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The Impact of Regulation and Governance on the Risk Profile of Banks

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ABSTRACT

The impact of regulation and corporate governance on banks' risk profiles has gained greater importance with the passage of new legislations starting late 1990s and the recent global turmoil in the financial services industry. The extant literature indicates that the effects of corporate governance mechanisms differ between financial and non-financial firms. Yet, the effects on risk-taking have been less conclusive for financial firms primarily because of changing regulations impacting incentives and risk-taking patterns of banks. While the objective of regulation in the banking industry is to preserve the stability of the financial sector and the economic system, corporate governance mechanisms help mitigate agency problems. As such, regulation and governance mechanisms are set to ensure that bank managers serve the best interests of stakeholders. This dissertation examines the risk profiles of banks in the context of recent legislations concerning bank regulations and corporate governance. The methodology includes univariate and multivariate analyses. The study, which covers a 13 year period, examines the impact of the Gramm-Leach-Bliley Act (GLBA) of 1999, on banks' risk profile. The findings suggest that governance structures comingle with regulation to determine the risk profile of banks, specifically; corporate governance and the risk profile of banks vary by bank size. This dissertation finds evidence that the deregulation experienced by the banking industry with the passage of the Act has had a diminishing impact on banks' risk, owing to diversification of revenues through nontraditional activities.

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CHAPTER I

INTRODUCTION

Research on corporate governance and regulation has provided great insights into the drivers and factors that contribute to corporate risk profile, which in turn impact the likelihood of firm failure. Banks warrant special attention because of their financial intermediary function, which affects every aspect of the economy. Corporate governance literature has examined agency theory, which suggests mechanisms that influence risk behavior of owners and managers; whereas banking literature has examined regulations and their effects on bank risk profiles.

Research indicates that the effects of corporate governance mechanisms differ between financial and non-financial firms (Mehran et. al. 2011). The effects of these mechanisms on risk-taking are more conclusive regarding non-financial than financial firms. The evidence regarding bank risk profile has produced mixed results based on ownership and on the structure of board of directors. Furthermore, the evidence suggests that bank regulation could have different effects on a firm's risk-taking patterns, depending on corporate governance structures (Laeven and Levine, 2009).

Yet, many questions have not yet been addressed. This dissertation makes an attempt to fill the gap in bank risk-taking literature, with an integrative framework that incorporates existing governance and regulation literature. It also examines the effects of the 1999 Graham Leach Bliley Act (GLBA), which is the most recent legislation to deregulate the financial service industry in the U.S. The purpose of this dissertation, along with anticipated contributions to the literature through empirical testing, is presented in the following sections.

1.1 Research Impetus

The 2008 failure of many banks and insurance companies led to a financial crisis that required unprecedented measures. The fallout within the financial industry resulted in a government takeover of Fannie Mae and Freddie Mac. On September 15, 2008, Lehman Brothers filed for bankruptcy protection, and Merrill Lynch was taken over by the Bank of America[1]. Following these events, the U.S. government seized control of the American International Group (AIG), spending $85 billion for bailout[2]. On September 25, 2008, Washington Mutual was seized by regulators, creating the worst bank failure in U.S. history and it was then sold to J.P. Morgan by the federal government[3]. Federal regulators soon approved the acquisition of Wachovia Corporation by Wells Fargo. A total of 140 banks and savings institutions with assets totaling $23.4 billion failed in

[1] www.nytimes.com/2008/09/15/business/15lehman.html?pagewanted=all
[2] http://online.wsj.com/article/SB122156561931242905.html
[3] http://www.marketwatch.com/story/wamu-fails-sold-to-jp-morgan-chase-for-19-billion

2009, according to reports by the Federal Deposit Insurance Company (FDIC). The ramifications are still being felt in the national and global economy. This crisis has been the impetus for this research, for identifying risk factors in bank behavior, especially in the period prior to the passage of the GLBA, after its passage, as well as during the financial crisis beginning in 2007.

1.2 Purpose of the Research

This dissertation addresses gaps in corporate governance and bank regulation literature, and examines the risk profile of banks in context of regulatory changes. Banks play a significant role in the economic system, and also as providers of external governance of firms. However, more studies are needed to carefully explore their corporate governance, considering their impact on the economic stability (Shleifer and Vishny, 1997; Macey and O'Hara, 2003, Spong and Sullivan, 2010). Furthermore, as Laeven and Levine (2009) indicate, research of bank risk and regulations has not yet addressed how corporate governance mechanisms factor into regulatory shifts in shaping individual bank performance. To explore pertinent literature trends, I examine the risk profile of banks from 1997-1999 (prior to the passage of the GLBA), and from 2000-2009 (after its passage). This period includes the financial crisis in 2007 through 2009 as well as the year of the passage of the Sarbanes and Oxley (SOX) Act in 2002.

1.3 Statement of the Problem

The purpose of the GLBA was to enhance competition, to provide stability to financial firms, and to improve capital markets (Greenspan, 1997). One of the main regulatory concerns prior to its passage was it might also increase risks of financial institution and adversely affect the soundness and stability of the U.S. financial system (Wall et. al., 1993; Berger and Mester, 1999). Therefore, this research seeks to address the following issues, concerning the 1999 enactment of the GLBA:

- How has the GLBA passage impacted the risk profile of banks?
- Do corporate governance mechanisms tie into the changing financial regulatory environment?
- How does ownership and board structure interact with regulation, and how do they influence bank risk profile?
- After 9 years of the Act's passage, what are the structural changes in banks' balance sheets and what would be the appropriate measures of risk for analyzing banks risk-taking behavior?

1.4 Characteristics of Corporate Governance in Banks

Corporate governance in banks, as defined by Greunin and Bratanovic (2003) "… relates to the manner in which the business of the bank is governed, including setting corporate objectives and a bank's risk profile, aligning corporate activities and behaviors with the expectation that management will operate in a safe and sound manner, running

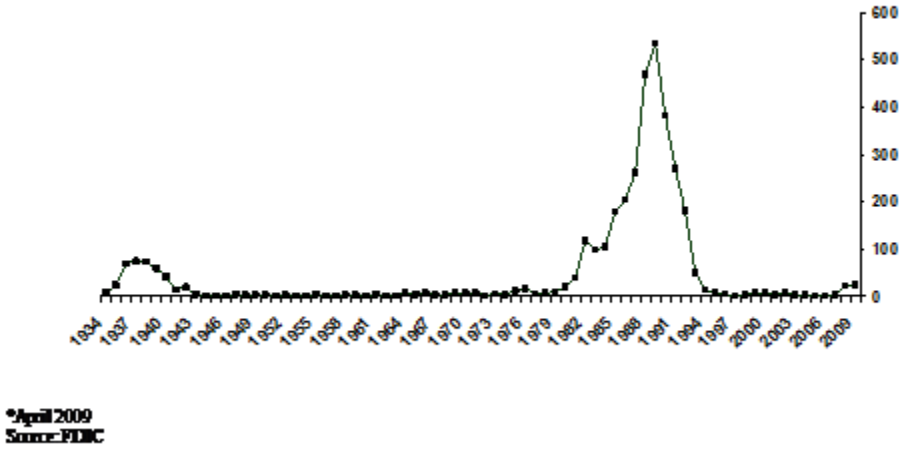
day to day operations within an established risk profile, while protecting the interests of depositors and other stakeholders." Along these lines, this study will examine internal governance characteristics, and relate them to the risk profile of banks before and after the passage of the Financial System Modernization Act in 1999 (FSMA), and also from the stand point of economic distress during the financial crisis starting in mid-2007. Despite the ongoing debate about whether regulation substitutes or complements traditional governance mechanisms, it is widely accepted that the soundness of corporate governance would depend on internal mechanisms, such as ownership structure and board composition. Therefore, risk profiles are examined according to differences in ownership and board structures. In particular, it is argued that the potential conflict of interest between managers and shareholders, including asymmetric incentive structures, would impact managers' decisions and the resulting differences in bank risk profiles.

Further, this study controls for new governance rules enacted in 2002 after a series of corporate scandals that resulted from accounting irregularities. These irregularities, along with corporate misconduct during the collapse of Enron in December 2001, led to major revisions on corporate governance rules by the government and the Securities Exchange Commission (SEC). As a result, the Sarbanes-Oxley Act (SOX) signed on July 30, 2002, aimed to improve corporate financial transparency. Stock exchange regulation amendments also improved corporate governance modification and oversight. The new rules required the majority of independent directors, plus independent directors in the compensation, nominating and audit committees. Considering the importance of the SOX Act in the business world, this dissertation explores its impact bank risk profiles.

1.5 Overview of Banking Regulation in the U.S.

The regulatory structure in the U.S. originated with the passage of the Banking Acts of 1933 and 1935, following the financial crisis of the Great Depression. It provided stability as reflected by the fact that very few banks failed since then, until the last two decades of the twentieth century. Figure 1 shows annual bank failures from 1934 until Q2 2009, based on the Federal Deposit Insurance Corporation (FDIC). Except for the peak of the S&L Association crisis, when more than 1,000 bank institutions failed between 1988 and 1989, their failure rate has been very low since 1934. The subprime crisis, beginning in mid-2007, led to the recent increase of U.S. bank failures.

Figure 1: U.S Bank Failures 1934-2009



The Banking Act of 1935 established the FDIC as a permanent government agency, which provides insurance for deposits at a specified level, while the Banking Act of 1933 created the separation of investment and commercial banking. In spite of the 1933 Act's dispositions, banks were able to find loopholes, where holding companies could acquire

subsidiaries, such as investment banks and insurance firms. With the intention to close these loopholes, the Bank Holding Company Act of 1956 (BHCA) designated that companies owned by BHCs must be engaged in activities "closely related to banking"[4]. Nevertheless, Finance Holding Companies (FHCs) were already conducting securities activities as early as 1987, authorized by Section 20 exemptions. With the introduction of the so-called Section 20 subsidiaries, banks were forbidden from being affiliated with any group that was "engaged principally" in underwriting or dealing in securities. However, in 1987, the Federal Reserve Bank allowed limited securities underwriting of bank affiliates. Gradually, these limits were lifted, and by 1996 Section 20 affiliates were allowed to underwrite up to 25% of their revenues in corporate bond and equity issues. Yeager et. al. (2007) noted that "virtually, all large bank holding companies had subsidiaries that were Section 20 Affiliates."

The FSMA, also referred to as the GLBA, has provisions that repealed restrictions in the Glass-Steagall Act of 1933 and the BHCA pertaining to securities firms and insurance companies, respectively. Three major changes following the Act contributed to the shaping of the currently competitive landscape of financial firms. First, the Act eliminated many federal and state legal barriers to affiliation among banks, securities firms, insurance companies, and other financial service providers, that had been in the BHCA and Section 20 of the Banking Act of 1933. Second, financial service organizations acquired flexibility in structuring new affiliations through holding companies and financial subsidiaries. Third, the Act permitted a qualifying BHC to become a FHC, and engage in an expanded array of activities that are "financial in nature

[4] http://www.fdic.gov/regulations/laws/rules/6000-500.html

and incidental to, or complementary to financial activities," subject to certain Federal Reserve Board restrictions that could "pose substantial risk to the safety and soundness of depository institutions or the financial system"[5]. The Act contained a list of pre-approved activities that included merchant banking, insurance company portfolio investment, and securities underwriting activities.

[5] http://www.fdic.gov/regulations/laws/rules/6000-500.html

CHAPTER II

LITERATURE REVIEW

This section is divided into two parts. The first part discusses banking regulation shifts prior to and after the enactment of the GLBA, while the second part reviews relevant literature pertaining to corporate governance mechanisms and their relation to risk-taking of banks.

2.1 Banking Regulation

Central to this research is the GLBA's impact on risk-taking behavior, as a result of their entry into nonbanking activities (securities, real estate, and the insurance business), all of which tend to generate greater risk (Lown et. al., 2000). Yeager et. al. (2007) indicate that the passage of the Act opened the way to the so-called "universal bank," in which the most potential benefit is derived from allowing financial institutions to exploit revenue efficiencies and economies that was not possible before deregulation. Universal banks are also able to capture revenue efficiencies by cross-selling commercial loan products and securities underwriting, in addition to cross-selling retail products, such as

certificates of deposit, brokerage services, and insurance. Critics of the Act argued that the financial system would be compromised with the consolidation of commercial banks, and other types of financial service firms (Akhigbe and Whyte, 2004), and that nonbanking activities would increase the incidence of commercial bank failures.

With banks allowed to fully affiliate between entities (securities firms, insurance companies, and other financial service providers), those favoring larger universal banks anticipated firms to be more stable this way. One view is that larger entities would have a stronger, diversified asset base than their specialized counterparts, and decreased profit variability, (Denenis and Nurullah, 2000; Mishkin, 1999). Evidence supporting this view indicates that diversification benefits can be realized if nonbank financial services reduce dependency on loans as a dominant source of income (Hughes et. al., 1999; Saunders and Walters, 1994). The second view, with its research on financial services consolidation, suggests that consolidation could lead to more diversified loan portfolios, thus making bank failures less likely. That is, if an increase in bank risk occurred, the increase in risk would be offset by the increase in average profitability, leading to a decrease in commercial bank failure (Mishkin, 1999; Boyd and Graham, 1986). Black (1975) and Fama (1980) associate universal banking with enhanced monitoring capability, which lowers bank risk-taking, while Steinherr (1996) associates a better risk-return and trade-off with universal banks, as well as a reduced income variability from the lending business.

Santomero and Eckles (2000) provide a different view on universal banking. First, they argue that as the consolidated entity's franchise value and firm brand are

interconnected, a negative outcome may in fact be magnified with other business units and the consolidated entity. They suggest that the vulnerability of any one of the lines of business could harm the entire franchise. Second, they argue that in times of stress these effects could be highly detrimental to the firm if a strong correlation exists between lines of business during economic downturns. Furthermore, they argue that the Financial Modernization Act has important implications for public policy, because of the contagion propensity of universal banks and large financial firms. They anticipate that the "too big to fail" standard could be accentuated with the formation of large firms in the financial sector that may require significant government bailouts at the expense of taxpayers. The development of the recent financial turmoil makes a strong case to support the argument of these authors.

There are several studies that examine factors impacting the risk profiles of financial institutions after major regulatory changes. Aharony et. al. (1988) present evidence that the passage of the Depository Institutions Deregulation and Monetary Control Act of 1980 had significant implications for the risk of financial institutions. This Act removed the power of the Federal Reserve Board of Governors to set the interest rates of savings accounts, and also allowed credit unions and S&Ls to offer checking deposits. Aharony et. al. (1988) found that after the Act's passage, the (total) return and risk of money center and regional banks increased, while that for thrifts decreased. Cornett and Tehranian (1989) found that the passage had a positive impact on the wealth of large commercial banks, but a negative impact on that of S & L Associations.

Empirical evidence of the effect of nonbank subsidiaries that engaged in the limited underwriting of securities activities on BHC risk prior to the passage of the Act risk is mixed. Wall (1987) examines the probability of bank insolvency with nonbank subsidiaries and suggests there is no evidence to conclude that deregulation would either increase or decrease bank risk. Boyd and Graham (1986) examine whether diversification into nonbank activities decreases or increases risk. Over the sample period (1971-1983), no evidence was found indicating that BHC's involvement in nonbank business activities either increased or decreased its risk of failure. However, after examining sub-periods, when regulatory policy was less stringent, a positive association was seen between the degree of involvement in nonbank activities and risk. During periods of stringent regulation of BHCs, no strong relationship was seen between the extent of nonbank involvement and risk. This suggests that regulation of nonbank activities partially limits the risk behavior of BHCs, and helps avoid undesirable bank failures. On the other hand, Boyd and Graham (1988) study hypothetical mergers between BHCs and nonbank financial firms and find that risk increases substantially when mergers are simulated between banks and securities firms, or between property/casualty insurance firms and real estate development. Rosen et. al. (1989) find limited potential for risk reduction from bank entry into real estate activities. By taking a portfolio approach, the study finds a BHC's tolerable level of real estate investment without altering its risk, measured by variance of earnings. Using REITs data, they find benefits for diversification up to a level of 4 percent in the total portfolio. The authors conclude that there is modest potential for diversification benefits by allowing BHCs to invest directly in real estate.

Regarding bank expansion into the insurance and securities businesses, Boyd, Graham and Hewitt (1993) simulate BHCs that merge with other financial firms to assess profitability and risk. They find that mergers between BHCs and insurance companies may reduce risk, whereas mergers between BHCs and securities firms would tend to increase it. Reichert and Wall (2000) use industry-level data during the period 1974-1997 to form efficient portfolios of selected sectors that provide traditional and nontraditional banking activities. Their model simulates the performance of a diversified financial services holding company under the assumption the Act had been enacted before 1999. The study finds diversification benefits for the two earlier periods considered, and that the increase in expected earnings is associated with reduction in risk. However, the results from the last decade provide only weak evidence of diversification benefits, leading the authors to conclude that the optimal portfolio is time-varying, possibly due to macroeconomic or technological reasons.

A number of studies have addressed GLBA's impact by focusing on stock price reaction leading to the announcement of the passage of the Act. Prior to the Act in 1999, research suggested that combining traditional commercial banking activities with securities activities was beneficial to the financial services industry. Using a sample of both commercial banks and thrifts, Akhigbe and Whyte (2001) found that five announcements that led to the passage of the Act created a positive wealth effect for the banking industry. On the other hand, Carow and Heron (2002) found positive returns for investment banks and insurance companies, but insignificant returns for banks for six events studied prior to the passage of the Act. Czyrnik and Klein (2004) provide evidence

of significant and positive effects on the value of commercial and investment banks but find different levels of reactions for all types of institutions.

Akhigbe and Whyte (2004) document changes in market risk for firms in the financial industry given GLBA rules. By using three capital market measures and event data methodology, their study finds a significant decline in systematic risk for banks, securities firms and insurance companies in contrast to a significant increase in total and unsystematic risks for banks and insurance companies. Mamun et. al. (2005) propose that exposure to systematic risk for different bank categories of banks decreased after the passage of the Act, and conclude that the GLBA is fairly successful in containing the risk in addition to creating diversification opportunities. Geyfman and Yeager (2009) found that for the period of gradual deregulation before the GLBA's passage, investment securities activities were positively associated with higher total and idiosyncratic risk and that small risk reduction occurred in the years after its passage, but do not attribute them to the change in the regulatory structure.

In summary, this first part of the literature provides different views regarding the stability of the financial system and the risk of bank failure associated with the deregulation of financial services system in the U.S. Prior to passage of the GLBA, there was considerable academic debate about the appropriateness of banks expanding into nonbank activities. Proponents of deregulation suggested that expansion reduces risk, while opponents predicted an increase in risk. This dissertation addresses the debate by focusing on the financial condition of banks surrounding the passage of the GLBA.

Current financial turmoil also provides a suitable time frame for further empirical examination about the link between banks' risk-taking during a period of deregulation. Specifically, this dissertation examines book-based risk measures, market risk measures, changes in asset and liability structures, and income streams that might have been caused by major changes in the Act. Contrary to previous studies that have focused on the wealth effect of the announcements leading to the passage of the Act, this dissertation focuses on sub-periods for capturing the trends in financial performance and risk during different regulatory regimes.

2.2 Corporate Governance in Banks

In light of recent developments in the financial sector, an analysis of bank risk-taking behavior and regulation should include prominent corporate governance mechanisms that mitigate the principal-agent problem in firms.

2.2.1 Corporate Governance Differences in Regulated and Unregulated Firms

Agency theory prescribes corporate governance structures and other internal control mechanisms as devices that are geared to lead executives' activities toward firm-value maximization. With banks functioning under strictly-regulated policies, corporate governance structures have been found to differ from unregulated firms. Adams and Mehran (2003) found systematic corporate governance differences between banking and

manufacturing firms. Their study indicated that BHCs have less stock-based compensation in executive compensation packages, larger boards, and committees that meet more frequently, and less concentrated block ownership. The authors attribute these findings to differences in the investment opportunities of BHCs and manufacturing firms as well as to the presence of regulation.

Bathala et. al. (2007) argue that due to the highly leveraged nature of financial services and utilities firms, it is possible that firms in those industries have governance structures that are less restrictive and shareholder-friendly than those in unregulated firms. Their findings show that banks are superior in corporate governance with respect to the Corporate Governance Quotient Index[6] and executive compensation, but are inferior with respect to audit mechanism. They also find that banks and nonbanks do not differ in governance mechanisms relating to board of directors and takeover defense.

Carrillo and Bathala (2009) examine differences in the Insolvency Risk and valuation effects of corporate governance and ownership structures in banks and nonbanking firms. Their results show that the audit committees do not influence the risk profiles of banks, but that the existence of a governance committee lowers the Insolvency Risk for both banks and nonbanking firms. Institutional ownership was found to lower the Insolvency Risk for nonbanking firms only. The study concludes that ownership differences seem to exert more influence on risk and valuation than corporate governance metrics, and that

[6] The Corporate Governance Index ranks corporate governance performance of more than 7,500 companies worldwide, including those represented in market indexes such as S&P 500, S&P, 600, S&P 4000, Russell 3000, MSCI's EAFE (Europe Asia and Far East) and S&P's TSX Composite index (Canada), for further description see Bathala et al (2007).

the impact is stronger for nonbanking firms than banks. Contrary to the complementary relationship between regulation and corporate governance mechanisms, they suggest that this could be due to a regulation-induced substitution effect. For board mechanisms, the findings do not substantiate board independence as being an effective corporate governance mechanism for risk and valuation of banks. They discuss how board independence in banks may not be an effective corporate governance mechanism, perhaps because outside board members do not fully understand banking industry characteristics.

As indicated, this dissertation helps enhance our understanding of the role of regulation in conjunction with the corporate governance of banks by examining the relation between risk-taking behavior and corporate governance structures during periods of financial system regulation and deregulation, as marked by the passage of the GLBA. Based on the literature review, corporate governance structures have not been studied in the context of major financial regulatory changes, thus this dissertation contributes to the gap in the literature focusing on internal monitoring mechanisms, specifically ownership structure and board composition.

2.2.2 Why Ownership Structure can affect Bank Risk-Taking?

Shareholders of highly leveraged firms (such as financial institutions) may benefit from increased risk-taking due to the option value of equity. Shareholders can be thought to have a call option on the firm's assets which is exercised only if the firm performs

well. As such, shareholders have the right but not the obligation to pay off the debt. The value of the debt can be thought of as the exercise price of the shareholder call option on the firm's assets. If the firm performs well, such as the value of the assets is higher than the face value of the debt, then shareholders exercise their call option to purchase the firm's assets (and pay the debt). In that case, management has an incentive to change the riskiness of the firm's investment activities because successful outcomes will benefit shareholders. If the firm's performance is poor, or the riskier investment activity is not successful to the extent that the value of the debt exceeds the value of assets, shareholders default on their obligations or forego their right to purchase the firm's assets, and creditors take ownership of assets (Galai and Masulis, 1976).

Similar to the call option of shareholders, creditors are considered to have a put option on the firm's assets. When the firm performs poorly, creditors must accept the firm's assets from shareholders. The face value of the shareholder's obligation is the exercise price of the put option. Depositors can be considered as debt holders who would demand higher interest rate on their deposits to compensate for the riskier investments undertaken by banks' shareholders. However, since depositors have limited to no ability to monitor banks' shareholders actions, shareholders can increase the value of their equity call options by increasing the risk of the asset at a low cost capital. It is argued that the existence the federal deposit insurance eliminates the need to monitor banks by depositors as bank obligations to depositors are guaranteed with some limits. Furthermore, if the deposit insurance premiums don't fully reflect the risk of the

institution, shareholders have and additional incentive to increase the risk at the expense of the insurer, (Merton 1977, Dold and Knopf, 2006).

2.2.2.1 Insider Ownership

Previous research on issues concerning ownership and bank risk-taking behavior shows little consensus. Empirical investigation by Saunders et. al. (1990), Knopf and Teall (1996) and Anderson and Fraser (2000) suggest a positive association between bank risk-taking behavior and insider ownership, indicating those banks with high insider ownership are more likely to be more risky. This can be interpreted as evidence that as inside ownership increases, the incentives are more aligned with those of shareholders. Studies suggest that the agency problem between outsiders and management is reduced through manager stock ownership. In the case of banks, however, increasing management ownership may yield an incentive to engage in moral hazard behavior (Belkhir, 2005). Chen et. al. (1998) find a negative relation between managerial ownership and market based risk measures as well as a non-linear relation between managerial ownership and risk proxies. Cebenoyan et. al. (1995) find that S&Ls with high managerial ownership engage in greater risk-taking behavior during regulatory leniency and forbearance and they engage in lower risk-taking behavior during regulatory stringency and non-forbearance. Demsetz and Strahan (1997) find that franchise value and ownership structure affect bank risk-taking behavior. Specifically, they find that the relationship between ownership structure and risk is significant only for low franchise value banks. They also find that risk is lower at banks without any insider holdings. However, there is

no connection between insider holdings and risk-taking at banks with insider holdings. Houston and James (1995) find no evidence that equity-based compensation is used to promote bank risk-taking. Alternatively, Kwan (2004) compares the profitability and risk-taking between publicly traded and privately held U.S BHCs and finds that publicly traded banks tend to be less profitable than privately held BHCs that are similar. Additionally, the risk between publicly held and privately owned banking companies, whether measured by loan portfolio quality or earnings variability, is statistically indistinguishable.

Two recent studies address the combined effect of bank governance and regulation on bank valuation and risk. Caprio et. al. (2007) evaluate the impact of ownership characteristics on shareholder protection laws, controlling international differences in bank regulation. They argue that in the case of banks, investor protection laws do not provide the necessary tools that allow small shareholders to prevent large shareholders from expropriating bank resources. In this sense, their monitoring role is adversely affected by the bank's complexity and opaqueness. In their study, the 10 largest banks across 44 countries are classified based on 5 categories of ownership: widely held, individuals, families, state, financial corporations, nonfinancial corporations and a trust or a foundation. The findings indicate that banks in general have concentrated ownership. In regards to ownership patterns, legal protection of shareholders and regulation, they find that widely-held ownership is uncharacteristic in countries with lower levels of shareholder protection and supervisory power. On the relationship between ownership, legal protection of shareholders and bank valuations they find a positive relationship

between ownership concentration and bank valuation, but a negative relationship between weak shareholder protection laws and bank valuation. Finally, they find that large cash flow rights reduce the negative effect of weak shareholder protection laws on bank valuations.

Laeven and Levine (2009) conduct an empirical examination of risk-taking by banks, ownership structure, and regulation in the 10 largest banks in 48 countries. Using cash flow rights as the measure to define large ownership, they find that bank risk is higher when there is a greater presence of large shareholders with significant cash flow rights. After bringing in regulation in the analysis, they find that deposit insurance increases risk only in the presence of large shareholders, but the impact is not significant with widely held ownership. In a similar study, Westman (2009) examines the interaction between ownership characteristics and regulatory environment in European banks and finds that ownership structure changes according to the severity of the moral hazard problem induced by the deposit insurance system. Chen et. al. (2011) study the effect of financial crises within a country's banking system and the link between control-ownership and cost borrowings, and conclude that control rights and cash-flow rights affects firm value and determine the cost of financing.

2.2.2.2 Large Shareholder Ownership

Large shareholders and concentrated ownership are important factors in a firm's governance structure. It is thought that the presence of a large stockholder (after here

referred to as blockholder) is expected to have an important disciplinary effect on managers through their monitoring role (Shleifer and Vishny, 1986; Maug, 1998, Noe, 2002; Gilland and Starks, 2003) since they have sufficient incentive to monitor management, along with the capacity to bear monitoring costs. Simultaneously, individual shareholders would also enjoy the benefits of monitoring management by blockholders without assuming the costs. The benefits for blockholders include the influence they can exert to improve firm performance. However, research is not conclusive on the monitoring role of blockholders. Bethel et. al. (1998) found that performance improves after large share block purchases by activist investors, while Koke et. al. (2001), provide little evidence that existing blockholders play an active role in disciplining underperforming management. In a more recent study, Borokhovich et. al. (2006) argue that blockholders with potential business ties to the firm (affiliated) versus those without ties (unaffiliated) have different incentives for monitoring management. They examine the abnormal returns related to the announcement of antitakeover amendment proposals and conclude that the market views affiliated blockholders as less effective monitors than unaffiliated blockholders.

2.2.3 Bank Regulation and Moral Hazard

To a large extent, the risk-taking behavior of bank managers is determined by restrictions imposed by regulators. Regulation plays an important role in the scope of banks' activities and it is intended to ensure that banks do not take excessive risks. However, theory indicates that regulation provides a different incentive for risk-taking behavior among bank stakeholders. Mishkin (1999) argues that the moral hazard

created by a government safety net can result in increased risk-taking that eventually leads to institutional losses as seen during the savings and loan crisis of the 1980s. Financial institutions were allowed to enter new lines of business at that time, which in turn led to greater risk-taking. Macey and O'Hara (2003) argue that the positive effect of federal agencies to insure deposits in qualified banks also has a regulatory cost. It provides the incentives to both shareholders and managers of insured banks to engage in excessive risk-taking. If these decisions lead to higher returns, the bank receives the sole benefit. On the other hand, if the risk leads to insolvency that could in turn trigger systemic risk then the bank will likely be bailed out. Since deposits are protected to a large extent despite the bank's investment outcomes, deposit insurance reduces the incentive for insured depositors to monitor the bank's risk-taking, and the motivation to engage in risky behavior is higher for owners than non-shareholder managers (Laeven and Levine, 2009). Additionally, Westman (2009) compares the performance and risk profile across similar deposit insurance system classes in European banks, and finds that risk is higher for banks with the most common ownership structure (variation of state owned banks, unlisted banks with bank blockholder owner, and unlisted banks with foreign blockholder) in countries where the moral hazard problem is severe. The author suggests that countries with generous deposit insurance induce risk-taking.

2.2.4 Why Board Structure Can Affect Bank Risk-Taking?

The Office of the Comptroller of the Currency issued a study in 1988 on bank failures, and concluded that in addition to management, the board of directors has a significant

influence on a bank's success or failure[7]. The study indicates that although economic conditions are a major influence on a bank's ability to achieve financial success, deficiencies within the board of directors and of management were the primary cause of most troubled and failed banks during the 1980s and early 1990s[8]. The study finds that characteristics of problematic banks include an uninformed or inattentive board as well as problems related to oversight by the board.

It is argued that the board of directors is a crucial mechanism in resolving the agency conflict between managers and shareholders because it is presumed that the board performs the monitoring function that individual shareholders are unable to perform due to lack of resources (Jensen 1993). The board of director's role as a corporate governance mechanism in banks deserves special attention due to the complexities of the banking industry, regulation, and informational asymmetries. Evidence suggests that these asymmetries are more pronounced with banks than with nonfinancial firms due to a more complex structure of information asymmetry among the different stakeholders (Ciancanelli and Reyes 2001, Furfine 2001). Caprio and Levine (2002) and Levine (2003) argue that greater government regulation along with greater opaqueness of banks compared to other industries affects corporate governance. Bank assets are informationally opaque because "bank loans are customized, privately negotiated agreements that, despite increase in availability of price information and in trading activity, still lack transparency and liquidity, making them difficult to quantify and

[7] OCC, Bank Failure: An Evaluation of the Factors Contributing to the Failure of National Banks (1988)
[8] OCC, An Examiners Guide to Problem Bank Identification, Rehabilitation, and Resolution, (2001).

manage", Greenspan (1996) . Corporate governance mechanisms associated with a monitoring role are also altered due to a lack of transparency and a lack of proper loan values, thus creating greater asymmetry between insiders and outsiders in the banking sector. Bank opacity exacerbates informational asymmetry, as reflected in the inability to determine loan quality, the complexity of financial engineering products, and the ability to modify investment risk (Levine, 2004).

2.2.4.1 Board of Directors Evidence

Research relating to the board of directors has focused on board effectiveness in monitoring management, which in turn has been linked with board independence. The monitoring by outside directors reduces managers' discretion, and as a result lowers the agency costs (Fama, 1980; Bathala and Rao, 1995). Fama and Jensen (1983) argue that outside directors are effective monitors since they are motivated by reputational concerns. Brickley et. al. (1988) argue that stock ownership by officers and board members provides incentive to monitor the managers more effectively. However, the degree to which director ownership provides monitoring incentive may also be affected by the level of diversification of their personal wealth. Conceivably, outside directors could be motivated to engage in risk-taking behavior if pursuing risky business strategies could lead to greater wealth and personal rewards. Therefore, officer and board ownership as well as compensation packages are important factors in determining the likelihood that board members will take an action that would impact shareholder wealth, and bank's risk.

2.2.5 Corporate Governance Legislation

Corporate failures that took place in the U.S. during 2001 to 2002 prompted the passage of the Sarbanes Oxley Act (SOX) of 2002 as well as a series of revisions in the stock exchange's regulations. The new rules included provisions to reduce the likelihood of corporate fraud and to provide alignment of incentives for the corporate insider with investors through enhanced disclosure. These also included explicit changes to corporate governance structures requiring increased outside representation on the board. In relation to corporate governance, SOX requires all public firms to have an independent audit committee while the New York Stock Exchange (NYSE) rules require a majority of independent directors on corporate boards, as well as absolute independence in the compensation committee, the nominating committee and the audit committee.

Prior research analyzed the impact of the passage of the SOX Act on firm value and risk. Chhaochharia and Grinstein (2005) found that during the announcement period of these rules the returns response varied across firm size. For small firms that were less compliant with the proposed legislation, by either having ineffective internal controls or boards that were not independent, they discovered negative abnormal returns to announcements prior to the passage of the Act. In contrast, large firms that were less compliant prior to the legislation present positive abnormal returns. Related to firm-risk evidence, Ashbaugh-Skaife et.al. (2009) look at the internal controls disclosures (ICD) setting that the SOX Act requires about financial reporting. They found that firms

reporting ICDs had higher idiosyncratic risk, suggesting that firms with internal control problems also present greater information risk to investors.

The corporate governance regulation literature has looked at the impact of the SOX Act in the financial services industry. Akhigbe and Martin (2006) estimate its impact on the valuation of firms in the financial services industry by evaluating the wealth effect of firms surrounding the passage of the Act. The results indicate a positive wealth effect for large and small banks, saving institutions and insurance companies, which the authors attribute to the disclosure and governance provisions associated with the Act. They also suggest that positive response is associated with expected improvement in the transparency of the relatively opaque nature of financial services firms. In a subsequent study, Akhigbe and Martin (2008) extend the impact of the SOX Act by examining the risk implications on U.S. financial services firms. The authors look at short and long term changes to market risk measures and find that the passage of the Act was associated with increased risk in the short term as a result of how firms disclose unfavorable information that was previously undisclosed. In contrast, longer term measures of market risk are negative, concluding that new information reflects a decrease in investor uncertainty along with increasing transparency.

In summary, the literature on corporate governance and banking regulation provide the framework for the empirical analysis used in this dissertation to analyze the risk-taking in financial institutions. Specifically, it allows exploring how governance structures comingle with regulation to determine the risk profile of banks.

CHAPTER III

HYPOTHESES

On the basis of the literature review, four hypotheses are tested to examine the impact of governance and regulation on the risk profile of banks.

3.1 Hypothesis 1: Regulation Induced Risk-Taking Behavior

The financial turmoil that started in mid-2007 led to a review of the extent that deregulatory changes enacted with the GLBA contributed to the crisis. As stated by policymakers, the subprime crisis revealed flaws in the financial regulatory structure: "The current system of functional regulation has several fundamental problems" (Treasury, 2008). But it is also argued that the supervisory structure is not the cause of the crisis. According to Mr. Thomas Hoening, president of the Federal Reserve Bank of Kansas City, in his address to the Institute of International Bankers on October 13, 2008, "No structure might have done particularly better or worse than another in preventing the current imbalances."

Major changes in the Gramm-Leach-Bliley Act of 1999 could present risk implications in the banking sector. The passage of the GLBA creates potential for bank risk increases, as they enter into riskier activities with securities and insurance businesses (Lown et. al. 2000; Boyd et. al. 1993). There are two arguments that suggest BHCs could result in less stable firms (Santomero and Eckles, 2000). One argument indicates that if the correlation between lines of business is stronger than what it is assumed under the initial activity expansion, the potential for increase in risk is significant, especially in downturn economic cycles. The second argument by Santomero and Eckles (2000) suggests that the "consolidated entity has a franchise value and brand name that are intimately intertwined with all of its businesses". As financial firms engage in a number of financial activities (anticipated to occur with the passage of the Act), they argue that there is an increase in the probability that financial distress within the conglomerate will extend to the holding company and its subsidiaries, which could destabilize the firm as well as the sector and the economy at large. The perception that financial conglomerates have increased systemic risk could in turn increase the bank risk in general (Akhigbe and Whyte, 2004).

On the other hand, the bank risk could either decrease or remain unchanged based on tradeoffs between diversification and risk. The potential for diversification to new lines of business through expansion to securities and insurance activities may reduce the risk. Berger and Mester (1999) provide evidence that the expanded product array and cross-selling opportunities have enabled banks to benefit from revenue gains, resulting from offering multiple products and services, increasing revenue potential and improved risk-

returns trade-offs. In addition, bank risk could be controlled as a response to active regulatory oversight which would prevent financial institutions from excessive risk-taking (Freixas and Santomero, 2002). Considering that the Act establishes functional regulation (such as banking activities overviewed by banking regulators, securities activities overviewed by securities regulators, insurance activities overviewed by insurance regulators, and the Federal Reserve Board serving as the supervisor for holding companies), the supervisory function could maintain integrity of the system and prevent excessive risk-taking by banks expanding into nontraditional activities. Thus, the barriers removed for U.S banks regarding universal banking could be safer and less susceptible to bank risk.

With the potential impact of universal banking on bank risk as well as the important role of regulatory oversight in the prevention of excessive risk-taking by banks, the final effect on risk is determined to a large extent by the risk preferences of each institution. Accordingly, the regulation induced risk-taking hypotheses to be tested are:

H01: The risk profile of BHCs has not change after the passage of the GLBA in 1999.

Ha1: The risk profile of BHCs has changed after the passage of the GLBA in 1999.

3.2 Hypothesis 2: Managerial Risk Incentives

Saunders et. al (1990) argue that the ability of a bank's stockholders to maximize the value of their call option by increasing risk depends on bank managers' preferences. As

such, the risk-taking behavior of bank managers is in part determined by the extent to which their interests and preferences coincide with those of shareholders. The alignment of preferences is achieved by giving managers stock or stock options in the banking firm. The potential for bank increase comes from managers having the incentive to engage in higher risk activities to maximize the value of their call option to the extent that management-ownership is not too large, or their wealth would be extremely sensitive to bank risk (Jensen and Meckling, 1976). As stockholders take advantage of a wider set of investment prospects (post GLBA), additional risk-taking could occur after a period of deregulation. In addition, if the moral hazard related to bank regulating structure and the FDIC's deposit insurance dominates, bank managers may engage in excessive risk-taking despite the potential for increase in their non-diversifiable risk. As such, shareholders may have the incentive to increase risk because they do not assume the costs of financial institution failures and institutional arrangements such as deposit insurance may weaken debtholder discipline (Erkens et. al., 2012)

The potential for bank risk decrease can be explained by the incentive bank managers have to reduce risk behavior in order to protect their undiversifiable risk as both human and financial capital are tied to the firm's fortunes. In addition, as regulators have the responsibility to ensure the safety and soundness of banks and issue prompt corrective actions when financial or managerial weaknesses surface, this threat could be the driving force for managers to operate within moderate risk levels. Thus, the incentive alignment between shareholders and managers via management ownership would reduce or not relate to the risk-taking behavior of banks.

