1}$	0.132	0.188**	0.257**	0.217*	0.152
	(1.48)	(2.39)	(2.42)	(1.92)	(1.18)
$\Delta Reins$	-0.143***	-0.126**	-0.274**	-0.337***	-0.243*
	(-2.73)	(-2.04)	(-2.50)	(-3.10)	(-1.93)
Ave. tax rate	-0.228	-0.103	-0.203	0.041	1.221
	(-0.86)	(-0.27)	(-0.36)	(0.06)	(1.44)
Ave. ROA	0.711	0.067	-2.042	-0.706	0.578
	(0.59)	(0.04)	(-0.81)	(-0.22)	(0.12)
Risk	0.736	0.580	-0.402	1.230	1.555
	(1.19)	(0.82)	(-0.44)	(1.32)	(1.18)
Intercept	0.077	0.052	0.299	-0.137	-0.193
	(0.48)	(0.27)	(1.11)	(-0.44)	(-0.45)
N	123	123	121	118	116
Adj. R^2	0.091	0.092	0.102	0.120	0.113

Table 2.9: Premiums change post demutualization: demutualized insurers with surplus notes

This table reports the results of the ordinary least squares regression of cumulative net premiums written growth post demutualization on the dummy of demutualized insurers with surplus notes in year -1 using the sample of demutualized insurers and their matching mutuals (the following equation).

$$\Delta\text{NPW}_{-1,t} = \text{I(Dem} * \text{SN)} + \text{I(Mut} * \text{woSN)} + \text{I(Mut} * \text{SN)} + \text{Size} + \Delta\text{Surplus}_{-1,t-1} + \Delta\text{Reins} + \text{Ave. tax rate} + \text{Ave. ROA} + \text{Risk}$$

Net premiums written change ($\Delta NPW_{-1,t}$) is defined as $NPW_t/NPW_{-1}-1$, where t stands for 1, 2, 3, 4, and 5 years post demutualization and NPW is the abbreviation of net premiums written. *I(Dem*SN)* is a dummy variable equal to one for demutualized insurers with surplus notes in year -1 and 0 otherwise. *I(Mut*woSN)* and *I(Mut*SN)* are dummy variables equal to one for the matching mutuals without surplus notes and with surplus notes in year -1. *Size* is the natural logarithm of net total assets in year -1. $\Delta Surplus_{-1,t-1}$ is the surplus change lagged by one year, defined as $Surplus_{t-1}/Surplus_{-1}-1$. $\Delta Reins$ is the change of reinsurance ratio (Reins) defined as $Reins_t/Reins_{-1}-1$, where reinsurance ratio is defined as reinsurance ceded to direct premiums written and reinsurance assumed. *Ave. tax rate* is the average of tax rate from year 0 to t, where tax rate is defined as federal income tax to taxable income. *Ave. ROA* is the average of return on assets (ROA) from year 0 to t, where ROA is defined as net income to net total assets. *Risk* is measured by the volatility of loss ratio from year 0 to year t, where loss ratio is calculated as loss incurred and loss adjustment expenses to net premiums earned. All dollar amounts are in 1999-dollar value. Continuous variables are pooled winsorized at the 1% and 99% levels. *t*-statistics are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	$\Delta NPW_{-1,1}$	$\Delta NPW_{-1,2}$	$\Delta NPW_{-1,3}$	$\Delta NPW_{-1,4}$	$\Delta NPW_{-1,5}$
	(1)	(2)	(3)	(4)	(5)
I(Dem*SN)	0.733***	0.622**	0.767**	0.897**	1.903***
	(3.62)	(2.57)	(2.38)	(2.50)	(4.17)
I(Mut*woSN)	0.127	0.077	0.093	0.117	0.217
	(0.87)	(0.44)	(0.41)	(0.44)	(0.66)
I(Mut*SN)	-0.021	-0.180	-0.269	-0.447	-0.221
	(-0.13)	(-0.92)	(-1.06)	(-1.58)	(-0.62)
Size	0.013	0.022	0.018	0.064	0.037
	(0.40)	(0.55)	(0.33)	(1.04)	(0.47)
$\Delta Surplus_{-1,t-1}$	0.128	0.187**	0.262**	0.232**	0.142
	(1.51)	(2.45)	(2.54)	(2.16)	(1.19)
$\Delta Reins$	-0.152***	-0.137**	-0.250**	-0.283***	-0.175
	(-3.06)	(-2.30)	(-2.34)	(-2.72)	(-1.49)
Ave. tax rate	-0.277	-0.189	-0.324	-0.150	0.736
	(-1.10)	(-0.51)	(-0.59)	(-0.24)	(0.93)
Ave. ROA	-0.042	-0.559	-2.748	-1.506	-1.227
	(-0.04)	(-0.35)	(-1.12)	(-0.50)	(-0.27)
Risk	0.783	0.604	-0.365	1.281	1.268
	(1.31)	(0.87)	(-0.42)	(1.45)	(1.03)
Intercept	-0.046	0.055	0.352	0.008	-0.181
	(-0.21)	(0.21)	(1.02)	(0.02)	(-0.39)
N	123	123	121	118	116
Adj. R^2	0.184	0.154	0.160	0.209	0.242

Table 2.10: Lines and states change post demutualization

Panel A reports lines and states changes of demutualized insurers post demutualization while Panel B adjusts for the change of matching mutuals. Year means event year. No. insurers stands for the number of demutualized insurers. No. lines and No. states stand for the number of lines and the number of states, respectively.

Panel A. Demutualized insurers

	Add lines		Drop lines		Add states		Drop states	
Year	No. insurers	No. lines	No. insurers	No. lines	No. insurers	No. states	No. insurers	No. states
0	11	30	6	8	9	14	6	24
1	8	19	8	18	7	25	5	18
2	8	13	9	15	7	49	4	7
3	5	34	5	8	10	77	4	5
4	10	33	11	14	10	33	8	15
5	5	9	7	17	9	22	5	6

Panel B. Adjust for matching mutuals

	Add lines		Drop lines		Add states		Drop states	
Year	No. insurers	No. lines	No. insurers	No. lines	No. insurers	No. states	No. insurers	No. states
0	5	18	1	-6	2	0	3	19
1	4	11	3	13	2	17	3	10
2	3	1	6	11	2	41	1	3
3	2	31	2	4	5	68	1	-10
4	7	27	8	10	5	25	5	9
5	2	6	2	2	5	15	3	3

Table 2.11: Efficiency changes for demutualized stock insurer targets and non-targets

This table presents the efficiency change for demutualized stock insurers who become targets versus the rest. Panel A provides technical efficiency, allocative efficiency, and cost efficiency using value-added data envelopment analysis (DEA). Panel B provides technical efficiency change, pure technical efficiency, scale efficiency, technical change, and total factor productivity using Malmquist DEA.

Panel A. Value-added-DEA

	Technical efficiency		Allocative efficiency		Cost efficiency	
Year	Target	Non-target	Target	Non-target	Target	Non-target
0	0.710	0.568	0.716	0.629	0.508	0.347
1	0.676	0.593	0.712	0.579	0.465	0.335
2	0.657	0.582	0.692	0.574	0.452	0.317
3	0.627	0.582	0.719	0.673	0.443	0.374
4	0.651	0.623	0.701	0.651	0.442	0.413
5	0.704	0.623	0.785	0.661	0.543	0.392

Panel B. Malmquist-DEA Cumulative Results

	Technical efficiency change		Pure technical efficiency		Scale efficiency		Technical change		Total factor productivity	
Year	Target	Non-target	Target	Non-target	Target	Non-target	Target	Non-target	Target	Non-target
0	0.957	1.045	0.959	1.053	1.004	0.985	0.854	0.936	0.824	0.963
1	0.882	1.068	0.874	1.040	0.915	1.026	0.883	0.934	0.793	0.972
2	0.976	1.007	0.953	1.013	0.925	1.003	0.915	1.011	0.909	0.986
3	1.056	1.181	1.031	1.191	0.926	1.002	0.869	1.074	0.928	1.225
4	0.991	1.402	0.966	1.406	0.926	1.005	0.855	0.926	0.852	1.232
5	0.927	1.342	0.925	1.410	0.905	0.958	0.915	1.029	0.854	1.291

Table 2.12: Premiums written on commercial lines post demutualization

This table reports results of the ordinary least squares regression of cumulative change of net premiums written on commercial lines on demutualization dummy using the sample of demutualized insurers and their matching mutuals (the following equation).

$$\Delta\text{Comm}_{-1,t} = \text{I(Dem)} + \text{Size} + \Delta\text{Surplus} + \text{Ave. ROA} + \text{Ave. HHI}$$

Growth of net premiums written in commercial lines ($\Delta Comm_{-1,t}$) is defined as $Comm_t$-$Comm_{-1}$, where t stands for 1, 2, 3, 4, and 5 years post demutualization and Comm stands for the percentage of net premiums written in commercial lines. *I(Dem)* is a dummy variable equal to one for demutualized insurers and 0 otherwise. *Size* is the natural logarithm of net total assets in year -1. *ΔSurplus* is surplus change defined as $Surplus_t$/$Surplus_{-1}$-1. *Ave. ROA* is the average of return on assets (ROA) from year 0 to t, where ROA is defined as net income to net total assets. *Ave. HHI* is the average of HHI from year 0 to t, where HHI is the Herfindahl index calculated based on net premiums written on each line. All dollar amounts are in 1999-dollar value. Continuous variables are pooled winsorized at the 1% and 99% levels. *t*-statistics are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	$\Delta Comm_{-1,1}$	$\Delta Comm_{-1,2}$	$\Delta Comm_{-1,3}$	$\Delta Comm_{-1,4}$	$\Delta Comm_{-1,5}$
	(1)	(2)	(3)	(4)	(5)
I(Dem)	0.029	0.019	0.045**	0.087***	0.074***
	(1.56)	(0.87)	(2.24)	(3.72)	(3.05)
Size	-0.000	0.001	-0.002	-0.003	0.003
	(-0.08)	(0.22)	(-0.29)	(-0.51)	(0.43)
ΔSurplus	-0.015	-0.021	-0.031**	-0.024**	-0.026***
	(-1.34)	(-1.52)	(-2.59)	(-2.01)	(-2.64)
Ave. ROA	0.394**	0.897***	0.786***	0.767**	1.051***
	(2.11)	(3.73)	(3.13)	(2.34)	(2.75)
Ave. HHI	-0.034	-0.054*	-0.057**	-0.066**	-0.063**
	(-1.40)	(-1.91)	(-2.22)	(-2.18)	(-2.04)
Intercept	0.012	0.005	0.028	0.037	0.007
	(0.47)	(0.15)	(0.96)	(1.12)	(0.21)
N	127	127	124	122	116
Adj. R^2	0.024	0.081	0.101	0.131	0.131

Table 2.13: Expense ratio change post demutualization

This table reports the ordinary least squares regression of cumulative change of expense ratio on demutualization dummy using the sample of demutualized insurers and their matching mutuals.

$$\Delta\text{Expense}_{-1,t} = \text{I(Dem)} + \text{Size} + \Delta\text{Surplus} + \text{Ave. ROA} + \text{Ave. HHI}$$

