ESSAYS ON FINANCE AND BANKING

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A flurry of new regulation was passed in the wake of the financial crisis of 2007. Much remains however unknown about policies designed to prevent a repeat. In this dissertation I investigate two such regulatory approaches in financial and banking markets. In Chapter 2 I present an analysis of a revision of proxy access rules as it was mandated by Congress in the 2010 Dodd-Frank Wall Street Reform Act and subsequently implemented by the SEC in August 2010. Proxy access – the right for shareholders to nominate directors to a firm's board – lies at the heart of shareholder control and the monitoring process of management. I use the repeal of a new proxy access regime by the U.S. Court of Appeals as a natural experiment to quantify the costs and benefits associated with proxy access. The findings indicate that proxy access resulted in an increase of shareholder wealth for firms with agency issues, smaller firms, and firms where more investors qualified to make use of it. There are no valuation changes for large firms, firms without any agency issues and firms with special-interest investors. The results indicate that the market valued the empowerment of shareholders positively and calls for renewed regulatory attention to proxy access. Chapter 3 analyzes the effects from portfolio diversification and banking competition on the stability of U.S. banks during the 2008-2011 banking crisis in which more than 10% of U.S. banks ceased to exist. To do so, the analysis makes use of exogenous cross-sectional and time-series variation in states' branching restrictions, the degree of county business cycle integration, and topographic variation due to oceans and international borders that limited the potential to diversify. I find that both banking competition and portfolio diversification significantly reduced the failure probability of banks thereby providing a policy rationale to reduce the financial fragmentation of U.S. banking markets, to promote banking competition and an overall greater degree of diversification.

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PREFACE

This work would not have been possible without the support of many people. I am deeply grateful to my wife, Anjana, for her continued encouragement, love and support for many years. I also greatly appreciate the expertise, advice and encouragement that I received from my committee members: Daniel Berkowitz, Dave Denis, Daniele Coen-Pirani and David DeJong. Finally, I thank my nieces and nephew – Lea, Julia and Nic – for their understanding that their uncle has been gone for such a long time, and my parents for their love and endless support during my years of wandering.

1.0 INTRODUCTION: THE U.S. FINANCIAL CRISIS OF 2007

Few signals pointed in spring 2007 to the panic and forthcoming massive losses in U.S. financial markets and the decline in the real economy that would start to engulf the U.S. economy just months later. In April 2007, the Dow Jones Industrial Average stood at an all-time high of 12,382 points while the composite market capitalization of publicly listed U.S. banks reached in February 2007 an all-time record of $1.7 trillion. At the same time, U.S. unemployment at 4.4% was at its lowest since 1970. It would be hard to imagine a worse and faster deterioration than what would occur over the following two years. By March 2009, the Dow Jones Industrial Average had lost more than half of its prior valuation and U.S. unemployment was still on the rise, reaching in October 2009 10% – just shy of its 1982 post-World War II record. With real estate and shareholder wealth down, total household net worth had shrunk by an unprecedented $16 trillion. It is hard to fathom what human tragedy lies behind those numbers.

Meanwhile, the U.S. banking sector went through one of its largest reorganization in modern history. By March 2009, the composite market capitalization of publicly listed U.S. banks had fallen by a staggering 75% to just $426 billion. Between 2008 and 2011, 10.6% of all U.S. banks had ceased to exist, half of which had been closed by the FDIC. The 427 failed banks between 2008 and 2011 alone rival the 575 bank failures in almost 50 years between the Great Depression (1934) and the Savings and Loan Crisis (1981). A major factor that eventually led to the stabilization of the U.S. banking sector was a federal recapitalization program for struggling banks in 2009. By December 31, 2009, the U.S. Government had injected a total of $200 billion as part of TARP's Capital Purchase Program (CPP) into 742 banks. In over 90% of those injections, the government received preferred stocks, thus effectively nationalizing part the U.S. banking sector. By June 2012, 341 institutions had repaid TARP funds, while another 401 banks were still partly owned by the government. Nonetheless, in another sign of continued bank distress, 921 U.S. banks with combined assets of $349 billion remained on the FDIC's (unofficial) list of "problem banks" as of July 2012.

Even though that these are striking numbers, banking crises and the accompanying massive wealth destruction are by no means a rare phenomenon. While Laeven and Valencia (2012) put the estimated output loss for the U.S. between 2007 and 2011 at 31% of GDP, the authors identify an additional 146 banking crisis episodes around the world between 1970 and 2011, 49 of which generated losses exceeding those of the recent crisis in the United States (see figure (1.1)). Consequently, research on the causes, policy responses and on the design of efficient regulation which strengthen the resilience of financial and banking systems remain relevant and essential for continuing economic progress.