As a result, the managerial risk incentive hypotheses are:

H02: Banks' risk-taking behavior does not differ according to levels of insider stock ownership.

Ha2: Banks' risk-taking behavior differs according to levels of insider stock ownership.

And,

H03: For a given level of insider ownership structure, banks' risk-taking behavior does not differ according to the regulatory environment.

Ha3: For a given level of insider ownership structure, banks' risk-taking behavior differs according to the regulatory environment.

3.3 Hypothesis 3: Blockholder Ownership

Large shareholders tend to have the financial means and incentives to monitor and control management so that they are likely to act in the best interest of the stockholders. The potential for change in BHC risk is defined by the degree of blockholders' wealth diversification. Well diversified blockholders could influence managerial action towards riskier investments to maximize their value of the call option, and this behavior could be accentuated with the expansion into riskier activities with the passage of the Act. While Blockholders with concentrated wealth have the interest that managers follow a less risky investment strategy. In addition, bank managers may have incentive to reduce risk to protect their non-diversifiable risk (employment).

Therefore, the hypotheses relating to blockholder ownership are as follows:

H04: Banks' risk-taking behavior does not differ according to the level of blockholder stock ownership.

Ha4: Banks' risk-taking behavior differs according to the level of blockholder stock ownership.

And,

H05: For a given level of blockholder ownership structure, banks' risk-taking behavior does not differ according to the regulatory environment.

Ha5: For a given level of blockholder ownership structure, banks' risk-taking behavior differs according to the regulatory environment.

3.4 Hypothesis 4: Outsider on the Board

Empirical evidence regarding bank board composition indicates that a higher proportion of outside directors is detrimental to the performance of banking firms (Adams and Mehran, 2008). Research that focuses on the monitoring and advising roles of inside and outside directors argues that inside managers are an important source of firm-specific information, that can in turn be effective for decision making, but they may have distorted incentives with private benefits and lack of independence from the CEO, while outsiders provide a more independent monitoring role, but have less information than insiders regarding firm constraints and opportunities (Raheja, 2005). De Andres and Vallelado (2008) argue that bank board composition is related to a director's ability to monitor and advice management and those larger and not excessively independent boards

might prove more efficient in monitoring and advising issues. Wang et. al. (2012) also find a negative impact of non-executive directors on BHCs' performance and argue that outside directors have less understanding of the banking sector. As the financial services industry expands into new lines of business, the monitoring and advising roles of the board of directors become more important, given the complexities of the industry increase with deregulation. However, as large and higher independent boards might not prove to be more effective in monitoring and advising functions for creating value, it is possible that a lack of banking business comprehension by outside directors may cause their associated monitoring role to be ineffective. As a consequence, the risk in bank has the potential to increase with a higher proportion of outside members in the board.

There is a possibility that a higher proportion of outside directors may decrease bank risk profile because independent boards are considered to have fewer conflicts of interests when monitoring managers, regardless of regulatory oversight. Therefore, effective monitoring from independent board members could limit the risk-taking behavior of bank managers. Also, reputational concerns that affect outside directors could also provide the right incentive for effective monitoring, thus reducing bank risk-taking.

Based on these arguments, the outsiders on the board hypotheses are:

H06: Banks' risk-taking behavior does not differ according to the proportion of outside directors.

Ha6: Banks' risk-taking behavior differs according to the proportion of outside directors.

And,

H07: For a given proportion of outside directors, banks' risk-taking behavior does not differ according to the regulatory environment.

Ha7: For a given proportion of outside directors, banks' risk-taking behavior differs according to the regulatory environment.

CHAPTER IV

VARIABLES, METHODOLOGY AND MODEL

4.1 Risk Measures

This dissertation examines three standard book-based risk measures and three market risk measures. An additional risk measure is constructed in the form of an index, based on the six different measures of risk.

4.1.1 Book Based Risk Measures

Bank risk is measured using accounting-based risk measures. Primarily, the risk of bank failure is measured by the Insolvency Risk, or the Z-Score, which takes into account rates of return, the variability of rates of return and level of capitalization. The Z-Score equals the return on assets, plus the capital-asset ratio, divided by the standard deviation of asset returns. The measure describes the likelihood that a firm's earnings will become low enough for its capital base to be reduced, or the number of standard deviations that profits must fall in order to drive a firm into bankruptcy. Higher values of Z are

consistent with higher values of capital asset ratios. For a given level of earnings, a higher Z-Score is indicative of less likelihood of insolvency, while a lower Z-score is associated with a higher probability of insolvency. The Z-Score is appropriate to consider from the regulators point of view since policymakers are concerned about bank failures and downside risk.

Since the score is highly skewed (Laeven and Levin, 2009), the Z-Score estimated is the log of Insolvency Risk as used by Iannotta et. al. (2007):

$$Z = \frac{\mu + (E/A)}{\sigma},$$

where μ and σ are the mean and standard deviation of the bank's return on assets, respectively, over a three-year period, with (E/A) being the capital to asset ratio.

The other three risk measures are 1) volatility of the return on assets (σ_{ROA}), and 2) volatility of the return on equity (σ_{ROE}). For a given year, the standard deviation is calculated over a three-year period using quarterly data and including the year-end quarter.

The volatility of ROA (SDROA) and volatility of ROE (SDROE) are measures that reveal bank risk, and are measures likely to be used by directors and stockholders when judging performance (Sullivan and Spong, 2007).

4.1.2 Market Based Risk Measures

Total risk is a concern to regulators, managers, investors and borrowers. While all are concerned with the bank's risk of failure and potential bankruptcy costs, regulators are particularly concerned with the impact on the Systemic Risk and the insurance fund (Stiroh, 2006). Idiosyncratic risk or Firm Risk is relevant to investors who care about the volatility of revenues, such that they measure the level of diversification within a BHC (Stiroh, 2006). As Total and Firm Risk measures are relevant, a market model differentiates the variance of total returns into these two components. The variance of equity market returns estimates Total Risk, where as the variance of the market model residuals measures Firm Risk.

The market model equation is:

$$RET_{i,t} = \alpha + \beta_1 MKT_t + \varepsilon_{i,t} \quad ,$$

where RET is measured as the firm's monthly equity return minus the risk-free rate and MKT is the return on the market in excess of the risk-free rate. Total Risk is the standard deviation of RET, Systematic Risk, or BETA, is the coefficient of MKT (β), and the idiosyncratic risk, or Firm Risk, is estimated by the standard deviation of the residuals (ε). The return data is calculated based on CRSP database and the excess return on the market is sourced from the excess return on the market (R_m-R_f) as calculated by Kenneth R. French and is available at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. Based on

Dimson (1979), monthly returns are used to reduce the bias in BETA as a result of infrequent trading. In the case of market risk measures, higher beta (β) values are indicative of higher risk.

4.1.3 Risk Index Measure

A Risk Index is constructed to capture an overall view of a bank's risk profile. Based on the decile distribution of this risk measure, each bank is assigned into a decile, with 1 indicating the lowest risk and 10 indicating the highest risk. A simple average is calculated of the aggregated risk measures in order to assign a nominal measure to each bank per year.

Table 1: Bank Risk Measures

Book Based Risk Measures

$$Z - Score = \frac{ROA + (E/A)}{\sigma_{ROA}}$$

$$\sigma_{ROA} = \sigma\left[\frac{NetIncome}{Assets}\right]$$

$$\sigma_{ROE} = \sigma\left[\frac{NetIncome}{Equity}\right]$$

Market Based Risk Measures

Firm Risk = Standard Deviation of residuals from the equation

$$RET_{i,t} = \alpha + \beta_1 MKT_t + \varepsilon_{i,t}$$

Systematic Risk = β from the equation $RET_{i,t} = \alpha + \beta_1 MKT_t + \varepsilon_{i,t}$

Total Risk = $\sigma_{(RET),}$

Index

Risk Index = (Z score Decile + (σ_{ROA}), Decile + (σ_{ROE}), Decile+ Firm Risk Decile + Systematic Risk Decile + Total Risk Decile)/6

4.2 Corporate Governance Variables

Ownership data of BHCs are derived from LionsShare FactSet Research, a provider of financial data and analytics, from SEC filings and proxy statements. Ownership structure variables in this study are Insider and Blockholder Ownership. The degree of Insider Ownership is measured as the percentage of shares owned by bank managers divided by

outstanding shares. Blockholders are individuals who own 5% or more of the outstanding shares. The percentage of blockholders is measured as the sum of ownership by all blockholders, divided by outstanding shares. Board of Directors data are collected from proxy statements and directors are classified as insiders or independent depending on their relationship to the bank as described in the proxy statements. Directors classification is based on relationship criteria developed by the Investor Responsibility Research Center (IRRC), described in the Appendix.

4.3 Methodology

The hypotheses are tested using univariate analysis and multivariate regression analysis.

4.3.1 Univariate Analysis

The first set of hypotheses testing consists of performing t-tests on the means of risk measures and governance measures for the periods before and after the passage of the GLBA. Specifically, t-tests with Bonferroni correction are performed as this is a multiple-comparison correction used when several dependent or independent statistical tests are performed simultaneously. This approach is typically used for multiple comparisons, as it accounts for the fact that while a given confidence level α may be appropriate for individual comparison, the same α is not appropriate for the entire set. The method corrects the alpha value by the number of comparisons being performed.

To further examine the impact of deregulation in risk-taking behavior of banks, this study examines individual components of a bank's assets, liabilities, income, and off-balance sheet positions to identify how bank performance ratios are linked to risk characteristics, and how these variables changed with the passage of the GLBA. In examining the differential impact of accounting ratios pre- and post- GLBA, the sample is divided into groups based on total assets. Matching sample banks into these size characteristics facilitates comparison of risk profiles to their peer group.

Three performance and measures for banks used by Cornett et. al. (2002) are included: capital risk ratios, asset quality ratios, and liquidity risk ratios. In addition, funding composition ratios, off-balance sheet composition ratios, and income structure ratios are also examined to explore whether bank-funding structure has shift towards more risky products. This would also explore how the use of derivatives by banks has helped to hedge their risk, and identify the change in income structure based on traditional and nontraditional banking activities, respectively.

Capital ratios measure the bank's ability to meet regulatory capital standards. Three ratios are considered: 1) Core Capital ratio, measured as shareholder's equity as a percentage of book value of total assets; 2) Loans to Capital, measured as total loans as a percentage of the book value of total capital; and 3) Deposits to Capital, measured as total deposits as a percentage of book value of total capital. As banks expand into riskier nontraditional activities, greater regulatory capital standards should follow. Similarly, as

banks expand into the securities and underwriting activities, one should observe a greater emphasis as sources of revenue and income nontraditional banking products.

An asset quality ratio measures quality of bank's loan portfolio and risk, and is proxied by the ratio of Net Charge-Offs to Total Loans. Another proxy, the Provision for Loan Losses is also included as a forward looking measure. These measures reflect the overall credit quality of bank's loan portfolio.

A bank's liquidity reflects its ability to fund its contractual obligations, such as lending and investment commitments as well as potential deposit withdrawals. Liquidity risk is defined as the bank's risk of loss resulting from inability to meet its cash needs, which must be covered by higher cost of funding sources. Two ratios are used: Loans to Deposits and Total Loans to Assets. Higher Total Loans to Deposits ratio reflects an increase in liquidity risk. A decrease in the Total Loans to Assets ratio reflects increase liquidity and could be explained by a shift from lending activities to underwriting activities after the GLBA. Funding composition is measured as the ratio of Transaction accounts to Assets and alternatively as Non-transaction accounts to Assets. Transaction accounts to Assets capture a low cost source of funds for banks, and Non-transaction accounts to Assets represent a higher source of costs of funds, which include the sum of the following accounts held in domestic offices: money market deposit accounts (MMDAs), other savings deposits and all time deposits. The funding structure indicates how the bank funds its loan portfolio between relatively cheap and more expensive sources of funds.

Off-balance sheet activity is measured by the extent of bank's use of derivative instruments. Banks engage in derivative contracts as intermediaries and end-users. Purnanandam (2007) notes that banks acting as financial intermediaries use derivatives for business purposes, and not for hedging. Reichert and Shyu (2002) show that banks use derivatives to effectively reduce their portfolio risk. The measure used to examine how banks rely on the use of derivatives for hedging purposes is the notional amount of derivatives that is reported under the non-trading purposes divided by the total assets of the bank. The notional principal amount is commonly used since it reflects the scale of derivative activities; however, the measure does not represent the marked to market value of risks associated with those contracts.

Income structure is determined by the difference between the interest income produced by traditional activities, and non-interest income produced by nontraditional activities. This study considers the ratio of Interest Income to Total Income, Non-interest income to Total Income, and Trading Revenue to Total Income.

4.3.2 Multivariate Regression Analysis

Next, the hypotheses tests are examined with a multivariate regression analysis, where the hypotheses remain unchanged except they are tested by controlling variables. Specifically, panel data are used to regress risk measures on the corporate governance variables, along with a set of control variables. Panel data analysis is a method of studying a set of cross-sectional data, discretely observed over a period of time.

1) Regression Specification

$$Risk_i = \alpha + \beta_1(\text{Insider Ownership}) + \beta_2(\text{Blockholder Ownership}) + \beta_3(\text{Outside Director}) + B_4 GLBA + B_5 SOX + \beta_6 \text{Crisis} + \beta_7(\text{Insider} * \text{GLBA}) + \beta_8(\text{Blockholder} * \text{GLBA}) + \beta_9(\text{OutsideDirector} * \text{GLBA}) + \beta_{10} \text{M \& A} + \lambda' Z + \pi_1 \text{Economic} + \varepsilon$$

Risk corresponds to its seven associated measures: Z-score, ROA standard deviation (SDROA), ROE standard deviation (SDROE), Total Risk, Systematic Risk, Firm Risk, and the Risk Index. Insider Ownership is the lag of percentage of management ownership, Blockholder Ownership is the lag of percentage of Blockholder Ownership, Outside Director is the percentage of outside directors. Following Cornett et. al. (2007), insider and blockholder measures are lagged by one year to allow for the effect of changes in governance structure to affect bank performance and risk profile. Cornett et. al. (2007) indicate that lagging ownership and governance measures also mitigates simultaneity issues. They also argue that to the extent that the firm has control over board membership, board composition is less subject to the endogeneity problem similar to that of blockholder or insider ownership.

GLBA is a dummy variable that takes the value of 1 for observations after 1999, the year of the Act's passage, SOX is a dummy variable that takes the value of 1 for observations after 2002, the year of the SOX Act passage. M&A is a variable that controls for mergers and acquisitions that takes the value of 1 if the bank is involved in any M&A activity. In cases of M&A, the acquiring bank's code is maintained and the target is dropped from the sample.

The control variables are included in the term $\lambda' Z$, where λ' is a vector of parameters, and Z is a vector of bank-specific portfolio characteristics. Bank control variables include firm Size, measured as the natural log of the book value of total assets. Size and risk could be directly or inversely related according to the following arguments. An inverse relationship could exist if larger banks are better able to diversify their risks, have more developed risk management techniques, and thus are less likely to fail (McAllister and McManus, 1993). If this argument holds, the sign of the coefficient for Size would be positive with respect to the Insolvency Risk (Z-Score), while a negative sign is expected for the other risk measures. Alternatively, it is argued that larger banks operate with riskier loan portfolios and operate with more leverage. In this case, a negative sign is expected with respect to Insolvency Risk, while a positive sign is expected with respect to remaining risk variables (Demsetz and Strahan, 1997).

Following the study by Saunders et. al. (1990), a financial leverage (Leverage) variable is also included based on the argument that highly leveraged firms tend to exhibit greater risk. Leverage is measured as the ratio of total assets relative to equity. Banks are characterized by high financial leverage, which magnifies their profits at the cost of increased risk. Higher leverage (lower capitalization) would be associated with higher risk. (i.e., the higher the capital the lower the bank's risk). A negative sign for the Leverage coefficient is expected with respect to Insolvency Risk and a positive sign is expected with respect to the other risk measures. In addition, the Tier1 capital ratio measured as Tier 1 Capital to Risk Weighted Assets is considered for robustness check.

Annual growth rate of total assets (Growth) is included to capture the effect of growth strategies of the bank in the period considered. High growth banks tend to be exposed to greater risk, greater capital needs, lower margins, and lower capital ratios. As a result, it is likely that the coefficient of Growth is negative with respect to Insolvency Risk and positive with respect to the other risk measures (Carrillo and Bathala, 2009). Growth is calculated as the compounded annual growth rate in assets over a three-year period.

Bank portfolio characteristics are captured in an index of loan concentration, represented with the variable Concentration. The Herfindahl-Hirschman Index is calculated following Demsetz and Strahan (1997), with the HHI equaling sum of the squared share of each loan category, relative to total loans. A large value indicates a greater degree of concentration.

Loan Concentration Index:

$$HHI_{j,t} = \sum_{j=1}^{n} \left[\frac{Loan_{j,t}}{\sum_{j} Loan_{j,t}} \right]^2$$

$Loan_j$ is the exposure of loan category j and $\Sigma Loan_j$ is the total exposure of loans to different segments, such as commercial and industrial, real estate, agriculture, individuals and others.

The Non-Interest Income to Total Income ratio is included to capture the impact of nontraditional banking activities in bank's risk profile. Non-Interest Income and risk could be directly or inversely associated according to the following arguments. With the passage of the GLBA, an anticipated benefit for financial institutions was to make use of revenue efficiencies and economies that was not possible before deregulation, which in

turn would lead to more diversified income sources and loan portfolios making bank failure less likely (Hughes et. al., 1999, Saunders and Walters, 1994). Under this argument, the sign of the coefficient for Non- Interest Income is expected to be positive for Insolvency Risk (Z-Score) and negative for the other risk measures. On the other hand, critics of the Act indicated that the GLBA creates potential for an increase in bank risk as BHCs enter into riskier activities with securities and insurance businesses (Lown et. al., 2000; Boyd et. al., 1993). Under this argument, a negative sign is expected with respect to Insolvency Risk (Z-Score) and a positive sign is expected with respect to the other risk measures. To check for robustness, Trading Revenue to Total Income is considered. Trading Revenue includes revenue from trading cash instruments, off-balance contracts and mark-to-market changes in the carrying value of assets and liabilities.

To control for a bank's asset quality, the ratio of Net Charge-Offs to Total Loans (Net Charge-Offs) is included. The higher the charge-off rate the greater the bank's risk. Another measure, the ratio of Loan Loss Provisions to Total Loans (Loan Loss Provisions) is also used to check for robustness; with higher Loan Loss Provisions values being associated with greater forward looking credit risk.

Bank liquidity is proxied by an approximation of the bank's Cost of Funds as the ratio of Interest Expense to Total Liabilities. A higher Cost of Funds is indicative of a bank needing to pay a premium for funds, especially as illiquidity problems arise. Higher Cost of Funds suggests that a bank takes higher risk, increasing the risk profile of the bank. A

negative sign is expected with respect to Insolvency Risk (Z-Score) and a positive sign is expected with respect to other risk measures. To check for robustness, liquidity is also measured as the ratio of Jumbo Deposits to Assets. To the extent that Jumbo Deposits are viewed to be more expensive source of funding than core deposits, a higher ratio may signal higher funding risk and higher riskiness of the bank.

The efficiency measure (Inefficiency) is calculated as the ratio of Non-Interest Expense to Total Revenue and is introduced to account for the incidence of operating costs in bank profits. A higher ratio is indicative of relative inefficiency and a lower value is indicative of greater efficiency.

4.3.3 Economic Environment Variables

The Real GDP Growth rate is the economic environment variable used to capture economic cycle effects. It is measured as the average annual growth rate of Real GDP for each year. The Federal Funds Rate is considered for robustness.

Table 2: Summary of Variables used in Base Model and Robustness Checks

Corporate Governance Measures

Blockholders = 5% or more of the outstanding shares

$$\text{Insider Ownership} = \frac{\text{Management Ownership}}{\text{Outstanding Shares}}$$

$$\text{Outside Director} = \frac{\text{Outside Director}}{\text{Total Board of Directors}}$$

Control Variables

Size = Log(Assets)

$$\text{Leverage} = \frac{\text{Assets}}{\text{Equity}} \; ; \frac{\text{Tier1}}{\text{RWA}}$$

Growth = Compounded annual growth rate in assets over a three year period

Loan Concentration = Herfinhadhl-Hirschman Index

$$HHI_{jt} = \sum_{j=1}^{n} \left[\frac{Loan_{j,t}}{\sum_{j} Loan_{j,t}} \right]^2$$

$$\text{Non Interest Income} = \frac{\text{Non Interest Income}}{\text{Total Income}} \; ; \; \frac{\text{Trading Revenue}}{\text{Total Income}}$$

$$\text{Asset Quality} = \frac{\text{Net Charge Offs}}{\text{Total Loans}} \; ; \; \frac{\text{Loan Loss Provisions}}{\text{Total Loans}}$$

$$\text{Liquidity} = \frac{\text{Interest Expense}}{\text{Total Loans}} \; ; \; \frac{\text{Jumbo Deposits}}{\text{Total Assets}}$$

$$\text{Efficiency Measure} = \frac{\text{Non-Interest Expense}}{\text{Total Revenue}}$$

Economic Environment = Real GDP Growth Rate; Federal Funds Rate

CHAPTER V

RESULTS

This section describes the data and results from univariate means tests and regression analysis.

5.1 Data

The effect of corporate governance variables and passage of the GLBA on bank risk profile is examined using a sample of 146 banks over the period 1997-2009. The sample is drawn from the FRY-9C reports that BHCs file with the Federal Reserve Bank, FactSet LionShares Research, CRSP tape and SEC website. To be included in the final sample, a BHC has to have 13 years of consecutive data in all of the four sources indicated above. This condition results in a final sample of 146 BHCs. In addition, a second full sample of BHCs is used for the analysis, which includes the surviving BHCs from the period 1997-2009 and the non- surviving sample. The latter includes active banks one year before the implementation of the GLBA that exited sometime during the period of study. Non-

surviving BHCs increase the sample to 196 banks. Table 3 and Table 4 report summary statistics for the variables used by the entire period and by each year, respectively.

Total assets range from $162 Million to $2,224 Billion, with an average of $37.5 Billion. During the 13-year period, BHCs experienced an average of 7.2% growth rate, and report a mean ROA and mean ROE of 1% and 11.4%, respectively. Stock ownership by managers ranges from a minimum of 0.1% to a maximum of 57.9%, with an average of 5.8%. Blockholder Ownership ranges from a minimum of 0% to a maximum of 84.2%, with an average of 13.6%. The Board of directors in BHCs is comprised largely by Outside Directors with a mean of 84.1%.

On the performance side, the sample includes both low and high performing BHCs. Mean ROE was 11.4%, ranging from -2.1% to 19.3%; while the mean ROA was 1%, ranging from -0.2% to 1.7%. Risk variables also reflect a sample that includes important variations across BHCs risk profiles. For example, the Z-Score or insolvency measure ranges from 10 to 148, with a mean of 75; SDROA has a mean of 0.4% and a range from 0.1% to 3%; SDROE has a mean of 4.8% and a range from 1.2% to 20.1%, Total Risk has a mean of 7.8% and a range from 3.2% to 16.8%, while Firm Risk has a mean of 7.2% and a range from 3.8% to 12.6%. Market Beta (Systematic Risk) has a mean of 0.51, and a range from 0.1 to 1.34.

The 13-year period reflects a complete economic cycle where Real GDP Growth is as high as 4.8% in 1999 and as low as -2.7% in 2009, with an average growth of 2.45 for the entire period.

Table 3: Descriptive statistics for a sample of 146 BHCs over the period 1997-2009

Variable	N	Mean	Standard Deviation	Min	Max
Assets ($ In millions)	1,898	37,599	187,983	162	2,224,539
ROA	1,898	1.0%	0.5%	-0.2%	1.7%
ROE	1,898	11.4%	5.3%	-2.1%	19.3%
Z-Score	1,898	75.5	2.6	10.8	148.4
SDROA	1,898	0.4%	0.3%	0.1%	3.0%
SDROE	1,898	4.8%	7.8%	1.2%	20.1%
Total Risk	1,898	7.8%	3.7%	3.2%	16.8%
Systematic Risk	1,898	0.51	0.41	0.14	1.34
Firm Risk	1,898	7.2%	2.4%	3.8%	12.6%
Risk Index	1,898	5.5	1.6	1.2	10.0
Insider Ownership	1,898	5.8%	8.7%	0.1%	57.9%
Blockholder Ownership	1,898	13.6%	14.6%	0.0%	84.2%
Outside Director	1,898	84.1%	9.4%	28.0%	96.0%
Size	1,898	15.1	1.7	12.0	21.5
Leverage	1,898	11.6	2.3	8.1	16.9
Growth	1,898	7.2%	5.6%	-14.7%	47.3%
Concentration	1,898	53.5%	13.5%	32.1%	79.0%
Non Interest Income	1,898	18.8%	9.0%	5.9%	39.7%
Net Charge Offs	1,898	0.4%	0.4%	0.0%	1.6%
Cost of Funds	1,898	3.7%	1.4%	1.4%	6.5%
Ineffeciency	1,898	43.1%	8.6%	28.9%	60.6%
Real GDP Growth	1,898	2.3%	2.2%	-3.5%	4.8%
Board Size	1,898	13	4	4	31
Outside Directors	1,898	10	4	2	26

Source: FRY9-C Reports, FactSet LionsShare, SEC Reports

Table 4: Descriptive Statistics for a sample of 146 BHCs over the period 1997-2009

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Assets ($ In millions)	12,350	19,052	20,509	24,992	27,137	29,164	31,973	40,211	43,214	49,232	56,503	66,977	67,467
ROA	1.2%	1.1%	1.2%	1.1%	1.1%	1.2%	1.1%	1.1%	1.1%	1.1%	0.9%	0.5%	0.3%
ROE	13.1%	12.9%	14.1%	12.9%	12.2%	13.3%	12.8%	12.5%	13.0%	12.3%	10.1%	5.3%	3.5%
Z-Score	85	85	81	92	86	75	77	95	94	96	71	34	26
SDROA	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.3%	0.3%	0.5%	0.7%
SDROE	4.1%	3.9%	4.1%	4.1%	4.2%	4.1%	4.2%	4.3%	4.4%	3.9%	3.9%	5.3%	12.1%
Total Risk	7%	9%	7%	10%	8%	7%	6%	5%	5%	5%	6%	12%	14%
Systematic Risk	0.41	0.64	0.55	0.41	0.15	0.25	0.38	0.46	0.84	0.77	0.70	0.35	0.77
Firm Risk	6%	7%	8%	8%	9%	8%	7%	6%	5%	5%	5%	9%	11%
Risk Index	5.1	5.7	5.6	5.9	5.5	5.4	5.1	4.8	5.0	4.4	5.0	6.4	7.7
Insider Ownership	6.3%	6.1%	6.2%	6.3%	6.0%	5.7%	5.9%	5.8%	5.7%	5.6%	5.7%	5.5%	5.1%
Blockholder Ownership	13.8%	13.3%	12.4%	12.2%	11.8%	11.9%	11.9%	12.5%	13.8%	14.8%	15.8%	16.2%	16.3%
Outside Director	83.0%	83.3%	84.3%	83.7%	80.9%	84.1%	83.7%	84.3%	85.0%	84.8%	85.3%	85.3%	85.4%
Size (Log of Assets)	14.4	14.6	14.7	14.8	14.9	15.0	15.1	15.2	15.3	15.4	15.5	15.5	15.6
Leverage	11.4	11.6	12.5	12.1	11.9	11.6	11.7	11.4	11.6	11.3	11.2	11.2	11.3
Growth	7.6%	8.3%	6.3%	8.7%	10.4%	8.7%	7.3%	6.3%	6.5%	7.0%	5.0%	5.6%	6.4%
Concentration	48.2%	48.7%	50.6%	50.1%	51.3%	52.3%	52.9%	54.6%	55.7%	56.8%	57.2%	57.7%	58.9%
Non Interest Income	14.3%	15.4%	16.2%	15.9%	17.8%	20.4%	22.7%	22.6%	20.5%	18.8%	18.3%	19.4%	22.0%
Net Charge Offs	0.3%	0.3%	0.3%	0.3%	0.4%	0.4%	0.3%	0.3%	0.2%	0.2%	0.3%	0.7%	1.1%
Cost of Funds	5.0%	5.0%	4.7%	5.3%	4.7%	3.1%	2.4%	2.1%	2.8%	3.7%	4.1%	3.0%	2.3%
Inefficiency	38.1%	38.7%	39.2%	37.0%	39.8%	44.6%	48.2%	49.1%	44.8%	40.9%	40.5%	46.5%	52.2%
Real GDP Growth	4.5%	4.4%	4.8%	4.1%	1.1%	1.8%	2.5%	3.5%	3.1%	2.7%	1.9%	-0.3%	-3.5%
Board Size	13	13	13	13	13	13	13	13	13	12	13	12	12
Outside Directors	10	10	10	10	10	10	9	9	9	9	10	10	10

Source: FRY9-C Reports, FactSet LionsShare, SEC Reports

5.1.1 BHC Balance Sheet Analysis 1997-2009

To perform the analysis at the peer group level, BHCs are grouped as large, medium and small based on total book assets. Large banks have greater than $100B in book assets; medium banks have book assets between $10B and $100B; and, small banks have book assets lower than $10B. Throughout the 13-year period of analysis, the U.S Banking Industry has shifted away from traditional banking activities towards activities that generate more fee income and other types of non-interest revenue. This shift is prevalent in large BHCs, where over 37% of the interest share is derived from non-interest earnings activities in the year 2009 (Table 5). Consistent with the banking regulatory changes, in the case of medium and small BHCs, the largest shift occurs in the years following the passage of the GLBA (Tables 6 and 7). This change is not as evident in large BHCs probably because many of them were already conducting securities activities before 1999 authorized by Section 20 exemptions.

Aside from expansion into more nontraditional activities, BHCs have become better capitalized as reflected by an increase in the core capital and Tier1 regulatory capital ratios (Tables 5 and 6). The shift from traditional banking activities, such as deposits and loans, is reflected by lower Loans to Capital and Deposits to Capital ratios (Tables 5 and 6).

Credit quality remained stable up until the sub-prime financial crisis of 2007, and it carried over until 2009. The banking industry apparently anticipating the deterioration of

their loan portfolios doubled the provisions for loan losses in 2007. Consistent with expectations, higher Net Charge Offs ratios prevailed in the industry following the two years, through 2009.

The liquidity and funding structure for medium and small BHCs considerably differs from their large BHC counterparts. Large BHCs have higher Loan to Deposit ratios, which indicates lower liquidity and higher reliability on borrowed funds that are more expensive than deposits.

Off-balance sheet activities, measured as the ratio of notional principal amount to total assets, has oscillated between 13% and 18% in large BHCs, indicative of their superior derivative use for hedging purposes. The level of off-balance sheet activity of medium sized BHCs has ranged between 6-8%, while the highest level of off-balance sheet activity for Small BHCs was in 2006 and 2008, with a ratio of 2%.

Table 5: Descriptive Statistics for a sample of 11 Large BHCs over the period 1997-2009 (Assets> $ 100B)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Assets ($In millions)	122,342	204,644	219,549	273,757	297,945	320,414	350,921	453,484	486,126	559,777	648,149	780,651	787,826
Capital													
Core Capital Ratio (Equity/Assets)	7.8%	8.0%	7.8%	8.2%	8.2%	8.4%	8.4%	9.4%	9.0%	9.3%	8.9%	9.3%	10.1%
Loans to Capital	7.9	7.5	7.5	7.1	6.7	6.6	6.5	6.0	6.3	6.1	6.6	6.2	5.5
Deposits to Capital	8.6	8.1	8.2	7.6	8.3	8.3	8.3	7.4	7.7	7.5	8.1	7.5	7.2
Tier1 Capital Ratio	9.3%	9.4%	9.3%	9.3%	9.2%	9.4%	9.5%	9.2%	8.7%	9.2%	8.3%	10.9%	11.8%
Asset Quality													
Net Charge Offs	0.5%	0.6%	0.6%	0.5%	0.9%	0.8%	0.7%	0.5%	0.5%	0.4%	0.5%	1.1%	1.6%
Loan Loss Provisions	0.5%	0.6%	0.6%	0.5%	1.0%	0.9%	0.6%	0.4%	0.5%	0.4%	0.8%	1.6%	2.0%
Liquidity and Funding													
Loans to Deposits	130%	178%	184%	217%	215%	228%	244%	303%	319%	370%	430%	530%	509%
Loans to Assets	63.0%	62.1%	60.9%	62.1%	59.2%	58.7%	58.1%	59.0%	59.3%	60.0%	60.1%	59.9%	58.1%
Transaction Accounts to Assets	42.3%	42.5%	41.7%	43.4%	45.0%	46.5%	46.5%	47.4%	47.5%	48.1%	45.4%	46.9%	50.1%
Non-Transaction Accounts to Assets	15.6%	14.6%	11.8%	10.9%	10.6%	9.2%	8.5%	8.3%	7.7%	7.2%	7.2%	7.8%	7.7%
Off Balance Sheet													
Derivatives to Total Assets	13.9%	15.8%	14.5%	13.3%	13.0%	16.2%	15.0%	14.9%	16.3%	15.2%	15.6%	17.6%	18.2%
Income Structure													
Interest Income	75.3%	72.4%	69.7%	70.3%	70.0%	66.1%	63.6%	63.5%	65.6%	67.1%	69.7%	70.7%	62.3%
Non Interest Income	24.7%	27.6%	30.3%	29.7%	30.0%	33.9%	36.4%	36.5%	34.4%	32.9%	30.3%	29.3%	37.7%
Trading Revenue	1.3%	1.5%	1.6%	1.8%	2.0%	1.8%	1.7%	1.8%	1.9%	1.9%	1.2%	0.8%	2.0%

Source: FRY9-C Reports, FactSet LionsShare, SEC Reports

Table 6: Descriptive Statistics for a sample of 29 Medium BHCs over the period 1997-2009 ($10B < Assets <= $100B)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Assets ($In millions)	11,679	13,339	14,436	15,938	16,941	17,996	19,852	21,691	23,649	25,185	27,498	28,973	28,358
Capital													
Core Capital Ratio (Equity/Assets)	8.3%	8.3%	8.1%	8.4%	8.8%	9.0%	9.1%	9.2%	9.2%	9.5%	9.5%	10.3%	10.1%
Loans to Capital	7.9	8.0	8.3	8.2	7.6	7.4	7.1	7.2	7.3	7.2	7.3	6.6	6.4
Deposits to Capital	8.9	8.9	8.7	8.8	8.5	8.4	8.3	8.2	8.3	8.0	7.8	7.3	7.8
Tier1 Capital Ratio	11.1%	10.5%	10.0%	10.0%	10.5%	10.8%	10.8%	10.7%	10.4%	10.1%	9.6%	11.4%	12.2%
Asset Quality													
Net Charge Offs	0.3%	0.3%	0.3%	0.4%	0.5%	0.5%	0.4%	0.3%	0.2%	0.2%	0.3%	0.8%	1.3%
Loan Loss Provisions	0.4%	0.4%	0.4%	0.5%	0.6%	0.6%	0.4%	0.2%	0.2%	0.2%	0.4%	1.2%	1.6%
Liquidity and Funding													
Loans to Deposits	222.5%	136.3%	172.4%	93.5%	90.3%	89.0%	87.7%	90.6%	91.4%	94.3%	98.3%	98.4%	87.6%
Loans to Assets	64.8%	65.7%	67.0%	67.4%	65.1%	64.0%	62.3%	64.3%	65.6%	67.2%	68.0%	68.0%	64.9%
Transaction Accounts to Assets	56.9%	56.9%	56.1%	57.5%	57.2%	57.8%	57.1%	57.5%	59.0%	59.0%	57.0%	57.0%	60.7%
Non-Transaction Accounts to Assets	17.3%	16.0%	14.0%	13.3%	13.5%	12.3%	12.4%	11.3%	10.6%	9.3%	8.8%	9.3%	10.3%
Off Balance Sheet													
Derivatives to Total Assets	6.6%	6.2%	6.4%	6.2%	6.2%	6.6%	7.0%	7.3%	7.9%	7.7%	7.6%	8.3%	7.4%
Income Structure													
Interest Income	82.1%	81.3%	79.8%	79.5%	77.0%	74.5%	72.2%	72.6%	74.8%	77.0%	78.3%	76.2%	73.7%
Non Interest Income	17.9%	18.7%	20.2%	20.5%	23.0%	25.5%	27.8%	27.4%	25.2%	23.0%	21.7%	23.8%	26.3%
Trading Revenue	0.7%	0.8%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	1.0%	1.0%	0.9%	1.2%

Source: FRY9-C Reports, FactSet LionsShare, SEC Reports

Table 7: Descriptive Statistics for a sample of 106 Small BHCs over the period 1997-2009 (Assets < $10B)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Assets ($In millions)	1,120	1,356	1,515	1,654	1,824	1,995	2,190	2,390	2,604	2,829	3,041	3,315	3,412
Capital													
Core Capital Ratio (Equity/Assets)	9.5%	9.2%	8.5%	8.7%	8.7%	8.9%	8.8%	8.9%	8.8%	9.1%	9.1%	9.0%	9.0%
Loans to Capital	6.9	7.1	8.0	7.9	7.7	7.4	7.4	7.6	7.9	7.8	7.9	8.1	7.9
Deposits to Capital	8.1	8.6	9.1	9.0	8.9	8.7	8.8	8.7	8.9	8.7	8.5	8.6	9.1
Tier1 Capital Ratio	13.8%	13.1%	12.4%	12.1%	12.1%	12.2%	12.3%	11.9%	11.6%	11.7%	11.1%	11.4%	12.0%
Asset Quality													
Net Charge Offs	0.2%	0.2%	0.2%	0.2%	0.4%	0.4%	0.3%	0.2%	0.2%	0.2%	0.3%	0.6%	1.1%
Loan Loss Provisions	0.3%	0.4%	0.3%	0.4%	0.5%	0.5%	0.4%	0.3%	0.2%	0.2%	0.4%	1.0%	1.5%
Liquidity and Funding													
Loans to Deposits	106.2%	97.8%	107.4%	103.5%	111.0%	101.2%	85.7%	88.6%	89.5%	90.1%	94.6%	96.0%	87.0%
Loans to Assets	63.6%	62.8%	65.2%	66.4%	65.9%	64.6%	64.4%	66.5%	67.6%	68.8%	70.2%	70.6%	67.5%
Transaction Accounts to Assets	59.0%	58.4%	58.3%	60.8%	60.4%	60.1%	58.8%	59.6%	61.4%	63.6%	62.5%	62.7%	65.3%
Non-Transaction Accounts to Assets	19.6%	19.8%	17.9%	16.2%	16.5%	16.1%	16.2%	15.5%	14.5%	13.2%	12.0%	11.2%	11.9%
Off Balance Sheet													
Derivatives to Total Assets	1.1%	1.3%	1.0%	1.0%	1.0%	0.9%	1.3%	1.5%	1.7%	2.0%	1.9%	2.0%	1.7%
Income Structure													
Interest Income	87.8%	86.8%	86.3%	86.8%	84.9%	82.4%	80.1%	80.1%	82.2%	83.9%	83.9%	82.9%	80.8%
Non Interest Income	12.2%	13.2%	13.7%	13.2%	15.1%	17.6%	19.9%	19.9%	17.8%	16.1%	16.1%	17.1%	19.2%
Trading Revenue	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%

Source: FRY9-C Reports, FactSet LionsShare, SEC Reports

Table 8 reports the mean differences for selected financial ratios for periods before and after the passage of GLBA. For both large and medium BHCs, the Core Capital ratio is significantly higher after the passage of the Act, while the ratio of Loans to Capital ratio is significantly lower. The combination of these two capital ratios shows that as banks expanded into nontraditional activities greater capital standards followed and as banks expanded into security and underwriting activities, a shift from traditional banking activities to non traditional banking activities followed.