Expense ratio change ($\Delta Expense_{-1,t}$) is defined as $Expense_t$-$Expense_{-1}$, where t stands for 1, 2, 3, 4, and 5 years post demutualization and Expense stands for expense ratio defined as underwriting expense to premiums written. *I(Dem)* is a dummy variable equal to one for demutualized insurers and 0 otherwise. *Size* is the natural logarithm of net total assets in year -1. *ΔSurplus* is surplus change defined as $Surplus_t$/$Surplus_{-1}$-1. *Ave. ROA* is the average of return on assets (ROA) from year 0 to t, where ROA is defined as net income to net total assets. *Ave. HHI* is the average of HHI from year 0 to t, where HHI is the Herfindahl index calculated based on net premiums written on each line. All dollar amounts are in 1999-dollar value. Continuous variables are pooled winsorized at the 1% and 99% levels. *t*-statistics are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	$\Delta Expense_{-1,1}$	$\Delta Expense_{-1,2}$	$\Delta Expense_{-1,3}$	$\Delta Expense_{-1,4}$	$\Delta Expense_{-1,5}$
	(1)	(2)	(3)	(4)	(5)
I(Dem)	-0.044**	-0.043**	-0.034	-0.051*	-0.092***
	(-2.17)	(-1.99)	(-1.56)	(-1.98)	(-3.18)
Size	0.003	-0.001	-0.005	-0.001	-0.007
	(0.45)	(-0.24)	(-0.73)	(-0.14)	(-0.85)
ΔSurplus	-0.011	-0.021	-0.036***	-0.026**	-0.007
	(-0.85)	(-1.52)	(-2.80)	(-2.04)	(-0.62)
Ave. ROA	0.259	-0.055	0.948***	0.661*	-1.049**
	(1.26)	(-0.23)	(3.33)	(1.77)	(-2.29)
Ave. HHI	0.026	0.002	-0.014	-0.016	0.036
	(0.98)	(0.09)	(-0.50)	(-0.47)	(0.96)
Intercept	-0.020	0.016	0.008	0.001	0.067
	(-0.69)	(0.52)	(0.26)	(0.03)	(1.60)
N	126	127	123	118	116
Adj. R^2	0.050	0.032	0.113	0.065	0.115

Table 2.14: Investment risk post demutualization

This table reports the ordinary least squares regression of investment risk on demutualization dummy using the sample of demutualized insurers and their matching mutuals (the following equation).

$$\text{invRisk}_{0,t} = \text{I(Dem)} + \text{Size} + \Delta\text{Surplus} + \text{Ave. ROA} + \text{Ave. HHI}$$

Investment risk ($invRisk_{0,t}$) is measured by the standard deviation of return on investments from year 0 to year t in percentage, where t stands for 1, 2, 3, 4, and 5 years post demutualization. Return on investments is defined as net investment gain or loss to investment assets. *I(Dem)* is a dummy variable equal to one for demutualized insurers and 0 otherwise. *Size* is the natural logarithm of net total assets in year -1. *ΔSurplus* is surplus change defined as $\text{Surplus}_t/\text{Surplus}_{-1}-1$. *Ave. ROA* is the average of return on assets (ROA) from year 0 to t, where ROA is defined as net income to net total assets. *Ave. HHI* is the average of HHI from year 0 to t, where HHI is the Herfindahl index calculated based on net premiums written on each line. All dollar amounts are in 1999-dollar value. Continuous variables are pooled winsorized at the 1% and 99% levels. *t*-statistics are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	$\text{invRisk}_{0,1}$	$\text{invRisk}_{0,2}$	$\text{invRisk}_{0,3}$	$\text{invRisk}_{0,4}$	$\text{invRisk}_{0,5}$
	(1)	(2)	(3)	(4)	(5)
I(Dem)	0.234***	0.240***	0.186**	0.220**	0.105
	(2.83)	(2.74)	(2.10)	(2.55)	(1.23)
Size	-0.044*	-0.017	-0.028	-0.017	-0.023
	(-1.89)	(-0.70)	(-1.08)	(-0.70)	(-0.93)
ΔSurplus	0.054	0.057	0.048	0.024	0.074**
	(1.03)	(1.03)	(0.91)	(0.55)	(2.09)
Ave. ROA	-0.954	-0.857	-0.552	-1.760	-3.230**
	(-1.12)	(-0.87)	(-0.49)	(-1.44)	(-2.39)
Ave. HHI	0.147	0.153	0.175	0.184	0.257**
	(1.34)	(1.32)	(1.51)	(1.64)	(2.34)
Intercept	0.458***	0.413***	0.503***	0.556***	0.639***
	(3.92)	(3.35)	(3.89)	(4.49)	(5.14)
N	128	128	125	123	117
Adj. R^2	0.102	0.067	0.045	0.067	0.107

CHAPTER 3: BANK MONITORING AND HOLD-UP: EVIDENCE FROM INITIAL PUBLIC BOND OFFERINGS

3.1. Introduction

Firms benefit from using bank loans. Besides providing capital, banks play a unique role in monitoring their borrowers. Banks are motivated to conduct due diligence since they bear the cost of default. Compared with arm's-length lenders, banks have cost advantages and monitoring efficiency due to economies of scale, accessibility to firms' private information, and more concentrated debt claims (Diamond, 1984; Fama, 1985; Houston and James, 1996). Vast amount of works document supportive results of bank monitoring. The stock market responds positively to bank loan announcements, but indifferently or negatively to public bond offerings and equity issuances (Mikkelson and Partch, 1986, Hadlock and James, 2002). Small and medium size growth firms benefit from bank lending since banks help to reduce agency costs in various ways (James 1987; Diamond, 1991a; Almazan and Suarez, 2003). There are also direct evidences of corporate decisions influenced by banks. Ahn and Choi (2009) find a negative relation between bank monitoring strength and corporate earnings management. Marshall et al. (2014) show bank's monitoring role in CEO succession and find better cash flow performance after the forced CEO turnover. In short, banks provide valuable monitoring to firms and reduce the moral hazard problem associated with external financing.

Bondholders also benefit from bank monitoring mainly for two reasons. First, as discussed above, bank monitoring provides value to firms by reducing agency costs and provides value to creditors by reducing managers' risk-taking behaviors. Second, bondholders benefit from cross-monitoring. Bondholders can spend fewer expenses on

monitoring due to the information produced through bank monitoring. Several empirical works support cross-monitoring hypothesis. Datta et al. (1999) find lower at-issue yield spread of first public straight bonds for firms with bank loans. Houston et al. (2014) find that loan default, a signal of questionable bank monitoring ability, negatively affects the prices of public bonds for firms borrowing from the same banks.

Besides bank monitoring benefits, using bank loans imposes potential costs on borrowers due to hold-up problem. Banks acquire information advantage during lending (Fama, 1985; Sharpe, 1990; Rajan, 1992). And they can use excess control rights or bargaining power to extract surplus when a firm wants to borrow more or reconstruct existing loans. This leads to the hold-up problem. Hold-up problem is especially severe for opaque borrowers with fewer financing alternatives. Information asymmetry impedes firms from switching to other banks due to adverse selection. Several empirical works demonstrate bank hold-up problem. Houston and James (1996) find that firms rely less on bank loans for important growth options to avoid hold-up problem, especially firms with a single bank relationship. Other papers document loan spreads decrease after firms reveal information to the public during initial public offerings and initial public bond offerings (Schenone, 2007; Hale and Santos, 2009).

Raising capital from the public bond market can reduce bank hold-up problem because it provides a very important source of financing to firms. However, the impact could be very different based on the financial conditions and the credit qualities of the firms. High credit quality firms can enter the public bond market earlier to avoid hold-up problem and to pay less on bank monitoring without much concern of bankruptcy costs. Although low credit quality firms can also enter the public bond market to reduce bank

hold-up problem, they also lose bank monitoring benefits and face higher bankruptcy costs from issuing public bonds. Additionally, underpricing can prevent low credit quality firms from issuing public bonds. Cai, Helwege and Warga (2007) document that the initial return is not significantly different from zero for investment grade bonds, indicating there is no underpricing for initial public bond offerings and seasoned bond offerings. However, they find speculative grade bonds are underpriced in all public offerings. Thus, incumbent banks are more likely to extract information rents from low credit quality borrowers than from high credit quality borrowers.

This paper investigates the two facets of using bank loans, i.e. the bank monitoring effects and the hold-up problem, using a unique sample of firms that make their initial public straight bond offerings (IPBOs for short later) from 1987 to 2015. For bank monitoring effect, this paper explores the effect of the strength of bank monitoring on the at-issue yield spread of initial public bonds. For bank hold-up problem, this paper examines loan spread changes at the issuance level before and after initial public bond offerings for different credit quality firms.

First, this paper examines the cross-monitoring effect of the strength of bank monitoring on the at-issue yield spread of initial public bonds. Following Datta et al. (1999), this paper uses a unique sample of firms making their initial public bond offerings. The advantages to use this sample are that it is free of the monitoring effects from other bondholders and it eliminates the potential conflicts between bondholders. This paper focuses on the strength of bank monitoring while the literature uses the existence of bank loans or not. Studying the effect on public bonds based on the strength of bank monitoring is more informative since almost all firms use some forms of bank loans in modern days.

This is because bank loans are more customized and more accessible for small amount financing. Additionally, bank loans have lower information and contracting costs since it is cheaper to give banks direct access to firms' operating decisions than to the public and firms can gain reputation during borrowings (Fama, 1985; Diamond, 1991). This paper uses three proxies for the strength of bank monitoring at the time of initial public bond offerings: the most restrictive covenant intensity of bank loans, the lead arranger of a syndicated loan who is a relationship lender to the firm, and the lead arranger who is a reputable lender (Rajan, 1992; Ahn and Choi, 2009; McCahery and Schwienbacher, 2010; Bharath et al., 2011; Li, Purda, and Wang, 2016).

This paper finds a significant decrease on the at-issue yield spread of initial public bonds for firms with the higher strength of bank monitoring. Specifically, an increase in the category of covenant and using a relationship lead arranger reduce the at-issue yield spread of initial public bonds by 16.9 bps and 27.5 bps, i.e. 7.6% and 12.4% of the average at-issue yield spread of initial public bonds, respectively. The use of reputable lead arranger also reduces the yield spread of the initial public bonds for firms without relationship lending. However, bank monitoring can generate non-positive or even negative effects on firms when the strength of bank monitoring exceeds certain level. One reason is that too powerful bank can distort the firm's investment decisions, especially when the firm needs additional financing from the bank once the project starts. Suboptimal investments will reduce firm value which in turn reduces bond value. This paper finds evidence that bondholders require a premium to compensate the potential problem of over-monitoring when the reputable lead arranger is also a relationship lender.

Next, this paper investigates bank hold-up problem for firms with different credit qualities when they first enter the public bond market. It examines loan spread changes at the issuance level before and after initial public bond offerings for different credit quality firms. Interestingly, this study finds that only low credit quality firms benefit from issuing public bonds but not high credit quality firms. This result is different from Hale and Santos (2009) who find high credit quality firms enjoy the decrease of loan spread but not low credit quality firms. The reason for the difference is that this paper controls for the loan spread difference between high credit quality firms and low credit quality firms before initial public bond offerings. Specifically, bank loans borrowed within one year after entering the public bond market have loan spreads 48 bps lower, a 21% reduction, than the prior loan spreads for low credit quality firms. One possible reason is that high credit quality firms enter the public bond market earlier to avoid the hold-up problem (Hale and Santos, 2008). To address the concern that the loan spread decrease is caused by cash infusions from public bond offerings, this paper examines the loan spread changes at the issuance level around the firm's second public bond offerings. This paper does not find any significant drop in loan spreads after the second public bond offerings, indicating that banks are less able to hold-up firms with alternative sources of financing.

This paper provides several contributions to the literature. First, this paper focuses on the effect of the strength of bank monitoring on the yield spread of initial public bonds while the prior literature considers only the existence of bank loans or not. The strength of bank monitoring is more informative since nearly all firms have some types of bank loans such as revolving credit facilities, letters of credit, and term loans. Second, this paper finds that the strength of bank monitoring over certain level will generate non-positive or even

negative effects to firms. Specifically, this paper finds bond investors require a premium for the initial public bonds when the reputable lead arranger is also a relationship lender. Third, this paper finds banks only hold-up low credit quality firms but not high credit quality firms before they enter the public bond market while Hale and Santos (2009) find the opposite. The reason for the difference is that this paper controls for the loan spread difference between high credit quality firms and low credit quality firms before initial public bond offerings.

The remainder of the paper is organized as follows. Section 3.2 presents hypotheses and empirical strategies. Section 3.3 describes the sample generation process and summary statistics. Section 3.4 provides empirical results. Section 3.5 concludes. Appendix C provides variable definitions.

3.2. Literature and Hypotheses Development

This section first discusses the hypothesis for the relation between the strength of bank monitoring and the at-issue yield spread of initial public bond offerings, followed by the regression specifications. Next, this section develops the hypotheses for the relation between the credit quality of firms and the bank hold-up problem, followed by the regression specifications.