Credit risk is higher after the passage of GLBA, as reflected by a positive and significant difference for Net Charge Offs and Loan Loss Provisions ratios, regardless of bank size. Turning into the liquidity and funding structure, large banks experienced a significant increase in liquidity risk with higher Total Loans to Deposits ratios, and higher reliability on borrowed funds. Liquidity risk in medium and small size banks is lower after the passage of the Act as reflected by significantly lower Total Loans to Deposits Ratios. The Transaction Accounts to Assets ratio and Non-transaction Accounts to Assets ratio show that BHCs continued to favor relatively cheaper sources of funds.

Even though Off-balance sheet ratios are higher after the passage of the Act, the difference is not significant in the peer group analysis. The ratios confirm higher derivative activity in large banks followed by medium sized banks, while derivative activity has been marginal in small banks. The significant differences in the income structure as measured by the ratios of Interest and Non-Interest Income to Total Income

reflect the shifts from deregulation of the banking industry and BHCs expansion into nontraditional activities after the implementation of the Act.

Table 8: Mean BHCs Financial Ratios before and after the passage of the GLBA, over the entire period

Financial Ratios	Large (Assets >$100B)			Medium (Assets between 10-$100B)			Small (Assets < $10B)		
	Before (1997-1999)	After (2000-2009)	Difference (After-Before)	Before (1997-1999)	After (2000-2009)	Difference (After-Before)	Before (1997-1999)	After (2000-2009)	Difference (After-Before)
Capital									
Core Capital Ratio (Equity/Assets)	7.8%	8.9%	1.1% **	8.2%	9.3%	1.1% **	9.1%	8.9%	-0.1%
Loans to Capital	7.6	6.4	-1.29 **	8.1	7.2	-0.90 **	7.3	7.8	0.4 **
Deposits to Capital	8.3	7.8	-0.49	8.8	8.1	-0.66 **	8.6	8.8	0.2
Tier1 Capital Ratio	9.3%	9.6%	0.2%	10.5%	10.7%	0.1%	13.1%	11.8%	-1.3% **
Asset Quality									
Net Charge Offs	0.6%	0.7%	0.2%	0.3%	0.5%	0.2% **	0.2%	0.4%	0.2% **
Loan Loss Provision	0.6%	0.9%	0.3% **	0.4%	0.6%	0.2% **	0.3%	0.5%	0.2% **
Liquidity and Funding									
Loans to Deposits	164%	337%	172% **	177%	92%	-85% **	104%	95%	-9.1% **
Loans to Assets	62.0%	59.5%	-2.6% **	65.8%	65.7%	-0.2%	63.9%	67.3%	3.4% **
Transaction Accounts to Assets	42.2%	46.7%	4.5% **	56.7%	58.0%	1.3%	58.6%	61.5%	2.9% **
Non-Transaction Accounts to Assets	14.0%	8.5%	-5.5% **	15.8%	11.1%	-4.7% **	19.1%	14.3%	-4.8% **
Off Balance Sheet									
Derivatives to Total Assets	14.7%	15.5%	0.8%	6.4%	7.2%	0.9%	1.1%	1.5%	0.4%
Income Structure									
Interest Income	72.5%	66.9%	-5.6% **	81.1%	75.6%	-5.5% **	87.0%	82.8%	-4.2% **
Non Interest Income	27.5%	33.1%	5.6% **	18.9%	24.4%	5.5% **	13.0%	17.2%	4.2% **
Trading Revenue	1.5%	1.7%	0.2%	0.8%	1.0%	0.2%	0.0%	0.0%	0.0%

** Significant at the 5%

5.2 Univariate Means Analysis

The risk implications that the Gramm-Leach-Bliley Act of 1999 presented in the banking sector are shown in the following sections.

5.2.1 Regulation induced risk-taking hypothesis

The regulation induced risk-taking hypotheses states:

H01: The risk profile of BHCs did not change after the passage of the GLBA in 1999.

Ha1: The risk profile of BHCs has changed after the passage of the GLBA in 1999.

Table 9 shows the mean difference by risk measure for the surviving BHC sample and the full sample (surviving and non-surviving BHCs). Results for the surviving sample (Panel A) indicate that the risk profile in BHCs changed in the post-GLBA period, with BHCs showing higher risk profiles after the passage of the Act. By including the non-surviving banks (Panel B), the initial significant variables remain unchanged; and in addition, mean Total and Systematic Risk differences become significant.

Table 9: Mean Differences in BHC Risk Before and After the Passage of the GLBA, over the entire period

Panel A: Surviving BHCs				Panel B: Surviving and Non-surviving BHCs			
	Before (1997-1999)	After (2000-2009)	Difference		Before (1997-1999)	After (2000-2009)	Difference
(n)	438	1460	After-Before	(n)	587	1770	After-Before
Z-Score	4.59	4.24	-0.35 ***	Z-Score	4.51	4.24	-0.27 ***
SDROA	0.36%	0.40%	0.04% ***	SDROA	0.38%	0.41%	0.03% **
SDROE	4.04%	5.05%	1.01% ***	SDROE	4.15%	5.00%	0.85% ***
Total Risk	7.91%	7.77%	-0.14%	Total Risk	8.06%	7.65%	-0.41% ***
Systematic Risk	0.53	0.51	-0.03	Systematic Risk	0.56	0.49	-0.07 ***
Firm Risk	6.91%	7.28%	0.4% ***	Firm Risk	7.00%	7.29%	0.29% ***
Risk Index	5.46	5.50	0.05	Risk Index	5.59	5.50	-0.09

*** Significant at 1%
** Significant at 5%
* Significant at 10%

Table 10 shows results by peer group for verifying the regulation induced risk-taking hypothesis. BHCs are grouped as large, medium and small based on total book assets. Large banks have greater than $100B in book assets; medium banks have book assets between $100B and $10B; and, small banks have book assets lower than $10B. The results confirm the initial findings that the risk profile of BHCs did change after the passage of the GLBA in 1999, albeit the statistical significance of risk measures is somewhat different across peer groups. Large and Medium BHCs results indicate that market risk measures tend to be lower after the passage of the GLBA, while book risk measures tend to be higher. A possible explanation for the differing effects between

market based risk and book based risk measures can be attributed to the information previously captured in the stock price returns. Prior to the passage of the Act, a series of announcements were made before its enacting, thus the market could have incorporated this information in the stock price well before BHCs were allowed to expand into nontraditional banking activities.

Table 10 indicates that after the passage of GLBA, book risk measures (Insolvency Risk and SDROA) have increased for BHCs regardless of bank size, while market risk measures (Total Risk and Systematic Risk) have turned significantly lower for large and medium BHCs (Panels A,B,C and D). SDROE and Firm Risk are only significantly different for small BHCs between the two periods.

Table 10: Mean BHC Risk Before and After the Passage of the GLBA Surviving and Non-surviving by Large, Medium and Small BHCs, over the entire period

Panel A: Large Surviving BHCs

	Before (1997-1999)	After (2000-2009)	Difference
(n)	33	110	After-Before
Z-Score	4.15	3.85	-0.31 *
SDROA	0.38%	0.44%	0.05% ***
SDROE	5.04%	5.04%	0.00%
Total Risk	9.40%	7.92%	-1.48% *
Systematic Risk	1.12	0.66	-0.46 ***
Firm Risk	6.12%	6.95%	0.83%
Risk Index	6.98	6.31	-0.68 **

Panel B: Large Surviving and Non-surviving BHCs

	Before (1997-1999)	After (2000-2009)	Difference
(n)	42	130	After-Before
Z-Score	4.24	3.78	-0.46 ***
SDROA	0.39%	0.44%	0.05% *
SDROE	5.07%	5.11%	0.04%
Total Risk	9.24%	7.74%	-1.50% **
Systematic Risk	1.12	0.66	-0.46 ***
Firm Risk	5.95%	6.96%	1.01%
Risk Index	6.72	6.38	-0.34

Panel C: Medium Surviving BHCs

	Before (1997-1999)	After (2000-2009)	Difference
(n)	87	290	After-Before
Z-Score	4.59	4.22	-0.37 ***
SDROA	0.36%	0.42%	0.06% **
SDROE	4.35%	4.64%	0.29%
Total Risk	8.40%	7.39%	-1.01% **
Systematic Risk	0.85	0.57	-0.28 ***
Firm Risk	6.48%	6.90%	0.42%
Risk Index	5.94	5.62	-0.32

Panel D: Medium Surviving and Non-surviving BHCs

	Before (1997-1999)	After (2000-2009)	Difference
(n)	108	333	After-Before
Z-Score	4.55	4.26	-0.29 ***
SDROA	0.37%	0.41%	0.04% *
SDROE	4.45%	4.68%	0.23%
Total Risk	8.46%	7.25%	-1.21% **
Systematic Risk	0.86	0.56	-0.30 ***
Firm Risk	6.54%	6.86%	0.32%
Risk Index	6.01	5.56	-0.45 ***

Panel E: Small Surviving BHCs

	Before (1997-1999)	After (2000-2009)	Difference
(n)	318	1060	After-Before
Z-Score	4.64	4.29	-0.35 ***
SDROA	0.36%	0.39%	0.04% **
SDROE	3.86%	5.16%	1.30% **
Total Risk	7.62%	7.86%	0.24%
Systematic Risk	0.39	0.48	0.09
Firm Risk	7.11%	7.42%	0.31% ***
Risk Index	5.16	5.38	0.22 **

Panel F: Small Surviving and Non-surviving BHCs

	Before (1997-1999)	After (2000-2009)	Difference
(n)	437	1307	After-Before
Z-Score	4.53	4.28	-0.24 ***
SDROA	0.38%	0.41%	0.03%
SDROE	3.99%	5.07%	1.08% **
Total Risk	7.85%	7.75%	-0.10%
Systematic Risk	0.44	0.46	0.02
Firm Risk	7.21%	7.44%	0.23% *
Risk Index	5.38	5.40	0.02

*** Significant at 1%
** Significant at 5%
* Significant at 10%

An additional comparison of the risk measures is made between banks that did not diversify into nontraditional banking activities and those that did, choosing 2004 as the reference year given that a complete breakdown of Investment Banking and Insurance Activities are publicly available only after 2003. The ratio of Investment Banking (IB) to Total Income is used to examine the differences in risk profile of banks due to expansion into nontraditional banking activities. BHCs are classified as Universal Banks if Investment Banking Income is greater than zero, and BHCs are classified as Traditional Banks if Investment Banking is equal to zero after 2004.

Results remain unchanged when the risk profile of Universal BHCs are examined (Panel A and B of Table 11). However, statistical significance of the mean differences for Traditional banks is reduced, especially when considering the full sample. Panels E and F in Table 11 reveal a significant increase in the Systematic Risk for Universal BHCs relative to Traditional BHCs after the Passage of the Act.

Table 11: Mean Differences in BHC Risk Before and After the Passage of the GLBA Universal and Traditional BHCs, over the entire period

Table 7

Panel A: Universal Surviving BHCs
(BHCs with Investment Banking share >0)

	Before (1997-1999)	After (2000-2009)	Difference
(n)	387	1290	After-Before
Z-Score	4.60	4.25	-0.35 ***
SDROA	0.36%	0.40%	0.04% ***
SDROE	4.09%	4.91%	0.82% ***
Total Risk	7.93%	7.77%	-0.16%
Systematic Risk	0.55	0.52	-3.26%
Firm Risk	6.86%	7.24%	0.38% ***
Risk Index	5.48	5.50	0.02

Panel B: Universal Surviving and Non-surviving BHCs
(BHCs with Investment Banking share >0)

	Before (1997-1999)	After (2000-2009)	Difference
(n)	500	1517	After-Before
Z-Score	4.52	4.23	-0.28 ***
SDROA	0.38%	0.41%	0.03% **
SDROE	4.20%	4.93%	0.73% ***
Total Risk	8.11%	7.68%	-0.43% ***
Systematic Risk	0.57	0.50	-6.73% ***
Firm Risk	6.98%	7.27%	0.29% ***
Risk Index	5.62	5.53	-0.09

Panel C: Traditional Surviving BHCs
(BHCs with Investment Banking share = 0)

	Before (1997-1999)	After (2000-2009)	Difference
(n)	51	170	After-Before
Z-Score	4.51	4.17	-0.34 ***
SDROA	0.37%	0.43%	0.07% ***
SDROE	3.68%	6.11%	2.43% ***
Total Risk	7.73%	7.83%	0.10%
Systematic Risk	0.43	0.44	0.01
Firm Risk	7.28%	7.58%	0.30%
Risk Index	5.28	5.53	0.24

Panel D: Traditional Surviving and Non-surviving BHCs
(BHCs with Investment Banking share = 0)

	Before (1997-1999)	After (2000-2009)	Difference
(n)	87	253	After-Before
Z-Score	4.48	4.29	-0.19
SDROA	0.36%	0.39%	0.04%
SDROE	3.89%	5.40%	1.51% *
Total Risk	7.80%	7.51%	-0.29%
Systematic Risk	0.53	0.45	-0.08
Firm Risk	7.10%	7.40%	0.30%
Risk Index	5.43	5.35	-0.09

Panel E: Traditional and Universal Surviving BHCs

	After Universal	After Traditional	Difference
(n)	1290	170	Universal-Traditional
Z-Score	4.25	4.17	0.08
SDROA	0.40%	0.43%	-0.04%
SDROE	4.91%	6.11%	-1.20%
Total Risk	7.77%	7.83%	-0.06%
Systematic Risk	0.52	0.44	0.07 **
Firm Risk	7.24%	7.58%	-0.34%
Risk Index	5.50	5.53	-0.03

Panel F: Traditional and Universal Surviving and Non-surviving BHCs

	After Universal	After Traditional	Difference
(n)	1517	253	Universal-Traditional
Z-Score	4.23	4.29	-0.06
SDROA	0.41%	0.39%	0.02%
SDROE	4.93%	5.40%	-0.47%
Total Risk	7.68%	7.51%	0.17%
Systematic Risk	0.50	0.45	0.05 ***
Firm Risk	7.27%	7.40%	-0.13%
Risk Index	5.53	5.35	0.18

*** Significant at 1%
** Significant at 5%
* Significant at 10%

To ensure that the results are not impacted by the crisis period, the univariate means test is performed excluding years 2007 through 2009. Results in Table 12 show that the risk profiles of BHCs changed based on the mean differences for 5 out of the 7 risk measures considered, closely resembling the results covering the entire period. While the Insolvency Risk and SDROA are higher after the passage of the GLBA, the mean

differences in Total Risk, Systematic Risk and the Risk Index show that the risk in BHCs became lower after the passage of the Act.

Table 12: Mean Differences in BHC Risk Before and After the Passage of the GLBA, 1997-2006 (Excluding the 2007-2009 crisis period)

Panel A: Surviving BHCs					Panel B: Surviving and Non-surviving BHCs				
	Before (1997-1999)	After (2000-2006)	Difference			Before (1997-1999)	After (2000-2006)	Difference	
(n)	438	1022	After-Before		(n)	587	1319	After-Before	
Z-Score	4.59	4.49	-0.11	**	Z-Score	4.51	4.44	-0.07	***
SDROA	0.36%	0.40%	0.04%	*	SDROA	0.38%	0.41%	0.03%	**
SDROE	4.04%	4.17%	0.13%		SDROE	4.15%	4.26%	0.11%	
Total Risk	7.91%	6.48%	-1.43%	*	Total Risk	8.06%	6.58%	-1.48%	*
Systematic Risk	0.53	0.47	-0.07	*	Systematic Risk	0.56	0.45	-0.11	*
Firm Risk	6.91%	6.86%	-0.1%		Firm Risk	7.00%	6.98%	-0.02%	
Risk Index	5.46	5.14	-0.32	*	Risk Index	5.59	5.21	-0.38	*

* Significant at 1%
** Significant at 5%
*** Significant at 10%

5.2.2 Managerial Risk Incentives

The Managerial Risk Incentives Hypothesis states:

H02: Banks' risk-taking behavior does not differ according to levels of insider stock ownership.

Ha2: Banks' risk-taking behavior differs according to levels of insider stock ownership.

And,

H03: For a given level of insider ownership structure, banks' risk-taking behavior does not differ according to the regulatory environment.

Ha3: For a given level of insider ownership structure, banks' risk-taking behavior differs according to the regulatory environment.

Insider Ownership is classified into three levels: low, medium, and high, based on the 33rd percentile distribution of BHC Insider Ownership, where the 33rd percentile is 1.2%, the 66th percentile is 4.4% and the 100th percentile is 57.9%. Table 13 shows the means of all risk measures by the three levels for the surviving sample and the full sample (surviving and non-surviving), respectively.

Table 13: Summary of Risk Measures by levels of Insider Ownership, over the entire period

Panel A: Surviving BHCs

		Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High	(n=634)	4.35	0.36%	4.66%	7.72%	0.48	7.25%	5.29
Medium	(n=624)	4.36	0.40%	5.08%	7.85%	0.50	7.28%	5.47
Low	(n=640)	4.27	0.41%	4.72%	7.85%	0.56	7.05%	5.70

Panel B: Surviving and Non Surviving BHCs

		Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High	(n=800)	4.33	0.36%	4.60%	7.73%	0.48	7.33%	5.38
Medium	(n=779)	4.35	0.44%	5.04%	7.76%	0.48	7.28%	5.47
Low	(n=778)	4.24	0.41%	4.73%	7.78%	0.57	7.04%	5.74

Table 14 shows the differences in mean risk measures shown in Table 13. Results in Table 14 indicate that for a given regulatory environment, bank risk-taking behavior differs according to managerial stock ownership only for SDROA, Systematic Risk and the Risk Index. Based on the sign of the difference, BHCs with high levels of Insider Ownership have lower risk than their counterparts with medium and low levels of concentration. The direction of the differences indicates that bank managers in BHCs with high ownership concentration have the incentive to reduce risk to protect their non-diversifiable risk, while bank managers in BHCs with medium and lower levels of stock

ownership seem to be more closely aligned with those of stockholders, and are likely engage in higher risk activities to maximize their value of their call option.

Table 14: Mean Differences in BHC Risk according to levels of Insider Ownership, over the entire period

Panel A: Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	-0.01	-0.04% **	-0.41%	-0.13%	-0.02	-0.03%	-0.18
High - Low	0.08	-0.04% **	-0.05%	-0.13%	-0.08 **	0.20%	-0.41 **
Medium - Low	0.08	-0.01%	0.36%	0.00%	-0.06 **	0.24%	-0.23 **

Panel B: Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	-0.02	-0.08% **	-0.44%	-0.04%	0.00	0.05%	-0.09
High - Low	0.09	-0.04% **	-0.14%	-0.05%	-0.09 **	0.30%	-0.36 **
Medium - Low	0.11	0.03%	0.30%	-0.01%	-0.09 **	0.25%	-0.27 **

**Significance at 5% level

Table 15 shows the mean difference in risk measures among levels of Insider Ownership by peer groups. Large BHCs with low levels of Insider Ownership are associated with higher risk measures. The frequency of significant differences in means increases when looking at the medium size peer group. The sign of the differences are also in line with previous findings that BHCs with lower inside ownership concentration have a higher risk profile than their counterparts with higher levels of ownership concentration. On the other hand, results for BHCs in the small peer group do not provide evidence to reject the null hypothesis, indicating that for a given regulatory environment, bank risk-taking behavior in small BHCs does not differ according to managerial stock ownership levels.

Table 15: Mean Differences in BHC Risk according to levels of Insider Ownership by Large, Medium and Small BHCs, for the entire period

Panel A: Large Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	-0.29	0.05%	1.05%	1.19%	0.25	-0.82%	0.46
High - Low	0.16	0.01%	0.23%	-0.16%	0.05	-1.33%	-0.65
Medium - Low	0.45 **	-0.04%	-0.82% **	-1.35%	-0.19	-0.51%	-1.10 **

Panel B: Large Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	-0.29	0.05%	1.05%	1.19%	0.25	-0.82%	0.46
High - Low	0.17	0.01%	0.20%	0.10%	0.05	-1.23%	-0.59
Medium - Low	0.46 **	-0.04%	-0.85% **	-1.09%	-0.20	-0.41%	-1.05 **

Panel C: Medium Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	0.27	-0.05%	-0.61%	-1.14%	0.00	-0.93% **	-0.79 **
High - Low	0.41 **	-0.13% **	-1.40% **	-1.26% **	-0.14 **	-0.77%	-1.28 **
Medium - Low	0.14	-0.08%	-0.80% **	-0.12%	-0.15 **	0.16%	-0.49 **

Panel D: Medium Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	0.31 **	-0.06%	-0.77% **	-1.02%	-0.02	-0.81% **	-0.85 **
High - Low	0.38 **	-0.12% **	-1.15% **	-0.91%	-0.13 **	-0.60%	-1.09 **
Medium - Low	0.07	-0.06% **	-0.38%	0.11%	-0.11 **	0.21%	-0.24

Panel E: Small Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	-0.07	-0.04%	-0.48%	0.04%	-0.01	0.12%	-0.04
High - Low	-0.12	-0.01%	0.40%	0.31%	0.01	0.40% **	0.08
Medium - Low	-0.05	0.03%	0.88%	0.26%	0.02	0.28%	0.12

Panel F: Small Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	-0.08	-0.08% **	-0.46%	0.10%	0.01	0.17%	0.06
High - Low	-0.09	-0.01%	0.23%	0.22%	0.01	0.38% **	0.09
Medium - Low	0.00	0.07% **	0.69%	0.12%	0.00	0.22%	0.02

**Significance at 5% level

To test the second part of the Managerial Risk Incentive hypothesis, the mean of each risk measure is calculated by the defined levels of ownership concentration considering the passage of the GLBA (Table 16).

Table 16: Summary of Mean BHC Risk Measures according to levels of Insider Ownership Before and After the Passage of the GLBA, over the entire period

Panel A: Surviving BHCs

		Z Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Pre GLBA High Level	(n=156)	4.59	0.34%	3.82%	7.42%	0.45	6.91%	5.07
Pre GLBA Medium Level	(n=138)	4.54	0.37%	4.11%	8.23%	0.57	7.15%	5.70
Pre GLBA Low Level	(n=144)	4.65	0.37%	4.23%	8.13%	0.59	6.69%	5.64
Post GLBA High Level	(n=478)	4.27	0.37%	4.94%	7.82%	0.49	7.36%	5.36
Post GLBA Medium Level	(n=486)	4.31	0.41%	5.35%	7.74%	0.48	7.32%	5.41
Post GLBA Low Level	(n=496)	4.16	0.42%	4.86%	7.77%	0.55	7.15%	5.72

Panel B: Surviving and Non-surviving BHCs

		Z Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Pre GLBA High Level	(n=212)	4.49	0.35%	3.84%	7.73%	0.50	7.08%	5.37
Pre GLBA Medium Level	(n=193)	4.50	0.40%	4.22%	8.16%	0.56	7.10%	5.67
Pre GLBA Low Level	(n=182)	4.54	0.38%	4.43%	8.34%	0.63	6.82%	5.76
Post GLBA High Level	(n=588)	4.27	0.36%	4.87%	7.72%	0.47	7.43%	5.38
Post GLBA Medium Level	(n=585)	4.31	0.45%	5.29%	7.64%	0.46	7.34%	5.41
Post GLBA Low Level	(n=597)	4.14	0.41%	4.83%	7.59%	0.55	7.11%	5.73

Table 17 shows the mean differences by ownership level for periods before and after the passage of the Act. The results indicate that except for the Insolvency Risk, bank risk-taking behavior did not differ according to the regulatory environment for any of the ownership levels. In case of Insolvency Risk, for the surviving BHCs, the risk has increased during the post GLBA period for the BHCs with high and low Insider Ownership levels. For the entire sample, the mean difference in Insolvency Risk is significant only for low levels of Insider Ownership. The lack of significance in the results may be explained by managers' behavior complying with the pre-existing regulations such as the issuance of prompt corrective actions when financial or managerial weakness surfaces. The results remain unchanged when doing the comparison by peer group (Table 18).

Table 17: Mean Differences in BHC Risk according to levels of Insider Ownership Before and After the Passage of the GLBA, over the entire period

Panel A: Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.32 **	0.03%	1.12%	0.40%	0.04	0.46%	0.29
Post GLBA Medium - Pre GLBA Medium	-0.23	0.04%	1.24%	-0.49%	-0.10	0.18%	-0.28
Post GLBA Low - Pre GLBA Low	-0.49 **	0.05%	0.63%	-0.36%	-0.04	0.46%	0.08

Panel B: Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.22	0.01%	1.03%	0.00%	-0.03	0.35%	0.02
Post GLBA Medium - Pre GLBA Medium	-0.19	0.04%	1.06%	-0.51%	-0.10	0.24%	-0.27
Post GLBA Low - Pre GLBA Low	-0.40 **	0.04%	0.40%	-0.75%	-0.08	0.29%	-0.03

**Significance at the 5% level

Table 18: Mean Differences in BHC Risk according to levels of Insider Ownership Before and After the Passage of the GLBA by Large, Medium and Small BHCs, over the entire period

Panel A: Large Surviving BHCs****

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA Medium - Pre GLBA Medium	-0.01	-0.02%	-0.67%	-0.98%	-0.60	2.21%	-0.94
Post GLBA Low - Pre GLBA Low	-0.39	0.07%	0.12%	-1.77%	-0.45	0.54%	-0.63

Panel B: Large Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA Medium - Pre GLBA Medium	-0.01	-0.02%	-0.67%	-0.98%	-0.60	2.21%	-0.94
Post GLBA Low - Pre GLBA Low	-0.57 **	0.06%	0.14%	-1.72%	-0.45	0.85%	-0.21

Panel C: Medium Surviving BHC

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.24	0.02%	-0.23%	-0.99%	-0.13	0.07%	-0.32
Post GLBA Medium - Pre GLBA Medium	-0.23	0.06%	0.40%	-1.28%	-0.36	0.44%	-0.43
Post GLBA Low - Pre GLBA Low	-0.64 **	0.10%	0.60%	-0.73%	-0.33	0.73%	-0.21

Panel D: Medium Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.19	0.01%	-0.18%	-0.89%	-0.13	0.16%	-0.35
Post GLBA Medium - Pre GLBA Medium	-0.21	0.05%	0.25%	-1.35%	-0.36	0.39%	-0.45
Post GLBA Low - Pre GLBA Low	-0.45	0.07%	0.55%	-1.20%	-0.34	0.42%	-0.41

Panel E: Small Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.34 **	0.04%	1.41%	0.45%	0.06	0.48%	0.41
Post GLBA Medium - Pre GLBA Medium	-0.26	0.04%	1.61%	0.42%	0.03	0.53%	-0.17
Post GLBA Low - Pre GLBA Low	-0.48 **	0.03%	0.79%	0.54%	0.18	0.40%	0.39

Panel F: Small Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.23	0.01%	1.32%	0.16%	-0.03	0.47%	0.08
Post GLBA Medium - Pre GLBA Medium	-0.20	0.04%	0.76%	-0.26%	0.00	0.07%	-0.16
Post GLBA Low - Pre GLBA Low	-0.34 **	0.02%	0.94%	-0.29%	0.13	0.08%	0.18

**Significance at the 5% level

****Large BHCs do not have a Pre-Post GLBA data with high levels of insider ownership

5.2.3 Blockholder Ownership Hypothesis

The Blockholder Ownership hypothesis states:

H04: Banks' risk-taking behavior does not differ according to the level of blockholder stock ownership.

Ha4: Banks' risk-taking behavior differs according to the level of blockholder stock ownership.

And,

H05: For a given level of blockholder ownership structure, banks' risk-taking behavior does not differ according to the regulatory environment.

Ha5: For a given level of blockholder ownership structure, banks' risk-taking behavior differs according to the regulatory environment.

Blockholder Ownership is classified into three levels: low, medium, and high based on the 33rd percentile distribution of BHC Blockholder Ownership, where the 33rd percentile is 5.4%, the 66th percentile is 14.1% and the 100th percentile is 44.5%. Table 19 shows the means of risk measures, by the three levels indicated for the surviving sample and full sample (surviving and non-surviving), respectively.

Table 19: Summary of Risk Measures by levels of Blockholder Ownership, over the entire period

Panel A: Surviving BHCs

		Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High	(n=676)	4.32	0.39%	4.75%	8.11%	0.52	7.43%	5.47
Medium	(n=622)	4.39	0.38%	4.81%	7.55%	0.52	7.04%	5.44
Low	(n=600)	4.26	0.40%	4.91%	7.72%	0.50	7.09%	5.57

Panel B: Surviving and Non-surviving BHCs

		Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High	(n=798)	4.28	0.39%	4.72%	8.11%	0.51	7.47%	5.56
Medium	(n=775)	4.40	0.42%	4.77%	7.46%	0.52	7.05%	5.41
Low	(n=784)	4.25	0.40%	4.88%	7.69%	0.50	7.13%	5.61

Table 20 shows the differences in mean risk measures shown in Table 19. Results in Table 20 indicate that for a given regulatory environment, bank risk-taking behavior differs according to blockholder stock ownership only in terms of Insolvency Risk, Total Risk, and Firm Risk. BHCs with medium levels of Blockholder Ownership tend to have lower Insolvency Risk compared to BHCs with high levels of blockholder concentration (Panel B). In this case, a moderate level of Blockholder Ownership influences managers to follow a less risky investment strategy, likely explained by lower blockholder wealth concentration. On the other hand, risk is consistently higher in BHCs with higher concentration of Blockholder Ownership as revealed by Total Risk and Firm Risk, where large and well diversified blockholders could influence managerial action towards riskier investments in the search of greater returns.

Table 20: Differences in BHC Risk according to levels of Blockholder Ownership, over the entire period

Panel A: Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	-0.08	0.01%	-0.06%	0.56% **	0.00	0.39% **	0.03
High - Low	0.06	-0.02%	-0.16%	0.40%	0.03	0.35% **	-0.10
Medium - Low	0.13 **	-0.02%	-0.10%	-0.16%	0.02	-0.05%	-0.13

Panel B: Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	-0.12 **	-0.02%	-0.05%	0.64% **	-0.01	0.42% **	0.15
High - Low	0.03	0.00%	-0.16%	0.42%	0.01	0.35% **	-0.06
Medium - Low	0.15 **	0.02%	-0.11%	-0.22%	0.02	-0.07%	-0.20 **

**Significance at 5% level

Table 21 shows the mean differences in risk measures by levels of Blockholder Ownership by different sized peer groups. The results suggest that greater presence of blockholders in the case of large BHCs is associated with higher Systematic Risk relative to peers with lower blockholder concentration, while no significant difference is found in the case of medium size BHCs. On the other hand, the significance of mean differences is more notably in the small peer group, indicating that for a given regulatory environment, bank risk-taking behavior in small BHCs differs according to blockholder stock ownership levels. The differences suggest that BHCs with medium concentration of Blockholder Ownership have lower Insolvency Risk, Total Risk and Firm Risk than their counterparts with larger concentrations of Blockholder Ownership. At the same time, BHCs with low concentration of Blockholder Ownership have lower Systematic Risk than their counterparts with greater concentrations.

Table 21: Mean Differences in BHC Risk according to levels of Blockholder Ownership by Large, Medium and Small BHCs, over the entire period

Panel A: Large Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	0.74	-0.05%	0.16%	0.59%	0.52 **	0.29%	-0.07
High - Low	0.40	0.02%	0.20%	1.79%	0.55 **	1.01%	0.74
Medium - Low	-0.34	0.07%	0.04%	1.20%	0.03	0.72%	0.81

Panel B: Large Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	0.83 **	-0.01%	0.34%	0.42%	0.43 **	-0.53%	-0.38
High - Low	0.48	0.04%	0.50%	0.61%	0.43 **	-0.22%	0.20
Medium - Low	-0.35	0.05%	0.16%	0.19%	0.00	0.31%	0.58

Panel C: Medium Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	0.11	-0.01%	-0.35%	0.12%	-0.01	0.11%	-0.35
High - Low	-0.03	0.03%	-0.10%	1.01%	0.05	0.29%	-0.16
Medium - Low	-0.15	0.04%	0.26%	0.89%	0.06	0.18%	0.20

Panel D: Medium Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	0.12	-0.01%	-0.38%	0.21%	0.01	0.16%	-0.31
High - Low	-0.07	0.01%	-0.27%	0.86%	0.06	0.20%	-0.08
Medium - Low	-0.19	0.02%	0.11%	0.66%	0.05	0.04%	0.23

Panel E: Small Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	-0.16 **	0.01%	0.03%	0.74% **	0.01	0.48% **	0.20
High - Low	-0.01	-0.03%	-0.15%	0.31%	0.09 **	0.21%	0.14
Medium - Low	0.15	-0.04%	-0.18%	-0.43%	0.08 **	-0.27%	-0.06

Panel F: Small Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm_Risk	Risk Index
High - Medium	-0.23 **	-0.03%	0.04%	0.78% **	-0.01	0.48% **	0.33 **
High - Low	-0.02	0.00%	-0.11%	0.35%	0.06 **	0.23%	0.13
Medium - Low	0.21	0.02%	-0.15%	-0.43%	0.07 **	-0.25%	-0.21

**Significance at 5% level

To test the second part of the Blockholder Ownership Hypothesis, the mean of each risk measure is calculated by the defined levels of ownership concentration for the periods before and after the passage of the GLBA (Table 22).

Table 22: Summary of Mean BHC Risk Measures by levels Blockholder Ownership Before and After the Passage of the GLBA, over the entire period

Panel A: Surviving BHCs

		Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Pre GLBA High	(n=146)	4.70	0.35%	3.77%	7.80%	0.50	7.20%	5.26
Pre GLBA Medium	(n=115)	4.59	0.36%	4.15%	7.35%	0.53	6.67%	5.39
Pre GLBA Low	(n=177)	4.51	0.36%	4.20%	8.36%	0.57	6.83%	5.66
Post GLBA High	(n=530)	4.21	0.40%	5.02%	8.20%	0.53	7.50%	5.53
Post GLBA Medium	(n=507)	4.35	0.39%	4.96%	7.60%	0.52	7.12%	5.45
Post GLBA Low	(n=423)	4.16	0.42%	5.20%	7.45%	0.47	7.19%	5.53

Panel B: Surviving and Non-surviving BHCs

		Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Pre GLBA High	(n=185)	4.56	0.38%	3.79%	8.07%	0.51	7.31%	5.51
Pre GLBA Medium	(n=160)	4.49	0.38%	4.19%	7.60%	0.57	6.82%	5.56
Pre GLBA Low	(n=242)	4.48	0.37%	4.41%	8.36%	0.60	6.88%	5.67
Post GLBA High	(n=613)	4.19	0.39%	5.00%	8.12%	0.51	7.52%	5.57
Post GLBA Medium	(n=615)	4.38	0.42%	4.92%	7.43%	0.51	7.11%	5.37
Post GLBA Low	(n=542)	4.15	0.41%	5.08%	7.38%	0.46	7.24%	5.59

Table 23 shows the mean differences by Blockholder Ownership level before and after the passage of the GLBA. The results indicate that BHC Insolvency Risk differs according to the regulatory environment for a given level of ownership structure, specifically for BHCs with High and Low blockholder concentration. The magnitude of the difference indicates that the Insolvency Risk is higher after the passing of the Act. In this sense, well diversified blockholders tend to influence managerial action towards riskier investments. The Lack of significance in other risk variables is more consistent

with effective regulatory oversight to prevent excessive risk-taking behavior during periods of regulatory stringency and regulatory leniency.

Table 23: Mean Differences in BHC Risk according to levels of Blockholder Ownership Before and After the Passage of the GLBA, over the entire period

Panel A: Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.49 **	0.05%	1.24%	0.40%	0.03	0.30%	0.26
Post GLBA Medium - Pre GLBA Medium	-0.24	0.03%	0.81%	0.25%	-0.01	0.45%	0.06
Post GLBA Low - Pre GLBA Low	-0.35 **	0.06%	1.00%	-0.91%	-0.10	0.36%	-0.13

Panel B: Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.37 **	0.01%	1.21%	0.04%	0.00	0.21%	0.06
Post GLBA Medium - Pre GLBA Medium	-0.12	0.04%	0.73%	-0.17%	-0.07	0.30%	-0.19
Post GLBA Low - Pre GLBA Low	-0.33 **	0.04%	0.68%	-0.98%	-0.14	0.36%	-0.09

**Significance at 5% level

By looking at the peer group, results in Panel E and F in Table 24 indicate that the initial findings are only consistent for the Small BHCs peer group. By separating the sample into their peer groups, new evidence indicates that the Systematic Risk is lower after the passage of the Act in the presence of medium and low concentration of blockholder for both large and medium size BHCs.

Table 24: Mean Differences in BHC Risk according to levels of Blockholder Ownership Before and After the Passage of the GLB, by Large, Medium and Small BHCs, over the entire period

Panel A: Large Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.30	-0.17%	0.63%	-1.70%	0.06	0.64%	-1.42
Post GLBA Medium - Pre GLBA Medium	-0.57	0.07%	0.17%	1.31%	-0.54	1.88%	-0.04
Post GLBA Low - Pre GLBA Low	-0.24	0.06%	-0.04%	-1.87%	-0.46 **	0.70%	-0.73

Panel B: Large Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.76	-0.09%	0.23%	-1.15%	0.07	1.16%	0.08
Post GLBA Medium - Pre GLBA Medium	-0.62	0.06%	0.31%	0.03%	-0.53 **	1.90%	0.31
Post GLBA Low - Pre GLBA Low	-0.36	0.06%	-0.01%	-1.93%	-0.45 **	0.76%	-0.54

Panel C: Medium Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.54	0.10%	0.50%	-0.79%	-0.18	-0.05%	-0.06
Post GLBA Medium - Pre GLBA Medium	-0.22	0.07%	0.21%	-0.71%	-0.28 **	0.57%	-0.47
Post GLBA Low - Pre GLBA Low	-0.34	0.01%	0.16%	-1.87%	-0.41 **	0.68%	-0.44

Panel D: Medium Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.53	0.09%	0.47%	-0.83%	-0.16	-0.07%	-0.04
Post GLBA Medium - Pre GLBA Medium	-0.04	0.05%	0.09%	-0.84%	-0.29 **	0.45%	-0.76
Post GLBA Low - Pre GLBA Low	-0.30	0.00%	0.23%	-2.06%	-0.42 **	0.44%	-0.49

Panel E: Small Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.48 **	0.04%	1.45%	0.75%	0.09	0.40%	0.38
Post GLBA Medium - Pre GLBA Medium	-0.25	0.01%	1.03%	0.54%	0.12	0.33%	0.28
Post GLBA Low - Pre GLBA Low	-0.35 **	0.07%	1.50%	-0.43%	0.03	0.26%	0.01

Panel F: Small Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.34 **	0.00%	1.41%	0.25%	0.04	0.26%	0.10
Post GLBA Medium - Pre GLBA Medium	-0.12	0.04%	0.94%	0.02%	0.03	0.14%	-0.03
Post GLBA Low - Pre GLBA Low	-0.31 **	0.04%	0.94%	-0.49%	-0.02	0.33%	0.04

** Significance at 5% level

5.2.4 Outsider in the Board Hypothesis

The Outsider on the Board hypothesis states:

H06: Banks' risk-taking behavior does not differ according to the proportion of outside directors.

Ha6: Banks' risk-taking behavior differs according to the proportion of outside directors.

And,

H07: For a given proportion of outside directors, banks' risk-taking behavior does not differ according to the regulatory environment.

Ha7: For a given proportion of outside directors, banks' risk-taking behavior differs according to the regulatory environment

Proportion of Outside Directors is classified in three levels: low, medium, and high based on the distribution of Outside Directors in the board, where the 33rd percentile is 82.44%, the 66th percentile is 88.9% and the 100th percentile is 93.8%. Table 25 shows the mean of all risk measures by the three levels for the surviving sample and full sample (surviving and non-surviving), respectively.

Table 25: Summary of Mean BHC Risk Measures by levels Outside Director, over the entire period

Panel A: Surviving BHCs

		Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High	(n=622)	4.25	0.39%	4.63%	7.94%	0.54	7.18%	5.58
Medium	(n=629)	4.40	0.39%	4.61%	7.64%	0.52	7.09%	5.39
Low	(n=647)	4.33	0.39%	5.20%	7.84%	0.48	7.32%	5.50

Panel B: Surviving and Non-surviving BHCs

		Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High	(n=795)	4.23	0.40%	4.77%	7.83%	0.55	7.14%	5.62
Medium	(n=770)	4.37	0.40%	4.56%	7.68%	0.50	7.17%	5.45
Low	(n=792)	4.33	0.41%	5.02%	7.75%	0.48	7.34%	5.50

Table 26 shows the difference in means for the measures reported in Table 25. Results in Table 26 indicate that for a given regulatory environment, bank risk-taking behavior differs according to the levels of Outside Directors presence only in regards to two risk measures. BHCs with medium presence level of Outside Directors have lower Insolvency Risk compared to those with higher presence levels (panel A and B), while Systematic Risk is significantly higher in BHCs with more independent board members. Higher risk profile in BHCs with larger presence of Outside Directors in the board is in line with the argument that lack of banking business comprehension by Outside Directors may cause their associated monitoring role to be ineffective.

Table 26: Mean differences in BHC Risk according to levels of Outside Director, over the entire period

Panel A: Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	-0.15 **	0.01%	0.01%	0.30%	0.03	0.09%	0.19
High - Low	-0.07	0.00%	-0.58%	0.10%	0.06 **	-0.14%	0.08
Medium - Low	0.07	-0.01%	-0.59%	-0.19%	0.03	-0.23%	-0.11

Panel B: Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	-0.13 **	0.00%	0.22%	0.15%	0.05	-0.03%	0.17
High - Low	-0.09	-0.01%	-0.25%	0.08%	0.07 **	-0.20%	0.12
Medium - Low	0.04	-0.01%	-0.47%	-0.07%	0.02	-0.17%	-0.05

**Significance at 5% level

Table 27 shows the mean differences in risk measures among levels of Outside Directors in the board by peer groups. The peer group comparison shows that given a regulatory environment, bank's risk-taking behavior does not differ by the proportion of Outside Directors in the board for large and small BHCs. Systematic Risk remains significantly higher only in medium size BHCs with larger presence of Outside Directors in the board than in those with lower presence.

Table 27: Mean Differences in BHC Risk according to levels of Outside Director by Large, Medium and Small BHCs, over the entire period

Panel A: Large Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	-0.23	0.06%	-0.04%	0.98%	0.02	0.19%	0.72
High - Low	-0.35	0.08%	0.59%	2.09%	-0.05	1.17%	0.22
Medium - Low	-0.11	0.02%	0.63%	1.11%	-0.07	0.98%	-0.51

Panel B: Large Surviving and Non Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	-0.15	0.05%	0.02%	0.77%	0.05	-0.05%	0.08
High - Low	-0.26	0.07%	0.64%	1.78%	-0.05	1.04%	0.56
Medium - Low	-0.11	0.02%	0.63%	1.02%	-0.10	1.10%	0.48

Panel C: Medium Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	-0.09	0.06%	0.68%	0.25%	0.09	-0.14%	0.29
High - Low	-0.18	0.06%	0.65%	0.48%	0.16	** -0.34%	0.14
Medium - Low	-0.09	0.00%	-0.03%	0.23%	0.07	-0.20%	-0.15

Panel D: Medium Surviving and Non Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	-0.04	0.06%	0.61%	0.20%	0.09	-0.22%	0.24
High - Low	-0.16	0.07%	0.46%	0.44%	0.17	** -0.49%	0.14
Medium - Low	-0.11	0.00%	-0.15%	0.23%	0.07	-0.28%	-0.10

Panel E: Small Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	-0.11	-0.02%	-0.24%	0.15%	-0.01	0.16%	0.05
High - Low	0.03	-0.03%	-0.99%	-0.19%	0.00	-0.08%	-0.15
Medium - Low	0.14	-0.01%	-0.74%	-0.34%	0.00	-0.24%	-0.20

Panel F: Small Surviving and Non Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
High - Medium	-0.11	-0.03%	0.07%	0.01%	0.01	0.05%	0.05
High - Low	-0.01	-0.04%	-0.50%	-0.16%	0.01	-0.10%	-0.06
Medium - Low	0.10	-0.01%	-0.58%	-0.17%	0.00	-0.15%	-0.11

**Significance at 5% level

To test the second part of the Outside Directors Hypothesis, the mean of each risk measure is calculated by the defined levels of Outside Directors considering the periods before and after the passage of the GLBA (Table 28).

Table 28: Summary of Mean BHC Risk Measures by levels of Outside Director Before and After the Passage of the GLBA, over the entire period

Surviving BHCs throughout 1997-2009

		Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Pre GLBA High	(n=148)	4.56	0.36%	4.29%	8.22%	0.56	6.89%	5.66
Pre GLBA Medium	(n=131)	4.70	0.35%	3.82%	7.82%	0.56	6.97%	5.31
Pre GLBA Low	(n=159)	4.54	0.36%	4.01%	7.69%	0.49	6.89%	5.39
Post GLBA High	(n=474)	4.16	0.40%	4.73%	7.85%	0.54	7.27%	5.55
Post GLBA Medium	(n=498)	4.32	0.39%	4.82%	7.60%	0.50	7.12%	5.41
Post GLBA Low	(n=488)	4.25	0.40%	5.59%	7.88%	0.48	7.46%	5.54

Surviving and Non Surviving BHCs throughout 1997-2009

		Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Pre GLBA High	(n=211)	4.48	0.37%	4.58%	8.29%	0.61	6.88%	5.72
Pre GLBA Medium	(n=178)	4.56	0.38%	3.80%	8.08%	0.55	7.04%	5.53
Pre GLBA Low	(n=198)	4.49	0.38%	4.01%	7.81%	0.52	7.08%	5.51
Post GLBA High	(n=584)	4.14	0.40%	4.84%	7.67%	0.53	7.24%	5.58
Post GLBA Medium	(n=592)	4.31	0.40%	4.79%	7.56%	0.49	7.21%	5.43
Post GLBA Low	(n=594)	4.27	0.42%	5.36%	7.73%	0.46	7.43%	5.50

Table 29 shows the mean difference by the proportion of Outside Directors in the board for the periods before and after the passage of the Act. The results indicate that for a given level of Outside Directors in the board, Insolvency Risk is the only risk measure that differs according to the regulatory environment. Further, the peer group results (Table 30, panels E and F) show that Insolvency Risk is higher only for small BHCs. With expansion into riskier nontraditional activities, lack of banking business knowledge from the part of Outside Directors in Small BHCs would limit the effective advising and monitoring functions, resulting in an increase of bank risk- taking by managers. The

Systematic Risk is lower after the passage of the Act in large and medium BHCs with higher proportion of Outside Directors.

Table 29: Mean Differences in BHC Risk according to levels of Outside Director Before and After the Passage of the GLBA, over the entire period

Panel A: Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.40 **	0.04%	0.44%	-0.37%	-0.02	0.38%	-0.11
Post GLBA Medium - Pre GLBA Medium	-0.38 **	0.05%	1.01%	-0.22%	-0.05	0.15%	0.10
Post GLBA Low - Pre GLBA Low	-0.29 **	0.04%	1.58%	0.19%	-0.01	0.57%	0.15

Panel B: Surviving and Non Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.34 **	0.03%	0.26%	-0.62%	-0.08	0.36%	-0.13
Post GLBA Medium - Pre GLBA Medium	-0.25 **	0.02%	0.98%	-0.52%	-0.07	0.17%	-0.10
Post GLBA Low - Pre GLBA Low	-0.23	0.04%	1.35%	-0.07%	-0.06	0.35%	-0.01

**Significance at 5% level

Table 30: Mean Differences in BHC Risk according to levels of Outside Director Before and After the Passage of the GLBA by Large, Medium and Small BHCs, over the entire period

Panel A: Large Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.22	0.08%	0.15%	-0.72%	-0.42 **	0.97%	-0.62
Post GLBA Medium - Pre GLBA Medium	-0.25	0.03%	-0.20%	-2.55%	-0.58 **	0.71%	-0.84
Post GLBA Low - Pre GLBA Low	-0.44	0.00%	-0.45%	-3.22%	-0.43	0.05%	-1.07

Panel B: Large Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.49	0.07%	0.17%	-0.82%	-0.43 **	1.25%	-0.10
Post GLBA Medium - Pre GLBA Medium	-0.32	0.03%	-0.19%	-2.63%	-0.58 **	0.79%	-0.75
Post GLBA Low - Pre GLBA Low	-0.53	0.00%	-0.43%	-3.17%	-0.40	0.01%	-0.92

Panel C: Medium Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.54 **	0.11%	0.86%	-0.50%	-0.15	0.69%	-0.04
Post GLBA Medium - Pre GLBA Medium	-0.55	0.06%	0.47%	-0.55%	-0.25 **	0.12%	0.01
Post GLBA Low - Pre GLBA Low	0.09	0.01%	-0.54%	-2.46%	-0.50 **	0.30%	-1.22

Panel D: Medium Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.36	0.08%	0.46%	-0.96%	-0.17	0.37%	-0.38
Post GLBA Medium - Pre GLBA Medium	-0.52 **	0.06%	0.57%	-0.72%	-0.29 **	0.23%	-0.04
Post GLBA Low - Pre GLBA Low	0.07	0.02%	-0.33%	-2.30%	-0.47 **	0.12%	-1.11

Panel E: Small Surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.38 **	0.02%	0.39%	-0.30%	0.11	0.10%	-0.03
Post GLBA Medium - Pre GLBA Medium	-0.33 **	0.04%	1.29%	0.09%	0.05	0.12%	0.21
Post GLBA Low - Pre GLBA Low	-0.35 **	0.05%	2.08%	0.81%	0.10	0.62%	0.44

Panel F: Small Surviving and Non-surviving BHCs

	Z-Score	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Post GLBA High - Pre GLBA High	-0.30 **	0.01%	0.23%	-0.50%	0.03	0.13%	-0.05
Post GLBA Medium - Pre GLBA Medium	-0.15	0.01%	1.17%	-0.33%	0.02	0.13%	-0.10
Post GLBA Low - Pre GLBA Low	-0.27 **	0.05%	1.73%	0.43%	0.02	0.39%	0.19

**Significance at 5% level

5.3 Multivariate Regression Analysis

The hypotheses are also tested performing a multivariate regression analysis. Specifically, risk measures are regressed on the measures of percentage of insider holdings, percentage of blockholder holdings and percentage of outside directors in the board, variables controlling for regulatory changes, interaction variables, bank specific variables and variables reflecting economic conditions. Extreme values in bank control variables and bank risk measures were set to a 95% Winsorization, where data below the 5^{th} percentile is set to the 5^{th} percentile and data above 95^{th} percentile is set to the 95^{th} percentile.

The linear equations are run using panel data techniques on a balanced sample consisting of 1,898 data points in bank-years, over the period 1997-2009. The Haussman test was conducted in order to specify whether the fixed effects or random effects model best fits the data under the null that individual effects (error components) are uncorrelated with the other explanatory variables. The null hypothesis is not rejected, indicating that the random-effects model is more consistent and efficient relative to the fixed effects model.

Possible collinearity among the explanatory variables is examined with the matrix of correlation and Variance Inflation Factor (VIF). The pairwise correlations of the regressors (Table 31), indicates that the correlations between variables are in general not indicative of potential multicollinearity problems. However, there are a few cases where

correlation is higher than 50%. Therefore, the variance inflation factors (VIFs) are examined (Table 32) to check for the degree of multicollinearity. Since the VIFs score for the regressor variables are in the range of 1.2 and 6.2, it is concluded that there is no high degree of multicollinearity. As a result, all the regressor variables are retained in the base model.

Table 31: Correlation Matrix Explanatory Variables

	Insider Ownership	Blockholder Ownership	Outside Director Ownership	GLBA	SOX	CRISIS	Insider*GLBA	Blockholder* GLBA	Outside Director*GLBA	M&A =1 if Acquisition	Size	Leverage	Growth	Concentration	Non Interest Income	Net Charge Offs	Cost of Funds	Inefficiency	Real GDP Growth
Insider Ownership	1.00																		
Blockholder Ownership	0.42 ***	1.00																	
Outside Director Ownership	-0.26 ***	-0.19 ***	1.00																
GLBA	-0.01	0.02	0.03	1.00															
SOX	-0.01	0.07 ***	0.09 ***	0.59 ***	1.00														
CRISIS	-0.01	0.10 ***	0.07 ***	0.30 ***	0.51 ***	1.00													
Insider*GLBA	0.84 ***	0.34 ***	-0.22 ***	0.28 ***	0.16 ***	0.07 ***	1.00												
Blockholder*GLBA	0.33 ***	0.77 ***	-0.16 ***	0.42 ***	0.31 ***	0.22 ***	0.48 ***	1.00											
Outside Director*GLBA	-0.07 ***	-0.03	0.22 ***	0.98 ***	0.59 ***	0.31 ***	0.21 ***	0.37 ***	1.00										
M&A =1 if Acquisition	-0.04 *	-0.08 ***	0.03	-0.02	0.04 **	-0.03	-0.03	-0.09 ***	-0.02	1.00									
Size	-0.04 *	-0.19 ***	0.20 ***	0.17 ***	0.19 ***	0.15 ***	0.02	-0.08 ***	0.20	0.25 ***	1.00								
Leverage	0.09 ***	-0.04	-0.02	-0.05 **	-0.10 ***	-0.08 ***	0.06 ***	-0.05 **	-0.06 ***	-0.04 ***	0.01	1.00							
Growth	-0.01	-0.12 ***	-0.15 ***	-0.02	-0.18 ***	-0.16 ***	0.00	-0.11	-0.05 **	0.11 ***	0.10 ***	0.11 ***	1.00						
Concentration	-0.02	0.13 ***	-0.11 ***	0.17 ***	0.22 ***	0.18 ***	0.03	0.17 ***	0.15 ***	-0.11 ***	-0.44 ***	-0.02 ***	0.09 ***	1.00					
Non Interest Income	0.04 *	0.00	0.10 ***	0.21 ***	0.22 ***	0.07 ***	0.09 ***	0.08 ***	0.22 ***	0.05 **	0.54 ***	-0.08 ***	-0.11 ***	-0.32 ***	1.00				
Net Charge Offs	0.02	-0.03	0.06 **	0.16 ***	0.15 ***	0.41 ***	0.05 **	0.05 ***	0.16 ***	-0.08 ***	0.31 ***	0.03	-0.06 **	-0.13 ***	0.17 ***	1.00			
Cost of Funds	0.00	0.02	-0.01	-0.45 ***	-0.59 ***	-0.22 ***	-0.14 ***	-0.18 ***	-0.45 ***	-0.02	-0.08 ***	0.22 ***	0.08 ***	-0.11 ***	-0.28 ***	-0.11 ***	1.00		
Inefficiency	0.11	0.09 ***	0.02	0.28 ***	0.38 ***	0.21 ***	0.17 ***	0.19 ***	0.28 ***	-0.11 ***	0.04 **	0.03	-0.16 ***	0.06 ***	0.49 ***	0.28 ***	-0.54 ***	1.00	
Real GDP Growth	0.02	-0.06 ***	-0.03	-0.59 ***	-0.40 ***	-0.70 ***	-0.16 ***	-0.31 ***	-0.58 ***	0.08 ***	-0.15 ***	0.07 ***	0.04 ***	-0.17 ***	-0.11 ***	-0.42 ***	0.30	-0.25 ***	1.00

***Significant at 1%

**Significant at 5%

*Significant at 10%

Table 32: Variance Inflation Factor Summary

Variable	VIF
Insider Ownership	5.74
Blockholder Ownership	4.30
Outside Director	4.06
GLBA Dummy (1 > Yr 1999)	3.43
SOX Dummy (1 > Yr 2002)	2.90
Crisis Dummy (1 > Yr 2006)	3.17
Insider*GLBA	6.22
Blockholder*GLBA	5.25
OutsideDirector*GLBA	2.57
M&A =1 if Acquisition	1.15
Size	2.50
Leverage (Assets/Equity)	1.16
Growth	1.25
Concentration	1.61
NonI nterest Income	2.37
Net Charge Offs	1.80
Cost of Funds	2.35
Inefficiency	2.31
Real GDP	4.42

Table 33 presents the results from the panel data regressions of each of the risk measures on the hypothesized determinants of risk. The estimated equations have Adjusted R-squared values in the range of 16% and 53%.

Table 33: Regression Results for the Random Effects Model based on pooled data for the years 1997 – 2009 Surviving BHCs

(n=1,898)

	Expected Sign	Z-Score	Expected Sign	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Intercept		7.536 ***		-0.005 ***	-0.194 ***	0.031 **	-1.852 ***	0.069 ***	0.261
		(15.16)		(-2.97)	(-4.19)	(1.92)	(-7.2)	(5.33)	(0.28)
Insider Ownership		-0.317		-0.002 ***	-0.001	0.009	0.060	-0.006	-0.914
		(-0.83)		(-1.9)	(-0.02)	(0.74)	(0.29)	(-0.57)	(-1.23)
Blockholder Owenrship		0.311		0.000	-0.010	0.018 ***	0.078	0.010 *	0.211
		(1.4)		(0.43)	(-0.49)	(2.41)	(0.71)	(1.88)	(0.56)
Outside Director		0.542		0.000	0.006	0.016	0.136	0.004	0.724
		(1.47)		(-0.3)	(0.17)	(1.24)	(0.78)	(0.47)	(1.23)
GLBA Dummy (1 > Yr 1999)		0.753 **		0.000	0.053	0.003	0.004	0.009	0.615
		(2.12)		(0.08)	(1.48)	(0.27)	(0.03)	(1.14)	(1.09)
SOX Dummy (1 > Yr 2002)		0.014		0.000	-0.001	-0.017 ***	-0.270 *	-0.026 ***	-0.776 ***
		(0.23)		(-0.31)	(-0.17)	(-8.08)	(-9.54)	(-19.5)	(-8.11)
Crisis Dummy (1 > Yr 2006)		-0.339 ***		0.000	0.010	0.023 ***	0.078 **	0.009 ***	0.713 ***
		(-5.08)		(0.69)	(1.44)	(9.42)	(2.5)	(6.09)	(6.79)
Insider Owenrship*GLBA		0.279		-0.001	-0.016	-0.019 *	-0.189	-0.010	-0.698
		(0.93)		(-1.13)	(-0.55)	(-1.79)	(-1.3)	(-1.4)	(-1.42)
Blockholder Ownerhsip*GLBA		-0.192		-0.001	-0.011	-0.020 **	0.016	-0.001	-0.399
		(-0.8)		(-0.83)	(-0.47)	(-2.32)	(0.14)	(-0.25)	(-1.05)
Outside Director*GLBA		-0.815 **		0.000	-0.061	-0.021	-0.153	-0.003	-0.999
		(-1.96)		(-0.25)	(-1.47)	(-1.4)	(-0.78)	(-0.37)	(-1.52)
M&A =1 if Acquisition		0.001		0.000	-0.002	-0.005 ***	-0.030 *	-0.002 **	-0.155 ***
		(0.03)		(-1.12)	(-0.44)	(-3.57)	(-1.66)	(-2.27)	(-2.51)
Size	-/+	-0.070 ***	-/+	0.000 ***	0.003 *	0.000	0.105 ***	0.002 ***	0.140 ***
		(-3.07)		(2.61)	(1.6)	(0.2)	(8.3)	(3.22)	(2.89)
Leverage	-	-0.041 ***	+	0.000 ***	0.007 ***	0.000	0.010 **	0.000	0.070 ***
		(-4.45)		(3.78)	(8.02)	(1.41)	(2.26)	(1.22)	(4.59)
Growth	-	-1.964 ***	+	0.002 ***	0.069 *	0.080 ***	0.299 *	0.052 ***	2.132 ***
		(-5.38)		(2.12)	(1.94)	(6.24)	(1.7)	(6.19)	(3.58)
Concentration	-	-0.899 ***	+	0.003 ***	0.069 ***	0.024 ***	0.613 ***	0.017 ***	1.761 ***
		(-4.34)		(4.74)	(3.64)	(3.57)	(5.8)	(3.26)	(4.74)
Non Interest Income	-/+	1.300 ***	-/+	-0.005 ***	-0.098 ***	-0.016 ***	-0.188	0.012	0.048
		(3.66)		(-4.58)	(-2.93)	(-1.35)	(-1.06)	(1.35)	(0.08)
Net Charge Offs	-	-0.805 ***	+	0.002 ***	0.049 ***	0.033 ***	0.152 ***	0.025 ***	1.695 ***
		(-14.71)		(14.78)	(9.21)	(17.11)	(5.79)	(19.48)	(19.01)
Cost of Funds	-	-4.432 **	+	0.002	0.067	0.088	1.730 *	0.113 ***	8.106 *
		(-2.18)		(0.28)	(0.35)	(1.27)	(1.73)	(-2.32)	(2.35)
Inefficiency	-	-3.073 ***	+	0.008 ***	0.157 ***	0.049 ***	-0.117	0.046 ***	1.883 ***
		(-8.85)		(7.54)	(4.71)	(4.09)	(-0.69)	(5.61)	(3.23)
Real GDP	+	9.175 *	-	0.015	0.738	-1.939 ***	24.938 ***	-0.763 ***	-2.225
		(1.7)		(0.97)	(1.35)	(-9.69)	(9.89)	(-6.38)	(-0.26)
Adjusted RSQ		38%		27%	16%	51%	24%	53%	40%

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

The estimated coefficient Insider Ownership is negative and significant at the 1% level with SDROA as the dependent variable, rejecting the null hypothesis that bank risk-taking behavior does not differ according to levels of insider stock ownership (H02). The sign of the coefficient suggests that management ownership is negatively related to the risk profile of banks. The results support the argument that when Insider Ownership is

high, the manager's behavior tends to be more prudent motivated by the need to protect personal wealth at risk or to reduce their non-diversifiable risk (employment). However, the results from the linear specifications with respect to the other risk measures do not show that Insider Ownership has an effect on the book based or market risk based measures.

The coefficient for the Blockholder Ownership is positive and significant at the 1% level when risk is measured by Total Risk and is marginally significant in the regression for Firm Risk. With this evidence, the null hypothesis that bank risk-taking behavior does not differ according to blockholder stock ownership is rejected (H04). Furthermore, higher levels of Blockholder Ownership levels are unfavorable to BHC Total Risk. These results are consistent with the argument that presence of blockholders motivates managers to follow riskier investment strategies, similar to the results of Laeven and Levine (2009).

Outside Directors does not seem to have a significant effect on risk-taking by managers, hence the null hypothesis that banks' risk-taking behavior does not differ according to the proportion of outside directors cannot be rejected (H06). While the corporate governance literature has found evidence of a relationship between board independence and firm performance, it is possible that the presence of regulation in the banking industry might be the mitigating factor for the agency problem, nullifying the effectiveness of independent board members in controlling the risk profile of banks.

The coefficient for GLBA, a dummy variable that controls for the passage of the Act, indicates that after the passage of the GLBA, banks on average have a lower Insolvency Risk (Z-Score), allowing to reject the null hypothesis that the average risk profile of BHCs has not change after the passage of the GLBA in 1999 (H01). However, the GLBA dummy is not statistically significant in other regressions.

The coefficient for SOX, a dummy variable that takes the value of 1 after the implementation of the Sarbanes-Oxley regulation, indicates that the tighter corporate governance legislation has decreased the risk profile of banks. The coefficient is negative and significant in regressions for the Risk Index and the market risk measures (Total Risk, Systematic Risk, and Firm Risk).

The coefficient for Crisis, a dummy variable that takes the value of 1 for the subprime financial crisis of 2007-2009, reflects that during the crisis period banks' operations became more risky. The coefficient is significant across all risk measures, except for SDROA and SDROE.

The interaction term, (Insider Ownership*GLBA) is significant only for Total Risk, allowing to reject the Managerial Risk Incentive hypothesis (H03). The sign indicates that after the passage of the Act, the presence of Insider Ownership is favorable to BHC Total Risk. Based on the results, in the deregulated environment managers are motivated by the need to protect their personal wealth or reduce their non-diversifiable risk.

The interaction term (Blockholder Ownership*GLBA) has a negative coefficient and is significant only for Total Risk, allowing to reject the hull hypothesis that for a given level of blockholder ownership structure bank risk-taking behavior does not differ according to the regulatory environment (H05). The negative sign indicates that in the deregulated environment blockholders became more concern with personal wealth at risk and pressured managers to have a more prudent behavior as the industry expanded into riskier activities.

The interaction between Outside Directors and GLBA is only significant in the regression with the Insolvency Risk measure (Z-Score). The sign of the coefficient indicates that subsequent to the passage of the Act, Insolvency Risk increases at BHCs with a higher percentage of Outside Directors in the board, which rejects the null hypothesis that for a given proportion of outside directors bank risk-taking behavior does not differ according to the regulatory environment (H07). This could be the result of expansion into riskier nontraditional activities, lack of banking business comprehension in the presence of more complex products or ineffective risk monitoring and advising by the outsider dominated boards. In this sense, higher presence Outside Directors in the board becomes unfavorable for BHCs in a deregulated industry environment.

To control for mergers and acquisitions (M&A) activity, the M&A variable takes the value of 1 if a bank engages in such an activity. Its coefficient is negative and significant for Total, Systematic and Firm Risk, as well as the Risk Index, indicating that banking expansion through bank mergers or acquisitions decreases the risk profile of banks.

The coefficient of Size indicates that larger banks are consistently associated with higher risk profiles (6 out of the 7 risk measures). This is consistent with Demsetz and Strahan (1997), who report that large BHC adopt riskier loan portfolios and operate with more leverage. A negative and significant sign observed for the log of Z indicates that larger banks tend to have higher Insolvency Risk. A positive and significant sign for SDROA and ROE, Systematic Risk and Risk Index measures further confirms the notion that risk is an increasing function of Size.

The coefficient for Leverage is negative and significant with respect to Insolvency Risk (Z-Score), and positive and significant with respect to SDROA and SDROE, Systematic Risk, and the Risk Index measures. These results support the argument that banks that have higher leverage (lower capitalization) tend to exhibit higher risk profiles.

Results for the Growth coefficient are consistent with the expectation that higher growth banks are associated with higher risk as a result of exposure to greater uncertainties associated with growth, for example, financial risks not anticipated by bank managers seeking growth in new markets or via increasingly complex products. The coefficient is negative and significant with respect to Insolvency Risk, and positive and significant with respect to the other risk measures except for Systematic Risk (6 out of the 7 risk measures).

Level of loan portfolio concentration (Concentration) measured by the Herfindahl-Hirschman Index, indicates that specialization in a given loan category is associated with

higher bank-risk profile. As such, BHCs can achieve risk reductions through loan diversification. These results are consistent across all risk measures considered.

The coefficient for Non Interest Income is significant in regressions for Insolvency Risk, SDROA and SDROE, and Total Risk, and it indicates that the non-interest income stream of a bank has the effect of reducing bank risk by allowing banks to have a more diversified source of revenues. These results contradict a prior study by Stiroh (2006) which finds banks that rely on activities that generate non-interest income incur greater risks. The difference in results can be explained by the sample period considered, or greater risks associated with the real estate and other high risk lending practices of BHCs during the recent period.

The consistent statistical significance and sign of the Net Charge Offs ratio across all regressions confirms that credit quality deterioration is associated with a higher risk profile.

Consistent with expectations, Cost of Funds correlates inversely and significantly with respect to Insolvency Risk, while it correlates positively with respect to Systematic Risk, Firm Risk and the Risk Index measures. One interpretation is that banks with higher cost of funds may be engaging in higher risk activities to cover its higher funding costs [9].

[9] The Hausman test was performed to test for the endogeneity of Cost of Funds. A new exogenous Cost of Funds variable was created by regressing exogenous variables (bank size, the federal funds rate, and the money supply) on Cost of Funds, and taking the fitted value as the new variables. The insignificance statistic of the residual coefficient in the base model indicates that there is no evidence of endogeneity.

The quality of management is proxied by a cost efficiency measure (Inefficiency) defined by the ratio of non-interest expense to total revenue. The higher the Inefficiency ratio the more a bank loses its income to expenses. The results indicate that inefficient banks are associated with higher risks. The coefficient of the ratio is negative and significant with respect to Insolvency Risk and positive and significant with respect to SDROA and SDROE, Total Risk, Systematic Risk and Firm Risk, as well as the Risk Index measure, leading to conclusion that better managed banks are less risky than inefficient banks.

Banks' operations depend to a large extent on the economic environment. As such, Real GDP Growth is used as a variable to control for economic condition. Its coefficient turns out to be significant in explaining the risk profile in banks in the majority of the risk measures. The sign of Real GDP Growth coefficient indicates that in general banks are exposed to less uncertainties in a growing economic environment (contributing to a lower risk profile), with the exception of Systematic Risk. Since Systematic Risk measures the portion of a bank's total risk that is explained by its connection to the economic system in which it operates, a positive and significant sign of Real GDP Growth suggests that the uncertainties associated with economic growth have a detrimental effect on the systematic portion of a bank's Total Risk.

5.4 Robustness Tests

A number of robustness tests are performed to further evaluate the results shown in the base empirical model.

5.4.1 Surviving and Non-surviving Sample

The sample is extended to include BHCs that exited the industry during the 13-year analysis period and the regression is run with unbalanced panel data analysis technique. Increasing the sample to 196 BHCs does not change the surviving sample results in any meaningful way. Table 34 indicates that the impact of the control variables on the risk measures remains unchanged. With regards to the hypothesis variables, minor change in results compared to the base model is shown. The coefficient for the Outside Directors variable becomes significant when regressed on the Insolvency Risk of banks, indicating that a larger portion of Outside Directors in the board is associated with lower Insolvency Risk.

Table 34: Regression Results for the Random Effects Model based on pooled data for the years 1997 – 2009, Surviving and Non-Surviving BHCs

(n=2,548)

	Expected Sign	Z-Score	Expected Sign	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Intercept		7.732 ***		-0.004 **	-0.145 ***	0.027 *	-1.750 ***	0.062 ***	-0.361
		(15.5)		(-2.45)	(-3.94)	(1.8)	(-8.12)	(5.12)	(-0.43)
Insider Ownership		-0.382		-0.003 *	0.003	0.014	0.138	-0.002	-0.044
		(-0.95)		(-2.01)	(0.12)	(1.23)	(0.8)	(-0.24)	(-0.06)
Blockholder Ownership		0.213		0.000	-0.012	0.017 **	0.023	0.008 *	0.169
		(0.97)		(0.04)	(-0.7)	(2.43)	(0.24)	(1.7)	(0.46)
Outside Director		0.894 ***		0.000	0.000	0.011	0.089	-0.007	-0.347
		(2.6)		(-0.41)	(-0.01)	(0.91)	(0.58)	(-0.88)	(-0.61)
GLBA Dummy (1 > Yr 1999)		0.940 ***		-0.001	0.030	0.001	-0.103	0.003	-0.334
		(2.88)		(-0.89)	(1.03)	(0.07)	(-0.7)	(0.36)	(-0.62)
SOX Dummy (1 > Yr 2002)		0.042		0.000	0.000	-0.017 ***	-0.260 ***	-0.027 ***	-0.759 ***
		(0.76)		(-0.01)	(-0.01)	(-8.8)	(-10.52)	(-22.05)	(-8.31)
Crisis Dummy (1 > Yr 2006)		-0.328 ***		0.000	0.010	0.025 ***	0.112 ***	0.009 ***	0.773 ***
		(-5.11)		(0.61)	(1.65)	(10.81)	(3.85)	(6.5)	(7.28)
Insider Ownership*GLBA		0.205		-0.001	-0.017	-0.019 *	-0.124	-0.009	-0.551
		(0.67)		(-1.3)	(-0.65)	(-1.85)	(-0.9)	(-1.31)	(-1.08)
Blockholder Ownership*GLBA		0.012		-0.001	-0.011	-0.023 ***	-0.009	-0.004	-0.681 *
		(0.06)		(-0.83)	(-0.52)	(-2.91)	(-0.09)	(-0.8)	(-1.83)
Outside Director*GLBA		-1.106 **		0.001	-0.039	-0.015	-0.056	0.006	0.245
		(-2.9)		(0.61)	(-1.13)	(-1.11)	(-0.33)	(0.69)	(0.39)
M&A =1 if Acquisition		-0.006		0.000	-0.001	-0.005 ***	-0.020	-0.003 **	-0.143 **
		(-0.16)		(-1.17)	(-0.36)	(-3.9)	(-1.16)	(-3.22)	(-2.3)
Size	-/+	-0.094 *	-/+	0.000	0.003 *	0.000	0.101 ***	0.001 *	0.198 ***
		(-3.95)		(1.48)	(1.67)	(0.53)	(10.14)	(1.74)	(4.79)
Leverage	-	-0.041 ***	+	0.000 ***	0.006 ***	0.001 **	0.010 **	0.000 **	0.062 ***
		(-4.81)		(5.24)	(8.38)	(1.97)	(2.53)	(2.24)	(4.34)
Growth	-	-0.572 ***	+	0.001 **	0.041 **	0.033 ***	0.055	0.013 ***	0.640 *
		(-2.84)		(2.15)	(2.38)	(4.83)	(0.61)	(2.86)	(1.91)
Concentration	-	-0.912 ***	+	0.002 ***	0.049 *	0.027 ***	0.478 ***	0.020 ***	1.862 ***
		(-4.52)		(3.88)	(3.4)	(4.65)	(5.47)	(4.3)	(5.46)
Non Interest Income	-/+	1.402 ***	-/+	-0.005 ***	-0.102 ***	-0.017	-0.171	0.003	-0.557
		(3.95)		(-4.47)	(-3.74)	(-1.53)	(-1.1)	(0.37)	(-0.94)
Net Charge Offs	-	-0.771 ***	+	0.002 ***	0.047 ***	0.031 ***	0.137 ***	0.022 ***	1.607 ***
		(-14.86)		(14.68)	(10.61)	(17.44)	(5.89)	(19.41)	(18.65)
Cost of Funds	-	-8.148 **	+	0.010 *	0.042	0.183 *	2.629 ***	0.079 *	2.683
		(-4.24)		(1.74)	(0.28)	(2.99)	(3.09)	(1.82)	(0.84)
Inefficiency	-	-3.379 ***	+	0.009 ***	0.152 ***	0.052 ***	-0.014	0.047 ***	2.927 ***
		(-10.27)		(9.51)	(5.75)	(4.89)	(-0.1)	(6.37)	(5.33)
Real GDP	+	11.127 *	-	-0.005	0.277	-1.734 ***	24.132 ***	-0.759 ***	1.309
		(2.13)		(-0.35)	(0.57)	(-9.08)	(10.21)	(-6.67)	(0.15)
Adjusted RSQ		33%		25%	15%	46%	24%	50%	34%

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

5.4.2 Economic Environment

To test for the robustness of the economic control variable, the average annual Federal Funds Rate is included in the model as a substitute for the Real GDP Growth rate. The Federal Funds Rate is a reflection of the monetary policy in place to maintain a healthy economic environment, with high rate levels are associated with a contractionary

monetary policy, and low rate levels are associated with an expansionary monetary policy. Table 35 reports the base model results hold for Total Risk, Systematic Risk and Firm Risk. As higher Federal Rates are predominant in periods of economic growth, the results are in line with the base model results that indicated higher levels of GDP Growth Rate are favorable to lower the Total Risk and Firm Risk of BHCs. Similar to the base model, economic growth has an unfavorable effect on the Systematic Risk of BHCs.