3.2.1. Bank Monitoring and the At-Issue Yield Spread of IPBOs

Monitoring borrowers is rooted in banks' main business. Banks raise funds from depositors with promised returns, lend to firms for profits, and spend resources monitoring and enforcing loan contracts with firms. Compared with arm's-length investors, banks have cost advantages in monitoring due to scale economies and low costs of delegation (Diamond, 1984; Freixas and Rochet, 1997). Banks also have comparative advantages in

monitoring efficiency for the following reasons. They have superior access to private information (Fama, 1985). They are a small capacity of lenders relative to projects with concentrated debt claims. Banks are more flexible and efficient at renegotiation as well as restructuring (Houston and James, 1996).

This paper focuses on the lead arranger in syndicated loans for measures of the strength of bank monitoring. Over the past two decades, the syndicated loan market has become the most important source of global corporate financing and surpasses the corporate bond markets in 2009 (Chui, Domanski, Kugler, and Shek, 2010; Lin, Ma, Malatesta, and Xuan, 2012). According to Dealscan, 79% of bank loans issued in the U.S. use syndication as the distribution method from 1987 to 2016. A syndicated loan is shared by a group of lenders in which a lead arranger initiates the loan and retains a portion, and the participant banks fund the rest parts of the loan. The lead arranger in general performs due diligence and monitoring, although each lender legally acts independently and individually to make the loan (Esty, 2001; Thomas and Wang, 2004). To deal with moral hazard problem between the lead arranger and the participants, the lead arranger usually retains a larger portion of loans to signal a credible commitment in due diligence and monitoring (Sufi, 2007; Ivashina, 2009). As a result, the proxies for the strength of bank monitoring later, i.e. relationship lending and reputable lender, focus on the lead arranger.

Bank reputation concerns enhance banks' incentives to monitor. The reputation of the lead arranger can be seen as a certification of the quality of the borrower (McCahery and Schwienbacher, 2010). What's more, the role of underwriter reputation is known to have price consequences for bond issuers, and IPO underpricing and price revisions (Fang, 2005; An and Chan, 2008).

Bank monitoring is valuable to firms as shown in many empirical studies. Stock market responds positively to bank loan announcement but indifferently or negatively to public bond offerings and equity issues (Mikkelson and Partch, 1986; Hadlock and James, 2002). Bank monitoring reduces managers' risk-taking behaviors. Ahn and Choi (2009) find the strength of bank monitoring is negatively related to earnings management. Banks also play a role in CEO succession and forced CEO turnover, resulting in a stronger cash flow performance (Marshall et al., 2014).

Bond investors price bank monitoring and in general require lower interest rates for the following reasons. First, bank monitoring provides value to firms and reduces managers' risk-taking behaviors. Second, bank monitoring reduces the costs bondholders spent on monitoring due to cross-monitoring effect. Datta et al. (1999) document lower at-issue yield spread of first public straight bonds for firms with bank relationship. However, they only consider the existence of bank loans rather the strength of bank monitoring. This paper considers both. With the fact that almost all firms use some forms of bank loans, the existence of bank loans is not very informative. Houston et al. (2014) find loan defaults, a signal of bank monitoring failure, negatively affect public bond prices borrowed from the same banks.

Hypothesis 1: At-issue yield spread of initial public bonds is negatively related to the strength of bank monitoring.

3.2.1.1 Empirical Specification

This paper uses the sample of firms issuing their first straight public bonds since they do not have monitoring effect from other bondholders. Also, there are no conflicts between bondholders. Without bond issuance records, the creditworthiness of a firm is

more uncertain to the public bond market, making bank monitoring more important to bond investors. The regression is as below:

$$YS_{it} = \beta_0 + \beta_1 MS_{it} + \beta_2 AL_{it} + \Psi B_{it} + \Upsilon X_{it} + \beta_3 BM_t + \alpha_{ind} + \varepsilon_{it}$$

Where i indexes firms, t indexes time, YS_{it} is maturity-matched at-issue yield spread of initial public bonds over Treasury notes/bonds, MS_{it} is the strength of bank monitoring, AL_{it} is the existence of bank loans in effect at the time of initial public bond offerings, B_{it} is bond characteristics, X_{it} is firm fundamentals at the time of bond issuance (i.e. firm size, market-to-book ratio, profitability, tangibility, and book leverage ratio), BM_t is the default risk premium measured by Moody's seasoned Baa corporate bond over 10-year Treasury bond (Fama and French, 1993), and α_{ind} is the industry fixed effect.

This paper uses three proxies for the strength of bank monitoring: the most restrictive covenant intensity of bank loans, relationship lending, and the reputable lead lender.

1) Covenant intensity of bank loans

Covenants often serve as a major monitoring and negotiation device by senior lenders. Enforcing loan covenants requires banks monitor lots of information about their borrowers (Diamond, 1984; Rajan and Winton, 1995). In practice, covenants in bank loan contracts specify coarse contingencies which require banks to monitor the situation and use the information to renegotiate the contract with new interest rate or exert direct influence on corporate policies and management (Chava and Roberts, 2008; Nini, Simith, and Sufi, 2012). Following Bradley and Roberts (2015), this paper forms the covenant intensity index which assigns one point for each of the following six types: security, dividend restrictions, two or more restricted financial ratios, asset sweep, debt sweep, and equity

sweep. It measures the degree of bank restrictions on both financial and non-financial levels. More restrictive covenants induce higher strength of bank monitoring to enforce loan contracts. This paper uses the most restrictive covenant intensity index (*Covenant Intensity*) for firms with multiple banks loans in the empirical tests.

2) Relationship lending

Relationship lending is the repeated borrowing from the same bank. Bharath et al (2011) argue that relationship lending leads to the higher strength of bank monitoring for the following reasons. First, banks gather custom-specific information through multiple interactions with the borrowers over time (Boot, 2000). This information remains proprietary and can be reused for later lending process. Thus, relationship lending can reduce adverse selection problem for repeated borrowers. Second, relationship lending reduces the element of moral hazard in syndicated loans between the lead arranger and the participant banks. In general, the lead arranger originates the loan and performs due diligence and monitoring (Esty, 2001). For relationship lending, the lead arranger has better proprietary information and lower costs of monitoring; thus, it provides more credible commitment to monitor. Participant banks would expect a lead arranger with relationship lending to monitor more than a lead arranger without relationship lending (Bharath et al., 2011). Third, relationship lending leads to more effective control of manager efforts and corporate operating decisions (Hansen and Torregrosa, 1992) due to information advantages and the commitment of monitoring.

This paper follows Bharath et al. (2011) for the definition of relationship lending. For each loan, if the borrower has the same lead arranger for other loans over the past five-year window, then the lead arranger is defined as a relationship lender. Firms with at least

one relationship lender are defined as having relationship lending, and the dummy variable *I(Relationship Lending)* equals to one. This paper follows Sufi (2007) and Bharath et al. (2011) to identify lead arrangers. A lead arranger is a single bank coded as the lead arranger; or a bank in a syndication retaining a significant share of the loan (>=25%) and playing the role of agent, administrative agent, arranger, lead bank, or lead arranger. This paper focuses on the U.S. market and exclude all foreign lead arrangers.

3) Reputable lead lender

A bank's concern of maintaining a good reputation will induce the bank to commit costly monitoring (Sharpe, 1990; Boot, Greenbaum, and Thakor, 1993; Aoki, 1994; Chemmanur and Fulghieri, 1994). For syndicated loans, the lead arranger performs due diligence and monitoring. Thus, for syndicated loans, more reputable lead arranger will commit higher strength of monitoring compared with the less reputable lead arrangers.

Following Fang (2005) and McCahery and Schwienbacher (2010), this paper defines a lead arranger as a reputable lead lender in a particular year if it was the top three biggest market players in that year[7]. The market share of each bank is calculated each year based on the total annual deal amount done. An equal fraction of the deal amount is imputed to each participant for syndicated loans. Reputable lead lender, *I(Reputable Lender)*, is a dummy variable equal to one if a firm has at least one reputable lead lender and zero otherwise. The definition of lead arranger is the same as above.

The reputable lead lender could be too powerful or over-monitor if it is also a relationship lead lender. A too powerful lead lender can distort the investments of the firm. Suboptimal investments will reduce the firm value as well as the bond value. This paper

[7] Following McCahery and Schwienbacher (2010), this paper uses the top five largest players for years prior to 2000.

includes a dummy variable *I(Relation*Reputable)*, the interaction term of *I(Relationship Lending)* and *I(Reputable Lender)*, and investigates the effect of potential over-monitoring from too powerful lead lenders on the yield spread of initial public bond offerings.

3.2.2. Bank Hold-Up Problem

Hold-up problem is a potential cost of relationship lending because banks acquire information advantages during lending (Rajan,1992). The information advantages impede firms from switching to other banks because of adverse selection. Hold-up problem is especially severe for opaque borrowers with fewer financing alternatives. Halo and Santos (2009) find banks price their information monopoly. They document that loan spreads at the issuance level are forced to decrease after the firms make their first public bond offerings. However, the decrease is only observed for firms issuing investment grade bonds. Additionally, they do not control for the difference of loan spreads between firms issuing investment grade bonds and firms issuing non-investment grade bonds prior to the bond offerings. Santos and Winton (2008) document that firms with public debt access pay lower interest rates on bank loans in recession compared with bank-dependent firms.

Hold-up problem requires a firm to be locked into the bank, conditioning on the firm's debt capacity and sources of financing. These conditions also determine the bank's incentives and ability to hold-up that firm. It is less likely for banks to hold-up firms with good financial conditions and with financing alternatives (this paper calls them high credit quality firms for short). First, banks do not have the ability to hold-up these firms since they can shift to other sources of financing easily. Hale and Santos (2008) find that firms with higher creditworthiness go to the public bond market earlier. Additionally, Cai et al. (2007) do not find underpricing for investment-grade bonds regardless of initial public

bond offerings or seasoned bond offerings. Second, banks have weak incentives to hold-up high credit quality firms since the loans issued are high quality assets to the banks and important parts in their portfolio. Additionally, these firms have strong negotiation power with banks. On the other hand, banks tend to hold-up firms with less debt capacity and limited sources of borrowing (this paper calls them low credit quality firms for short). Adverse selection further limits their abilities to switch to uninformed lenders.

This paper argues that banks hold-up low credit quality firms, but not high credit quality firms as discussed above. Thus, the incentives for firms to first enter the public bond market could be very different. This paper uses the credit rating of initial public bonds as a proxy for the credit quality of the firm (Denis and Mihov, 2003). Firms issuing investment grade bonds are regarded as high credit quality firms while firms issuing non-investment grade bonds are regarded as low credit quality firms. High credit quality firms enter the public bond market to diversify the sources of financing and to reduce monitoring costs paid on bank loans since the marginal benefit of bank monitoring is low. Additionally, public bonds are in general less costly and allow more discretion on operational decisions and financing decisions.

One important incentive for low credit quality firms to enter the public bond market is to reduce bank hold-up problem. For low credit quality firms to issue public bonds (non-investment grade initial public bonds), the borrowing costs from bank loans must be higher than bankruptcy costs and losing bank monitoring benefits. Low credit quality firms have higher bankruptcy costs because they have higher probability of default. Bankruptcy costs are higher for public bonds since dispersed investors postpone the process of bankruptcy and final deal (Bolton and Scharfstein, 1996). Additionally, public bonds are almost not

renegotiable compared with bank loans. Thus, this paper argues that reducing bank hold-up problem is an important incentive to issue public bonds for low credit quality firms. Alternative sources of financing and the credible threat of losing borrowers force banks to reduce the interest rates of bank loans after initial public bond offerings for low credit quality firms.

Hypothesis 2: There is no significant change on interest rates of bank loans before and after initial public bond offerings for high credit quality firms.

Hypothesis 3: Interest rates of bank loans decrease after initial public bond offerings for low credit quality firms.