Table 35: Regression Results for the Random Effects Model based on pooled data for the years 1997 through 2009. Robustness check for Economic Variable: Replacing GDP Growth Rate with Average Annual Fed Funds Rate

(n=1,898)

	Expected Sign	Z Score	Expected Sign	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Intercept		7.630 ***		-0.004 ***	-0.181 ***	0.014	-1.853 ***	0.073 *	0.220
		(15.35)		(-2.91)	(-3.95)	(0.86)	(-7.2)	(5.93)	(0.24)
Insider Ownership		-0.318		-0.002 ***	0.001	0.010	-0.029	-0.002	-0.921
		(-0.83)		(-1.92)	(0.03)	(0.8)	(-0.14)	(-0.18)	(-1.24)
Blockholder Ownership		0.317		0.000	-0.009	0.017 **	0.051	0.011 **	0.206
		(1.42)		(0.43)	(-0.41)	(2.18)	(0.47)	(2.19)	(0.55)
Outside Director		0.555		0.000	0.006	0.014	0.210	0.001	0.726
		(1.5)		(-0.27)	(0.17)	(1.05)	(1.22)	(0.12)	(1.23)
GLBA Dummy (1 > Yr 1999)		0.706 **		0.000	0.048	0.013	-0.072	0.010	0.630
		(1.99)		(0.02)	(1.35)	(0.96)	(-0.44)	(1.33)	(1.13)
SOX Dummy (1 > Yr 2002)		0.045		0.000	0.002	-0.024 ***	-0.319 ***	-0.027 ***	-0.785 ***
		(0.8)		(-0.06)	(0.31)	(-11.72)	(-11.99)	(-21.64)	(-8.6)
Crisis Dummy (1 > Yr 2006)		-0.411 ***		0.000	0.004	0.039 ***	-0.105 ***	0.014 ***	0.731 ***
		(-7.94)		(0.12)	(0.76)	(20.03)	(-4.35)	(12.65)	(8.88)
Insider Ownership*GLBA		0.270		-0.001	-0.018	-0.017 *	-0.179	-0.011	-0.694
		(0.9)		(-1.13)	(-0.6)	(-1.62)	(-1.25)	(-1.6)	(-1.41)
Blockholder Ownership*GLBA		-0.216		-0.001	-0.016	-0.015 *	0.062	-0.005	-0.386
		(-0.9)		(-0.84)	(-0.65)	(-1.7)	(0.56)	(-0.89)	(-1.02)
Outside Director*GLBA		-0.825 **		0.000	-0.062	-0.019	-0.216	-0.001	-1.000
		(-1.98)		(-0.27)	(-1.48)	(-1.2)	(-1.12)	(-0.07)	(-1.52)
M&A =1 if Acquisition		0.003		0.000	-0.001	-0.005 ***	-0.046 **	-0.001	-0.157 ***
		(0.07)		(-1.13)	(-0.31)	(-3.74)	(-2.54)	(-1.35)	(-2.53)
Size	-/+	-0.072 ***	-/+	0.000 **	0.003	0.001	0.099 ***	0.002 ***	0.140 ***
		(-3.15)		(2.56)	(1.55)	(0.77)	(7.67)	(3.05)	(2.88)
Leverage	-	-0.040 ***	+	0.000 ***	0.007 ***	0.000	0.017 ***	0.000	0.070 ***
		(-4.32)		(3.86)	(7.98)	(0.88)	(3.73)	(-0.04)	(4.58)
Growth	-	-1.971 ***	+	0.002 **	0.072 **	0.084 ***	-0.108	0.042 ***	2.146 ***
		(-5.37)		(2.07)	(2.02)	(6.48)	(-0.61)	(5.08)	(3.57)
Concentration	-	-0.910 ***	+	0.003 ***	0.067 ***	0.026 ***	0.625 ***	0.017 ***	1.767 ***
		(-4.38)		(4.72)	(3.55)	(3.97)	(5.93)	(3.36)	(4.76)
Non Interest Income	-/+	1.339 ***	-/+	-0.005 ***	-0.096 ***	-0.023 ***	0.019	0.002	0.042
		(3.76)		(-4.49)	(-2.89)	(-1.98)	(0.11)	(0.28)	(0.07)
Net Charge Offs	-	-0.810 ***	+	0.002 ***	0.047 ***	0.034 ***	0.215 ***	0.021 ***	1.702 ***
		(-14.2)		(14.26)	(8.5)	(16.66)	(7.94)	(16.59)	(18.37)
Cost of Funds	-	-4.828 **	+	-0.001	0.142	0.146	6.695 ***	0.282 ***	8.402 *
		(-1.92)		(-0.1)	(0.61)	(1.8)	(5.33)	(4.71)	(1.91)
Inefficiency	-	-3.073 ***	+	0.008 ***	0.153 ***	0.046 ***	0.181	0.031 ***	1.908 ***
		(-8.74)		(7.52)	(4.58)	(3.88)	(1.06)	(3.83)	(3.22)
Federal Funds Rate	+	**0.784**	**-**	**0.003**	**-0.064**	**-0.168 *****	**9.271 *****	**-0.415 *****	**0.263**
		(0.5)		**(0.66)**	**(-0.42)**	**(-3.07)**	**(12.37)**	**(-11.67)**	**(0.1)**
Adjusted RSQ		38%		27%	16%	48%	26%	55%	40%

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

5.4.3 Leverage, Income Structure, Asset Quality and Liquidity

Tables 36 through 39 report robustness checks for bank control variables: BHCs capital ratio, income structure, asset quality and liquidity. Results in Table 36 report that when substituting the Leverage measure with the Tier1 Ratio (Tier1 Capital divided by Total Assets) the effect of Leverage in the risk profile of BHCs remains unchanged. BHCs with higher regulatory capital ratios have a lower risk profile.

Table 36: Regression Results for the Random Effects Model based on pooled data for the years 1997 through 2009. Robustness check for Leverage: Replacing Capital Ratio with Tier 1 Capital Ratio

(n=1,898)

	Expected Sign	Z-Score	Expected Sign	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Intercept		6.553 ***		-0.005 *	-0.063	0.016	-1.455 ***	0.046 ***	-0.159
		(12.28)		(-3)	(-1.33)	(0.89)	(-5.19)	(3.29)	(-0.15)
Insider Ownership		-0.395		-0.002 *	0.017	0.011	0.064	-0.003	-0.684
		(-1.06)		(-1.69)	(0.52)	(0.87)	(0.32)	(-0.29)	(-0.91)
Blockholder Ownership		0.339		0.000	-0.014	0.018 **	0.074	0.009 *	0.134
		(1.53)		(0.38)	(-0.69)	(2.31)	(0.68)	(1.78)	(0.35)
Outside Director		0.465		0.000	0.012	0.017	0.157	0.004	0.845
		(1.26)		(-0.22)	(0.33)	(1.25)	(0.9)	(0.48)	(1.43)
GLBA Dummy (1 > Yr 1999)		0.721 **		0.000	0.060	0.005	0.007	0.010	0.762
		(2.02)		(0.29)	(1.56)	(0.37)	(0.04)	(1.3)	(1.35)
SOX Dummy (1 > Yr 2002)		-0.002		0.000	0.001	-0.017 ***	-0.274 ***	-0.027 ***	-0.770 ***
		(-0.03)		(-0.37)	(0.17)	(-8.08)	(-9.67)	(-19.69)	(-8.01)
Crisis Dummy (1 > Yr 2006)		-0.303 ***		0.000	0.006	0.023 ***	0.068 **	0.009 ***	0.693 ***
		(-4.52)		(0.64)	(0.86)	(9.5)	(2.18)	(6.29)	(6.59)
Insider Ownership*GLBA		0.215		-0.001	-0.010	-0.019 *	-0.167	-0.011	-0.696
		(0.72)		(-1.15)	(-0.36)	(-1.83)	(-1.15)	(-1.53)	(-1.4)
Blockholder Ownership*GLBA		-0.233		-0.001	-0.006	-0.021 **	0.032	-0.003	-0.457
		(-0.97)		(-0.98)	(-0.26)	(-2.46)	(0.28)	(-0.5)	(-1.2)
Outside Director*GLBA		-0.750 *		-0.001	-0.073	-0.022	-0.170	-0.004	-1.130
		(-1.8)		(-0.41)	(-1.73)	(-1.44)	(-0.87)	(-0.42)	(-1.72)
M&A =1 if Acquisition		0.017		0.000	-0.004	-0.005 ***	-0.036 **	-0.002 **	-0.155 ***
		(0.44)		(-1.09)	(-1.03)	(-3.43)	(-1.97)	(-1.98)	(-2.5)
Size	-/+	-0.052 **	-/+	0.000 ***	0.002	0.001	0.096 ***	0.001 ***	0.166 ***
		(-2.27)		(3.23)	(0.84)	(0.94)	(7.38)	(2.08)	(3.25)
Leverage (Tier1/RWA)	**+**	**3.651 *** **	-	**0.004**	**-0.413 *** **	**-0.078 ** **	**-1.484 *** **	**0.096**	**2.469**
		(3.97)		**(1.49)**	**(-4.84)**	**(-2.45)**	**(-3.27)**	**(1.36)**	**(1.57)**
Growth	-	-1.955 ***	+	0.002 *	0.057	0.084 ***	0.311	0.056 ***	2.389 ***
		(-5.36)		(1.65)	(1.62)	(6.54)	(1.77)	(6.63)	(3.99)
Concentration	-	-0.922 ***	+	0.003 ***	0.068 ***	0.023 ***	0.610 ***	0.019 ***	1.886 ***
		(-4.54)		(4.98)	(3.8)	(3.47)	(5.78)	(3.61)	(5.02)
Non Interest Income	-/+	1.357 ***	-/+	-0.005 ***	-0.112 ***	-0.021 *	-0.178	0.006	-0.397
		(3.88)		(-5.13)	(-3.57)	(-1.76)	(-1)	(0.69)	(-0.64)
Net Charge Offs	-	-0.828 ***	+	0.002 ***	0.050 ***	0.033 ***	0.159 ***	0.024 ***	1.696 ***
		(-15.16)		(14.81)	(9.4)	(17.09)	(6.06)	(19.28)	(18.88)
Cost of Funds	-	-6.494 ***	+	0.004	0.379 **	0.107	2.131 **	0.098 **	4.614
		(-3.3)		(0.69)	(2.1)	(1.59)	(2.17)	(2.06)	(1.35)
Inefficiency	-	-3.203 ***	+	0.008 ***	0.185 ***	0.055 ***	-0.107	0.052 ***	2.534 ***
		(-9.43)		(8.24)	(5.88)	(4.68)	(-0.64)	(6.42)	(4.35)
Real GDP	+	9.912 *	-	0.019	0.651	-1.893 ***	24.542 ***	-0.720 ***	0.057
		(1.82)		(1.21)	(1.16)	(-9.47)	(9.73)	(-6.02)	(0.01)
Adjusted RSQ		38%		27%	14%	51%	24%	54%	39%

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

The use of Trading Revenue income (Trading Revenue to Total Income) in place of Non-Interest Income does not change the results in the base model (Table 37). Nontraditional banking activities, reflected in Trading Revenue, suggest a potential source of diversification in the income structure of BHCs, lowering their risk profile.

Table 37: Regression Results for the Random Effects Model based on pooled data for the years 1997 through 2009. Robustness check for Income Structure: Replacing Non-Interest Income with Trading Revenue

(n=1,898)

	Expected Sign	Z-Score	Expected Sign	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Intercept		7.527 **		-0.005 ***	-0.202 ***	0.040 **	-1.837 ***	0.069 ***	-0.177
		(14.39)		(-3.14)	(-4.17)	(2.36)	(-6.92)	(5.3)	(-0.18)
Insider Ownership		-0.234		-0.003 **	-0.009	0.009	0.050	-0.004	-0.968
		(-0.6)		(-2.17)	(-0.25)	(0.75)	(0.25)	(-0.43)	(-1.29)
Blockholder Ownership		0.318		0.000	-0.011	0.018 ***	0.077	0.010 **	0.206
		(1.41)		(0.39)	(-0.5)	(2.34)	(0.7)	(1.88)	(0.55)
Outside Director		0.545		0.000	0.007	0.017	0.137	0.004	0.733
		(1.47)		(-0.3)	(0.19)	(1.29)	(0.78)	(0.46)	(1.25)
GLBA Dummy (1 > Yr 1999)		0.813 **		0.000	0.047	0.004	-0.002	0.009	0.582
		(2.28)		(-0.18)	(1.3)	(0.28)	(-0.01)	(1.15)	(1.04)
SOX Dummy (1 > Yr 2002)		0.009		0.000	0.000	-0.017 ***	-0.271 ***	-0.026 ***	-0.787 ***
		(0.14)		(-0.22)	(-0.06)	(-7.96)	(-9.57)	(-19.52)	(-8.22)
Crisis Dummy (1 > Yr 2006)		-0.343 **		0.000	0.010	0.023 ***	0.079 ***	0.009 ***	0.705 ***
		(-5.13)		(0.67)	(1.41)	(9.47)	(2.51)	(6.05)	(6.73)
Insider Ownership*GLBA		0.233		-0.001	-0.010	-0.019	-0.185	-0.010	-0.673
		(0.77)		(-0.9)	(-0.33)	(-1.77)	(-1.27)	(-1.42)	(-1.37)
Blockholder Ownership*GLBA		-0.205		0.000	-0.010	-0.021 ***	0.017	-0.001	-0.362
		(-0.85)		(-0.69)	(-0.43)	(-2.38)	(0.15)	(-0.27)	(-0.96)
Outside Director*GLBA		-0.856 **		0.000	-0.057	-0.022	-0.149	-0.003	-0.962
		(-2.05)		(-0.09)	(-1.35)	(-1.43)	(-0.76)	(-0.36)	(-1.47)
M&A =1 if Acquisition		-0.005		0.000	-0.001	-0.005 ***	-0.029	-0.002 **	-0.156 **
		(-0.13)		(-0.92)	(-0.33)	(-3.47)	(-1.61)	(-2.34)	(-2.54)
Size	-/+	-0.056 **	-/+	0.000 **	0.003	-0.001	0.102 ***	0.002 ***	0.167 ***
		(-2.35)		(2.21)	(1.22)	(-0.72)	(7.96)	(3.09)	(3.33)
Leverage	-	-0.046 ***	+	0.000 ***	0.008 ***	0.001 *	0.011 **	0.000	0.070 ***
		(-4.95)		(4.44)	(8.51)	(1.6)	(2.42)	(1.1)	(4.59)
Growth	-	-2.068 ***	+	0.002 *	0.063 *	0.082 ***	0.283	0.052 ***	2.079 ***
		(-5.66)		(1.82)	(1.77)	(6.45)	(1.62)	(6.19)	(3.5)
Concentration	-	-0.970 ***	+	0.003 ***	0.076 ***	0.025 ***	0.625 ***	0.017 ***	1.739 ***
		(-4.64)		(5.18)	(3.94)	(3.84)	(5.95)	(3.3)	(4.69)
Tradign Revenue	-/+	**7.424 ** **	-/+	**-0.038 *** **	**-0.709 ** **	**0.062**	**-0.755**	**0.046**	**-11.124 * **
		(2.02)		**(-3.37)**	**(-2.09)**	**(0.53)**	**(-0.41)**	**(0.51)**	**(-1.7)**
Net Charge Offs	-	-0.825 ***	+	0.002 ***	0.052 ***	0.033 ***	0.156 ***	0.024 ***	1.700 ***
		(-15.13)		(15.46)	(9.7)	(17.55)	(5.96)	(19.48)	(19.17)
Cost of Funds	-	-5.677 **	+	0.008	0.188	0.084	1.905 *	0.128 ***	7.443 **
		(-2.76)		(1.23)	(0.95)	(1.2)	(1.91)	(2..66)	(2.18)
Inefficiency	-	-2.727 ***	+	0.007 ***	0.131 ***	0.039 ***	-0.171	0.048 ***	2.035 ***
		(-8.33)		(6.76)	(4.23)	(3.67)	(-1.06)	(6.17)	(3.65)
Real GDP	+	9.770 *	-	0.014	0.709	-1.955 ***	24.839 ***	-0.758 ***	-1.485
		(1.81)		(0.89)	(1.3)	(-9.77)	(9.85)	(-6.31)	(-0.18)
Adjusted RSQ		37%		27%	16%	51%	24%	53%	40%

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

The asset quality dimension is tested for robustness with a forward looking view of credit quality of the bank's loans by replacing the ratio of Net Charge Offs with the ratio of Loan Loss Provisions. Results in Table 38 confirm that expectations of deterioration in the credit quality of a bank's loan portfolio would increase the BHC's risk profile.

Table 38: Regression Results for the Random Effects Model based on pooled data for the years 1997 through 2009. Robustness check for Asset Quality: Replacing Net Charge Offs with Loan Loss Provisions

(n=1,898)

	Expected Sign	Z-Score	Expected Sign	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Intercept		7.784 ***		-0.006 ***	-0.216 ***	0.025	-1.930 ***	0.060 ***	-0.449
		(15.73)		(-3.74)	(-4.66)	(1.53)	(-7.54)	(4.65)	(-0.48)
Insider Ownership		-0.322		-0.002 *	-0.002	0.009	0.059	-0.005	-0.903
		(-0.84)		(-1.91)	(-0.06)	(0.78)	(0.29)	(-0.52)	(-1.21)
Blockholder Ownership		0.440		0.000	-0.018	0.013 *	0.058	0.006	-0.032
		(1.57)		(-0.04)	(-0.82)	(1.67)	(0.53)	(1.19)	(-0.08)
Outside Director		0.467		0.000	0.009	0.020	0.146	0.006	0.870
		(1.27)		(-0.16)	(0.25)	(1.53)	(0.83)	(0.72)	(1.47)
GLBA Dummy (1 > Yr 1999)		0.634 **		0.000	0.058	0.009	0.023	0.013	0.856
		(1.79)		(0.35)	(1.62)	(0.69)	(0.14)	(1.57)	(1.52)
SOX Dummy (1 > Yr 2002)		0.005		0.000	-0.002	-0.017 ***	-0.268 ***	-0.026 ***	-0.770 ***
		(0.08)		(-0.52)	(-0.26)	(-7.81)	(-9.43)	(-19.32)	(-8)
Crisis Dummy (1 > Yr 2006)		-0.272 ***		0.000	0.008	0.020 ***	0.073 **	0.007 ***	0.597 ***
		(-4.02)		(0.29)	(1.18)	(7.99)	(2.28)	(4.78)	(5.57)
Insider Ownership*GLBA		0.257		-0.001	-0.016	-0.017 *	-0.191	-0.010	-0.698
		(0.85)		(-1.15)	(-0.53)	(-1.65)	(-1.31)	(-1.37)	(-1.41)
Blockholder Ownership*GLBA		-0.315		0.000	-0.005	-0.015 *	0.038	0.003	-0.132
		(-1.32)		(-0.34)	(-0.19)	(-1.76)	(0.34)	(0.47)	(-0.35)
Outside Director*GLBA		-0.726 *		-0.001	-0.066	-0.025 *	-0.169	-0.006	-1.192 *
		(-1.75)		(-0.45)	(-1.56)	(-1.68)	(-0.86)	(-0.66)	(-1.8)
M&A =1 if Acquisition		-0.006		0.000	-0.002	-0.004 ***	-0.031 *	-0.002 **	-0.150 **
		(-0.15)		(-1.27)	(-0.52)	(-3.21)	(-1.7)	(-2.13)	(-2.42)
Size	-/+	-0.078 ***	-/+	0.000 ***	0.004 **	0.000	0.108 ***	0.002 ***	0.161 ***
		(-3.42)		(3.33)	(2.16)	(0.4)	(8.59)	(2.83)	(3.31)
Leverage	-	-0.035 ***	+	0.000 ***	0.007 ***	0.000	0.009 **	0.000	0.059 ***
		(-3.82)		(3.27)	(7.65)	(0.59)	(2.07)	(0.47)	(3.85)
Growth	-	-1.563 ***	+	0.003 ***	0.093 **	0.062 ***	0.364 **	0.041 ***	1.366 **
		(-4.28)		(3.03)	(2.59)	(4.84)	(2.07)	(4.85)	(2.28)
Concentration	-	-0.860 ***	+	0.003 ***	0.065 ***	0.022 ***	0.607 ***	0.017 ***	1.740 ***
		(-4.16)		(4.5)	(3.38)	(3.27)	(5.74)	(3.21)	(4.65)
Non Interest Income	-/+	1.186 ***	-/+	-0.005 ***	-0.101 ***	-0.010	-0.181	0.015	0.323
		(3.33)		(-4.46)	(-2.99)	(-0.88)	(-1.01)	(1.56)	(0.52)
Loan Loss Provisions	-	**-0.649 *****	+	**0.002 *****	**0.034 *****	**0.028 *****	**0.106 *****	**0.019 *****	**1.302 *****
		(-14.87)		**(12.47)**	**(7.75)**	**(18.46)**	**(5.06)**	**(19.19)**	**(18.36)**
Cost of Funds	-	-5.867 ***	+	0.006	0.151	0.144 **	2.001 **	0.066	4.656
		(-2.89)		(0.94)	(0.77)	(2.11)	(1.99)	(1.36)	(1.34)
Inefficiency	-	-3.167 ***	+	0.009 ***	0.177 ***	0.048 ***	-0.053	0.051 ***	2.312 ***
		(-9.18)		(8.5)	(5.3)	(4.08)	(-0.31)	(6.24)	(3.98)
Real GDP	+	3.775	-	0.023	0.883	-1.667 ***	25.481 ***	-0.614 ***	7.383
		(0.69)		(1.41)	(1.58)	(-8.33)	(9.95)	(-5.04)	(0.86)
Adjusted RSQ		38%		25%	15%	52%	24%	53%	39%

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

Bank Liquidity dimension is tested for robustness by replacing the proxy measure of Cost of Funds with the ratio of Jumbo Deposits to Total Assets. Table 39 indicates that bank's use of more expensive deposits to fund their asset base is associated with higher risk profile.

Table 39: Regression Results for the Random Effects Model based on pooled data for the years 1997 through 2009. Robustness check for Liquidity: Replacing Cost of Funds with Jumbo Deposits to Total Assets Ratio

(n=1,898)

	Expected Sign	Z-Score	Expected Sign	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Intercept		7.502 ***		-0.004 ***	-0.174 ***	0.036 **	-1.860 ***	0.065 ***	-0.138
		(15.43)		(-2.88)	(-3.95)	(2.23)	(-7.53)	(5)	(-0.15)
Insider Ownership		-0.313		-0.002 **	0.001	0.010	0.075	-0.007	-0.964
		(-0.84)		(-1.91)	(0.02)	(0.81)	(0.38)	(-0.66)	(-1.3)
Blockholder Ownership		0.304		0.000	-0.007	0.020 ***	0.067	0.009 *	0.127
		(1.37)		(0.51)	(-0.32)	(2.61)	(0.62)	(1.76)	(0.34)
Outside Director		0.511		0.000	0.003	0.017	0.140	0.003	0.688
		(1.39)		(-0.32)	(0.07)	(1.29)	(0.8)	(0.42)	(1.16)
GLBA Dummy (1 > Yr 1999)		0.766 **		0.000	0.054	0.004	-0.009	0.009	0.574
		(2.15)		(0.11)	(1.52)	(0.28)	(-0.06)	(1.12)	(1.02)
SOX Dummy (1 > Yr 2002)		0.080		0.000	-0.001	-0.018 ***	-0.241 ***	-0.025 ***	-0.681 ***
		(1.47)		(-0.43)	(-0.18)	(-9.27)	(-9.34)	(-20.11)	(-7.75)
Crisis Dummy (1 > Yr 2006)		-0.366 ***		0.000	0.010	0.024 *	0.093 ***	0.008 ***	0.666 ***
		(-5.55)		(0.75)	(1.56)	(9.73)	(3.03)	(5.73)	(6.45)
Insider Ownership*GLBA		0.259		-0.001	-0.017	-0.019 ***	-0.166	-0.010	-0.666
		(0.87)		(-1.15)	(-0.61)	(-1.85)	(-1.15)	(-1.4)	(-1.35)
Blockholder Ownership*GLBA		-0.170		-0.001	-0.013	-0.021 **	0.008	-0.001	-0.339
		(-0.71)		(-0.86)	(-0.54)	(-2.36)	(0.07)	(-0.11)	(-0.9)
Outside Director*GLBA		-0.810 **		0.000	-0.063	-0.022	-0.150	-0.003	-0.939
		(-1.94)		(-0.28)	(-1.51)	(-1.42)	(-0.76)	(-0.32)	(-1.43)
M&A =1 if Acquisition		0.004		0.000	-0.002	-0.005 ***	-0.032 *	-0.002 **	-0.151 **
		(0.1)		(-1.12)	(-0.44)	(-3.65)	(-1.73)	(-2.18)	(-2.45)
Size	-/+	-0.080 ***	-/+	0.000 ***	0.003	0.000	0.109 ***	0.002 ***	0.132 ***
		(-3.58)		(2.65)	(1.55)	(0.28)	(9.05)	(3.37)	(2.7)
Leverage	-	-0.041 ***	+	0.000 ***	0.007 ***	0.001 *	0.009 **	0.000	0.064 ***
		(-4.54)		(3.69)	(8.2)	(1.85)	(2.1)	(1.02)	(4.21)
Growth	-	-1.910 ***	+	0.002 **	0.060	0.080 ***	0.294 *	0.053 ***	2.154 ***
		(-5.26)		(2.08)	(1.73)	(6.32)	(1.68)	(6.2)	(3.61)
Concentration	-	-0.891 ***	+	0.003 ***	0.065 ***	0.024 ***	0.568 ***	0.018 ***	1.815 ***
		(-4.39)		(4.79)	(3.67)	(3.73)	(5.5)	(3.38)	(4.88)
Non Interest Income	-/+	1.354 ***	-/+	-0.005 ***	-0.094 ***	-0.017 ***	-0.211	0.016	0.281
		(3.88)		(-4.59)	(-2.98)	(-1.47)	(-1.22)	(1.81)	(0.46)
Net Charge Offs	-	-0.808 ***	+	0.002 ***	0.049 ***	0.033 ***	0.148 ***	0.025 ***	1.689 ***
		(-14.8)		(14.81)	(9.29)	(17.15)	(5.67)	(19.41)	(18.91)
Jumbo Deposits to Total Assets	**-**	**-0.677 ** **	**+**	**0.000**	**-0.011**	**-0.005**	**0.500 *** **	**-0.010**	**-0.142**
		(-2.29)		**(-0.04)**	**(-0.41)**	**(-0.47)**	**(3.38)**	**(-1.33)**	**(-0.27)**
Inefficiency	-	-2.824 ***	+	0.008 ***	0.145 ***	0.041 ***	-0.158	0.054 ***	2.446 ***
		(-8.89)		(8.01)	(4.88)	(3.81)	(-1.02)	(7.07)	(4.58)
Real GDP	+	7.575	-	0.016	0.729	-1.917 ***	25.623 ***	-0.798 ***	-4.491
		(1.41)		(0.99)	(1.33)	(-9.6)	(10.2)	(-6.71)	(-0.54)
Adjusted RSQ		38%		27%	16%	51%	24%	53%	40%

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

5.4.4 Investment Banking (IB) Breakdown Reporting

The impact of nontraditional banking activities is further examined by taking into consideration the Investment Banking reporting items to include only these three sources: 1) Fees and commissions from securities brokerage, 2) Investment Banking advisory and underwriting fees and commissions, and, 3) Fees and commissions from annuity sales. The regression analysis is performed for the period 2004-2009, to account for an adjustment period after the passage of the GLBA and the availability of Investment Banking reporting breakdown of these three nontraditional activities. IB share is included in the model as the proxy for BHC income structure. The results in Table 40 indicate that nontraditional banking activities help diversify the income structure of BHCs and thus lower the risk profile of banks. While the impact and significance of the control variables remain similar to the base model, the impact of the corporate governance variables changes by lowering the level of statistical significance found in the base model.

Table 40: Regression Results for the Random Effects Model based on pooled data for the years 2004 through 2009. Investment Banking Activity Reporting Availability

(n=876)

	Expected Sign	Z-Score	Expected Sign	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Intercept		7.872 ***		-0.015 ***	-0.315 ***	0.009	-0.638	0.025	-1.649
		(9.58)		(-5.22)	(-3.37)	(0.4)	(-1.6)	(1.51)	(-1.22)
Insider Ownership		-0.597		-0.003	0.018	0.008	0.214	0.015	0.804
		(-0.98)		(-1.38)	(0.28)	(0.52)	(0.75)	(1.25)	(0.8)
Blockholder Ownership		0.586		0.000	-0.040	0.006	-0.101	0.009	-0.763
		(1.61)		(0.07)	(-1.09)	(0.67)	(-0.64)	(1.34)	(-1.44)
Outside Director		0.256		0.000	-0.080	-0.003	-0.002	-0.001	-0.564
		(0.69)		(0.01)	(-1.6)	(-0.3)	(-0.01)	(-0.07)	(-0.95)
Crisis Dummy (1 > Yr 2006)		-0.234 ***		0.000	0.008	0.018 ***	0.020	0.008 ***	0.517 ***
		(-3.51)		(-0.24)	(0.79)	(8.28)	(0.58)	(5.74)	(4.87)
M&A =1 if Acquisition		0.037		0.000	-0.002	-0.005 ***	-0.046 *	-0.003 **	-0.210 **
		(0.7)		(-0.58)	(-0.27)	(-3.06)	(-1.67)	(-2.41)	(-2.53)
Size	-/+	-0.065 *	-/+	0.000 **	0.006	0.001	0.056 ***	0.000	0.211 ***
		(-1.7)		(2.45)	(1.54)	(1.22)	(3.08)	(0.02)	(3.32)
Leverage	-	-0.040 ***	+	0.000 ***	0.014 ***	0.000	0.000	0.000	0.099 ***
		(-2.86)		(8.07)	(7.62)	(0.82)	(0.04)	(-0.09)	(4.4)
Growth	-	-0.313	+	0.003	0.114	0.095 ***	0.629 **	0.059 ***	2.594 ***
		(-0.49)		(1.03)	(1.36)	(5.18)	(1.95)	(4.42)	(2.55)
Concentration	-	-1.433 ***	+	0.005 ***	0.113 ***	0.044 ***	0.459 ***	0.033 ***	2.720 ***
		(-3.91)		(4.16)	(2.89)	(4.81)	(2.62)	(4.56)	(4.49)
IB Income	**-/+**	**-0.308**	**-/+**	**-0.019 ***	**-0.532**	**-0.169 ****	**-3.054 ***	**-0.150 ****	**-9.848 ***
		(-0.1)		**(-1.65)**	**(-1.42)**	**(-1.99)**	**(-1.94)**	**(-2.31)**	**(-1.9)**
Net Charge Offs	-	-0.868 ***	+	0.003 ***	0.061 ***	0.038 ***	0.258 ***	0.026 ***	2.048 ***
		(-12.64)		(11)	(6.37)	(18.26)	(7.28)	(18.21)	(18.65)
Cost of Funds	-	-8.702 **	+	0.018	0.175	0.374 ***	2.144	0.380 ***	17.199 ***
		(-2.87)		(1.55)	(0.44)	(4.27)	(1.39)	(5.99)	(3.52)
Inefficiency	-	-2.206 ***	+	0.012 ***	0.224 ***	0.035 ***	-0.194	0.042 ***	2.553 ***
		(-4.82)		(6.91)	(3.95)	(2.78)	(-0.85)	(4.46)	(3.44)
Real GDP	+	22.528 *	-	-0.045 **	-1.589 *	-2.783 ***	30.994 ***	-1.095 ***	-8.535
		(4)		(-1.97)	(-1.8)	(-15.27)	(10.41)	(-8.96)	(-0.96)
Adjusted RSQ		53%		40%	21%	79%	19%	74%	65%

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

5.4.5 Lagged Corporate Governance Variables

Cornett et. al. (2007) suggest that lagging ownership governance variables helps mitigate the simultaneity issues as it facilitates to test the hypothesis of how insider or blockholder ownership affect the risk profile, which is the main purpose of this model. While Cornett et. al. (2007) do not indicate a similar issue with presence of Outside Director in the board, the base model is modified to include the lag of Outside Director variable. Table 41 shows that the lagged variable of the board structure makes no difference to the base model regression results.

Table 41: Regression Results for the Random Effects Model based on pooled data for the years 2004 through 2009. Lagged Corporate Governance Variables

(n=1,898)

	Expected Sign	Z-Score	Expected Sign	SDROA	SDROE	Total Risk	Systematic Risk	Firm Risk	Risk Index
Intercept		7.413 ***		-0.004 *	-0.188 ***	0.020 **	-1.994 ***	0.066 ***	-0.283
		(13.75)		(-2.65)	(-3.79)	(1.09)	(-7.22)	(4.8)	(-0.29)
Insider Ownership		-0.289		-0.002 **	0.000	0.011	0.078	-0.006	-0.798
		(-0.76)		(-1.95)	(0.01)	(0.91)	(0.38)	(-0.53)	(-1.08)
Blockholder Ownership		0.307		0.000	-0.009	0.018 **	0.073	0.010 **	0.182
		(1.37)		(0.5)	(-0.4)	(2.38)	(0.67)	(1.86)	(0.48)
Outside Director (Lagged)		0.683		-0.001	0.004	0.032	0.321	0.008	1.465
		(1.51)		(-0.43)	(0.1)	(1.57)	(1.5)	(0.76)	(1.62)
GLBA Dummy (1 > Yr 1999)		0.936 **		0.001	0.083	0.011	0.093	0.011	0.900
		(2.17)		(0.5)	(1.53)	(0.73)	(0.46)	(1.16)	(1.32)
SOX Dummy (1 > Yr 2002)		0.017		0.000	0.000	-0.017 ***	-0.270 ***	-0.026 ***	-0.778 ***
		(0.29)		(-0.22)	(-0.08)	(-8.08)	(-9.5)	(-19.46)	(-8.11)
Crisis Dummy (1 > Yr 2006)		-0.342 ***		0.000	0.010	0.023 ***	0.078 *	0.009 ***	0.711 ***
		(-5.12)		(0.68)	(1.44)	(9.42)	(2.48)	(6.1)	(6.78)
Insider Ownership*GLBA		0.259		-0.001	-0.020	-0.019 *	-0.195	-0.010	-0.712
		(0.86)		(-1.22)	(-0.69)	(-1.8)	(-1.34)	(-1.42)	(-1.44)
Blockholder Ownership*GLBA		-0.190		-0.001	-0.014	-0.020 **	0.022	-0.001	-0.364
		(-0.8)		(-0.93)	(-0.6)	(-2.27)	(0.19)	(-0.23)	(-0.96)
Outside Director (Lagged)*GLBA		**-1.031 ****		**-0.001**	**-0.097**	**-0.031**	**-0.258**	**-0.006**	**-1.337**
		(-2.04)		**(-0.65)**	**(-1.52)**	**(-1.57)**	**(-1.08)**	**(-0.52)**	**(-1.57)**
M&A =1 if Acquisition		0.002		0.000	-0.002	-0.005 ***	-0.030	-0.002 ***	-0.152 ***
		(0.05)		(-1.13)	(-0.44)	(-3.52)	(-1.62)	(-2.25)	(-2.46)
Size	-/+	-0.070 ***	-/+	0.000 ***	0.003 *	0.000	0.105 ***	0.002 ***	0.136 ***
		(-3.06)		(2.68)	(1.69)	(0.09)	(8.19)	(3.25)	(2.82)
Leverage	-	-0.041 ***	+	0.000 ***	0.007 ***	0.000	0.010	0.000	0.070 ***
		(-4.44)		(3.74)	(8.03)	(1.39)	(2.24)	(1.22)	(4.59)
Growth	-	-1.951 ***	+	0.002 **	0.068 *	0.082 ***	-0.287	0.053 ***	2.213 ***
		(-5.35)		(2.18)	(1.93)	(6.38)	(-1.63)	(6.23)	(3.72)
Concentration	-	-0.898 ***	+	0.003 ***	0.068 ***	0.024 ***	0.612 ***	0.017 ***	1.738 ***
		(-4.34)		(4.78)	(3.67)	(3.54)	(5.77)	(3.23)	(4.68)
Non Interest Income	-/+	1.299 **	-/+	-0.005 ***	-0.096 ***	-0.016	-0.189	0.012	0.046
		(3.66)		(-4.57)	(-2.96)	(-1.34)	(-1.06)	(1.35)	(0.07)
Net Charge Offs	-	-0.803 ***	+	0.002 ***	0.049 ***	0.033 *	0.154 ***	0.025 ***	1.701 ***
		(-14.67)		(14.77)	(9.22)	(17.16)	(5.83)	(19.49)	(19.08)
Cost of Funds	-	-4.318 **	+	0.002	0.054	0.086	1.706 *	0.114 ***	8.234 ***
		(-2.12)		(0.31)	(0.28)	(1.25)	(1.7)	(2.34)	(2.39)
Inefficiency	-	-3.084 ***	+	0.008 ***	0.151 ***	0.048 ***	-0.124	0.046 ***	1.845 ***
		(-8.88)		(7.52)	(4.63)	(4.07)	(-0.73)	(5.6)	(3.16)
Real GDP	+	8.945 *	-	0.014	0.672	-1.937 ***	24.961 ***	-0.762 ***	-2.205
		(1.66)		(0.9)	(1.23)	(-9.69)	(9.9)	(-6.37)	(-0.26)
Adjusted RSQ		38%		27%	16%	51%	24%	53%	40%

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

5.4.6 2007-2009 Crisis Period

The impact of the crisis period is analyzed by running the model separately for the periods 1997-2006 and 2007-2009. The results are presented by risk measure for the base model (1997-2009), the period before the crisis (1997-2006), and the crisis period (2007-2009).

With regards to the hypothesis variables, the overall significance levels of the coefficients do not change. While in the estimation covering the entire period the lag of Insider Ownership was only significant for SDROA, the significance drops when considering the sub periods (Table 43). The coefficient for Insider Ownership is significant with a negative effect for the Before-Crisis period in the regression with SDROE (Table 44). In a similar way, the lag of Blockholder is significant only regressed on Total Risk and Firm Risk in the estimation covering the entire period (1997-2009); however, the significance drops in the sub-period analysis (Table 45 and 47, respectively). The coefficient for Blockholder Ownership is significant with a positive sign during the Before-Crisis period for SDROE (Table 43), consistent with the initial relation found for this governance variable in the base model for SDROA. The coefficient for Outside Directors in the Board continues to lack significance across all models and sub-periods. Table 42 shows that the coefficient for the interaction term (Blockholder*GLBA) is significant during the Before-Crisis period, suggesting that higher levels of Blockholder Ownership increases BHC's Insolvency Risk. The coefficients for both Insider and Blockholder Ownership interaction terms drop the

significance in the regression with Total Risk (Table 45). The coefficients for the hypotheses variables remain unchanged in the regression with Systematic Risk.

Turning to the control variables, their impact remains similar to the base model except for the Environmental Control Variable. The coefficient for Real GDP Growth has the opposite of the expected sign in the Before-Crisis model for Insolvency Risk (Table 42) Total Risk (Table 45), Firm Risk (Table 47) and the Risk Index (Table 48) measures. These results indicate that the crisis period has influenced to a large extent the initial results in the base model with regards to the impact of economic activity and the risk profile of banks. While the initial results have lead us to conclude that expansionary economic activity decreases the risk of BHCs for the abovementioned variables, the robustness tests indicate that BHCs are subject to more uncertainties during economic growth cycles, in line with the initial relationship found between Real GDP Growth and Systematic Risk.