3.2.2.1 Empirical Specification

This paper uses the difference-in-difference method to examine bank hold-up problem. Let -t/t denote the years bank loans borrowed before/after initial public bond offerings. This paper uses two different samples, i.e. bank loans borrowed within one year before and after IPBOs (t ϵ (-1,1)), and bank loans borrowed within one year before and within two years after IPBOs (t ϵ (-1,2)). The regression model is specified as following:

$$AISD_{ijt} = \beta_0 + \beta_1 AIPBO_{ijt} + \beta_2 Inv.Grade_{ijt} + \beta_3 AIPBO_{ijt} * Inv.Grade_{ijt} + \gamma F_{ijt} + \omega L_{ijt} + \delta O_{ijt} + \alpha_{ind} + \varepsilon_{ijt}$$

Where *i* indexes firms, *j* indexes loan facilities, *t* indexes time, $AISD_{ijt}$ is the all-in-spread drawn which is the interest rate spread on a loan over LIBOR plus any associated fees to originate the loan, $AIPBO_{ijt}$ is a dummy variable equal to one if the loan is borrowed after initial public bond offerings, $Inv.Grade_{ijt}$ is a dummy variable equal to one if the initial public bond is rated as investment grade, $AIPBO_{ijt} * Inv.Grade_{ijt}$ is the interaction term of $AIPBO_{ijt}$ and $Inv.Grade_{ijt}$, F_{ijt} are firm fundamentals (i.e. firm size, market-to-book

ratio, profitability, tangibility, and book leverage ratio), L_{ijt} are loan features (i.e. loan amount, maturity, loan type, performance pricing provisions, secured, syndication, and covenant intensity), O_{ijt} are lagged value-weighted monthly bank returns, and α_{ind} is the industry fixed effect.

Letting subscript I (NI) denote high credit quality firms proxied by investment grade initial public bonds (low credit quality firms proxied by non-investment grade initial public bonds) and superscript A (B) denote bank loans borrowed after (before) initial public bond offerings. β_1, β_2, and β_3 can be interpreted as follows.

$\beta_1 = AISD_{NI}^{A} - AISD_{NI}^{B}$ measures the difference in all-in-spread drawn of bank loans borrowed after and before initial public bond offerings for low credit quality firms. Hypothesis 3 predicts β_1 <0 since low credit quality firms with bank hold-up problem will benefit from issuing public bonds.

$\beta_2 = AISD_{I}^{B} - AISD_{NI}^{B}$ measures the difference in all-in-spread drawn of bank loans between high credit quality firms and low credit quality firms before initial public bond offerings. High credit quality firms can borrow at lower interest rates, predicting that β_2 <0.

$\beta_3 = (AISD_{I}^{A} - AISD_{I}^{B}) - (AISD_{NI}^{A} - AISD_{NI}^{B})$ measures the difference in all-in-spread drawn of bank loans between high credit quality firms and low credit quality firms for loans borrowed after and before initial public bond offerings. Hypothesis 2 and Hypothesis 3 predict that the change of all-in-spread drawn is negative and larger in magnitude for low credit quality firms compared with that of high credit quality firms, respectively. The sign for the change of all-in-spread drawn for high credit quality firms is not clear since they

may benefit less or not benefit from bank lending after initial public bond offerings. All this leads up to the prediction that $\beta_3 > 0$.

3.3. Data and Descriptive Statistics

3.3.1. Sample Generation

The data for this paper comes from several sources. First, this paper uses the SDC Global New Issues database to get all bond issuances for non-financial firms (excluding SIC code 6000-6999) from January 1970 to October 2016 in the U.S. This paper excludes global bonds, convertible bonds and private placement under 144A, and selects the first non-convertible public bond to form the gross sample of initial public bond offerings. To further clean the sample, this paper cross checks with the Moody's Manual from 1987 to 2010, the Compustat CIQ, and the firm fixed-income securities on Bloomberg. Mortgage-backed securities, asset-backed securities and MTN program are counted as initial public bond offerings, however, they are excluded from the final sample since they are either priced differently or under specific regulations. The initial public bonds with floating rates are excluded from the sample.

This paper uses the Loan Pricing Corporation's (LPC) DealScan database to identify the firms' borrowing information from banks and their loan information before and after initial public bond offerings. LPC DealScan database starts in early 1980s but with very limited records of loans in the first part of that decade. Following Hale and Santos (2008, 2009), this paper starts the sample of firms issuing initial public bonds from January 1st, 1987. Due to data limitation, it assumes that firms making initial public bond offerings after 1987 have not issued any public bonds before 1970.

This paper uses Compustat to gather the fundamental information of firms. Loan information and firm fundamental information are linked through Chava and Roberts (2008)'s link table from 1987 to August 2012 and through company name or ticker thereafter. For firms without any recorded loan information or with records only after initial public bond offerings, this paper manually checks their 10-Ks from EDGAR and LexisNexis Company Profiles. This paper finds that all firms have some types of bank relationship such as revolving credit facilities, term loans, and letters of credit before issuing public bonds. Compustat is used to determine the age of firms when they issue first public bonds. Specifically, firm age is calculated as the time distance between the firm's first appearance in Compustat and its first public bond issuance.

Finally, this paper uses CRSP/Compustat Merged (CCM) from the Center for Research in Security Prices (CRSP) as the link to merge the SDC-Compustat-DealScan database. Term premium and default risk premium are from FRED database of Federal Reserve Bank of St. Louis.

The final sample is composed of 284 initial public bond offerings made by 234 distinct firms from 1987 to 2015 with bank loan information available. Among them, 39 firms issued multiple public bonds at the time of initial public bond offerings.

3.3.2. Descriptive Statistics

Figure 3.1 plots the distribution of initial public bond offerings by year from 1987 to 2015 at both the deal level and the firm level. Table 3.1 provides the statistics. It shows that 88.5% of the initial public bonds are issued before 2000 and there is no initial public bond issuance in years 2004, 2008, 2009, and 2014. Economic downturns negatively affect

firm borrowings from the public bond market as shown in dot-com bubble and 2008 global financial crisis.

Table 3.2 characterizes the sample of 284 initial public bonds issued by 234 firms. Panel A of Table 3.2 shows that the mean (median) dollar amount of initial public bonds is $156.75 million ($112.25 million) scaled by the 1987 CPI deflator. The mean yield-to-maturity and yield spread of bonds at the offering time are 8.40% and 2.22%, respectively. Panel B of Table 3.2 reports that 44% and 39% of the initial public bonds have maturity within 5-to-10-year category and 10-to-15-year category, respectively. The sample has the average bond maturity of 11.26 years. Panel C of Table 3.2 reports that 60.2% of IPBOs are rated as investment grade while 36.3% of them are rated as speculative grade based on the Moody's rating. Only 3.5% of initial public bonds are not rated at the time of issuance. Panel D of Table 3.2 shows that firms making initial public bond offering are well dispersed in different industries based on the Fama-French twelve industries classification.

Table 3.3 provides the fundamental information of firms in the year before initial public bond offerings and compares that with overall Compustat firms. Columns (1) and (2) report the means and medians of characteristics of firms issuing initial public bonds while Columns (3) and (4) report the means and medians of Compustat firms. Columns (3) and (4) also report the *t*-test results on the means and the Wilcoxon rank sum test results on the medians. Continuous variables are winsorized at the 1% and 99% levels to deal with extreme values. Table 3.3 shows that firms issuing initial public bonds are significantly larger in size. They are more profitable, tangible, and matured with lower market-to-book ratio compared with all Compustat firms. Firms issuing initial public bonds are more likely to pay dividends and have significantly higher market leverage ratio and book leverage

ratio compared with Compustat firms. The average (median) firm age at the time of initial public bond offerings is 18.31 (9.05) years.

Table 3.4 compares amount, maturity, and loan spread between high credit quality firms and low credit quality firms before and after initial public bond offerings. Columns (1) and (2) compare bank loans borrowed within one year before initial public bond offerings ($t \in (-1,0)$). The *t*-test results are marked on Column (2). The results show high credit quality firms on average borrow larger loan amounts at lower loan spreads and with shorter maturities. The results are all statistically significant at the 1% level. The results are similar for bank loans borrowed within one year after the initial public bond offerings ($t \in (0,1)$).

This paper also compares loan features borrowed within one year before and after initial public bond offerings for each credit quality firm category (*t*-statistics not reported). Importantly, there are no statistically significant differences in loan amount, maturity, and all-in-spread drawn (*AISD*) for loans borrowed by high credit quality firms. For low credit quality firms, the all-in-spread drawn drops significantly by 53.5 bps on average for bank loans borrowed within one year after IPBOs compared with bank loans borrowed within one year before IPBOs, and it is statistically significant. However, there are no statistically significant changes in loan amount and maturity. Above analyses indicate that banks treat loans borrowed before and after IPBOs differently for high credit quality firms and low credit quality firms. Hold-up problem is more likely in low credit quality firms.

Other loan features are largely unchanged for loans borrowed within one year before and after IPBOs (not tabulated). As before, revolver credit facilities and term loans are still largely used. However, the usage of 364-Day facility increases by 4.9% while the

usage of term loans decreases by 4.7%. The primary purposes for bank loans are corporate purposes, debt repayment, working capital and takeover. More than 99% of the loans are senior and approximately 89.6% of them are distributed through syndication. Secured loans take up approximately 28% of all loans. Around 34% of loans include performance pricing provisions and the most commonly used types are senior debt rating and total debt to cash flow.

3.4. Empirical Results

This section reports the strength of bank monitoring on the at-issue yield spread of initial public bonds and bank hold-up problem for different credit quality firms.

3.4.1. Bank Monitoring and the At-Issue Yield Spread of IPBOs

Table 3.5 reports the regression results of at-issue yield spread of initial public bonds on the strength of bank monitoring using the specifications discussed in Section 3.2.1. The dependent variable is the at-issue yield spread of initial public bond in percentage, i.e. the difference between the yield-to-maturity of initial public bond and the yield of a maturity-matched Treasury note/bond. Columns (1) to (4) use the full sample of initial public bonds and report the coefficient estimates on the most restrictive covenant intensity of loans (*Covenant Intensity*), at least one lead bank who is a relationship lender (*I(Relationship Lending)*), at least one lead bank who is reputable (*I(Reputable Lender)*), and the relationship lender who is also a reputable lender (*I(Relation*Reputable)*), respectively. All regressions control for bond characteristics (i.e. bond amount, bond maturity, and a dummy variable for investment grade rating) and firm characteristics (i.e. size, market-to-book ratio, profitability, tangibility, and book leverage ratio). The regressions also include the default risk premium in the public bond market. *t*-statistics

reported in parentheses below parameter estimates are computed using robust standard errors.

The coefficient on *Covenant Intensity* is negative and statistically significant, consistent with Hypothesis 1 that bond investors price higher strength of bank monitoring and require a lower at-issue yield spread of initial public bonds. For firms with bank loan covenants, adding one more category of covenant reduces the at-issue yield spread of initial public bonds by 16.9 bps. The magnitude of this effect is economically significant. One more category of covenants leads to a 7.6% (0.169/2.22) decrease on the average at-issue yield spread of initial public bonds. Firms with bank loan covenants have higher at-issue yield spread than those without loan covenants since *I(Covenant)* is positive and statistically significant. This finding is consistent with Bradley and Roberts (2015) who argues that firms with poor financial condition are more likely to include covenants in their debt contracts. For example, small, highly levered, volatile firms with highly liquid assets and significant information asymmetries are more likely to include covenants.

The coefficient on *I(Relationship Lending)* is also negative and statistically significant. The average at-issue yield spread is 27.5 bps lower, i.e., a 12.4% decrease, if at least one lead arranger is a relationship lender. Through the long-term lending process, relationship lenders gather more soft-information about firms so that they are more efficient in monitoring. Public bond investors price this monitoring effect by requiring a lower yield.

The coefficient on *I(Reputable Lender)* is slightly positive and not statistically significant. At the first glance, the reputation of the lead arranger and the monitoring strength are not taken into consideration of bond pricing by public bond investors.

However, adding the interaction term of relationship lending and reputable lender *I(Relation*Reputable)* in Column (4) shows a different story. Public bond investors require a lower yield if the firm has a long-term relationship with the lead arranger or if the lead arranger is more reputable since the coefficients on *I(Relationship Lending)* and *I(Reputable Lender)* are both negative and statistically significant. However, the coefficient on *I(Relation*Reputable)* is positive and statistically significant which indicates bond investors require a premium when the lead bank is reputable and has a long-term relationship with the firm. The result indicates that bank monitoring can generate non-positive or even negative effects on firms when the strength of bank monitoring exceeds certain level. One reason is that the too powerful bank can distort firm's investment decisions, especially when the firm needs additional financing from the bank once the project starts. Suboptimal investments will reduce firm value which in turn reduces bond value.

In summary, this paper finds strong support for Hypothesis 1 that higher strength of bank monitoring provides value to firms and lowers the at-issue yield spread of initial public bonds. However, bond investors will require a premium to compensate if they have the concern of bank over-monitoring.

The control variable *I(Active Loan)* is negative although only statistically significant in Column (1), consistent with the prior literature that the existence of bank loans leads to a lower at-issue yield spread. However, only 4.7% (11/234) firms do not have loans in effect at the time of initial public bond offerings; thus, it is more informative to focus on the strength of bank monitoring rather than the existence of bank loans or not. Table 3.5 also shows that investment grade bonds (*Inv. Grade*) have significantly lower at-

issue yield spreads compared with non-investment grade bonds. Additionally, larger firms (*Firm Size*) and more profitable firms (*Profitability*) can issue initial public bonds at lower at-issue yield spreads. The results in Table 3.5 also indicate that bond investors require a premium for firms with more tangible assets (*Tangibility*), with higher book leverage ratios (*Book Leverage*), and when the default risk in the public bond market is high (*Default Premium*).

3.4.2. Bank Hold-Up Problem

Table 3.6 reports the difference-in-difference regression results using the specifications discussed in Section 3.2.2. The dependent variable is the bank loan spread measured by all-in-spread drawn in basis points. This paper uses two different samples in Columns (1) and (2), i.e. bank loans borrowed within one year before and after IPBOs ($t \in (-1,1)$), and bank loans borrowed within one year before and within two years after IPBOs ($t \in (-1,2)$). The variables of interests are the dummy variable equal to one for bank loans borrowed post IPBOs (*AIPBO*), the dummy variable equal to one for high credit quality firms proxied by investment grade initial public bonds (*Inv. Grade*), and the product of them (*AIPBO*Inv. Grade*). For both samples, the regressions control for firm characteristics, and loan features. They also add the bank industry returns from the Kenneth French's online data library to control for banks' credit supply. The *t*-statistics reported in parentheses below parameter estimates are computed using robust standard errors.

The coefficients on *AIPBO* are negative and statistically significant for both samples, indicating that bank loans borrowed after IPBOs have lower loan spreads for low credit quality firms. The results are consistent with Hypothesis 3 that low credit quality firms benefit from issuing public bonds due to the mitigation of hold-up problem.

Specifically, bank loans borrowed by low credit quality firms within one year after IPBOs on average have loan spread 48.21 bps less than that of bank loans borrowed within one year before IPBOs. The drop of loan spread is economically significant since it presents a 21.3% (48.21/226.20) reduction of the prior loan spread (i.e. loan spread for loans borrowed within one year before IPBOs) for low credit quality firms. Column (2) shows that the reduction on all-in-spread drawn lasts at least two years after IPBOs. High costs of bank loans caused by hold-up problem push firms to enter the public bond market and issue non-investment grade initial public bonds since the costs of bank loans outweigh bankruptcy costs of issuing public bonds and the cost of losing bank monitoring benefits. It explains the reason why firms issue initial public bonds with high yield, underpriced, and with high bankruptcy costs. Issuing public bonds provides the firm an alternative source of financing which is a credible threat to banks. To avoid losing customers, banks charge lower but not necessary fair interest rates in response. Additionally, issuing public bonds increases firm leverage and financial risks. It is not reasonable for banks to require lower loan spreads for the newly issued bank loans post IPBOs. A more reasonable explanation is that banks charge higher interest rates on low credit quality firms before they enter the public bond market. In other words, banks hold-up low credit quality firms before their initial public bond offerings.

The coefficients on *Inv. Grade* are negative and statistically significant for all samples, indicating high credit quality firms pay all-in-spread drawn approximately 110 bps lower than that of low credit quality firms before issuing public bonds. This result is consistent with the descriptive statistics in univariate analysis (Table 3.4).

The coefficients on *AIPBO*Inv. Grade* are positive and statistically significant, consistent with Hypothesis 2 and Hypothesis 3 that low credit quality firms reduce more on loan spreads due to bank hold-up problem compared with high credit quality firms.

Other interesting findings are discussed below. The coefficients on *PPP*, a dummy variable for the inclusion of performance pricing provisions, are negative and statistically significant. The evidence indicates using performance pricing provision lowers the all-in-spread drawn since it establishes ex ante how the interest rate changes based on the firm's credit quality change. It reduces the adverse selection and moral hazard by threatening ex post settling (Asquith, Beatty and Weber, 2005). Lenders compensate borrowers for granting it by lowering all-in-spread drawn. Secured bank loans, *Secured*, have a higher all-in-spread drawn. Loans using covenants have lower all-in-spread drawn since *I(Covenant)* is negative and statistically significant. This is consistent with Bradley and Roberts (2015) who find a negative relation between the promised yield on corporate debt and the usage of covenants which are jointly determined. The higher covenant intensity, *Covenant Intensity*, increases loan spread due to higher bank monitoring costs.

A possible concern that loan spread decreases post initial public bond offerings for low credit quality firms are caused by the cash infusions from the public bond offerings. Although higher leverage increases bankruptcy costs, the priority structure changes since bank loans in general have higher priority in claims. To address this concern, this paper investigates the bank loan spreads prior to and post second public bond offerings. Specifically, this paper compares loan spreads within one year as well as within two years before and after second public bond offerings. If the above argument about additional cash infusion is the main driver, there would be a significant drop in loan spreads for low credit

quality firms post second public bond offerings. Table 3.7 shows that there is no statistically significant difference in loan spreads for low credit quality firms using loans borrowed within one year (and two years) before and after second public bond offerings. This paper also does not find any significant changes in loan spreads for loans borrowed by high credit quality firms before and after second public bond offerings.

3.5. Summary and Conclusions

Bank loans generate both benefits and costs to firms. Using a unique sample of firms making their initial public straight bond offerings, this paper finds that higher strength of bank monitoring reduces the at-issue yield spread of initial public bond offerings. The three proxies used for the strength of bank monitoring at the time of initial public bond offerings are: the most restrictive covenant intensity of bank loans, the lead arranger of a syndicated loan who is a relationship lender to the firm, and the lead arranger who is a reputable lender. This paper finds that one additional category of covenant and the existence of relationship lead arranger reduce the at-issue yield spread of initial public bonds by 16.9 bps and 27.5 bps, i.e. 7.6% and 12.4% of the average at-issue yield spread of initial public bonds, respectively. The existence of reputable lead arranger also reduces the yield spread of the initial public bonds for firms without relationship lending. However, when the strength of bank monitoring exceeds certain level, bondholders may not appreciate it or even require a premium to compensate. This paper finds higher yield spread of initial public bond offerings when the reputable lead arranger is also a relationship lender. One reason is that a very powerful bank may distort a firm's investment decisions which will reduce firm value as well as bond value.

This paper also provides evidence that banks hold-up low credit quality firms. This paper finds that low credit quality firms benefit from entering the public bond market. Bank loans borrowed one year within the firms entering the public bond market have loan spreads 48 bps lower, a 21% reduction of the prior loan spreads for low credit quality firms. However, this study does not find any reduction on loan spreads after high credit quality firms entering the public bond market. The results support the hypothesis that banks hold-up low credit quality firms but not high credit quality firms.

The results are important to bank managers, firm borrowers, bond investors, and policy makers. Designing a more efficient contract to reduce the hold-up problem between banks and borrowers and to maintain bank monitoring effect provides social benefits.

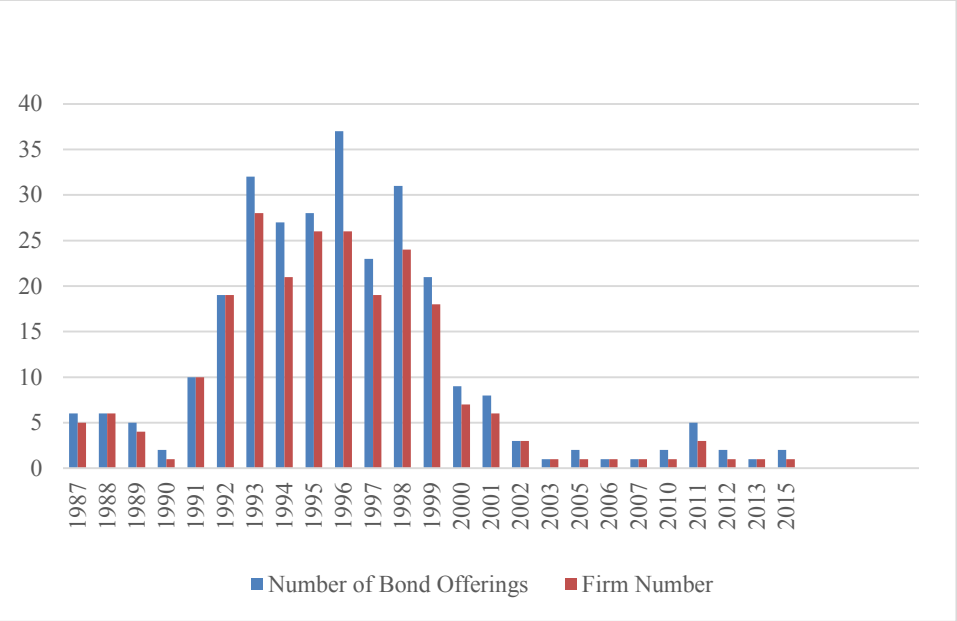

Figure 3.1: The distribution of initial public bond offerings and the corresponding firms by year. This figure plots the number of initial public bond offerings and the number of issuing firms from 1987 to 2015. Note: no initial public bond offerings in years 2004, 2008, 2009, and 2014.

Table 3.1: The distribution of initial public bond offerings and corresponding firms by year

This table provides statistics for the number of initial public bond offerings (Deal No.) as well as the number of issuing firms (Firm No.) from 1987 to 2015. Percent is measured in percentage. Note: no initial public bond offerings in years 2004, 2008, 2009, and 2014.

Year	Deal No.	Percent	Firm No.	Percent	Year	Deal No.	Percent	Firm No.	Percent
1987	6	2.11	5	2.14	2000	9	3.17	7	2.99
1988	6	2.11	6	2.56	2001	8	2.82	6	2.56
1989	5	1.76	4	1.71	2002	3	1.06	3	1.28
1990	2	0.70	1	0.43	2003	1	0.35	1	0.43
1991	10	3.52	10	4.27	2005	2	0.70	1	0.43
1992	19	6.69	19	8.12	2006	1	0.35	1	0.43
1993	32	11.27	28	11.97	2007	1	0.35	1	0.43
1994	27	9.51	21	8.97	2010	2	0.70	1	0.43
1995	28	9.86	26	11.11	2011	5	1.76	3	1.28
1996	37	13.03	26	11.11	2012	2	0.70	1	0.43
1997	23	8.10	19	8.12	2013	1	0.35	1	0.43
1998	31	10.92	24	10.26	2015	2	0.70	1	0.43
1999	21	7.39	18	7.69	Total	284	100.00	234	100.00

Table 3.2: Descriptive statistics of initial public bond offerings

This table presents deal level descriptive statistics of 284 initial public bond offerings made by 234 firms from 1987 to 2015. Amount is in millions of 1987 dollars computed by the CPI deflator. YTM is the bond offering yield-to-maturity in percentage. Industry is classified based on Fama-French 12 industry portfolios.