Table 42: Regression Results for the Random Effects Model for Insolvency Risk to Examine the Crisis Period Impact

		Z-Score		
	Expected Sign	Entire Period (1997-2009)	Before Crisis (1997-2006)	Crisis Period (2007-2009)
Intercept		7.536 ***	7.855 ***	7.509 ***
		(15.16)	(13.71)	(7.81)
Insider Ownership		-0.317	-0.227	0.171
		(-0.83)	(-0.56)	(0.24)
Blockholder Ownership		0.311	0.295	0.613
		(1.4)	(1.24)	(1.62)
Outside Director		0.542	0.575	0.730
		(1.47)	(1.5)	(1.3)
GLBA Dummy (1 > Yr 1999)		0.753 **	0.677 *	
		(2.12)	(1.78)	
SOX Dummy (1 > Yr 2002)		0.014	0.131 *	
		(0.23)	(1.9)	
Crisis Dummy (1 > Yr 2006)		-0.339 ***		
		(-5.08)		
Insider Ownerhsip*GLBA		0.279	0.263	
		(0.93)	(0.75)	
Blockholder Ownership*GLBA		-0.192	-0.560 **	
		(-0.8)	(-2.07)	
Outside Director*GLBA		-0.815 **	-1.006 **	
		(-1.96)	(-2.28)	
M&A =1 if Acquisition		0.001	-0.001	-0.089
		(0.03)	(-0.01)	(-1.3)
Size	-/+	-0.070 ***	-0.070 **	-0.098 ***
		(-3.07)	(-2.71)	(-2.43)
Leverage	-	-0.041 ***	-0.040 ***	-0.029 *
		(-4.45)	(-3.46)	(-1.77)
Growth	-	-1.964 ***	-2.136 ***	-0.752
		(-5.38)	(-5.16)	(-0.8)
Concentration	-	-0.899 ***	-0.774 ***	-1.721 ***
		(-4.34)	(-3.26)	(-3.96)
Non Interest Income	-/+	1.300 ***	1.537 ***	0.285
		(3.66)	(3.36)	(0.49)
Net Charge Offs	-	-0.805 ***	-0.689 ***	-0.872 ***
		(-14.71)	(-8.12)	(-11.36)
Cost of Funds	-	-4.432 **	-5.158 **	-5.067
		(-2.18)	(-2.19)	(-1.28)
Inefficiency	-	-3.073 ***	-3.221 ***	-1.935 ***
		(-8.85)	(-7)	(-3.84)
Real GDP	+	9.175 *	-24.913 **	22.548 ***
		(1.7)	(-2.13)	(4.44)
n		1898	1606	438
Adjusted RSQ		38%	13%	56%

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

Table 43: Regression Results for the Random Effects Model for SDROA to Examine the Crisis Period Impact

		SDROA		
	Expected Sign	Entire Period (1997-2009)	Before Crisis (1997-2006)	Crisis Period (2007-2009)
Intercept		-0.005 ***	0.008 ***	-0.021 ***
		(-2.97)	(10.12)	(-4.34)
Insider Ownership		-0.002 ***	0.000	-0.005
		(-1.9)	(0.12)	(-1.33)
Blockholder Ownership		0.000	0.000	0.002
		(0.43)	(0.18)	(0.89)
Outside Director		0.000	0.000	0.000
		(-0.3)	(0.73)	(0.01)
GLBA Dummy (1 > Yr 1999)		0.000	0.000	
		(0.08)	(-0.24)	
SOX Dummy (1 > Yr 2002)		0.000	0.000 **	
		(-0.31)	(-2.28)	
Crisis Dummy (1 > Yr 2006)		0.000		
		(0.69)		
Insider Ownerhsip*GLBA		-0.001	0.000	
		(-1.13)	(0.21)	
Blockholder Ownership*GLBA		-0.001	0.000	
		(-0.83)	(-1.62)	
Outside Director*GLBA		0.000	0.000	
		(-0.25)	(-0.03)	
M&A =1 if Acquisition		0.000	0.000 **	0.000
		(-1.12)	(-1.87)	(-0.98)
Size	-/+	0.000 ***	0.000	0.000 **
		(2.61)	(1.14)	(2.35)
Leverage	+	0.000 ***	0.000 ***	0.001 ***
		(3.78)	(-8.7)	(6.62)
Growth	+	0.002 ***	0.002 ***	0.006
		(2.12)	(5)	(1.3)
Concentration	+	0.003 ***	0.000	0.006 ***
		(4.74)	(0.2)	(2.82)
Non Interest Income	-/+	-0.005 ***	-0.003 ***	-0.004
		(-4.58)	(-5.15)	(-1.45)
Net Charge Offs	+	0.002 ***	0.000	0.002 ***
		(14.78)	(0.1)	(5.54)
Cost of Funds	+	0.002	0.022 ***	0.008
		(0.28)	(8.67)	(0.37)
Inefficiency	+	0.008 ***	0.005 ***	0.018 ***
		(7.54)	(9.63)	(6.68)
Real GDP	-	0.015	-0.004	0.066 ***
		(0.97)	(-0.38)	(2.27)
n		1898	1606	438
Adjusted RSQ		27%	17%	44%

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

Table 44: Regression Results for the Random Effects Model for SDROE to Examine the Crisis Period Impact

		SDROE		
	Expected Sign	Entire Period (1997-2009)	Before Crisis (1997-2006)	Crisis Period (2007-2009)
Intercept		-0.194 ***	0.039 ***	-0.364 ***
		(-4.19)	(3.22)	(-2.16)
Insider Ownership		-0.001	-0.024 ***	0.032
		(-0.02)	(-2.64)	(0.27)
Blockholder Ownership		-0.010	0.008 **	-0.035
		(-0.49)	(1.9)	(-0.54)
Outside Director		0.006	0.008	-0.171
		(0.17)	(1.29)	(-1.6)
GLBA Dummy (1 > Yr 1999)		0.053	0.003	
		(1.48)	(0.54)	
SOX Dummy (1 > Yr 2002)		-0.001	0.000	
		(-0.17)	(-0.01)	
Crisis Dummy (1 > Yr 2006)		0.010		
		(1.44)		
Insider Ownerhsip*GLBA		-0.016	-0.008	
		(-0.55)	(-1.44)	
Blockholder Ownership*GLBA		-0.011	0.001	
		(-0.47)	(0.3)	
Outside Director*GLBA		-0.061	-0.005	
		(-1.47)	(-0.79)	
M&A =1 if Acquisition		-0.002	-0.001	-0.010
		(-0.44)	(-1.55)	(-0.64)
Size	-/+	0.003 *	0.000	0.009
		(1.6)	(0.66)	(1.32)
Leverage	+	0.007 ***	0.001 ***	0.019 ***
		(8.02)	(6.76)	(5.86)
Growth	+	0.069 *	0.035 **	0.195
		(1.94)	(5)	(1.11)
Concentration	+	0.069 ***	0.001	0.145 **
		(3.64)	(0.12)	(2.02)
Non Interest Income	-/+	-0.098 ***	-0.025 ***	-0.092
		(-2.93)	(-2.89)	(-0.86)
Net Charge Offs	+	0.049 ***	0.002	0.052 ***
		(9.21)	(1.6)	(3.26)
Cost of Funds	+	0.067	0.177 ***	0.316
		(0.35)	(4.26)	(0.4)
Inefficiency	+	0.157 ***	0.047 ***	0.335 ***
		(4.71)	(5.78)	(3.29)
Real GDP	-	0.738	-0.251	2.349 *
		(1.35)	(-1.41)	(1.86)
n		1898	1606	438
Adjusted RSQ		16%	8%	24%

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

Table 45: Regression Results for the Random Effects Model for Total Risk to Examine the Crisis Period Impact

		Total Risk		
	Expected Sign	Entire Period (1997-2009)	Before Crisis (1997-2006)	Crisis Period (2007-2009)
Intercept		0.031 **	-0.003	-0.003
		(1.92)	(-0.14)	(-0.1)
Insider Ownership		0.009	-0.005	0.010
		(0.74)	(-0.34)	(0.41)
Blockholder Ownership		0.018 ***	-0.002	0.009
		(2.41)	(-0.18)	(0.7)
Outside Director		0.016	0.013	0.008
		(1.24)	(1.02)	(0.4)
GLBA Dummy (1 > Yr 1999)		0.003	0.045 *	
		(0.27)	(3.73)	
SOX Dummy (1 > Yr 2002)		-0.017 ***	-0.029 *	
		(-8.08)	(-13.04)	
Crisis Dummy (1 > Yr 2006)		0.023 ***		
		(9.42)		
Insider Ownerhsip*GLBA		-0.019 *	0.003	
		(-1.79)	(0.31)	
Blockholder Ownership*GLBA		-0.020 **	0.012	
		(-2.32)	(1.43)	
Outside Director*GLBA		-0.021	-0.024	
		(-1.4)	(-1.73)	
M&A =1 if Acquisition		-0.005 ***	-0.001	-0.007 **
		(-3.57)	(-0.47)	(-2.3)
Size	-/+	0.000	-0.001	0.003 **
		(0.2)	(-1.25)	(1.92)
Leverage	+	0.000	0.000	0.000
		(1.41)	(1.2)	(-0.16)
Growth	+	0.080 ***	0.050 *	0.102 ***
		(6.24)	(3.6)	(2.98)
Concentration	+	0.024 ***	0.005	0.053 ***
		(3.57)	(0.62)	(3.73)
Non Interest Income	-/+	-0.016 ***	0.000	-0.024
		(-1.35)	(0)	(-1.14)
Net Charge Offs	+	0.033 ***	0.012 *	0.040 ***
		(17.11)	(4.33)	(13.1)
Cost of Funds	+	0.088	0.556 *	0.413 ***
		(1.27)	(6.81)	(2.74)
Inefficiency	+	0.049 ***	0.032 *	0.031
		(4.09)	(1.98)	(1.59)
Real GDP	-	-1.939 ***	3.138 *	-2.688 ***
		(-9.69)	(8.51)	(-11.76)
n		1898	1606	438
Adjusted RSQ		51%	34%	70%

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

Table 46: Regression Results for the Random Effects Model for Systematic Risk to Examine the Crisis Period Impact

		Systematic Risk		
	Expected Sign	Entire Period (1997-2009)	Before Crisis (1997-2006)	Crisis Period (2007-2009)
Intercept		-1.852 ***	-1.842 ***	-0.364
		(-7.2)	(-6.09)	(-0.77)
Insider Ownership		0.060	0.134	-0.113
		(0.29)	(0.6)	(-0.34)
Blockholder Ownership		0.078	0.070	-0.001
		(0.71)	(0.61)	(0)
Outside Director		0.136	0.153	-0.017
		(0.78)	(0.88)	(-0.06)
GLBA Dummy (1 > Yr 1999)		0.004	-0.057	
		(0.03)	(-0.34)	
SOX Dummy (1 > Yr 2002)		-0.270 *	-0.318 ***	
		(-9.54)	(-10.37)	
Crisis Dummy (1 > Yr 2006)		0.078 **		
		(2.5)		
Insider Ownerhsip*GLBA		-0.189	-0.238	
		(-1.3)	(-1.52)	
Blockholder Ownership*GLBA		0.016	0.078	
		(0.14)	(0.65)	
Outside Director*GLBA		-0.153	-0.157	
		(-0.78)	(-0.81)	
M&A =1 if Acquisition		-0.030 *	-0.017	-0.031
		(-1.66)	(-0.85)	(-0.77)
Size	-/+	0.105 ***	0.131 ***	0.031
		(8.3)	(8.61)	(1.63)
Leverage	+	0.010 **	0.009	0.010
		(2.26)	(1.65)	(1.13)
Growth	+	0.299 *	0.707 ***	1.235
		(1.7)	(3.7)	(2.57)
Concentration	+	0.613 ***	0.350 ***	0.331
		(5.8)	(2.86)	(1.61)
Non Interest Income	-/+	-0.188	-0.631 ***	0.099
		(-1.06)	(-2.74)	(0.33)
Net Charge Offs	+	0.152 ***	-0.013	0.225 ***
		(5.79)	(-0.33)	(5.41)
Cost of Funds	+	1.730 *	3.048 ***	2.190
		(1.73)	(2.69)	(1.05)
Inefficiency	+	-0.117	-0.161	0.179
		(-0.69)	(-0.73)	(0.66)
Real GDP	-	24.938 ***	10.448 ***	35.739 ***
		(9.89)	(2.07)	(11.79)
n		1898	1606	438
Adjusted RSQ		24%	24%	32%

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

Table 47: Regression Results for the Random Effects Model for Firm Risk to Examine the Crisis Period Impact

		Firm Risk		
	Expected Sign	Entire Period (1997-2009)	Before Crisis (1997-2006)	Crisis Period (2007-2009)
Intercept		0.069 ***	0.056 ***	0.048 *
		(5.33)	(4.24)	(1.9)
Insider Ownership		-0.006	-0.011	0.007
		(-0.57)	(-1.13)	(0.36)
Blockholder Ownership		0.010 *	0.000	0.014
		(1.88)	(0.05)	(1.45)
Outside Director		0.004	0.000	-0.010
		(0.47)	(0.06)	(-0.65)
GLBA Dummy (1 > Yr 1999)		0.009	0.023 ***	
		(1.14)	(3.05)	
SOX Dummy (1 > Yr 2002)		-0.026 ***	-0.033 ***	
		(-19.5)	(-23.81)	
Crisis Dummy (1 > Yr 2006)		0.009 ***	0.000	
		(6.09)	0.000	
Insider Ownerhsip*GLBA		-0.010	0.001	
		(-1.4)	(0.1)	
Blockholder Ownership*GLBA		-0.001	0.015 ***	
		(-0.25)	(2.85)	
Outside Director*GLBA		-0.003	0.002	
		(-0.37)	(0.21)	
M&A =1 if Acquisition		-0.002 **	0.000	-0.003
		(-2.27)	(0.21)	(-1.54)
Size	-/+	0.002 ***	0.003 ***	0.000
		(3.22)	(3.97)	(-0.02)
Leverage	+	0.000	0.000	0.000
		(1.22)	(1.32)	(0.08)
Growth	+	0.052 ***	0.038 ***	0.081 ***
		(6.19)	(4.51)	(3.25)
Concentration	+	0.017 ***	0.013 **	0.035 ***
		(3.26)	(2.39)	(3.09)
Non Interest Income	-/+	0.012	0.015	0.002
		(1.35)	(1.48)	(0.1)
Net Charge Offs	+	0.025 ***	0.011 ***	0.028 ***
		(19.48)	(6.5)	(13.47)
Cost of Funds	+	0.113 ***	0.068	0.605 ***
		(-2.32)	(1.36)	(5.71)
Inefficiency	+	0.046 ***	0.030 ***	0.029 **
		(5.61)	(3.03)	(2.13)
Real GDP	-	-0.763 ***	1.543 ***	-0.917 ***
		(-6.38)	(6.82)	(-6.59)
n		1898	1606	438
Adjusted RSQ		53%	48%	72%

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

Table 48: Regression Results for the Random Effects Model for Risk Index to Examine Crisis Period Impact

		Risk Index		
	Expected Sign	Entire Period (1997-2009)	Before Crisis (1997-2006)	Crisis Period (2007-2009)
Intercept		0.261	1.530	0.472
		(0.28)	(1.44)	(0.28)
Insider Ownership		-0.914	-0.967	-0.623
		(-1.23)	(-1.22)	(-0.52)
Blockholder Ownership		0.211	-0.028	-0.349
		(0.56)	(-0.07)	(-0.54)
Outside Director		0.724	0.511	-1.703
		(1.23)	(0.93)	1.580
GLBA Dummy (1 > Yr 1999)		0.615	1.232 **	
		(1.09)	(2.35)	
SOX Dummy (1 > Yr 2002)		-0.776 ***	-1.133 ***	
		(-8.11)	(-11.62)	
Crisis Dummy (1 > Yr 2006)		0.713 ***	0.000	
		(6.79)	0.000	
Insider Ownerhsip*GLBA		-0.698	-0.483	
		(-1.42)	(-0.97)	
Blockholder Ownership*GLBA		-0.399	0.894 **	
		(-1.05)	(2.39)	
Outside Director*GLBA		-0.999	-0.633	
		(-1.52)	(-1.04)	
M&A =1 if Acquisition		-0.155 ***	-0.069	-0.092
		(-2.51)	(-1.09)	(-0.69)
Size	-/+	0.140 ***	0.117 **	0.188 ***
		(2.89)	(2.06)	(2.74)
Leverage	+	0.070 ***	0.041 **	0.080 ***
		(4.59)	(2.27)	(2.69)
Growth	+	2.132 ***	0.999	1.900
		(3.58)	(1.63)	(1.13)
Concentration	+	1.761 ***	0.746 *	2.714 ***
		(4.74)	(1.83)	(3.67)
Non Interest Income	-/+	0.048	1.576 **	-0.115
		(0.08)	(2.06)	(-0.11)
Net Charge Offs	+	1.695 ***	0.423 ***	2.097 ***
		(19.01)	(3.34)	(14.74)
Cost of Funds	+	8.106 *	3.137	24.526 ***
		(2.35)	(0.85)	(3.39)
Inefficiency	+	1.883 ***	1.321 **	2.663 ***
		(3.23)	(1.85)	(2.87)
Real GDP	-	-2.225	110.027 ***	-3.577
		(-0.26)	(6.94)	(-0.36)
n		1898	1606	438
Adjusted RSQ		40%	17%	66%

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

5.4.7 Non Linear Model Specification

Table 49 shows the results of the non linear model specification for the risk measures that are most relevant to regulators: Z-Score, Total Risk, Systematic Risk and Firm Risk. The base model is modified to include the quadratic measures of the corporate governance measures. The quadratic model uncovers a U-shaped relationship between Firm Risk and Outside Director. The coefficient on the linear term is -0.074 and the coefficient on the quadratic term is 0.053. Solving for the level of Outside Director that minimizes Firm Risk (by taking the first derivative) it can be concluded that the minimum level is achieved at a level of 69.8% of Outside Director. The optimal level is lower compared to the 84.1% mean of Outsider Director in BHC during the period of analysis. These results are in accordance with the findings by De Andres and Vallelado (2008) and Wang et. al. (2012), who argue that not excessively independent boards might prove more efficient in monitoring and advising issues. With regards to Z-Score model, the non linear coefficient for Outside Directors is significant indicating that more independent boards tend to reduce the Insolvency Risk of BHCs.

Table 49: Non Linear Model Specification Transformation of Risk Variables and Corporate Governance Measures into Log form

(n=1,898)

	Expected Sign	LogZ	Expected Sign	Total Risk	Systematic Risk	Firm Risk
Intercept		6.564 ***		0.081 ***	-1.275 ***	0.097 ***
		(7.74)		(2.77)	(-3.18)	(4.96)
Insider Ownership		-0.100		-0.023	-0.154	-0.009
		(-0.12)		(-0.9)	(-0.4)	(-0.47)
Insider Ownership Squared		**-0.792**		**0.022**	**0.488**	**-0.003**
		(-0.45)		**(0.38)**	**(0.59)**	**(-0.06)**
Blockholder Ownership		0.218		0.034 **	0.191	0.021 **
		(0.48)		(2.25)	(0.89)	(1.98)
Blockholder Ownership Squared		**0.309**		**-0.040**	**-0.112**	**-0.016**
		(0.39)		**(-1.47)**	**(-0.3)**	**(-0.89)**
Outside Director		3.241 *		-0.105	-1.188	-0.074 *
		(1.66)		(-1.52)	(-1.29)	(-1.67)
Outside Director Squared		**-1.828**		**0.082 ***	**0.895**	**0.053 ***
		(-1.38)		**(1.74)**	**(1.43)**	**(1.76)**
GLBA Dummy (1 > Yr 1999)		0.350		-0.013	0.076	0.004
		(0.97)		(-1.01)	(0.45)	(0.51)
SOX Dummy (1 > Yr 2002)		0.016		-0.016 **	-0.269 ***	-0.026 ***
		(0.27)		(-7.18)	(-9.44)	(-19.18)
Crisis Dummy (1 > Yr 2006)		-0.342 ***		0.022 ***	0.086 ***	0.009 ***
		(-5.11)		(9.13)	(2.71)	(5.89)
Insider Ownership*GLBA		0.136		-0.032 ***	-0.214	-0.017 **
		(0.39)		(-2.71)	(-1.31)	(-2.11)
Insider Ownership Squared*GLBA		**0.792**		**0.142 *** **	**0.459**	**0.057 ***
		(0.61)		**(3.09)**	**(0.75)**	**(1.95)**
Blockholder Ownership*GLBA		-0.062		-0.046 ***	0.076	0.000
		(-0.19)		(-3.88)	(0.5)	(0.03)
Blockholder Ownership Squared*GLBA		**-0.450**		**0.056 ** **	**-0.269**	**-0.012**
		(-0.71)		**(2.41)**	**(-0.89)**	**(-0.84)**
Outside Director*GLBA		0.176		0.021	-0.296	0.013
		(0.23)		(0.75)	(-0.81)	(0.73)
Outside Director Squared*GLBA		**-0.597**		**-0.030**	**0.077**	**-0.012**
		(-1.03)		**(-1.4)**	**(0.28)**	**(-0.93)**
M&A =1 if Acquisition		-0.001		-0.005 ***	-0.029	-0.002 **
		(-0.01)		(-3.57)	(-1.58)	(-2.32)
Size	-/+	-0.068 ***	-/+	0.000	0.099 ***	0.002 ***
		(-2.84)		(-0.07)	(8.8)	(3.47)
Leverage	-	-0.041 ***	+	0.000	0.011 **	0.000
		(-4.42)		(1.11)	(2.49)	(1.19)
Growth	-	-1.975 ***	+	0.078 ***	-0.211	0.054 ***
		(-5.39)		(6.08)	(-1.22)	(6.4)
Concentration	-	-0.887 ***	+	0.024 ***	0.529 ***	0.018 ***
		(-4.2)		(3.51)	(5.31)	(3.6)
Non Interest Income	-/+	1.303 ***	-/+	-0.015	-0.173	0.007
		(3.62)		(-1.25)	(-1.02)	(0.81)
Net Charge Offs	-	-0.795 ***	+	0.034 ***	0.150 *	0.025 ***
		(-14.38)		(17.33)	(5.76)	(19.59)
Cost of Funds	-	-4.578 ***	+	0.091	1.623 *	0.127 ***
		(-2.22)		(1.3)	(1.66)	(2.66)
Inefficiency	-	-3.164 ***	+	0.050 ***	-0.085	0.043 ***
		(-9.02)		(4.16)	(-0.51)	(5.28)
Real GDP	+	9.496 *	-	-2.019 ***	25.167 **	-0.761 ***
		(1.76)		(-10.14)	(9.84)	(-6.26)
Adjusted RSQ		38%		52%	24%	53%

*** Sgnificant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell values are parameter estimates (t-ratios)

5.4.8 Double Log Model Specification

The risk measures in the base model are transformed to double log specification: Z-Score, Total Risk, Systematic Risk and Firm Risk. The transformation allows calculating the elasticity of the governance measures with respect to each risk measure and eases the interpretation of the coefficients. Based on the results presented in Table 50, a 10% increase in Insider Ownership initially reduces Total Risk by 0.29%. After the passage of the Act the effect is positive, leading to a net increase in Total Risk of 0.02%. The coefficient of Blockholder indicates that a 10% increase of Blockholder Ownership increases BHC Firm Risk by 0.06%.

Table 50: Double Log Model Specification. Transformation of Risk Variables and Corporate Governance Measures into Log form

(n=1,898)

	Expected Sign	Z-Score	Expected Sign	Log of Total Risk	Log of Systematic Risk	Log of Firm Risk
Intercept		8.156 ***		-2.768 ***	-6.184 ***	-2.459 ***
		(15.91)		(-12.64)	(-10.72)	(-14.36)
Log of Insider Ownership		**-0.031**		**-0.029 ****	**-0.006**	**-0.005**
		(-1.04)		**(-2.16)**	**(-0.18)**	**(-0.57)**
Log of Blockholder Ownership		**0.008**		**-0.003**	**0.000**	**0.006 ***
		(0.74)		**(-0.54)**	**(0.03)**	**(1.77)**
Log of Outside Director		**0.341**		**0.076**	**-0.004**	**0.054**
		(1.33)		**(0.63)**	**(-0.01)**	**(0.66)**
GLBA Dummy (1 > Yr 1999)		0.115		-0.059	-0.029	0.043
		(0.83)		(-0.9)	(-0.16)	(0.98)
SOX Dummy (1 > Yr 2002)		0.024		-0.291 ***	-0.585 ***	-0.408 ***
		(0.4)		(-10.45)	(-7.71)	(-21.5)
Crisis Dummy (1 > Yr 2006)		-0.354 ***		0.338 ***	0.314 ***	0.135 ***
		(-5.35)		(10.79)	(3.66)	(6.42)
Log of Insider Ownership*GLBA		**0.037**		**0.031 ****	**0.038**	**-0.003**
		(1.33)		**(2.36)**	**(1.05)**	**(-0.29)**
Log of BlockholderOwnership*GLBA		**-0.001**		**0.007**	**0.025**	**-0.001**
		(-0.08)		**(1.24)**	**(1.63)**	**(-0.13)**
Log of OutsideDirector*GLBA		**-0.465**		**-0.118**	**-0.045**	**-0.087**
		(-1.54)		**(-0.83)**	**(-0.12)**	**(-0.92)**
M&A =1 if Acquisition		0.005		-0.058 ***	-0.053	-0.026 **
		(0.13)		(-3.18)	(-1.06)	(-2.09)
Size	-/+	-0.073 **	-/+	-0.018	0.248 ***	0.034 ***
		(-2.5)		(-1.46)	(7.82)	(3.4)
Leverage	-	-0.042 ***	+	0.002	0.025 **	0.001
		(-4.44)		(0.38)	(2.14)	(0.33)
Growth	-	-1.995 ***	+	0.993 ***	1.168 **	0.729 ***
		(-5.35)		(5.71)	(2.48)	(6.13)
Concentration	-	-0.874 ***	+	0.132	1.377 ***	0.180 **
		(-3.81)		(1.29)	(5.03)	(2.42)
Non Interest Income	-/+	1.296 ***	-/+	-0.043	-0.448	0.163
		(3.38)		(-0.25)	(-0.96)	(1.31)
Net Charge Offs	-	-0.763 ***	+	0.345 ***	0.304 ***	0.296 ***
		(-13.66)		(13.23)	(4.3)	(16.59)
Cost of Funds	-	-4.778 **	+	1.816 *	1.874	2.192 ***
		(-2.24)		(1.86)	(0.71)	(3.2)
Inefficiency	-	-3.357 ***	+	0.613 ***	-0.492	0.626 ***
		(-9.22)		(3.66)	(-1.09)	(5.36)
Real GDP	+	9.718 *	-	-20.031 ***	69.580 ***	-10.449 ***
		(1.85)		(-8.01)	(10.17)	(-6.26)
Adjusted RSQ		38%		47%	21%	51%

*** Sgnificant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell values are parameter estimates (t-ratios)

5.5 Peer Group Analysis

The impact of Insider Ownership, Blockholder Ownership and Outside Directors on the risk profile of banks is examined at the peer group level to further assess how the relationships found in the base regression model differ when analyzing BHCs by peer group. BHCs are grouped as large, medium and small, based on total assets. Large banks have greater than $100B in assets; medium banks have assets between $10B and $100B; and, small banks have assets lower than $10B.

Table 51: Mean statistics for sample of 146 BHCs over the period 1997-2009 by peer group

Variable	All	Large (Assets >$100B)	Medium (Assets between 10-$100B)	Small (Assets <$10B)
Total Number of Banks	146	11	29	106
Assets ($ In millions)	37,599	423,506	20,426	2,250
ROA	1.0%	1.1%	1.1%	1.0%
ROE	11.4%	13.4%	12.0%	11.0%
Z Score	75.55	50.34	74.33	79.15
SDROA	0.4%	0.4%	0.4%	0.4%
SDROE	4.8%	5.0%	4.6%	4.9%
Total Risk	7.8%	8.3%	7.6%	7.8%
Systematic Risk	0.51	0.77	0.63	0.46
Firm Risk	7.2%	6.8%	6.8%	7.3%
Risk Index	5.5	6.5	5.7	5.3
Insider Ownership	5.8%	1.1%	4.9%	6.6%
Blockholder Ownership	13.6%	3.0%	14.4%	14.5%
Outside Director	84.1%	89.2%	84.4%	83.4%
Size	15.1	19.1	16.5	14.3
Leverage	11.6	12.0	11.4	11.6
Growth	7.2%	9.8%	6.9%	7.1%
Concentration	53.5%	38.9%	46.5%	56.9%
Non Interest Income	18.8%	31.8%	23.1%	16.2%
Net Charge Offs	0.4%	0.7%	0.4%	0.4%
Cost of Funds	3.7%	4.2%	3.5%	3.7%
Ineffeciency	43.1%	43.1%	43.9%	42.8%
Board Size	13	16	15	12
Outside Directors	10	13	11	9

Source: FRY9-C Reports, Factset LionsShare, SEC Reports

Table 51 presents summary statistics for the three peer groups. Based on the classification criteria, large banks have average assets of $423B, medium banks have average assets of $20.4B and small banks have average assets of $2.2B. On the risk profile side, large banks have greater Insolvency Risk (Z-Score), Total Risk, and Systematic Risk, SDROA and ROE. Firm Risk is similar across the peer groups. On the performance side, large banks have a slightly higher ROE, while all banks have a similar ROA. Larger banks have a more diversified loan portfolio based on the loan concentration index, and generate a larger percent of non-interest income. On the corporate governance side, larger banks have larger boards and larger percentage of Outside Directors in the board. Small banks have the largest percent of Insider Ownership.

The peer group comparison is made using two approaches. The first approach consists on running the original regression model for each peer group sample. The second approach includes dummy variables for large and medium banks and interaction variables. The results are presented by risk measure, in Tables 50 through 56. The regression results of the two approaches slightly differ when compared to the base model. Overall, the impact of the control variables on bank risk remains unchanged relative to the base regression model. However, some changes occur with regards to the hypothesis variables. Results are presented in Tables 52 through 58.

The frequency of the significance significance for the Insider Ownership coefficient is noticeably higher for medium sized banks. In all cases (Tables 52 through 58), the

coefficient is significant and its sign indicates that the greater the presence of Insider Ownership the lower the risk profile of medium sized BHCs.

The coefficient for Insider Ownership is also significant in the regressions for SDROA and Systematic Risk of small BHCs (Tables 51 and 54). The positive coefficient indicates that higher levels of Insider Ownership are associated with higher Systematic Risk of small BHCs, opposite to the effect found in medium sized banks. Insider Ownership does not impact the risk profile of large sized BHCs.

The coefficient and significance of the interaction effect between Insider Ownership and the GLBA passage shows that the passage of the Act further decreases the risk of medium BHCs when looking at SDROA and SDROE. Similarly, the passage of the Act further decreases Total Risk and Firm Risk in large BHCs.

The coefficient for Blockholder Ownership is significant occasionally for medium and large sized BHCs. Based on the results, the presence of Blockholder Ownership increases the risk when measuring Total Risk in medium sized BHCs, Systematic Risk in large BHCs, and Firm Risk in large BHCs. However, the passage of the Act decreases the initial impact in medium sized BHCs, with a negative net effect in Total Risk (0.034 + (-0.047)); and reduces the Risk Index measure for medium BHCs. The presence of Blockholder Ownership does not have an impact in small size BHCs.

Outside Directors presence becomes significant when considering large BHCs in the case of SDROA and SDROE, as well as for the Risk Index. The sign of the coefficient indicates that higher presence of Outside Directors is associated with an increase in these three risk measures. Outside Directors has no impact in the risk measures considered for medium or small BHCs.

With regards to the passage of the Act, GLBA seems to have a significant and decreasing effect on the Insolvency Risk of small BHCs. On the other hand, the passage of the Sarbanes-Oxley Act has a general dampening effect in the market based risk measures of medium and small BHCs (Total Risk and Systematic Risk). Firm Risk and the Risk Index are also lower after the passage of SOX, regardless of the peer group.

The second approach used in the peer group analysis leads to similar findings in the base model and the peer sample approach.

Table 52: Regression Results for the Random Effects Model by Peer Group for Insolvency Risk

		Z-Score				
	Expected Sign	Base	Large	Medium	Small	Size dummy interacted with hypothesys variables
Intercept		7.536 ***	7.744 **	7.732 ***	7.326 ***	6.863 ***
		(15.16)	(2.37)	(4.52)	(10)	(12.27)
Insider Ownership		-0.317	4.859	1.765 *	-0.533	-0.646
		(-0.83)	(1.03)	(1.79)	(-1.15)	(-1.5)
Large Banks* Insider Ownership						6.550
						(1.52)
Medium Banks*Insider Ownership						1.994 **
						(2.3)
Blockholder Ownership		0.311	-0.408	0.011	0.268	0.230
		(1.4)	(-0.3)	(0.02)	(0.97)	(0.87)
Large Banks*Blockholder Ownership						-0.424
						(-0.35)
Medium Banks*Blockholder Ownership						0.186
						(0.38)
Outside Director		0.542	-2.740	0.353	0.606	0.440
		(1.47)	(-1.3)	(0.35)	(1.45)	(1.13)
Large Banks*Outside Director						-1.197
						(-0.92)
Medium Banks*Outside Director						0.177
						(0.32)
GLBA Dummy (1 > Yr 1999)		0.753 **	-2.216	0.686	0.830 **	0.672 *
		(2.12)	(-1.01)	(0.71)	(2.03)	(1.82)
SOX Dummy (1 > Yr 2002)		0.014	0.041	0.100	-0.043	-0.018
		(0.23)	(0.17)	(0.76)	(-0.58)	(-0.29)
Crisis Dummy (1 > Yr 2006)		-0.339 ***	-0.721 *	-0.353 **	-0.302 ***	-0.331 ***
		(-5.08)	(-2.94)	(-2.38)	(-3.79)	(-4.83)
Insider Ownership*GLBA		0.279	0.485	0.200	0.193	0.335
		(0.93)	(0.76)	(0.4)	(0.37)	(0.65)
Insider Ownership*GLBA*Large Banks						0.262
						(0.34)
Insider Ownership*GLBA*Medium Banks						-0.454
						(-0.66)
Blockholder Ownership*GLBA		-0.192	-0.440	0.200	-0.226	-0.248
		(-0.8)	(-0.21)	(0.44)	(-0.69)	(-0.77)
Blockholder Owenrship*GLBA*Large Banks						0.429
						(0.22)
Blockholder Ownership*GLBA*Medium Banks						0.429
						(0.8)
Outside Director*GLBA		-0.815 **	2.330	-0.822	-0.898 *	-0.717
		(-1.96)	(0.94)	(-0.74)	(-1.66)	(-1.64)
Outside Director*GLBA*Large Banks						-0.031
						(-0.16)
Outside Director*GLBA*Medium Banks						-0.144
						(-1.04)
M&A =1 if Acquisition		0.001	0.001	0.154 *	-0.039	-0.010
		(0.03)	(0)	(1.84)	(-0.83)	(-0.24)
Size	-/+	-0.070 ***	0.014	-0.093	-0.034	-0.020
		(-3.07)	(0.11)	(-1.11)	(-0.79)	(-0.67)
Leverage	-	-0.041 ***	-0.055	-0.021	-0.045 ***	-0.040 ***
		(-4.45)	(-1.23)	(-0.87)	(-4.12)	(-4.46)
Growth	-	-1.964 ***	-2.115 *	-1.480 *	-2.086 ***	-1.920 ***
		(-5.38)	(-1.69)	(-1.96)	(-4.54)	(-5.36)
Concentration	-	-0.899 ***	1.339	-1.505 **	-0.861 ***	-0.932 ***
		(-4.34)	(1.12)	(-2.55)	(-3.8)	(-5)
Non Interest Income	-/+	1.300 ***	1.839	2.998 ***	0.744 *	1.446 ***
		(3.66)	(1.42)	(3.88)	(1.68)	(4.38)
Net Charge Offs	-	-0.805 ***	-0.645 ***	-0.613 ***	-0.843 ***	-0.855 ***
		(-14.71)	(-2.95)	(-5.16)	(-12.54)	(-15.76)
Cost of Funds	-	-4.432 **	1.476	0.768	-8.406 `	-4.144 **
		(-2.18)	(0.24)	(0.17)	(-3.22)	(-2.12)
Inefficiency	-	-3.073 ***	-2.971 ***	-4.086 ***	-3.121 ***	-2.848 ***
		(-8.85)	(-2.62)	(-4.83)	(-7.44)	(-8.6)
Real GDP	+	9.175 *	-5.653	10.419	10.855 *	9.105 *
		(1.7)	(-0.28)	(0.87)	(1.69)	(1.64)
Large Banks						0.634
						(0.55)
Medium Banks						-0.347
						(-0.73)
Adjusted RSQ		38%	43%	41%	38%	39%
Number of BHCs		146	11	29	106	146
n		1,898	143	377	1,378	1,898
Assets			>$100B	$10B-$100B	<$10B	

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

Table 53: Regression Results for the Random Effects Model by Peer Group for SDROA

	Expected Sign	SDROA				
		Base	Large	Medium	Small	Size dummy interacted with Hypothesys variables
Intercept		-0.005 ***	0.006	-0.010 **	-0.007 **	-0.007 ***
		(-2.97)	(0.91)	(-2.19)	(-2.67)	(-2.74)
Insider Ownership		-0.002 ***	-0.003	-0.005 *	0.003 **	-0.004 **
		(-1.9)	(-0.35)	(-1.94)	(2.15)	(-2.42)
Large Banks* Insider Ownership						-0.004
						(-0.31)
Medium Banks*Insider Ownership						0.004
						(0.92)
Blockholder Ownership		0.000	-0.001	0.001	0.000	0.000
		(0.43)	(-0.35)	(0.87)	(0.59)	(-0.02)
Large Banks*Blockholder Ownership						0.002
						(0.51)
Medium Banks*Blockholder Ownership						0.000
						(-0.07)
Outside Director		0.000	0.007 *	0.001	-0.001	0.000
		(-0.3)	(1.83)	(0.46)	(-0.78)	(-0.24)
Large Banks*Outside Director						0.009 **
						(2.31)
Medium Banks*Outside Director						0.002
						(0.9)
GLBA Dummy (1 > Yr 1999)		0.000	-0.003	0.002	0.000	0.000
		(0.08)	(-0.73)	(0.62)	(-0.15)	(0.23)
SOX Dummy (1 > Yr 2002)		0.000	0.000	0.000	0.000	0.000
		(-0.31)	(0.53)	(-0.68)	(-0.77)	(-0.07)
Crisis Dummy (1 > Yr 2006)		0.000	0.000	0.000	0.000	0.000
		(0.69)	(0.3)	(0.33)	(0.6)	(0.37)
Insider Ownership*GLBA		-0.001	0.001	-0.003 **	0.001	0.001
		(-1.13)	(0.67)	(-2.13)	(0.79)	(0.44)
Insider Ownership*GLBA*Large Banks						-0.001
						(-0.36)
Insider Ownership*GLBA*Medium Banks						-0.004 *
						(-1.76)
Blockholder Ownership*GLBA		-0.001	-0.004	-0.001	-0.001	-0.001
		(-0.83)	(-0.98)	(-0.59)	(-1.33)	(-1.13)
Blockholder Owenrship*GLBA*Large Banks						-0.008
						(-1.47)
Blockholder Ownership*GLBA*Medium Banks						0.002
						(1.09)
Outside Director*GLBA		0.000	0.003	-0.002	0.000	-0.001
		(-0.25)	(0.7)	(-0.52)	(-0.16)	(-0.55)
Outside Director*GLBA*Large Banks						0.001
						(1.2)
Outside Director*GLBA*Medium Banks						0.001 **
						(2.1)
M&A =1 if Acquisition		0.000	0.000	0.000	0.000	0.000
		(-1.12)	(-0.03)	(0.09)	(-1.63)	(-1.23)
Size	-/+	0.000 ***	0.000	0.000	0.000 **	0.000
		(2.61)	(-1.48)	(1.54)	(2.48)	(1.62)
Leverage	+	0.000 ***	0.000 **	0.000	0.000 **	0.000 ***
		(3.78)	(-2.02)	(-0.09)	(4.66)	(5.28)
Growth	+	0.002 ***	0.002	0.001	0.004 **	0.003 ***
		(2.12)	(1.02)	(0.6)	(2.5)	(2.75)
Concentration	+	0.003 ***	0.000	0.005 ***	0.003 **	0.003 ***
		(4.74)	(-0.08)	(2.96)	(3.87)	(4.39)
Non Interest Income	-/+	-0.005 ***	-0.001	-0.009 ***	-0.003 **	-0.005 ***
		(-4.58)	(-0.23)	(-4.48)	(-2.41)	(-4.52)
Net Charge Offs	+	0.002 ***	0.001 **	0.001 ***	0.003 **	0.002 ***
		(14.78)	(2.1)	(4.29)	(13.74)	(14.29)
Cost of Funds	+	0.002	0.012	0.011	0.000	0.012 *
		(0.28)	(0.97)	(0.89)	(0.04)	(1.83)
Inefficiency	+	0.008 ***	0.003	0.015 ***	0.006 **	0.009 ***
		(7.54)	(1.21)	(6.54)	(4.91)	(8.49)
Real GDP	-	0.015	-0.041	0.007	0.026	0.015
		(0.97)	(-1.06)	(0.22)	(1.39)	(0.96)
Large Banks						-0.009 **
						(-2.45)
Medium Banks						-0.002
						(-1.25)
Adjusted RSQ		27%	33%	31%	30%	30%
Number of BHCs		146	11	29	106	146
n		1,898	143	377	1,378	1,898
Assets			>$100B	$10B-$100B	<$10B	

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

Table 54: Regression Results for the Random Effects Model by Peer Group for SDROE

		SDROE				
	Expected Sign	Base	Large	Medium	Small	Size dummy interacted with hypothesys variables
Intercept		-0.194 ***	0.032	-0.110 **	-0.277 ***	-0.167 ***
		(-4.19)	(0.49)	(-2.3)	(-3.82)	(-3.46)
Insider Ownership		-0.001	-0.053	-0.051 *	-0.023	-0.024
		(-0.02)	(-0.59)	(-1.86)	(-0.48)	(-0.6)
Large Banks* Insider Ownership						0.034
						(0.09)
Medium Banks*Insider Ownership						-0.030
						(-0.41)
Blockholder Ownership		-0.010	-0.024	0.007	-0.001	0.002
		(-0.49)	(-0.91)	(0.51)	(-0.04)	(0.07)
Large Banks*Blockholder Ownership						0.124
						(1.09)
Medium Banks*Blockholder Ownership						0.012
						(0.26)
Outside Director		0.006	0.074 *	0.007	-0.015	-0.014
		(0.17)	(1.84)	(0.25)	(-0.33)	(-0.39)
Large Banks*Outside Director						0.088
						(0.72)
Medium Banks*Outside Director						0.018
						(0.35)
GLBA Dummy (1 > Yr 1999)		0.053	-0.004	0.007	0.046	0.051
		(1.48)	(-0.11)	(0.27)	(0.99)	(1.41)
SOX Dummy (1 > Yr 2002)		-0.001	0.002	-0.003	-0.005	-0.004
		(-0.17)	(0.36)	(-0.8)	(-0.65)	(-0.61)
Crisis Dummy (1 > Yr 2006)		0.010	-0.001	0.001	0.013	0.012 *
		(1.44)	(-0.21)	(0.34)	(1.39)	(1.75)
Insider Ownership*GLBA		-0.016	0.005	-0.029 **	0.054	0.049
		(-0.55)	(0.4)	(-2.04)	(0.92)	(0.96)
Insider Ownership*GLBA*Large Banks						-0.119
						(-1.62)
Insider Ownership*GLBA*Medium Banks						-0.075
						(-1.13)
Blockholder Ownership*GLBA		-0.011	-0.030	-0.010	-0.042	-0.037
		(-0.47)	(-0.76)	(-0.82)	(-1.14)	(-1.16)
Blockholder Owenrship*GLBA*Large Banks						-0.071
						(-0.36)
Blockholder Ownership*GLBA*Medium Banks						0.012
						(0.23)
Outside Director*GLBA		-0.061	0.004	-0.005	-0.057	-0.063
		(-1.47)	(0.08)	(-0.17)	(-1.04)	(-1.46)
Outside Director*GLBA*Large Banks						0.009
						(0.47)
Outside Director*GLBA*Medium Banks						0.006
						(0.42)
M&A =1 if Acquisition		-0.002	-0.001	0.001	-0.005	-0.003
		(-0.44)	(-0.48)	(0.24)	(-0.87)	(-0.66)
Size	-/+	0.003 *	0.003	0.003	0.010 **	0.005 **
		(1.6)	(1.25)	(1.32)	(2.38)	(2.03)
Leverage	+	0.007 ***	0.000	0.003 ***	0.007 ***	0.006 ***
		(8.02)	(0.39)	(3.95)	(6.51)	(8.01)
Growth	+	0.069 *	0.039	0.015	0.098 *	0.052
		(1.94)	(1.62)	(0.73)	(1.96)	(1.56)
Concentration	+	0.069 ***	-0.012	0.050 ***	0.074 ***	0.062 ***
		(3.64)	(-0.51)	(3.04)	(3.24)	(3.93)
Non Interest Income	-/+	-0.098 ***	-0.029	-0.079 ***	-0.092 **	-0.085 ***
		(-2.93)	(-1.17)	(-3.62)	(-2.02)	(-2.93)
Net Charge Offs	+	0.049 ***	0.009 **	0.015 ***	0.063 ***	0.047 ***
		(9.21)	(2.25)	(4.59)	(8.53)	(9.23)
Cost of Funds	+	0.067	0.156	0.062	0.078	-0.163
		(0.35)	(1.31)	(0.5)	(0.28)	(-0.92)
Inefficiency	+	0.157 ***	0.047 **	0.132 ***	0.164 ***	0.126 ***
		(4.71)	(2.15)	(5.54)	(3.68)	(4.22)
Real GDP	-	0.738	-0.365	-0.068	1.116	0.770
		(1.35)	(-0.94)	(-0.2)	(1.5)	(1.37)
Large Banks						-0.096
						(-0.9)
Medium Banks						-0.022
						(-0.52)
Adjusted RSQ		16%	26%	29%	18%	16%
Number of BHCs		146	11	29	106	146
n		1,898	143	377	1,378	1,898
Assets			>$100B	$10B-$100B	<$10B	

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

Table 55: Regression Results for the Random Effects Model by Peer Group for Total Risk

	Expected Sign	Total Risk				
		Base	Large	Medium	Small	Size dummy interacted with Hypothesys variables
Intercept		0.031 **	0.085	0.077	-0.006	0.036
		(1.92)	(0.82)	(1.46)	(-0.24)	(1.23)
Insider Ownership		0.009	0.169	-0.054 **	0.024	0.019
		(0.74)	(0.99)	(-1.97)	(1.5)	(0.94)
Large Banks* Insider Ownership						0.020
						(0.11)
Medium Banks*Insider Ownership						-0.123 **
						(-2.51)
Blockholder Ownership		0.018 *	0.063	0.034 **	0.012	0.010
		(2.41)	(1.21)	(2.21)	(1.25)	(0.92)
Large Banks*Blockholder Ownership						0.048
						(1.02)
Medium Banks*Blockholder Ownership						0.027
						(1.28)
Outside Director		0.016	0.067	-0.013	0.007	0.002
		(1.24)	(0.81)	(-0.34)	(0.45)	(0.11)
Large Banks*Outside Director						0.114 **
						(2.25)
Medium Banks*Outside Director						0.028
						(1.27)
GLBA Dummy (1 > Yr 1999)		0.003	-0.044	-0.040	0.003	0.003
		(0.27)	(-0.49)	(-1.11)	(0.23)	(0.22)
SOX Dummy (1 > Yr 2002)		-0.017 *	-0.019 **	-0.019 ***	-0.017 **	-0.016 ***
		(-8.08)	(-1.93)	(-3.79)	(-6.78)	(-7.1)
Crisis Dummy (1 > Yr 2006)		0.023 *	0.038 ***	0.019 ***	0.022 **	0.022 ***
		(9.42)	(3.68)	(3.21)	(8)	(9.25)
Insider Ownership*GLBA		-0.019	-0.042 *	0.007	-0.022	-0.015
		(-1.79)	(-1.77)	(0.38)	(-1.22)	(-0.85)
Insider Ownership*GLBA*Large Banks						-0.029
						(-1.01)
Insider Ownership*GLBA*Medium Banks						0.005
						(0.18)
Blockholder Ownership*GLBA		-0.020 *	-0.119	-0.047 ***	-0.015	-0.017
		(-2.32)	(-1.43)	(-2.72)	(-1.3)	(-1.5)
Blockholder Owenrship*GLBA*Large Banks						-0.125 *
						(-1.77)
Blockholder Ownership*GLBA*Medium Banks						-0.035 *
						(-1.81)
Outside Director*GLBA		-0.021	0.024	0.025	-0.019	-0.017
		(-1.4)	(0.24)	(0.6)	(-1.11)	(-1.05)
Outside Director*GLBA*Large Banks						-0.016 **
						(-2.43)
Outside Director*GLBA*Medium Banks						-0.009 *
						(-1.89)
M&A =1 if Acquisition		-0.005 *	-0.003	-0.006 *	-0.006 **	-0.005 ***
		(-3.57)	(-0.58)	(-1.84)	(-3.4)	(-3.4)
Size	-/+	0.000	0.007 **	-0.001	0.003 **	0.000
		(0.2)	(1.97)	(-0.47)	(2.33)	(0.14)
Leverage	+	0.000	0.001	-0.001	0.000	0.000
		(1.41)	(0.79)	(-0.61)	(0.53)	(0.35)
Growth	+	0.080 *	0.063	0.078 ***	0.072 **	0.066 ***
		(6.24)	(1.27)	(2.83)	(4.53)	(4.72)
Concentration	+	0.024 *	-0.010	0.042 **	0.022 **	0.015 *
		(3.57)	(-0.27)	(2.37)	(2.89)	(1.71)
Non Interest Income	-/+	-0.016 *	0.080	-0.016	-0.018	0.001
		(-1.35)	(1.64)	(-0.61)	(-1.22)	(0.1)
Net Charge Offs	+	0.033 *	0.041 *	0.031 ***	0.032 **	0.034 ***
		(17.11)	(4.93)	(7.13)	(13.64)	(16.44)
Cost of Funds	+	0.088	0.461 **	0.249	0.117	0.224 ***
		(1.27)	(2.06)	(1.6)	(1.31)	(2.75)
Inefficiency	+	0.049 *	0.045	0.061 ***	0.058 **	0.062 ***
		(4.09)	(1.06)	(2.15)	(4.02)	(4.51)
Real GDP	-	-1.939 *	2.029	-2.131 ***	-1.905 **	-1.962 ***
		(-9.69)	(1.35)	(-4.56)	(-8.39)	(-10.1)
Large Banks						-0.095 **
						(-2.07)
Medium Banks						-0.015
						(-0.78)
Adjusted RSQ		51%	63%	53%	51%	53%
Number of BHCs		146	11	29	106	146
n		1,898	143	377	1,378	1,898
Assets			>$100B	$10B-$100B	<$10B	

*** Significant at 1%
** Significant at 5%
* Significant at 10%
Note: Cell Values are parameter estimates (t-ratios)

Table 56: Regression Results for the Random Effects Model by Peer Group for Systematic Risk

		Systematic Risk				
	Expected Sign	Base	Large	Medium	Small	Size dummy interacted with Hypothesys variables
Intercept		-1.852 ***	-1.455	-0.800	-2.626 ***	-2.537 ***
		(-7.2)	(-1.13)	(-1.02)	(-6.95)	(-6.88)
Insider Ownership		0.060	0.883	-1.411 ***	0.618 ***	0.461 *
		(0.29)	(0.45)	(-3.1)	(2.69)	(1.78)
Large Banks* Insider Ownership						-0.092
						(-0.04)
Medium Banks*Insider Ownership						-2.608 ***
						(-4.13)
Blockholder Ownership		0.078	1.355 **	-0.074	0.075	0.077
		(0.71)	(2.38)	(-0.33)	(0.59)	(0.59)
Large Banks*Blockholder Ownership						0.852
						(1.44)
Medium Banks*Blockholder Ownership						-0.111
						(-0.42)
Outside Director		0.136	0.631	-0.218	-0.249	-0.259
		(0.78)	(0.71)	(-0.47)	(-1.32)	(-1.43)
Large Banks*Outside Director						0.761
						(1.2)
Medium Banks*Outside Director						0.463
						(1.58)
GLBA Dummy (1 > Yr 1999)		0.004	-0.237	-0.659	-0.245	-0.277 *
		(0.03)	(-0.25)	(-1.51)	(-1.34)	(-1.67)
SOX Dummy (1 > Yr 2002)		-0.270 *	-0.036	-0.109 *	-0.358 ***	-0.261 ***
		(-9.54)	(-0.35)	(-1.83)	(-10.78)	(-9.08)
Crisis Dummy (1 > Yr 2006)		0.078 **	0.144	0.079	0.050	0.055 *
		(2.5)	(1.38)	(1.17)	(1.42)	(1.83)
Insider Ownership*GLBA		-0.189	0.027	0.112	-0.218	-0.258
		(-1.3)	(0.1)	(0.48)	(-0.95)	(-1.13)
Insider Ownership*GLBA*Large Banks						0.134
						(0.37)
Insider Ownership*GLBA*Medium Banks						0.234
						(0.71)
Blockholder Ownership*GLBA		0.016	-0.401	0.239	-0.205	-0.084
		(0.14)	(-0.46)	(1.17)	(-1.41)	(-0.58)
Blockholder Owenrship*GLBA*Large Banks						-1.297
						(-1.47)
Blockholder Ownership*GLBA*Medium Banks						0.006
						(0.02)
Outside Director*GLBA		-0.153	-0.131	0.520	0.219	0.315
		(-0.78)	(-0.12)	(1.03)	(1.02)	(1.6)
Outside Director*GLBA*Large Banks						-0.645 ***
						(-7.69)
Outside Director*GLBA*Medium Banks						-0.435 ***
						(-7.17)
M&A =1 if Acquisition		-0.030 *	-0.074	0.000	-0.054 **	-0.033 *
		(-1.66)	(-1.27)	(0)	(-2.53)	(-1.85)
Size	-/+	0.105 ***	0.041	0.054	0.188 ***	0.170 ***
		(8.3)	(0.82)	(1.4)	(8)	(7.26)
Leverage	+	0.010 **	0.014	-0.009	-0.001	0.001
		(2.26)	(0.75)	(-0.79)	(-0.17)	(0.23)
Growth	+	0.299 *	0.257	0.580 *	-0.256	0.386 **
		(1.7)	(0.49)	(1.69)	(-1.2)	(2.2)
Concentration	+	0.613 ***	-0.321	0.641 **	0.576 ***	0.643 ***
		(5.8)	(-0.68)	(2.37)	(5.14)	(5.79)
Non Interest Income	-/+	-0.188	0.223	0.122	-0.340	-0.058
		(-1.06)	(0.42)	(0.34)	(-1.59)	(-0.31)
Net Charge Offs	+	0.152 ***	0.310 ***	0.106 *	0.142 ***	0.150 ***
		(5.79)	(3.39)	(1.96)	(4.64)	(5.77)
Cost of Funds	+	1.730 *	2.114	3.834 *	3.672 ***	3.106 ***
		(1.73)	(0.84)	(1.9)	(3.01)	(3.05)
Inefficiency	+	-0.117	1.231 ***	0.711 *	-0.252	-0.034
		(-0.69)	(2.62)	(1.84)	(-1.29)	(-0.2)
Real GDP	-	24.938 ***	30.924 ***	34.999 ***	21.751 ***	24.630 ***
		(9.89)	(3.53)	(6.44)	(7.68)	(10.19)
Large Banks						-0.653
						(-1.13)
Medium Banks						-0.090
						(-0.36)
Adjusted RSQ		24%	50%	32%	31%	30%
Number of BHCs		146	11	29	106	146
n		1,898	143	377	1,378	1,898
Assets			>$100B	$10B-$100B	<$10B	

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Note: Cell Values are parameter estimates (t-ratios)

Table 57: Regression Results for the Random Effects Model by Peer Group for Firm Risk

	Expected Sign	Firm Risk				
		Base	Large	Medium	Small	Size dummy interacted with Hypothesys variables
Intercept		0.069 ***	0.041	0.053	0.044 **	0.046 ***
		(5.33)	(0.7)	(1.51)	(2.32)	(2.8)
Insider Ownership		-0.006	0.017	-0.049 **	0.002	0.000
		(-0.57)	(0.17)	(-2.47)	(0.16)	(-0.02)
Large Banks* Insider Ownership						-0.116
						(-1.1)
Medium Banks*Insider Ownership						-0.050 *
						(-1.83)
Blockholder Ownership		0.010 *	0.047	-0.049 **	0.002	0.002
		(1.88)	(1.65)	(-2.47)	(0.16)	(0.3)
Large Banks*Blockholder Ownership						0.066 **
						(2.31)
Medium Banks*Blockholder Ownership						0.028 **
						(2.27)
Outside Director		0.004	0.039 *	0.029 **'	0.003	0.009
		(0.47)	(0.84)	(2.82)	(0.44)	(0.98)
Large Banks*Outside Director						0.012
						(0.4)
Medium Banks*Outside Director						-0.018
						(-1.33)
GLBA Dummy (1 > Yr 1999)		0.009	0.011	0.010	0.004	0.010
		(1.14)	(0.22)	(0.49)	(0.4)	(1.26)
SOX Dummy (1 > Yr 2002)		-0.026 ***	-0.034	0.026	0.005	-0.027 ***
		(-19.5)	(-6.31)	(1.24)	(0.5)	(-19.58)
Crisis Dummy (1 > Yr 2006)		0.009 ***	0.018 ***	-0.032 **'	-0.025 **'	0.009 ***
		(6.09)	(3.2)	(-11.23)	(-15.19)	(5.92)
Insider Ownership*GLBA		-0.010	-0.038 ***	0.005	0.009 **'	-0.002
		(-1.4)	(-2.83)	(1.49)	(4.97)	(-0.17)
Insider Ownership*GLBA*Large Banks						-0.037 **
						(-2.11)
Insider Ownership*GLBA*Medium Banks						-0.003
						(-0.19)
Blockholder Ownership*GLBA		-0.001	-0.019 ***	0.001	-0.003	0.006
		(-0.25)	(-0.41)	(0.09)	(-0.24)	(0.87)
Blockholder Owenrship*GLBA*Large Banks						-0.043
						(-0.98)
Blockholder Ownership*GLBA*Medium Banks						-0.033 ***
						(-2.79)
Outside Director*GLBA		-0.003	0.010	-0.024 **	0.004	-0.008
		(-0.37)	(0.17)	(-2.43)	(0.59)	(-0.83)
Outside Director*GLBA*Large Banks						0.013 ***
						(3.22)
Outside Director*GLBA*Medium Banks						0.007 **
						(2.3)
M&A =1 if Acquisition		-0.002 **	0.002	-0.014	-0.003	-0.002 ***
		(-2.27)	(0.73)	(-0.61)	(-0.28)	(-2.6)
Size	-/+	0.002 ***	-0.003	-0.001	-0.003 **'	0.000
		(3.22)	(-1.57)	(-0.75)	(-3.25)	(-0.48)
Leverage	+	0.000	0.000	-0.002	0.000	0.000
		(1.22)	(0.29)	(-1.2)	(0.11)	(1.38)
Growth	+	0.052 ***	0.029	-0.001 **	0.001 **	0.048 ***
		(6.19)	(1.04)	(-2.5)	(2.5)	(5.67)
Concentration	+	0.017 ***	0.014	0.058 **'	0.043 **'	0.016 ***
		(3.26)	(0.66)	(3.61)	(4.05)	(3.17)
Non Interest Income	-/+	0.012	0.035	0.041 **'	0.014 **	0.009
		(1.35)	(1.29)	(3.35)	(2.45)	(1.03)
Net Charge Offs	+	0.025 ***	0.026	-0.001	0.009	0.024 ***
		(19.48)	(5.58)	(-0.08)	(0.85)	(19.25)
Cost of Funds	+	0.113 ***	0.100 ***	0.026 **'	0.023 **'	0.127 **
		(-2.32)	(0.8)	(10.26)	(14.94)	(2.6)
Inefficiency	+	0.046 ***	0.027	0.038	0.166 **'	0.046 ***
		(5.61)	(1.15)	(0.41)	(2.71)	(5.63)
Real GDP	-	-0.763 ***	-0.658	0.068 **'	0.040 **'	-0.735 ***
		(-6.38)	(-1.36)	(3.78)	(4.11)	(-6.13)
Large Banks						-0.029
						(-1.04)
Medium Banks						0.006
						(0.54)
Adjusted RSQ		53%	-66%	-73% **'	-76% **'	54%
Number of BHCs		146	11	29	106	146
n		1,898	143	377	1,378	1,898
Assets			>$100B	$10B-$100B	<$10B	

*** Significant at 1%
** Significant at 5%
* Significant at 10%
Note: Cell Values are parameter estimates (t-ratios)

Table 58: Regression Results for the Random Effects Model by Peer Group for Risk Index

		Risk Index				
	Expected Sign	Base	Large	Medium	Small	Size dummy interacted with Hypothesys variables
Intercept		0.261	5.829	1.771	-0.639	0.445
		(0.28)	(1.21)	(0.62)	(-0.47)	(0.37)
Insider Ownership		-0.914	-8.798	-8.466 ***	0.860	0.556
		(-1.23)	(-1.21)	(-4.92)	(1.05)	(0.65)
Large Banks* Insider Ownership						-9.225
						(-1.24)
Medium Banks*Insider Ownership						-8.698 ***
						(-4.24)
Blockholder Ownership		0.211	3.272	1.078	-0.079	-0.226
		(0.56)	(1.54)	(1.33)	(-0.18)	(-0.5)
Large Banks*Blockholder Ownership						3.287
						(1.62)
Medium Banks*Blockholder Ownership						1.368
						(1.54)
Outside Director		0.724	6.150 *	0.364	0.041	0.297
		(1.23)	(1.85)	(0.23)	(0.06)	(0.48)
Large Banks*Outside Director						4.671 **
						(2.15)
Medium Banks*Outside Director						-0.035
						(-0.04)
GLBA Dummy (1 > Yr 1999)		0.615	0.246	0.213	0.090	0.355
		(1.09)	(0.07)	(0.14)	(0.14)	(0.62)
SOX Dummy (1 > Yr 2002)		-0.776 ***	-1.294 ***	-1.170 ***	-0.595 ***	-0.756 ***
		(-8.11)	(-3.36)	(-5.7)	(-5.09)	(-7.7)
Crisis Dummy (1 > Yr 2006)		0.713 ***	1.208 ***	0.662 ***	0.699 ***	0.719 ***
		(6.79)	(3.1)	(2.91)	(5.65)	(6.88)
Insider Ownership*GLBA		-0.698	-0.383	-0.689	-0.437	-0.553
		(-1.42)	(-0.39)	(-0.86)	(-0.55)	(-0.7)
Insider Ownership*GLBA*Large Banks						-0.464
						(-0.37)
Insider Ownership*GLBA*Medium Banks						-0.327
						(-0.29)
Blockholder Ownership*GLBA		-0.399	-4.160	-1.783 **	-0.319	-0.100
		(-1.05)	(-1.28)	(-2.56)	(-0.63)	(-0.2)
Blockholder Owenrship*GLBA*Large Banks						-8.690 ***
						(-2.86)
Blockholder Ownership*GLBA*Medium Banks						-1.868 **
						(-2.24)
Outside Director*GLBA		-0.999	-0.252	-0.463	-0.368	-0.567
		(-1.52)	(-0.06)	(-0.27)	(-0.49)	(-0.84)
Outside Director*GLBA*Large Banks						-0.614 **
						(-2.12)
Outside Director*GLBA*Medium Banks						-0.229
						(-1.09)
M&A =1 if Acquisition		-0.155 ***	0.075	-0.179	-0.195 ***	-0.150 **
		(-2.51)	(0.35)	(-1.39)	(-2.62)	(-2.45)
Size	-/+	0.140 ***	0.348 *	0.009	0.274 ***	0.144 *
		(2.89)	(1.86)	(0.07)	(3.2)	(1.91)
Leverage	+	0.070 ***	0.070	0.020	0.053 ***	0.056 ***
		(4.59)	(1.01)	(0.51)	(2.98)	(3.62)
Growth	+	2.132 ***	0.075	2.377 **	2.123 ***	2.079 ***
		(3.58)	(0.04)	(2.02)	(2.84)	(3.46)
Concentration	+	1.761 ***	3.201 ***	3.054 ***	1.674 ***	1.744 ***
		(4.74)	(1.82)	(3.13)	(4.19)	(4.67)
Non Interest Income	-/+	0.048	-0.396	-0.578	0.123	-0.030
		(0.08)	(-0.2)	(-0.47)	(0.16)	(-0.05)
Net Charge Offs	+	1.695 ***	1.822 *	1.366 ***	1.760 ***	1.682 ***
		(19.01)	(5.34)	(7.38)	(16.34)	(18.86)
Cost of Funds	+	8.106 *	1.069	2.303	8.426 **	6.766 *
		(2.35)	(0.11)	(0.33)	(0.95)	(1.95)
Inefficiency	+	1.883 ***	3.605 **	5.674 ***	0.845	2.066 ***
		(3.23)	(2.06)	(4.22)	(1.22)	(3.55)
Real GDP	-	-2.225	-0.182	-12.273	2.435	-2.749
		(-0.26)	(-0.01)	(-0.67)	(0.25)	(-0.33)
Large Banks						-3.413 *
						(-1.73)
Medium Banks						0.696
						(0.83)
Adjusted RSQ		40%	59%	49%	39%	42%
Number of BHCs		146	11	29	106	146
n		1,898	143	377	1,378	1,898
Assets			>$100B	$10B-$100B	<$10B	

*** Significant at 1%
** Significant at 5%
* Significant at 10%
Note: Cell Values are parameter estimates (t-ratios)

5.6 Quantile Regression Analysis

Quantile regression analysis has become an important statistical technique that aims to provide a more comprehensive view to the conventional linear regression models (Koenker and Hallok, 2001). While the least squares method and linear regression models estimate coefficients that approximate the conditional mean, the quantile regression estimates the deviations from the conditional median or specified quantiles. Quantile regression is used in this analysis to assess the stability of the regression model specification between the 20^{th} and 80^{th} quantiles, as usually strange relationships are likely to be captured in the tails of the distribution due to thinness of the data.

In Figures 2 through 7, the quantile regressions are plotted for each of the 20 coefficients of explanatory variable by each risk measure, the dependent variables. The solid grey line (horizontal line) in each graph represents the estimate from the OLS regression. The solid black line in each figure shows the estimate for the quantile, with the shaded grey area depicting the 95 percent confidence interval band for the quantile regression estimates.

When comparing the quantile regression for the Insolvency Risk model with the least squares estimates (Figure 2), it can be concluded that for most of the explanatory variables the estimates are stable with the exception of Net Charge Offs and Inefficiency. While Net Charge Offs has an incremental impact in Insolvency Risk of 0.8, the impact is much larger at the 60th quantiles and above. According to the panel regression,

Inefficiency had and incremental impact in Insolvency Risk of 3.7, however, the impact is about 2.0 in the distribution between the 20th and 60th quantile.

The quantile regression for SDROA model (Figure 3) and SDROE (Figure 4) models show disparities in the variables Concentration and Net Charge offs, where the impact is lower at the lower quantiles of the distribution.

The Total Risk model (Figure 5) shows stable estimates, except for some disproportions for the impact of Net Charge Offs, where the impact is lower for the tails of the distribution and higher between the 40th and 80th quantiles. Turning to the Systematic Risk Model (Figure 6), unequal responses are apparent in the case of Size and Net Charge Offs. Size has a higher incremental impact on risk in the right tail of the distribution and Net Charge Offs has a lower incremental impact at the left tail of the distribution. Net Charge Offs also shows wide impact variation in Firm Risk at both ends of the distribution (Figure 7).

Figure 2: Least Squares and Quantile Regression Estimates for Insolvency Risk (Z-Score) Model to Examine Stability of OLS Model Specification

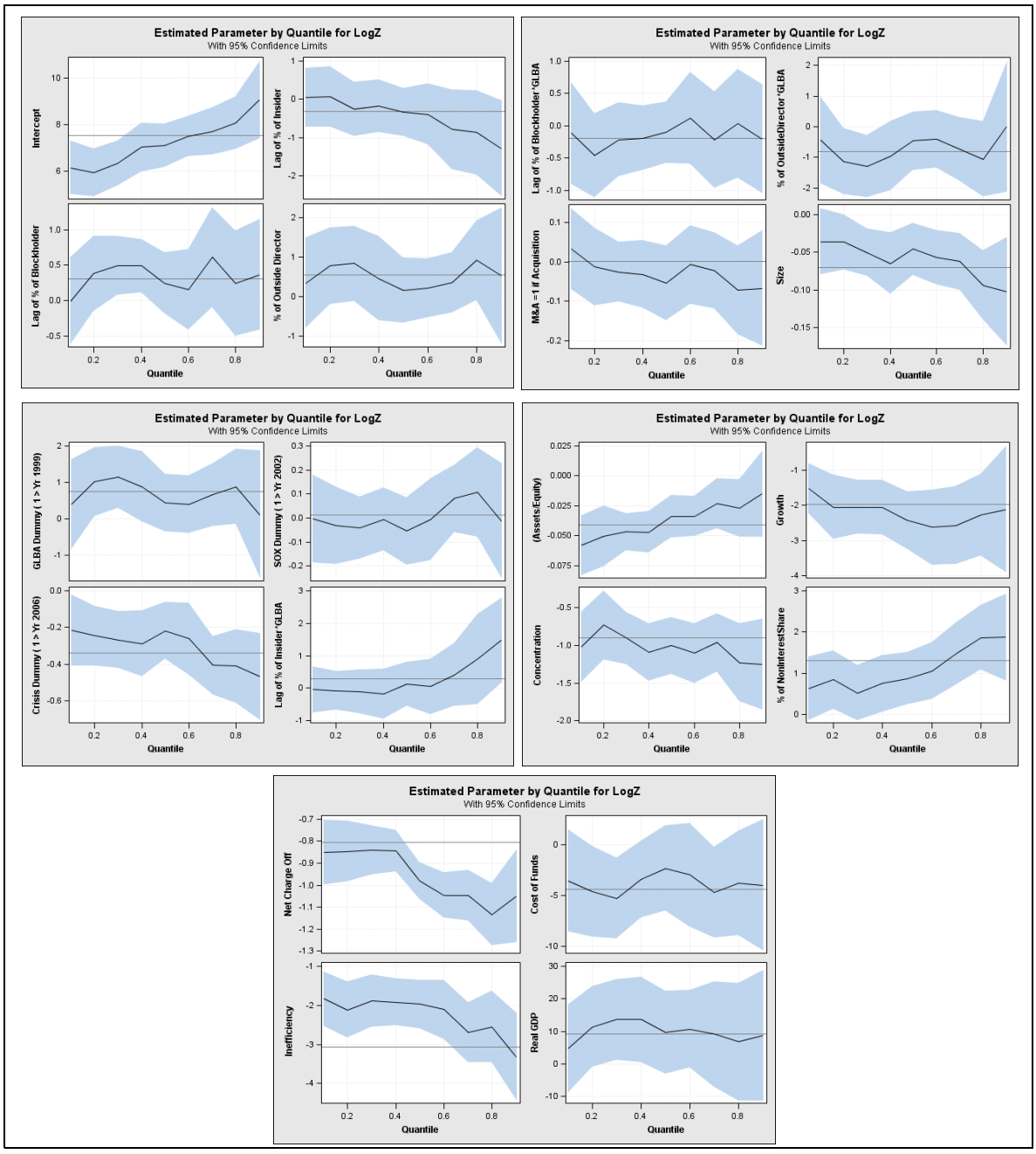


Figure 3: Least Squares and Quantile Regression Estimates for SDROA Model to Examine Stability of OLS Model Specification

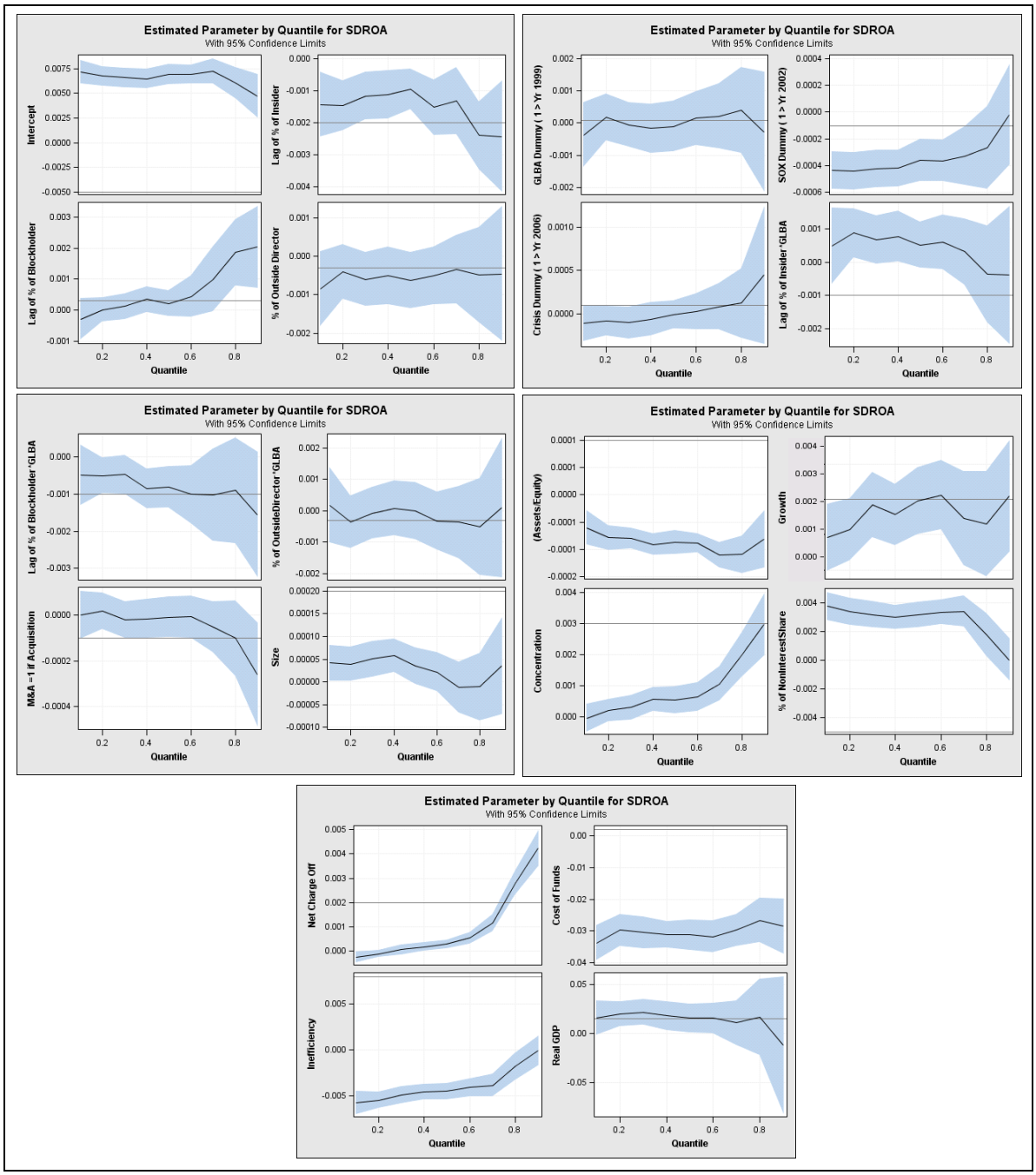


Figure 4: Least Squares and Quantile Regression Estimates for SDROE Model to Examine Stability of OLS Model Specification

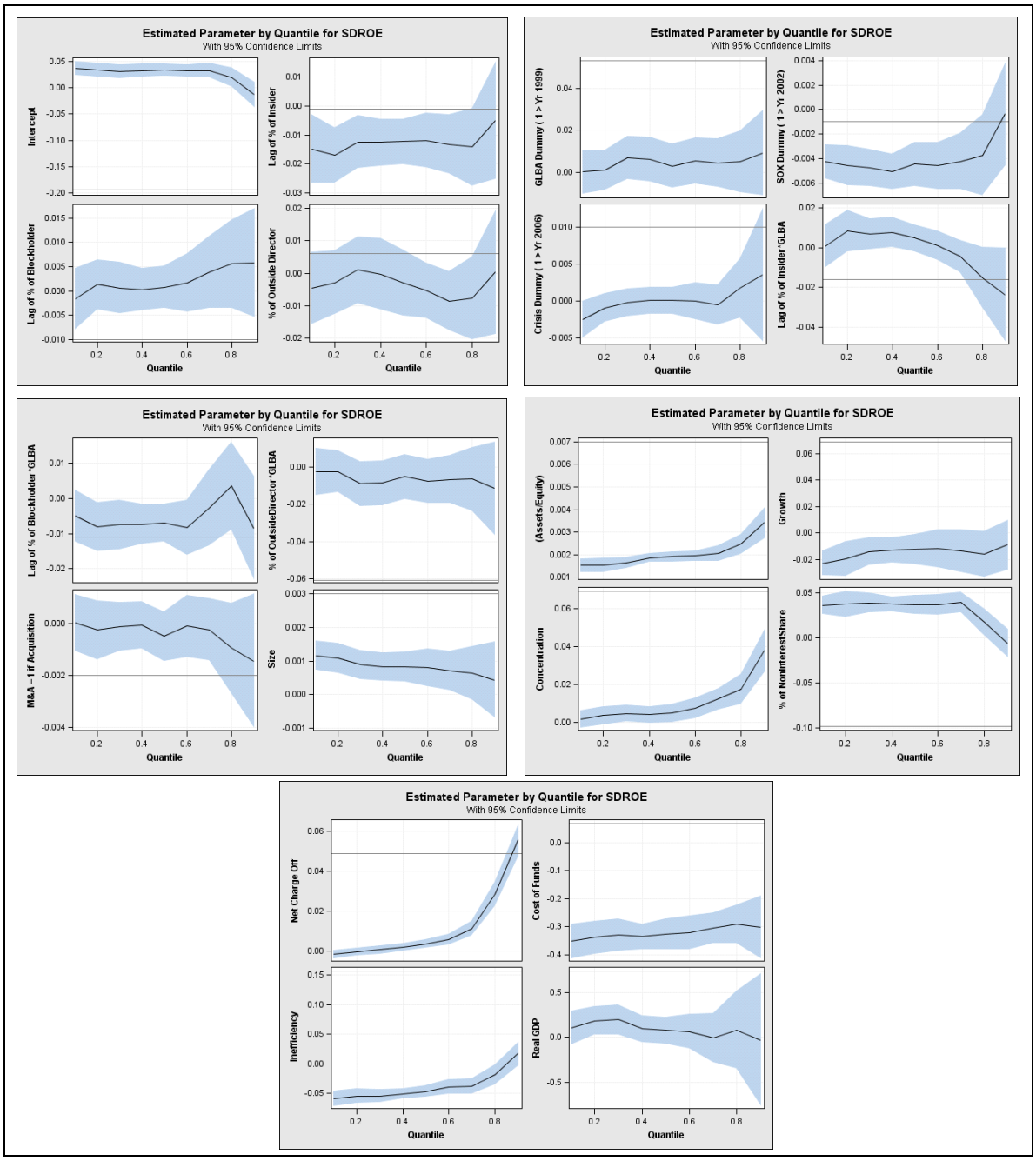


Figure 5: Least Squares and Quantile Regression Estimates for Total Risk Model Examine Stability of OLS Model Specification