Panel A: Amount and YTM

Variables	Mean	Std. Dev	25th Pctl.	Median	75th Pctl.
Amount: $MM	156.75	135.38	76.62	112.25	181.88
YTM: %	8.40	2.26	6.87	7.80	9.72
Yield Spread: %	2.22	1.77	0.90	1.52	3.30

Panel B: Maturity Distribution

Bond Maturity: Years	Frequency	Percent
1 < Maturity ≤5	16	5.63
5 < Maturity ≤ 10	125	44.01
10 < Maturity ≤ 20	111	39.08
20 < Maturity ≤ 30	14	4.93
Maturity > 30	18	6.34
Observations (Average)	284 (11.26)	100

Panel C: Moody's Rating

Moody's Rating		Frequency	Percent
Investment Grade	Aaa	2	0.7
	Aa	7	2.46
	A	53	18.66
	Baa	109	38.38
Non-investment Grade	Ba	41	14.44
	B	59	20.77
	Caa	3	1.06
Not Rated		10	3.52
Observations		284	100

Panel D: Fama-French 12 Industries Distribution

Industry	Frequency	Percent
Consumer Non-Durables	22	7.75
Consumer Durables	7	2.46
Manufacturing	48	16.9
Oil, Gas, and Coal Extraction and Products	31	10.92
Chemicals and Allied Products	27	9.51
Business Equipment	17	5.99
Telephone and Television Transmission	18	6.34
Utilities	27	9.51
Wholesale, Retail, and Some Services	39	13.73
Healthcare, Medical Equipment, and Drugs	15	5.28
Other	33	11.62
Observations	284	100

Table 3.3: Characteristics of IPBO firms

This table presents means and medians of firm characteristics for IPBO firms and for Compustat firms from 1987 to 2015. IPBO firms consist of 234 firms who made their initial public bond offerings during this time period. Compustat firms are nonfinancial (excluding SIC codes 6000-6999) U.S. firms covered by Compustat. *Size* is sales in millions of dollars. Dollar values are inflation-adjusted using the CPI in year 1987. *Market-to-book* is the market value of assets divided by the book value of assets. *Profitability* is earnings before interest and taxes scaled by total asset. *Book leverage ratio* is the sum of short-term debt and long-term debt scaled by total asset. *Market leverage ratio* is the sum of short-term debt and long-term debt scaled by market value of asset. *Interest coverage ratio* is the EBIT divided by interest payment. *Tangibility* is the sum of inventories and property, plant and equipment scaled by total asset. *Dividend dummy* is assigned one for firms with dividend payment. *Firm age* is calculated as the time distance between the firm's first appearance in Compustat and its first public bond issuance. Continuous variables are winsorized at the 1% and 99% levels. The *t*-test results and the Wilcoxon rank sum test results of the mean and median differences between two samples are marked on the mean and median of Compustat firms, respectively. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	IPBO firms		Compustat firms	
	Mean (1)	Median (2)	Mean (3)	Median (4)
Size: $MM	1,449.30	736.70	935.80***	66.32***
Market/Book	1.869	1.577	2.639***	1.455
Profitability	0.100	0.094	-0.103***	0.048***
Book Leverage	0.307	0.282	0.236***	0.197***
Market Leverage	0.271	0.244	0.223***	0.137***
Interest Coverage	24.427	4.345	-10.135***	2.162***
Tangibility	0.557	0.559	0.430***	0.428***
Dividend Dummy	0.577	1.000	0.283***	0.000***
Firm Age: year	18.31	9.05		

Table 3.4: The impact of IPBOs on loan spread, maturity, and amount

Computations based on the loans taken out by our sample of IPBO firms from 1987 to 2015. Observations (number in parentheses) are at loan facility level. *Amount* is the loan deal amount in millions of 1987 dollars computed with the CPI deflator. *Maturity* is the loan maturity in years. Loan spread *AISD* is the all-in-spread drawn at origination in basis points. High credit quality firms and low credit quality firms are proxied by the Moody's rating of the initial public bonds issued, i.e. investment grade and non-investment grade, respectively. -t/t stands for the years loans borrowed before/after initial public bond offerings. Columns (1) and (2) consist of loans borrowed within one year before initial public bond offering by high credit quality firms and low credit quality firms, respectively. Columns (3) and (4) consist of loans borrowed within one year after initial public bond offerings by high credit quality firms and low credit quality firms, respectively. The *t*-test results for the differences between high credit quality firms and low credit quality firms for different borrowing time periods are marked on Columns (2) and (4), respectively. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	$t \in (-1,0)$		$t \in (0,1)$	
Loan features	High credit quality firms (1)	Low credit quality firms (2)	High credit quality firms (3)	Low credit quality firms (4)
Amount: $MM	583.43	324.60**	527.60	249.42***
	(148)	(143)	(103)	(95)
Maturity: year	3.27	4.79***	2.80	5.30***
	(128)	(129)	(90)	(88)
AIS: bps	57.04	226.20***	68.12	172.70***
	(121)	(109)	(79)	(73)

Table 3.5: The impact of bank monitoring on IPBOs' at-issue yield spread

This table presents industry fixed effect models of bank monitoring on IPBO at-issue yield spread based on the IPBO sample from 1987 to 2015 with all data available. Each observation is a bond. Dependent variable is bond yield spread (*YS*), the difference between bond at-issue yield-to-maturity and the yield of a maturity-matched Treasury note/bond. *Covenant Intensity* is scaled from one to six, with one on each of the following: security, dividend restrictions, two or more restricted financial ratios, asset sweep, debt sweep, and equity sweep. Here, Covenant Intensity is the maximum value of all loans at IPBOs. *I(Covenant*) is a dummy variable equal to one if at least one loan has covenants mentioned above. *I(Relationship Lending)* is a dummy variable equal to one if at least one loan has relationship lead bank. *I(Reputable Lender)* is a dummy variable equal to one if at least one lead bank is in the top tier bank (reputable bank) in that year. *I(Relation*Reputable)* is the interaction term of *I(Relationship Lending)* and *I(Reputable Lender)*. *I(Active Loan)* is a dummy variable equal to one if a firm has active bank loans during IPBOs. *Bond Amount* is the natural logarithms of IPBO bond amount in millions of 1987 dollars computed with the CPI deflator. *Bond Maturity* is IPBO bond maturity in years. *Inv. Grade* is a dummy variable equal to one if the bond is rated investment grade based on Moody's rating. *Firm size* is the natural logarithms of sales in millions of 1987 dollars computed with the CPI deflator. *M/B* is the market value of assets divided by the book value of assets. *Profitability* is earnings before interest and taxes scaled by total asset in percentage. *Tangibility* is the sum of inventories and property, plant and equipment scaled by total asset. *Book Leverage* is the sum of short-term debt and long-term debt scaled by total asset. *Default Premium* is monthly Moody's seasoned Baa corporate bond yield relative to yield on 10-year Treasury constant maturity in percent. *t*-statistics (in parentheses) are computed using robust standard errors. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	YS (1)	YS (2)	YS (3)	YS (4)
Covenant Intensity	-0.169**			
	(-2.14)			
I(Covenant)	0.678***			
	(3.71)			
I(Relationship Lending)		-0.275*		-0.498**
		(-1.80)		(-2.48)
I(Reputable Lender)			0.062	-0.345*
			(0.46)	(-1.83)
I(Relation*Reputable)				0.621***
				(2.65)
I(Active Loan)	-0.484**	-0.101	-0.324	-0.012
	(-2.04)	(-0.40)	(-1.33)	(-0.04)
Bond Amount	-0.081	-0.040	-0.042	-0.029
	(-0.65)	(-0.31)	(-0.33)	(-0.22)
Bond Maturity	-0.006	-0.010	-0.009	-0.010
	(-0.57)	(-1.01)	(-0.88)	(-0.99)
Inv. Grade	-1.963***	-1.967***	-1.946***	-1.967***
	(-10.39)	(-9.74)	(-9.66)	(-9.73)
Firm Size	-0.283***	-0.281***	-0.304***	-0.300***
	(-3.90)	(-3.74)	(-4.00)	(-3.93)
M/B	-0.077	-0.090	-0.078	-0.089
	(-1.35)	(-1.59)	(-1.34)	(-1.60)

Table 3.5 (Continued)

Profitability	-0.034***	-0.030***	-0.031***	-0.028***
	(-3.68)	(-3.46)	(-3.34)	(-3.19)
Tangibility	0.685*	0.703*	0.643*	0.754**
	(1.83)	(1.94)	(1.74)	(2.09)
Book Leverage	0.457	0.645*	0.622*	0.576*
	(1.33)	(1.87)	(1.77)	(1.66)
Default Premium	0.694***	0.685***	0.728***	0.711***
	(4.63)	(4.32)	(4.64)	(4.61)
Constant	4.599***	4.395***	4.465***	4.358***
	(7.05)	(7.03)	(6.96)	(7.05)
Industry Fixed Effect	Yes	Yes	Yes	Yes
Adj. R-squared	0.713	0.701	0.697	0.704
Observations	237	237	237	237

Table 3.6: The impact of IPBOs on loan spreads

This table reports the effect of IPBOs on loan spreads for different credit quality firms using difference-in-difference models. IPBOs are from 1987 to 2015. Observations are at loan facility level. -t/t stands for the years loans borrowed before/after initial public bond offerings. Columns (1) and (2) consist of bank loans borrowed within one year before and after IPBOs, and within one year before and within two years after IPBOs, respectively. Dependent variable is loan spread, the all-in-spread drawn at origination in basis points. *AIPBO* is a dummy variable equal to one for loans borrowed after IPBOs. *Inv. Grade* is a dummy variable equal to one if the initial public bond is rated as investment grade by Moody's rating. *AIPBO*Inv. Grade* is an interaction term. *Firm Size* is the natural logarithms of sales in millions of 1987 dollars computed with the CPI deflator. *M/B* is the market value of assets divided by the book value of assets. *Profitability* is earnings before interest and taxes scaled by total asset in percentage. *Tangibility* is the sum of inventories and property, plant and equipment scaled by total asset. *Book Leverage* is the sum of short-term debt and long-term debt scaled by total asset. *Loan amount* is the loan deal amount in millions of 1987 dollars computed with the CPI deflator. *Loan maturity* is the loan maturity in years. *PPP* is a dummy variable equal to one if the loan facility has performance pricing provisions. *Secured* is a dummy variable equal to one if a loan is secured. *Syndication* is a dummy variable equal to one if the loan's distribution method is syndication. *Term loan* is a dummy variable equal to one if it is a term loan. *I(Covenant*) is a dummy variable equal to one if the facility has covenants mentioned above. *Covenant Intensity* is scaled from one to six, with one on each of the following: security, dividend restrictions, two or more restricted financial ratios, asset sweep, debt sweep, and equity sweep. *Lag bank return* and *Lag2 bank return* are one-month and two-month lagged value weighted monthly bank industry returns from Kenneth French's online data library (industry number 44 in the 48-industry portfolio, with the name "Banking"), respectively. *t*-statistics (in parentheses) are computed using robust standard errors. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	AISD, t ϵ (-1,1)	AISD, t ϵ (-1,2)
Variables	(1)	(2)
AIPBO	-48.21***	-35.35**
	(-3.23)	(-2.26)
Inv. Grade	-117.1***	-115.1***
	(-7.22)	(-6.73)
AIPBO*Inv. Grade	72.55***	70.28***
	(3.89)	(3.96)
Firm Size	-6.130	0.983
	(-1.04)	(0.20)
M/B	-6.983	-5.003
	(-1.30)	(-1.01)
Profitability	0.493	-1.035
	(0.58)	(-1.14)
Tangibility	4.370	4.527
	(0.19)	(0.19)
Book Leverage	12.61	22.33
	(0.40)	(0.85)
Loan amount	-5.644	-15.00***
	(-0.98)	(-3.01)
Loan maturity	-4.952*	-3.280
	(-1.73)	(-1.39)
PPP	-24.27**	-19.89**
	(-2.37)	(-2.03)
Secured	86.44***	96.17***
	(6.20)	(7.97)

Table 3.6 (Continued)

Syndication	-2.406	-1.251
	(-0.15)	(-0.07)
Term Loan	23.18	20.73
	(1.53)	(1.48)
I(Covenant)	-32.17***	-28.86**
	(-2.68)	(-2.47)
Covenant Intensity	14.65***	12.95***
	(2.77)	(3.14)
Lag bank return	0.691	-0.884
	(0.90)	(-1.15)
Lag2 bank return	-0.356	-0.00455
	(-0.46)	(-0.01)
Constant	335.9***	467.3***
	(4.39)	(6.80)
Industry Fixed Effect	Yes	Yes
Adj. R-squared	0.624	0.533
Observations	295	452

Table 3.7: The impact of second public bond offerings on loan spreads

This table presents loan spreads prior to and post second public bond offerings by the sample of IPBO firms from 1987 to 2015. Observations (number in parentheses) are at the loan facility level. Loan spread is the all-in-spread drawn at origination in basis points. High credit quality firms and low credit quality firms are classified based on Moody's rating of firm's second public bond offerings, i.e. investment grade and non-investment grade, respectively. Columns (1) and (2) consist of bank loans borrowed within one year before and after second public bond offerings, respectively. Columns (3) and (4) consist of bank loans borrowed within two years before and after second public bond offerings, respectively. *t*-tests results for Column (1) and Column (2), and Column (3) and Column (4) are marked on Column (2) and Column (4), respectively. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	$t \in (-1,0)$ (1)		$t \in (0,1)$ (2)		$t \in (-2,0)$ (3)		$t \in (0,2)$ (4)	
Loan spread: bps	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
High Credit Quality Firms	64.43 (110)	46.49	63.35 (114)	58.09	74.77 (238)	60.71	75.86 (238)	68.03
Low Credit Quality Firms	239.40 (27)	217.00	237.60 (43)	97.45	245.30 (73)	154.90	205.30 (119)	99.49

CHAPTER 4: CONCLUSION

This dissertation contains two topics in regard to organizational structure, agency costs, and monitoring in financial institutions. The first topic analyzes demutualization in the property-liability insurance industry and the second topic investigates the roles of bank loans in terms of monitoring and hold-up.

Using a sample of 39 demutualized insurers in the property-liability insurance industry from 1997 to 2009, this paper finds the benefits following demutualization are consistent with the motivations investigated, i.e. access to capital, growth and diversification from increased organizational flexibility, and the reduction of agency costs. First, this paper finds that demutualized insurers have higher cumulative surplus growth over five years post demutualization, especially demutualized insurers with surplus nots before demutualization. Specifically, demutualized insurers with surplus note before have higher surplus growth over five years post demutualization, indicating their long-term need of capital. Demutualized insurers without surplus notes, however, show weak one-time need of capital. Second, demutualized insurers increase organizational flexibility post demutualization which facilitates business growth and diversification through merger and acquisitions and other business combinations. Demutualized insurers have faster net premiums written growth over time and they strategically adjust premiums in lines and states. Merger and acquisitions also provide an important channel to raise surplus. Specifically, 51% demutualized insurers choose to become targets and most of them receive capital infusion from parents immediately. Third, this study finds that demutualized insurers gradually increase premiums written in commercial lines, indicating their motivation to reduce agency costs. In short, access to capital, growth and diversification

due to increased organizational flexibility, and the reduction of agency costs are the important motivations behind the demutualization decisions.

Bank loans provide both benefits and costs to firms. First, using a unique sample of firms making their initial public straight bond offerings, this study finds that the higher strength of bank monitoring reduces the at-issue yield spread of initial public bond offerings. Specifically, one additional category of covenant and the existence of relationship lead arranger reduce the at-issue yield spread of initial public bonds by 16.9 bps and 27.5 bps, i.e. 7.6% and 12.4% of the average at-issue yield spread of initial public bonds, respectively. The existence of reputable lead arranger also reduces the yield spread of the initial public bonds for firms without relationship lending. However, when the strength of bank monitoring exceeds certain level, bondholders may not appreciate it or even require a premium to compensate. The reason is that a very powerful bank may distort the firm's investment decisions which will reduce the firm value as well as the bond value. Second, this study finds evidence that banks hold-up low credit quality firms before they enter the public bond market. Bank loans borrowed within one year after the firms entering the public bond market have loan spreads 48 bps lower, a 21% reduction of the prior loan spreads for low credit quality firms. However, this study does not find any reduction on loan spreads for high credit quality firms.

REFERENCES

Ahn, S. and Choi, W., (2009). The role of bank monitoring in corporate governance: Evidence from borrowers' earnings management behavior. *Journal of Banking & Finance*, *33*(2), pp.425-434.

Almazan, A. and Suarez, J., (2003). Entrenchment and severance pay in optimal governance structures. *The Journal of Finance*, *58*(2), pp.519-548.

An, H. H., & Chan, K. C. (2008). Credit ratings and IPO pricing. *Journal of Corporate Finance*, *14*(5), 584-595.

Asquith, P., Beatty, A., & Weber, J. (2005). Performance pricing in bank debt contracts. *Journal of Accounting and Economics*, *40*(1-3), 101-128.

Belth, Joseph. (1996). The Looming Controversy Over Capital Notes. *The Insurance Forum*, September, 64-68.

Belth, Joseph. (2015). *The Insurance Forum: A Memoir*. Ellettsville, Indiana: The Insurance Forum.

Berger, A. N., & Udell, G. F. (1995). Relationship lending and lines of credit in small firm finance. *Journal of Business*, 351-381.

Berger, A. N., Cummins, J. D., & Weiss, M. A. (1997). The coexistence of multiple distribution systems for financial services: The case of property-liability insurance. *The Journal of Business*, *70*(4), 515-546.

Bharath, S. T., Dahiya, S., Saunders, A., & Srinivasan, A. (2011). Lending relationships and loan contract terms. *The Review of Financial Studies*, *24*(4), 1141-1203.

Bolton, P. and Scharfstein, D.S., (1996). Optimal debt structure and the number of creditors. *Journal of Political Economy*, *104*(1), pp.1-25.

Boose, M. A. (1990). Agency theory and alternative predictions for life insurers: An empirical test. *Journal of Risk and Insurance*, 499-518.

Boot, A. W. (2000). Relationship banking: What do we know?. *Journal of Financial Intermediation*, *9*(1), 7-25.

Boot, A. W., Greenbaum, S. I., & Thakor, A. V. (1993). Reputation and discretion in financial contracting. *The American Economic Review*, 1165-1183.

Bradley, M. and Roberts, M.R., (2015). The structure and pricing of corporate debt covenants. *The Quarterly Journal of Finance*, *5*(02), p.1550001.

Butler, R. J., Cui, Y., & Whitman, A. (2000). Insurers' Demutualization Decisions. *Risk Management and Insurance Review*, *3*(2), 135-154.

Cai, N.K., Helwege, J. and Warga, A., (2007). Underpricing in the corporate bond market. *Review of Financial Studies*, *20*(6), pp.2021-2046.

Chamberlain, S. L., & Tennyson, S. (1998). Capital shocks and merger activity in the property-liability insurance industry. *Journal of Risk and Insurance*, 563-595.

Chava, S. and Roberts, M.R., (2008). How does financing impact investment? The role of debt covenants. *The Journal of Finance*, *63*(5), pp.2085-2121.

Chemmanur, T. J., & Fulghieri, P. (1994). Reputation, renegotiation, and the choice between bank loans and publicly traded debt. *Review of Financial Studies*, *7*(3), 475-506.

Chui, M. K., Domanski, D., Kugler, P., & Shek, J. (2010). The collapse of international bank finance during the crisis: evidence from syndicated loan markets. *WP*.

Cummins, J. D., & Weiss, M. A. (1993). Measuring cost efficiency in the property-liability insurance industry. *Journal of Banking & Finance*, *17*(2-3), 463-481.

Cummins, J. D., & Xie, X. (2008). Mergers and acquisitions in the US property-liability insurance industry: Productivity and efficiency effects. *Journal of Banking & Finance*, *32*(1), 30-55.

Cummins, J. D., & Xie, X. (2009). Market values and efficiency in US insurer acquisitions and divestitures. *Managerial Finance*, *35*(2), 128-155.

Cummins, J. D., Tennyson, S., & Weiss, M. A. (1999). Consolidation and efficiency in the US life insurance industry. *Journal of Banking & Finance*, *23*(2-4), 325-357.

Datta, S., Iskandar-Datta, M. and Patel, A., (1999). Bank monitoring and the pricing of corporate public debt. *Journal of Financial Economics*, *51*(3), pp.435-449.

Denis, D.J. and Mihov, V.T., (2003). The choice among bank debt, non-bank private debt, and public debt: evidence from new corporate borrowings. *Journal of Financial Economics*, *70*(1), pp.3-28.

Diamond, D.W., (1984). Financial intermediation and delegated monitoring. *The Review of Economic Studies*, *51*(3), pp.393-414.

Diamond, D.W., (1991). Monitoring and reputation: The choice between bank loans and directly placed debt. *Journal of Political Economy*, *99*(4), pp.689-721.

Dumm, R. E., & Hoyt, R. E. (1999). Surplus Note Utilization by Life Insurers: Empirical Evidence. *Journal of Insurance Regulation*, *17*(3), 348.

Erhemjamts, O., & Phillips, R. D. (2012). Form over matter: Differences in the incentives to convert using full versus partial demutualization in the US life insurance industry. *Journal of Risk and Insurance*, *79*(2), 305-334.

Esty, B. C. (2001). Structuring loan syndicates: A case study of the Hong Kong Disneyland project loan. *Journal of Applied Corporate Finance*, *14*(3), 80-95.

Fama, E.F. and French, K.R., (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, *33*(1), pp.3-56.

Fama, E.F., (1985). What's different about banks?. *Journal of Monetary Economics*, *15*(1), pp.29-39.

Fang, L. H. (2005). Investment bank reputation and the price and quality of underwriting services. *The Journal of Finance*, *60*(6), 2729-2761.

Freixas, X., Rochet, J.-C., (1997). Microeconomics of Banking. MIT Press, Cambridge.

Hadlock, C.J. and James, C.M., (2002). Do banks provide financial slack?. *The Journal of Finance*, *57*(3), pp.1383-1419.

Hale, G. and Santos, J.A., (2008). The decision to first enter the public bond market: The role of firm reputation, funding choices, and bank relationships. *Journal of Banking & Finance*, *32*(9), pp.1928-1940.

Hale, G. and Santos, J.A., (2009). Do banks price their informational monopoly?. *Journal of Financial Economics*, *93*(2), pp.185-206.

Hansen, R. S., & Torregrosa, P. (1992). Underwriter compensation and corporate monitoring. *The Journal of Finance*, *47*(4), 1537-1555.

Hetherington, J. A. (1969). Fact v. fiction: Who owns mutual insurance companies. *Wis. L. Rev.*, 1068.

Houston, J. and James, C., (1996). Bank information monopolies and the mix of private and public debt claims. *The Journal of Finance*, *51*(5), pp.1863-1889.

Houston, J.F., Lin, C. and Wang, J., (2014). Does Bank Monitoring Matter to Bondholders?. *WP*.

Huang, L. Y., Lai, G. C., McNamara, M., & Wang, J. (2011). Corporate governance and efficiency: evidence from US property–liability insurance industry. *Journal of Risk and Insurance*, *78*(3), 519-550.

Ivashina, V. (2009). Asymmetric information effects on loan spreads. *Journal of Financial Economics*, *92*(2), 300-319.

James, C., (1987). Some evidence on the uniqueness of bank loans. *Journal of Financial Economics*, *19*(2), pp.217-235.

Jeng, V., & Lai, G. C. (2005). Ownership structure, agency costs, specialization, and efficiency: analysis of Keiretsu and independent insurers in the Japanese nonlife insurance industry. *Journal of Risk and Insurance*, *72*(1), 105-158.

Jiménez, G., Lopez, J.A. and Saurina, J., (2009). Empirical analysis of corporate credit lines. *Review of Financial Studies*, *22*(12), pp.5069-5098.

Lamm-Tennant, J., & Starks, L. T. (1993). Stock versus mutual ownership structures: the risk implications. *Journal of Business*, 29-46.

Li, B., Purda, L.D. and Wang, W., (2016). Do Bondholders Value Senior Loan Lender Control Rights?. *WP*.

Lin, C., Ma, Y., Malatesta, P., & Xuan, Y. (2012). Corporate ownership structure and bank loan syndicate structure. *Journal of Financial Economics*, *104*(1), 1-22.

Marshall, A., McCann, L. and McColgan, P., (2014). Do banks really monitor? Evidence from CEO succession decisions. *Journal of Banking & Finance*, *46*, pp.118-131.

Mayers, D., & Smith Jr, C. W. (1981). Contractual provisions, organizational structure, and conflict control in insurance markets. *Journal of Business*, 407-434.

Mayers, D., & Smith Jr, C. W. (1988). Ownership structure across lines of property-casualty insurance. *The Journal of Law and Economics*, *31*(2), 351-378.

Mayers, D., & Smith Jr, C. W. (2005). Agency problems and the corporate charter. *Journal of Law, Economics, and Organization*, *21*(2), 417-440.