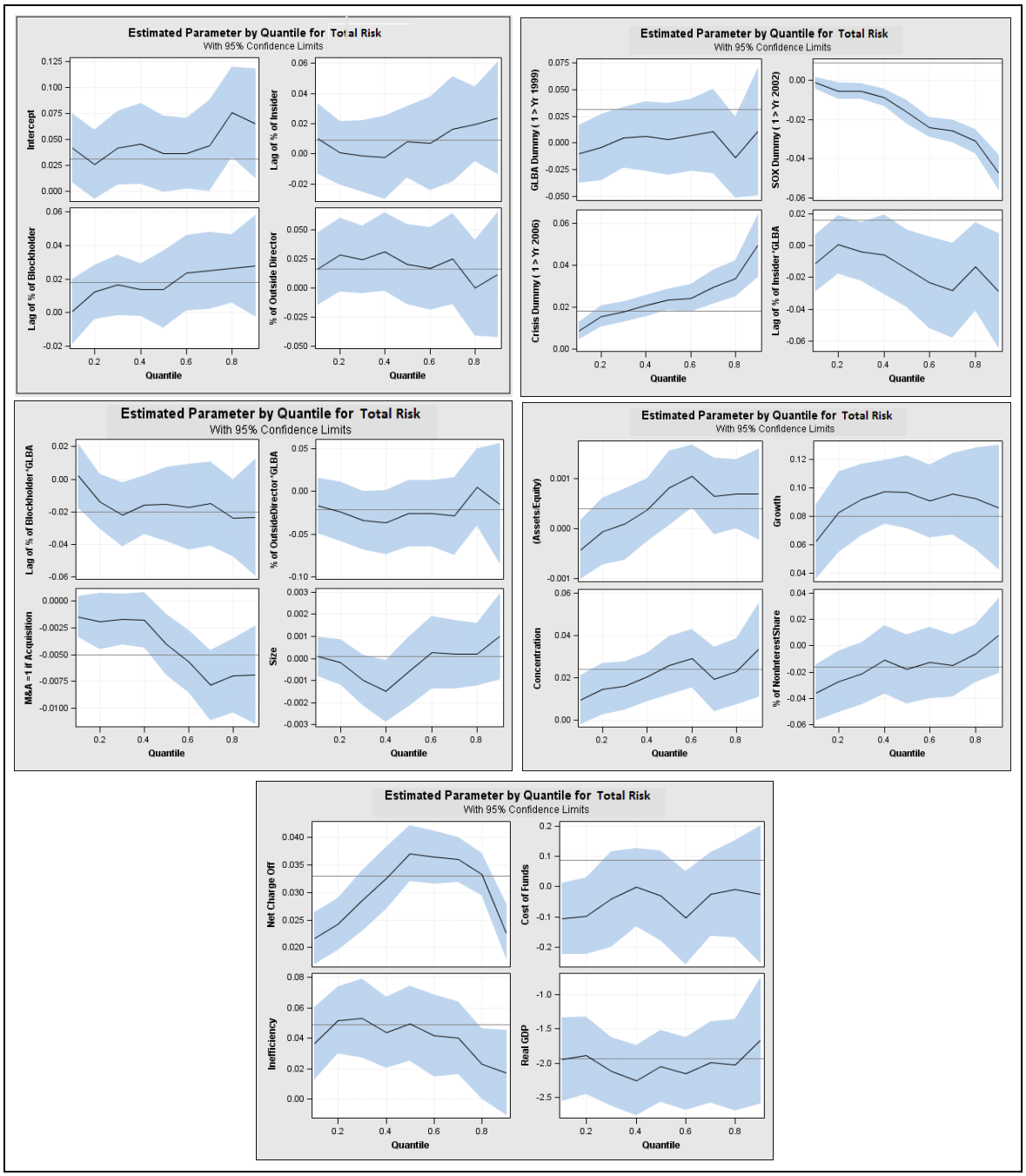


Figure 6: Least Squares and Quantile Regression Estimates for Systematic Risk Model to Examine Stability of OLS Model Specification

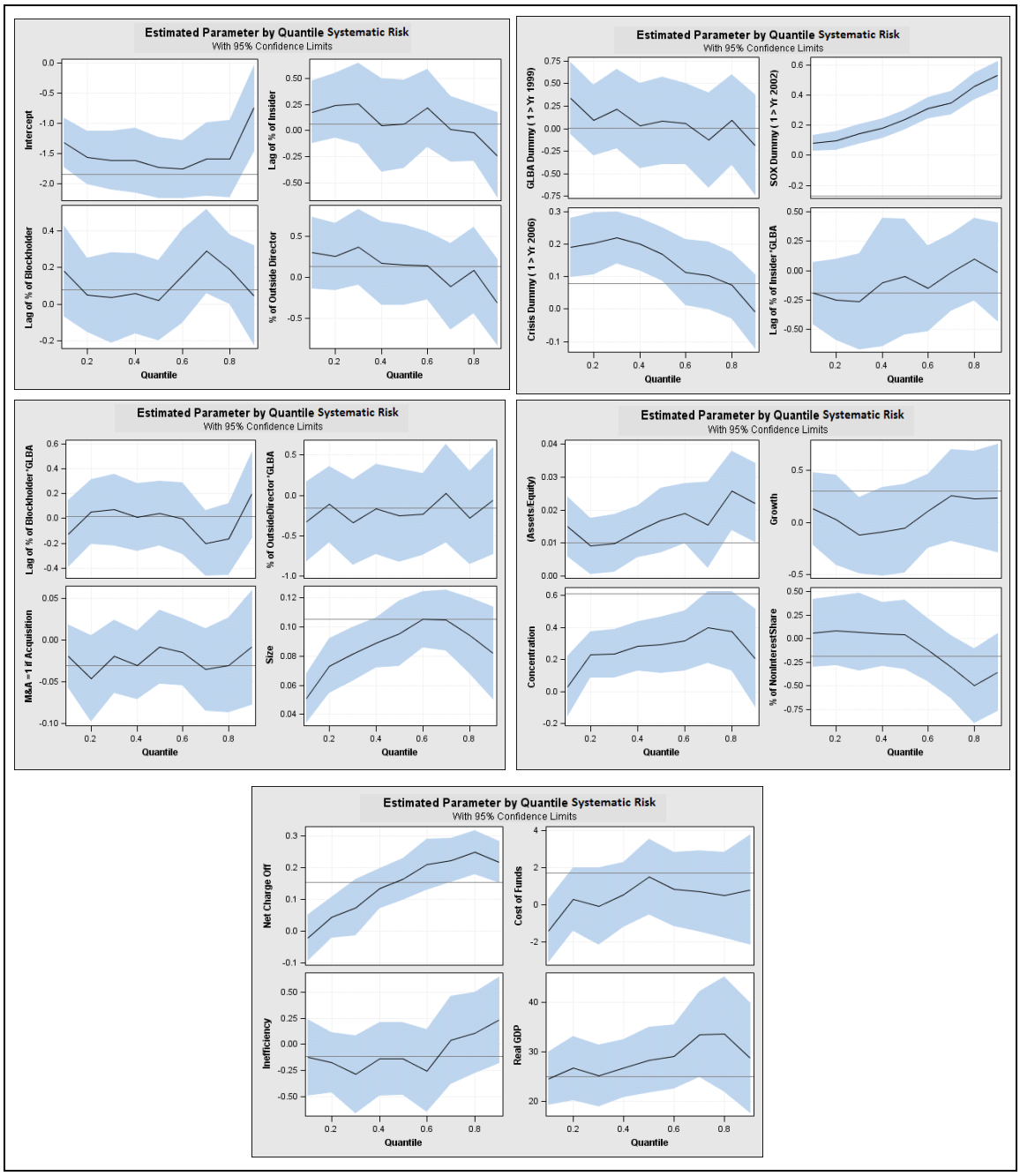


Figure 7: Least Squares and Quantile Regression Estimates for Firm Risk Model to Examine Stability of OLS Model Specification

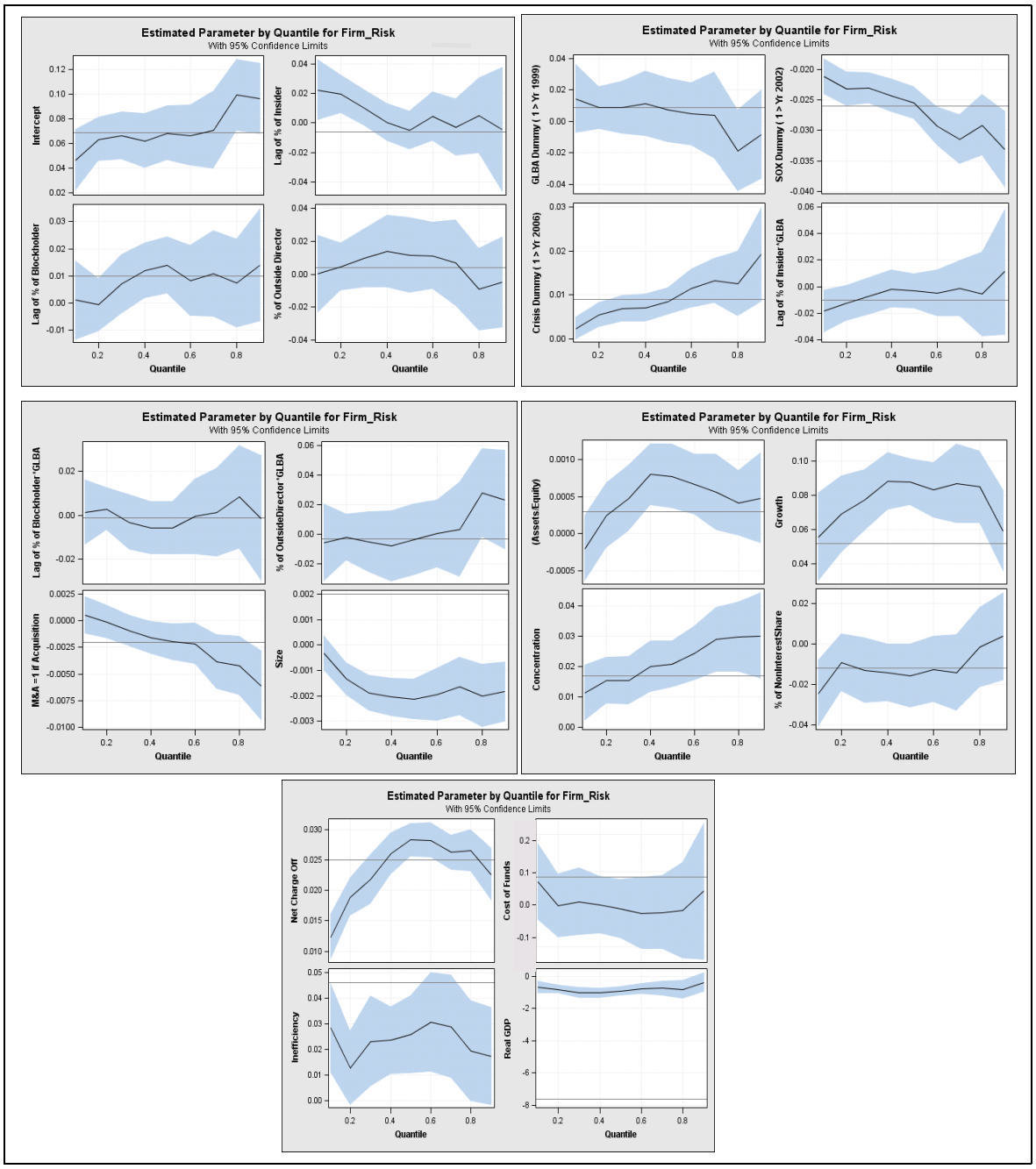
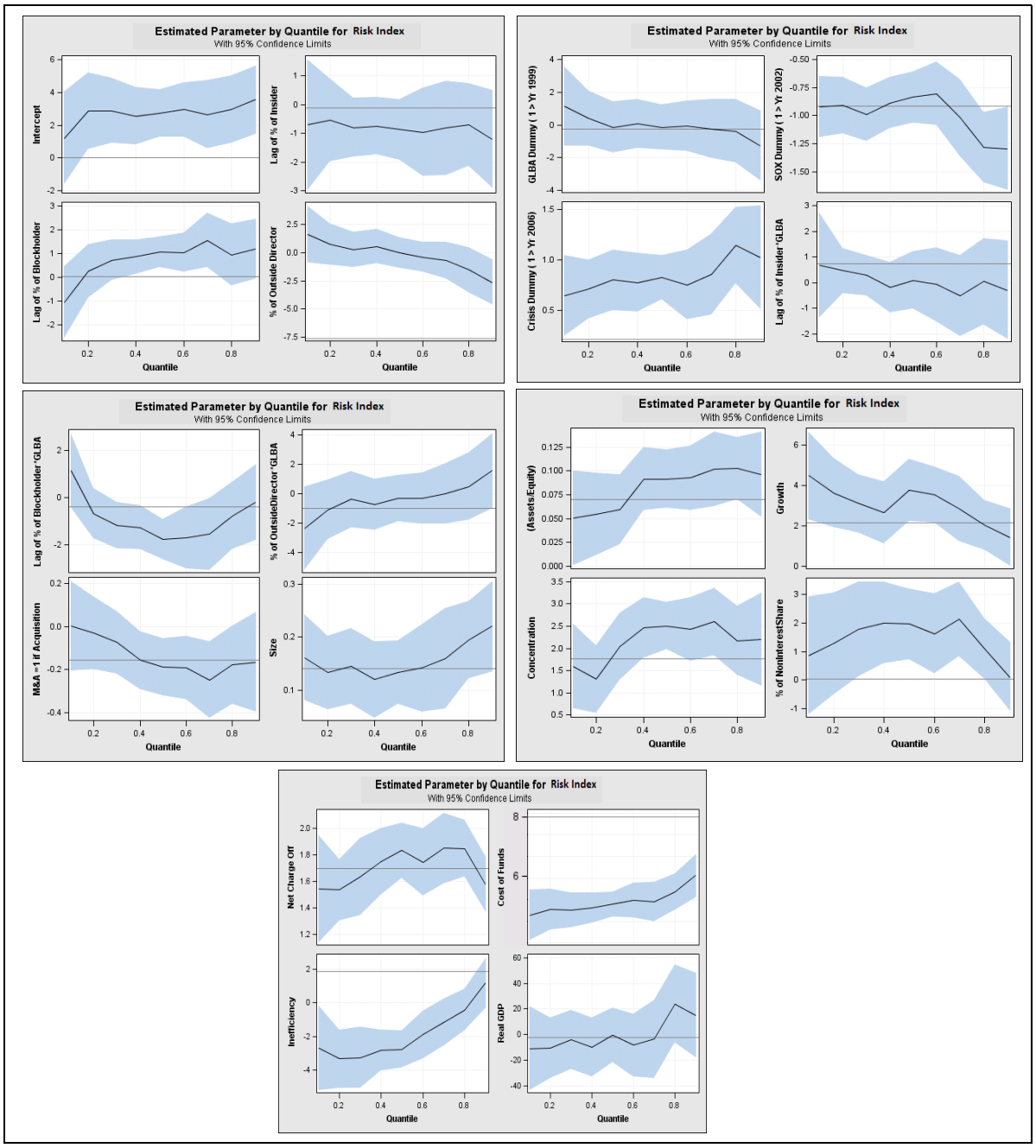


Figure 8: Least Squares and Quantile Regression Estimates for Risk Index Model to Examine Stability of OLS Model Specification



CHAPTER VI

CONCLUSIONS AND IMPLICATIONS

Deregulation after the passage of the GLBA allowed the U.S banking industry to broaden banks' sources of income, by advancing into more nontraditional fee-generating banking activities. Theory indicates potential conflicts among stakeholders in BHCs and points that regulatory shift would have a different impact on bank risk depending on the governance structure of BHCs. This dissertation examines theories from corporate governance and banking literatures to assess four issues: 1) How has the GLBA passage impacted the risk profile of banks? 2) Do corporate governance mechanisms tie into the changing financial regulatory environment?, 3) How do ownership and board structures interact with regulation, and together how do they influence bank risk profile?, and 4) After 9 years of the Act's passage, how do balance sheet data and new measures of risk help better assess the bank's risk-taking behavior?

This dissertation finds that the BHC risk profile would change after the passage of the GLBA. The change, however, differs between book-based and market-based risk measures. BHCs tend to have higher book-based risk measures, but lower market=based risks measures. Insolvency Risk (Z-Score) and the standard deviation of ROA are found

to be significantly higher after the passage of the Act, while Total Risk and Systematic Risk were found to be lower. These findings remain essentially the same when the analysis is conducted at the peer group level, universal versus traditional BHCs, and when controlled for the financial crisis of 2007-2009.

Significant differences found among various risk measures across BHCs with high, medium and low levels of Insider Ownership leads us to conclude that bank risk-taking behavior somewhat differs according to managerial stock ownership. Higher risk profiles are characteristic of BHCs where Insider Ownership is lower. Extending the analysis by peer group shows that this finding is characteristic of large and medium BHCs with low ownership. Introducing the regulatory change into the analysis leads us to conclude that the Insolvency Risk (Z-score) of BHCs differs according to the regulatory environment, for a high and low levels of Insider Ownership concentration. The lack of statistical significance in other risk measures may be explained by managers' behavior complying with the pre-existing mandates such as the issuance of prompt corrective actions when financial or managerial weakness surfaces.

Risk profile differences are found among BHCs with different levels of Blockholder Ownership. The results show that a moderate level of Blockholder ownership is associated with lower Insolvency Risk, while higher Blockholder Ownership concentration is associated with higher market-based risk measures. Extending the analysis to the peer group by asset size reveals that the dynamic between risk (as measured by the Insolvency Risk, Total Risk, Systematic Risk and Firm Risk) and

ownership is particularly evident for small BHCs with different levels of concentration, where as high levels of Blockholder Ownership are associated with higher risks. Introducing the regulatory changes with confirms higher Insolvency Risks for high and low levels of Blockholder Ownership in small BHCs after the passage of the Act. The analysis between risk profiles and the degree of board independence shows that bank risk does not differ by proportion of Outside Directors in the board. However, after the regulatory changes in GLBA, the risk is higher across all levels of Outside Directors in the board in small BHCs. In summary, as regulators are concerned with the insolvency risk of BHCs, the results call for a closer attention to small BHCs with high and low Insider Ownership levels, and, high and low blockholder ownership levels, regardless of the proportion of Outside Directors.

In the 13-year period covered by the analysis, the U.S Banking Industry has shifted away from traditional banking activities towards activities that generate more fee income and other types of non-interest revenue. This shift is evident in particular for medium and small BHCs after the implementation of the GLBA, as seemingly, large BHCs had been conducting nontraditional banking activities even prior to the passage of the Act through the Section 20 exemptions. While it has been argued that the passage of the GLBA created an environment for potential increase in bank risk as they entered into riskier activities with securities and insurance businesses, the results indicate that nontraditional banking activities have enabled a decrease in the risk profile of banks through revenue diversification benefits.

Consequent upon this structural regulatory change, as BHCs have expanded into more nontraditional activities, medium and large BHCs have become better capitalized, with improvement in the core capital ratio from 8% in 1997 to 10% in 2009. Nevertheless, banks continue to be characterized by high financial leverage, which has a direct impact on risk. The liquidity and funding structure for small and medium BHCs differs from their large BHC counterparts, with the latter relying on more expensive funds. Risk profile is found to be an increasing function of the cost of funds.

At the aggregate level, the results from regression analysis suggest managerial ownership has no influence in the risk profile of BHCs. While Insider Ownership is found to decrease the volatility of ROA, the impact is minimal and the lack of significance in the regressions with other risk variables does not allow us to definitively conclude that managerial ownership has an impact in the risk profile of banks. Blockholder Ownership affects bank risk-taking, particularly market based risk measures, regardless of the regulatory environment. These results are consistent with the argument that Blockholders with concentrated wealth prefer that managers follow less risky investment strategies. Outside Directors are found to not have an influence over any of the risk measures capturing the risk profile of banks. The lack of a relationship between Outside Directors on the board and risk is counter to the argument that outsiders on the board are effective in their monitoring and advising functions. While the corporate governance literature has found evidence of a relationship between board independence and firm performance, it is possible that the presence of regulation in the banking industry might be the mitigating factor for the agency problem, in effect controlling the

risk profile of banks. With the introduction of the deregulatory change, managerial and blockholder ownership have a decreasing impact on Total Risk, while Outside Directors has an increasing impact on Insolvency Risk.

In the peer group analysis, it appears that the interaction between regulation and ownership leads to distinctive conclusions. Insider Ownership is found to have a consistent impact on the risk profile of medium BHCs. That is, managers with large equity holdings tend to pursue less risky strategies that reduce the risk profile of medium BHCs. On the other hand, Insider Ownership is found to increase the Systematic Risk and the volatility of ROA in small BHCs, indicating that managers' incentives are aligned with outside shareholders as they show a preference for riskier investments to maximize the equity call option value. Finally, the evidence suggests that Insider Ownership does not influence the risk profile of large BHCs.

Blockholder ownership is found to have an increasing impact on the Firm Risk of medium and large BHCs; however, after the passage of the Act the presence of Blockholder Ownership is found to favor the risk in large BHCs with a net reduction in risk.

Outside Directors are found to have a U-shaped relationship with Firm Risk, where the minimum level of Firm Risk is achieved at 70% of Outside Director presence. Consistent with the findings of Adams and Mehran (2008), independent boards do not prove to be more effective in the monitoring function to control excessive risk-taking.

This dissertation contributes to the finance and banking literature by using an integrated approach to understanding corporate governance and regulation in risk-taking within the banking industry. With a comprehensive period of time coverage, this dissertation illustrates that corporate governance mechanisms tie into the changing regulatory environment and have an effect on bank risk-taking. The findings of the study imply that regulatory and governance structures comingle with respect to their beneficial roles in monitoring banks and reduction of agency costs.

Future research in the literature of corporate governance in banks and regulation should include periods subsequent to the financial crisis of 2007-2009, considering that the banking industry is subject to the implementation of new regulations such as the Consumer Protection Act and further enhancements to the Basel III framework and its implementation in the United States.

Findings about the relationship between corporate governance mechanisms and bank regulation indicate that policy makers should consider corporate governance structures in the design of banking regulation, and that investors should also consider governance structures and the degree of banking regulation in their investment decision. Regulatory agencies should exert closer monitoring in assessing the insolvency risk of BHCs with higher presence of Outside Directors after the passage of deregulatory legislation; in particular, to the Insolvency Risk of small BHCs.

REFERENCES

Adams, R. and H. Mehran (2003). Is Corporate Governance Different for Bank Holding Companies? *Federal Reserve Bank of New York Economic Policy Review*, 9, 123-142.

Adams, R. and H. Mehran (2008). Corporate Performance, Board Structure, and Their Determinants in the Banking Industry. *Federal Reserve Bank of New York Staff Reports*, no. 330.

Aharony, J., A. Saunders and I. Swary (1988). The Effects of DIDMCA on bank stockholders' returns and risk. *Journal of Banking and Finance*, 12, 317-31.

Akhigbe, A. and A. D. Martin (2006).Valuation impact of Sarbanes-Oxley: Evidence from disclosure and governance within the financial services industry. *The Journal of Banking and Finance*, 30, 989-1006.

Akhigbe, A. and A. D. Martin (2008). Influence of Disclosure and Governance on Risk of US Financial Services firms following Sarbanes-Oxley. *The Journal of Banking and Finance*, 32, 2124-2135.

Akhigbe, A. and A. M. Whyte (2001). The Market's Assessment of Financial Services Modernization Act of 1999. *The Financial Review*, 36, 119-38.

Akhigbe, A. and A. M. Whyte (2004). The Gramm-Leach-Bliley Act of 1999: Risk Implications for the Financial Services Industries. *The Journal of Financial Research*, 27, 435-46.

Anderson, C.R. and D. R. Fraser (2000). Corporate Control, Bank Risk Taking, and the Health of the Banking Industry. *Journal of Banking and Finance*, 24, 1383-1398.

Ashbaugh-Skaife, H., D. W. Collins, W. R. Kinney Jr, and R. Lafond (2009). The Effect of SOX Internal Control Deficiencies on Firm Risk and Cost of Equity. *Journal of Accounting Research*, 47, 1-43.

Bathala, C. and R. P. Rao (1995). The Determinants of Board Composition: An Agency Theory Perspective. *Managerial and Decision Economics* 16 (January-February), 59-69.

Bathala, C., S. Nippani, R. Vinjamury (2007). Industry Differences in Corporate Governance: The Case of Banking and Nonbanking Firms. *ICFAI Journal of Applied Finance*, 13, 17-25.

Belkhir, M. (2005). Additional Evidence on Insider Ownership and Bank Risk-Taking. *Banques et Marche*, 78, 34-43.

Berger, A. N, and L. J. Mester (1999). What Explains the Dramatic Changes in Cost and Profit Performance of the U.S. Banking Industry? *Wharton Financial Institutions Center Working Paper,* 99-10.

Berger, A. N., R. S. Demsetz, and P. Strahan (1999). The Consolidation of the Financial Services Industry: Causes, Consequences and implications for the future. *Journal of Banking and Finance*, 23, 135-194.

Bethel, J.E., J. P. Liebeskind and T. Opler (1998). Block Share Purchases and Corporate Performance. *Journal of Finance*, 53, 605-35.

Black, F. (1975). Bank Funds Management in an Efficient Market. *Journal of Financial Economics* 2, 323-39.

Borokhovich, K., K. R. Brunarski, Y. SS. Harman and R. Parrino (2006). Variation in the Monitoring Incentives of Outside Stockholders. *Journal of Law and Economics*, 49, 651-680.

Boyd, J H., S. L. Graham and R.S. Hewitt (1993). Bank Holding Company Mergers with Nonbank Financial Firms: Effects on the Risk of Failure. *Journal of Banking and Finance,* 1, 43-63.

Boyd, J.H. and S. L. Graham (1986). Risk, Regulation, and Bank Holding Company Expansion into Nonbanking. *Federal Reserve Bank of Minnesota Quarterly Review,* 2, 2-17.

Boyd, J.H., and S. L. Graham (1988). The Profitability and Risk Effects of Allowing Bank Holding Companies to Merge with Other Financial Firms: A Simulation Study. *Federal Reserve Bank of Minnesota Quarterly Review,* 12, 3-20.

Brickley, J.A., D. Lease and. R. C. W. Smith (1988). Ownership Structure and Voting on Anti-takeover Amendments. *Journal of Financial Economics* 20, 267-291.

Caprio, G. and R. Levine (2002). Corporate Governance of Banks Concepts and International Observations. Paper presented at the Global Corporate Governance Forum Network Research Meeting.

Caprio, G., L. Laeven and R. Levine (2007). Governance and Bank Valuation. *Journal of Financial Intermediation,* 16, 584-617.

Carow, K.A and R. Heron (2002). Capital Market Reactions to the Passage of the Financial Services Modernization Act of 1999. *Quarterly Review of Economics and Finance*, 42, 465-85.

Carrillo, G, and C. Bathala (2009). Corporate governance in Banks: Do Ownership and Board Structure Matter for Bank's Risk Profile and Valuation. Corporate Governance: Millennium Challenges, *Institute of Public Enterprise*. Excel India Publishers, 17-33.

Cebenoyan, A. S., E. S. Cooperman and C. A. Register (1995). Deregulation, Reregulation, Equity Ownership, and S&L Risk Raking. *Financial Management* 24, 63-76

Chen, R. C, T. L. Steiner and A. M. Whyte, A. M. (1998). Risk-Taking Behavior and Management Ownership in Depository Institutions. *The Journal of Financial Research*, XXI, 1, 1-16.

Chen, L., and Y. Ma, P. Malatesta, and Y. Xuan. (2011). Ownership Structure and the Cost of Corporate Borrowing. *Journal of Financial Economics*, 100, 1-23.

Chhaochharia, V., and Y. Grinstein (2005). Corporate governance and firm value: The impact of the 2002 governance rules, *Journal of Finance*, 62, 1789-1825.

Ciancanelli, P. and J. Reyes (2001). Corporate Governance in Banking: A Conceptual Framework. Working Paper, SSRN.

Cornett, M. M. and H. Tehranian (1989), Stock market reactions to the Depository Institutions Deregulation and Monetary Control Act of 1980. *Journal of Banking and Finance.* 13, 82-100.

Cornett, M. M., E. Ors and H. Tehranian (2002). Bank Performance Around the Introduction of a Section 20 Subsidiary. *Journal of Finance*, 57, 501-521.

Cornett, M. M., E. Ors, A.J. Marcus, A. Saunders, and H. Tehranian (2007). The Impact of Institutional Ownership on Corporate Operating Performance. *Journal of Banking and Finance*, 31, 1772-1794.

Czyrnik, K., and L. S. Klein (2004). Who Benefits from Deregulating the Separation of Banking Activities? Differential Effects on Commercial Bank, Investment Bank, and Thrift Stock Returns. *The Financial Review*, 39, 317-341.

Demsetz, R.S. and P. E. Strahan (1997). Diversification, Size, and Risk at Bank Holding Companies. *Journal of Money, Credit, and Banking*, 29, 300-313.

Demsetz, R.S., M. R. Saidenberg and P. E. Strahan (1997). Agency Problems and Risk Taking at Banks. Staff Reports no. 29 Federal Reserve Bank of New York.

De Andres, P. and E. Vallelado (2008). Corporate Governance in Banking: The Role of the Board of Directors. *Journal of Banking and Finance*, 32, 2570-2580.

Denenis, E. and M. Nurullah (2000). Testing Return and Risk Effects of European Banks' Diversification into Insurance Business. City University Business School, London, working paper.

Dimson, E. (1979). Risk Measurement When Shares Are Subject to Infrequent Trading. *Journal of Financial Economics* 7, 197-226.

Dold, W. and J.D. Knopf (2006). Impact of Corporate Ownership and Governance of Thrift Risk-Taking and Returns. Available at SSRN: http://ssrn.com/abstract=928652

Erkens, D. H., M. Hung, and P. Matos (2012). Corporate Governance in the 2007-2008 Financial Crisis: Evidence from Financial Institutions Worldwide. *Journal of Corporate Finance*, 18, 389-411.

Fama, E.F. (1980). Agency Problems And The Theory Of The Firm. *Journal of Political Economy*, 88, 134-45.

Fama, E.F. (1980). *Banking in the Theory of Finance*. Journal of Monetary Economics 6, 33-58.

Fama, E.F. and M. C. Jensen (1983). Separation Of Ownership And Control, Journal of Law and Economics 27, 327-49.

Freixas, X. and A. Santomero (2002). An Overall Perspective on Banking Regulation. working paper no. 02-1, *Federal Reserve Bank of Philadelphia*.

Furfine, C.H. (2001). Banks As Monitors Of Other Banks: Evidence From The Overnight Federal Funds Market. *Journal of Business*, 74, 33-57.

Galai, D. and R. Masulis, (1976). The option pricing model and the risk factor of stock. *Journal of Financial Economics*, 3, 53-81.

Geyfman, V. and T. Yeager, (2009). On the Riskiness of Universal Banking: Evidence from Banks in the Investment Banking Business Pre- and Post- GLBA. *Journal of Money, Credit, and Banking*, 41, 1649-69.

Gillan, S, L. and L. T. Starks (2003). Corporate Governance, Corporate Ownership, and the Role of Institutional Investors: A Global Perspective. *Journal of Applied Finance*, 13, 4-22.

Greenspan, A. (1997). Statement to the U.S. House Committee on Banking and Financial Services, *Federal Reserve Bulletin*, 83,578-83.

Greenspan, A. (1996), Remarks at Financial Markets Conference of the Federal Reserve Bank of Atlanta, Coral Gables, Florida, February 23.

Greunin, H and Bratanovic, S. (2003). Analyzing and Managing Banking Risk: A Framework for assessing Corporate Governance and Financial Risk. *The World Bank,* Second Edition.

Houston, J.F. and C. James (1995). CEO Compensation and Bank Risk: Is Compensation in banking Structured to Promote Risk Taking. *Journal of Monetary Economics* 36, 405-31.

Hughes, J., W. Lang, L. Mester and C. Moon (1999). The dollars and Sense of Bank Consolidation. *Journal of Banking and Finance*, 23, 291-324.

Iannotta, G., G. Nocera and A. Sironi (2007). Ownership Structure, Risk And Performance In The European Banking Industry. *Journal of Banking and Finance,* 31, 2127-2149.

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

Jensen, M. C. (1993). The Modern Industrial Revolution, Exit, and the Failure of Internal Control Systems. *Journal of Finance,* 48, 831-880.

Kwan, S.H. (2004). Risk and Return Of Publicly Held Versus Privately Owned Banks. *Federal Reserve Bank Of New York Economic Policy Review* 10, 97-107.

Koke, J. F., I. Dherment-Ferere and L. Renneboog (2001). Corporate Monitoring by Blockholders in Europe: Empirical Evidence of Managerial Disciplining in Belgium, France, Germany and the UK. ZEW Discussion Paper No. 01-24. Available at SSRN: http://ssrn.com/abstract=358286 or DOI: 10.2139/ssrn.358286

Koenker, R and K. Hallok (2001). Quantile Regression. *Journal of Economic Perspectives* 15, 143-156.

Knopf, J.D. and J. L. Teall (1996). Risk-Taking behavior at Bank Holding Companies. *Journal of Business Finance and Accounting*, 29, 989-1005.

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

Levine, R. (2003). The Corporate Governance of Banks: A Concise Discussion of Concepts and Evidence. *Discussion Paper prepared for the Global Corporate Governance Forum.*

Levine, R. (2004). The Corporate Governance of Banks: A Concise Discussion of Concepts and Evidence. *Working Paper, World Bank Policy Research*.

Lown, C., C. Osler, P.E. Strahan and A. Sufi (2000). The Changing Landscape of the Financial Services Industry: What lies ahead? *Federal Reserve Bank of New York Economic Policy Review,* 39-55.

Macey, J.R. and M. O'Hara (2003). The Corporate Governance of Banks. Federal Reserve Bank of New York Economic Policy Review, 91-107.

Mamun, A., M. K. Hassan and N. Maroney (2005). The Wealth and Risk Effects of the Gramm-Leach-Bliley Act (GLBA) on the US Banking Industry. *Journal of Business Finance and Accounting,* 32, 351-86.

Maug, E. (1998). Large Shareholders as Monitors: Is There a Tradeoff between Liquidity and Control. *Journal of Finance*, 53, 65-98.

McAllister, P.H. and D. A. McManus (1993). Resolving the Scale Efficiency Puzzle In Banking, *Journal of Banking and Finance,* 17, 483-498.

Mehran, H. A. D. Morrison, and J.D. Shapiro (2011). Corporate Governance and Banks: What Have We Learned from the Financial Crisis? *FRB of New York Staff Report* No. 502, 1-42

Merton, R.C. (1977). An Analytic Derivation of the Cost of Deposit Insurance and Loan Guarantees: an Application of Modern Option Pricing Theory. *Journal of Banking and Finance,* 1, 3-11.

Mishkin, F.S. (1999). Financial Consolidation: Dangers and Opportunities. *Journal of Banking and Finance*, 23, 675-691.

Noe, T. (2002). Institutional Activism and Financial Market Structure. *Review of Financial Studies*, 15, 289-319.

Office of the Comptroller of the Currency (OCC), Bank Failure: An Evaluation of the Factors Contributing to the Failure of National Banks, at 5 (1988).

Office of the Comptroller of the Currency (OCC), An Examiner' Guide to Problem Bank Identification, Rehabilitation, and Resolution, at 8 (2001).

Purnanandam, A. (2007). Interest Rate Derivatives At Commercial Banks: An Empirical Investigation. *Journal of Monetary Economics*, 54, 1769–1808

Raheja, C. (2005). Determinants of Board Size and Composition: A Ttheory of Corporate Boards. *Journal of Quantitative Analysis* 40, 283-306.

Reichert, A. K., and Y.W Shyu (2002). The determinants of Derivative Use by US.S and Foreign Banks. *Research in Finance*, 19, 143-171

Reichert, A. K..and L. D. Wall (2000). The potential for Portfolio Diversification in Financial Services. *Federal Reserve Bank of Atlanta Economic Review (Third quarter),* 35-51

Rosen, R. J.,. P. R. Lloyd-Davies, M. Kwast and D. Humphrey (1989). A Portfolio Analysis of Bank Investment in Real Estate. *Journal of Banking and Finance,* 13, 355-366.

Rosenstein, S., and J. G. Wyatt (1990). Outside Directors, Board Independence and Shareholder Wealth. *Journal of Financial Economics,* 26, 175-191.

Santomero, A. M. and D. L. Eckles, (2000). The Determinants of Success in the New Financial Services Environment: Now That Firms Can Do Everything, What Should They Do and Why Should Regulators Care. *Federal Reserve Bank of New York, Economic Policy Review,* 6, 11-23.

Saunders, A., E. Strock and N. Travlos, (1990). Ownership Control, Regulation and Bank Risk-Taking. *Journal of Finance,* 45, 643-654.

Saunders, A. and I. Walters, (1994).Universal Banking in the United States: What Could We gain? What could we lose? New York, NY: Oxford University Press.

Shleifer, A. and R. Vishny (1986). Large Shareholders and Corporate Control. *Journal of Political Economy,* 94, 461-48.

Shleifer, A. and R. Vishny (1997). A Survey of Corporate Governance. *Journal of Finance*, 52, 737-783.

Simpson, W.G. and A. E. Gleason (1999). Board Structure, Ownership, and Financial Distress in Banking Firms. *International Review of Economics and Finance,* 8, 281-292.

Spong, K. and R. Sullivan (2010). Bank Ownership and Risk Taking: Improving Corporate governance in Banking after the Crisis (September 1, 2010). Forthcoming in the *Research Handbook On Banking And Governance,* James R. Barth, Class Wihlborg, and Chen Lin, eds., Edward Elgar, 2012. Available at SSRN: http://ssrn.com/abstract=1900609

Steinherr, A. (1996). Performance of Universal Banks: Historical Review and Appraisal. In Anthony Saunders and Ingo Walter, eds., Universal Banking: Financial System Design Reconsidered, 2-30. New York: New York University Press.

Stiroh, K. J. (2006). New Evidence on the Determinants of Bank Risk. *Journal of Financial Services Research,* 30, 237–263.

Stiroh, K. J. and A. Rumble (2006). The dark side of diversification: The case of US financial holding companies. *Journal of Banking and Finance*, 30, 2131-2161.

Sullivan, R. J. and K. R. Spong (2007). Manager Wealth Concentration, Ownership Structure, and Risk in Commercial Banks. *Journal of Financial Intermediation*, 16, 229-48.

Treasury, (2008). The Department of the Treasury Blueprint for a Modernized Financial Regulatory System. The Department of the Treasury, Washington, D.C.

Wall, L.D. (1987). Has Bank Holding Companies' Diversification Affected their Risk of Failure? *Journal of Economics and Business* 39, 313-26.

Wall, L.D., A. Reichert, and S. Mohanty (1993). Deregulation and the Opportunities for Commercial Bank Diversification. *Federal Reserve Bank of Atlanta Economic Review* 1-25.

Wang, W.K., W.M. Lu, and Y.L. Lin, (2012). Does Corporate Governance Play an Important role in BHC Performance? Evidence from the U.S. *Economic Modeling,* 29, 751-760.

Westman, H. (2010). The role of Ownership Structure and Regulatory Environments in Bank Corporate Governance. Available at SSRN:http://ssrn.com/abstract=1435041

Yeager, T., F. Yeager, and E. Harshman (2007). The Financial Modernization Act: Evolution or Revolution? *Journal of Economics and Business*, 59, 313-339.

APPENDIX

A. IRRC Classification of Board of Directors affiliation.

Inside Director:

Senior Management

- Junior Management
- Employee of common stock ownership ESOP

Outside directors affiliated with the firm:

- Member of an inside stockholders' group or significant shareholder not employed by the firm (where insider group includes those with stakes of 10% or more of the company's total voting shares).
- Part of an interlocking directorship (defined as directors sitting on each other's boards, e.g two CEOs sitting on each other boards)
- Former employees of the firms.
- Related to an officer of the company
- Member of a professional firm providing services to the company (e.g. law firm, consulting firm, investment bank, etc)
- Officer of a firm that has a significant supplier/customer relationship to the company (significant is defined as 1% or more of the suppliers annual sales)
- Derives personal benefit from the company (individual consultant to the company, non-employee chairman or vice chairman of the board who earns over $100,000 per year from the position or is involved in transactions with the company valued at $100,000 or more).
- Director who is affiliated with a non-profit institution that received more than $100,000 from the company.

Independent outside director:

- All other outside directors.