Mayers, D., & Smith, C. W. (2002). Ownership structure and control: property-casualty insurer conversion to stock charter. *Journal of Financial Services Research*, *21*(1-2), 117-144.

Mayers, D., & Smith, C. W. (2004). Incentives for Managing Accounting Information: Property-Liability Insurer Stock-Charter Conversions. *Journal of Risk and Insurance*, *71*(2), 213-251.

McCahery, J., & Schwienbacher, A. (2010). Bank reputation in the private debt market. *Journal of Corporate Finance*, *16*(4), 498-515.

Mikkelson, W.H. and Partch, M.M., (1986). Valuation effects of security offerings and the issuance process. *Journal of Financial Economics*, *15*(1), pp.31-60.

National Association of Insurance Commissioners. (1998). Mutual insurance holding company reorganizations.

Nini, G., Smith, D.C. and Sufi, A., (2012). Creditor control rights, corporate governance, and firm value. *Review of Financial Studies*, *25*(6), pp.1713-1761.

Plosser, M.C. and Santos, J.A., (2016). Bank Monitoring. *WP*.

Pottier, S. W., & Sommer, D. W. (1997). Agency theory and life insurer ownership structure. *Journal of Risk and Insurance*, 529-543.

Rajan, R. and Winton, A., (1995). Covenants and collateral as incentives to monitor. *The Journal of Finance*, *50*(4), pp.1113-1146.

Rajan, R.G., (1992). Insiders and outsiders: The choice between informed and arm's-length debt. *The Journal of Finance*, *47*(4), pp.1367-1400.

Santos, J.A. and Winton, A., (2008). Bank loans, bonds, and information monopolies across the business cycle. *The Journal of Finance*, *63*(3), pp.1315-1359.

Schenone, C., (2010). Lending relationships and information rents: Do banks exploit their information advantages?. *Review of Financial Studies*, *23*(3), pp.1149-1199.

Schiff, D. (1998). The Big Fix: Mutual Insurance Holding Companies. *Schiff's Insurance Observer*, 8-11.

Sharpe, S.A., (1990). Asymmetric information, bank lending, and implicit contracts: A stylized model of customer relationships. *The Journal of Finance*, *45*(4), pp.1069-1087.

Shiu, Y. M. (2011). Reinsurance and capital structure: Evidence from the United Kingdom non-life insurance industry. *Journal of Risk and Insurance*, *78*(2), 475-494.

Sufi, A. (2007). Information asymmetry and financing arrangements: Evidence from syndicated loans. *The Journal of Finance*, *62*(2), 629-668.

Thomas, H., & Wang, Z. (2004). The integration of bank syndicated loan and junk bond markets. *Journal of Banking & Finance*, *28*(2), 299-329.

Viswanathan, K. S. (2006). The pricing of insurer demutualization initial public offerings. *Journal of Risk and Insurance*, *73*(3), 439-468.

Viswanathan, K. S., & Cummins, J. D. (2003). Ownership structure changes in the insurance industry: An analysis of demutualization. *Journal of Risk and Insurance*, *70*(3), 401-437.

Wittenberg-Moerman, R., (2008). The role of information asymmetry and financial reporting quality in debt trading: Evidence from the secondary loan market. *Journal of Accounting and Economics*, *46*(2), pp.240-260.

Xie, X. (2010). Are publicly held firms less efficient? Evidence from the US property-liability insurance industry. *Journal of Banking & Finance*, *34*(7), 1549-1563.

APPENDIX A: DEMUTUALIZED INSURERS IN THE PROPERTY-LIABILITY INSURANCE INDUSTRY

Property-Liability Mutual	Demutualization Year	Inc. State
Goschenhoppen-Home Mutual Insurance Co.	1997	PA
Old Guard Mutual Fire Insurance Co.	1997	PA
Old Guard Mutual Insurance Co.	1997	PA
Patrons Oxford Mutual Insurance Co.	1997	ME
Select Risk Mutual Insurance Co.	1997	PA
Allegheny Mutual Casualty Co.	1998	PA
Compensation Mutual Insurance Company	1998	ME
FCCI Mutual Insurance Co.	1998	FL
Pioneer Mutual Insurance Co. (NY)	1998	NY
Farmers Casualty Company Mutual	1999	IA
Lakeland Mutual Insurance Company	1999	PA
Medical Inter-Insurance Exchange of New Jersey	1999	NJ
Michigan Educational Employees Mutual Insurance Co.	1999	MI
Pennsylvania Millers Mutual Insurance Co.	1999	PA
The Millers Mutual Fire Insurance Co.	1999	TX
FCCI Commercial Insurance Fund	2000	FL
Millers Mutual Insurance Company	2000	PA
Mutual Insurance Corporation of America	2000	MI
Florida Family Mutual Insurance Company	2001	FL
Attorneys Liability Protection Society, A Mutual RRG	2001	MT
Michigan Lawyers Mutual Insurance Company	2001	MI
First Commercial Mutual Company	2002	FL
First Nonprofit Mutual Insurance Company	2002	IL
Garrison Property and Casualty Association	2003	TX
Mercer Mutual Insurance Company	2003	PA
Millers Mutual Insurance Company	2003	IL
Milwaukee Mutual Insurance Company	2003	WI
Fremont Mutual Insurance Company	2004	MI
Le Mars Mutual Insurance Company of Iowa	2004	IA
Employers Insurance Company of Nevada, A Mutual Company	2005	NV
Petroleum Marketers Mutual Insurance Company	2005	IA
Farmers Home Mutual Fire Insurance Company	2006	AR
Louisiana United Businesses Self Insurers Fund	2006	LA
Mutual Service Casualty Insurance Company	2006	MN
American Physicians Insurance Exchange	2007	TX

IMT Insurance Company (Mutual)	2007	IA
Patriot Mutual Insurance Company	2007	ME
Sheboygan Falls Mutual Insurance Company	2008	WI
Commercial Mutual Insurance Company	2009	NY

APPENDIX B: VARIABLE DEFINITIONS IN CHAPTER 2

Variable	Definition
I(Dem)	a dummy variable equal to one for demutualized insurers and 0 otherwise
I(Dem*SN)	a dummy variable equal to one for demutualized insurers with surplus notes in year -1 and 0 otherwise
Assets	Net total assets measured in constant dollars using the CPI with base year 1999
Size	The natural logarithm of net total assets in 1999-dollar value
Surplus	Surplus measured in constant dollars using the CPI with base year 1999
Surplus/Assets	Capital and surplus to net total assets ratio
DPW	Direct premiums written measured in constant dollars using the CPI with base year 1999
NPW	Net premiums written measured in in constant dollars using the CPI with base year 1999
NPW growth	The growth rate of net premiums written
Reinsurance ratio	Reinsurance ceded / (direct premiums written + reinsurance assumed)
SN dummy	Dummy variable that equals one if the insurer has surplus notes and zero otherwise
SN amount	Surplus nots amount measured in constant dollars using the CPI with base year 1999
% commercial lines premiums	Percentage of net premiums written in commercial lines
% long-tail lines premiums	Percentage of net premiums written in long-tail lines
Line of business Herfindahl	Herfindahl index calculated based on net premiums written on each line, i.e. the sum of the square of net premiums written on each line divided by the square of insurer's net premiums written
State of business Herfindahl	Herfindahl index calculated based on direct premiums written in each state, i.e. the sum of the square of direct premiums written on each line divided by the square of insurer's direct premiums written
ROA	Return on assets defined as net income to net total assets
Loss ratio	(Loss incurred + loss adjustment expenses)/Net premiums earned
Risk	The volatility of loss ratio
totRisk	Total risk is measured by the standard deviation of return on assets. Return on assets is defined as net income to net total assets.

invRisk	Investment risk is measured by the standard deviation of return on investments, where return on investments is defined as net investment gain or loss to investment assets.
Tax rate	Federal income tax/taxable income
Expense ratio	underwriting expense/premiums written
ΔSurplus	$Surplus_t/Surplus_{-1}-1$, where t stands for 1, 2, 3, 4, and 5 years post demutualization
ΔDPW	$DPW_t/DPW_{-1}-1$, where t stands for 1, 2, 3, 4, and 5 years post demutualization and DPW stands for direct premiums written
ΔReins	$Reins_t/Reins_{-1}-1$, where t stands for 1, 2, 3, 4, and 5 years post demutualization and Reins stands for reinsurance ratio defined as reinsurance ceded to direct premiums written and reinsurance assumed
Ave. tax rate	average of tax rate from year 0 to t, where tax rate is defined as federal income tax to taxable income
Ave. ROA	the average of return on assets (ROA) from year 0 to t, where ROA is defined as net income to net total assets
I(Dividends)	a dummy variable equal to 1 if the insurer pays dividends from year 0 to year t and 0 otherwise
ΔNPW	$NPW_t/NPW_{-1}-1$, where t stands for 1, 2, 3, 4, and 5 years post demutualization and NPW is the abbreviation of net premiums written
ΔComm	$Comm_t-Comm_{-1}$, where t stands for 1, 2, 3, 4, and 5 years post demutualization and Comm stands for the percentage of net premiums written in commercial lines
Ave. HHI	the average of HHI from year 0 to t, where HHI is the Herfindahl index calculated based on net premiums written on each line
ΔExpense	$Expense_t-Expense_{-1}$, where t stands for 1, 2, 3, 4, and 5 years post demutualization and Expense stands for expense ratio defined as underwriting expense to premiums written

APPENDIX C: VARIABLE DEFINITIONS IN CHAPTER 3

Variable Label	Description
	Panel A: Deal Characteristics
YS	difference between bond offering yield-to-maturity and the yield of a maturity-matched Treasury note/bond
AISD	all-in-spread drawn at origination in basis points
Covenant Intensity	scaled from one to six, with one on each of the following: security, dividend restrictions, two or more restricted financial ratios, asset sweep, debt sweep, and equity sweep. (Bradley and Roberts, 2015) It is the maximum covenant intensity for the firm's all active loans at IPBOs in Table 5 and the covenant intensity for the loan issued in Table 6.
I(Covenant)	dummy variable equal to one if the firm has at least one covenant in Table 5 and if the facility has covenant in Table 6
I(Relationship Lending)	dummy variable equal to one if at least one loan has relationship lead bank during IPBOs
I(Reputable Lender)	dummy variable equal to one if at least one lead bank is the reputable bank (i.e. top 5 before 2000 and top 3 thereafter) in that year
I(Relation*Reputable)	the interaction term of I(Relationship Lending) and I(Reputable Lender)
I(Active Loan)	dummy variable equal to one if a firm has bank loans in effect during IPBOs
Bond Amount	natural logarithms of IPBO bond amount in millions of 1987 dollars computed with the CPI deflator
Bond Maturity	IPBO bond maturity in years
Inv. Grade	dummy variable equal to one if the IPBOs of a firm are rated as investment grade by Moody's rating
AIPBO	dummy variable equal to one if the loan is borrowed after IPBOs.
AIPBO*Inv. Grade	interaction term of AIPBO and Inv. Grade
Loan amount	loan deal amount in millions of 1987 dollars computed with the CPI deflator
Loan maturity	loan maturity in years
PPP	dummy variable equal to one if the loan facility has performance pricing provisions
Secured	dummy variable equal to one if a loan is secured
Syndication	dummy variable equal to one if the loan's distribution method is syndication
Term Loan	a dummy variable equal to one if it is a term loan
	Panel B: Firm Characteristics

Firm size	natural logarithm of sales in millions of 1987 dollars computed with the CPI deflator
Size	Sales in millions of 1987 dollars computed with the CPI deflator.
M/B	market value of assets divided by the book value of assets
Profitability	earnings before interest and taxes scaled by total asset in percentage
Tangibility	sum of inventories and property, plant and equipment scaled by total asset.
Book Leverage	sum of short-term debt and long-term debt scaled by total asset
	Panel C: Market Characteristics
Default Premium	monthly Moody's seasoned Baa corporate bond yield relative to yield on 10-year Treasury constant maturity in percent
Lag bank return	one-month lagged value weighted monthly bank industry returns from Kenneth French's online data library (industry number 44 in the 48-industry portfolio, with the name "Banking")
Lag2 bank return	one-month lag of Lag bank return