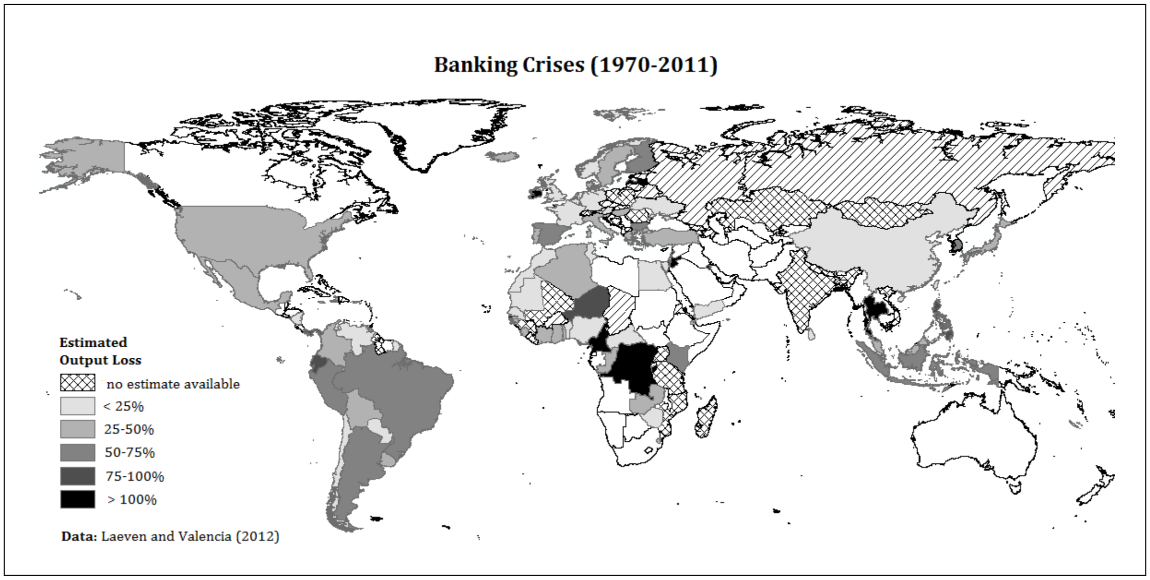

Figure 1.1: Banking Crises Worldwide, 1970-2011

Banking crises before 2007 were mostly the disease of developing nations and have often been linked to weak institutions. The most recent crisis however forcefully illustrates that advanced economies with strong institutions are also not immune from financial distress. With its sudden onset and vast consequences, the U.S. financial crisis provides an abrupt economic shock that will provide researchers for years to come with the opportunity to learn from it. This dissertation is one such contribution within a much broader research agenda by scientists across many disciplines that makes use of the shock so to analyze how regulatory institutions can be strengthened so to avoid (or at least mitigate) future financial crises.

To this end, Chapter (2) analyzes the effects of a shareholder empowerment provision as it was prescribed by U.S. Congress in the 2010 Dodd-Frank Wall Street Reform Act. As part of financial reform, Congress mandated the Securities and Exchange Commission to facilitate director candidate nominations by shareholders. This was to be achieved by granting shareholders access to the firm's voting ballot for director elections (the proxy) and was in turn expected to strengthen the monitoring link over management, thus providing a barrier against excessive managerial risk-taking and overconfidence. By empowering shareholders – so Congress argued – regulators could harness the desire of shareholders to avoid firm losses and bankruptcy, particularly among large publicly listed financial institutions. Given the efficiency and liquidity of U.S. financial markets, the analysis investigates the market response to specifically designed portfolios so to estimate what investors thought about the potential benefits and costs from shareholder empowerment via proxy access.

A lot of exciting recent work on bank stability has focuses on the propagation of shocks via interbank and securities markets. An important observation that is often overlooked however is that the great majority of U.S. bank failures occurred in 2010 and thereafter – months and sometimes years after the financial panic that reached its peak in March 2009 (see figure (3.1)). Chapter (3) therefore investigates how local economic conditions affected bank failures and analyzes the degree to which geographic portfolio diversification and the exposure to banking competition prior to the financial crisis impacted bank survival. The analysis makes use of two exceptional features of the U.S. banking environment. First, the unique extent of banking and local economic business cycle data that is made available by U.S. regulators which allows for the construction of a novel measure of bank portfolio risk. Second, an equally unique institutional setup that provides rich exogenous cross-sectional and time-series variation in the degree of banking competition across U.S. states. The analysis finds that the degree of portfolio risk/diversification that a bank incurs via its branch network is a significant and important source of bank stability. While greater banking competition prior to the crisis also increased bank survival (a finding that is in line with the efficient structure hypothesis), the effect from portfolio diversification is 2-3 times larger and remains significant across a series of robustness checks. The finding thereby calls for renewed regulatory attention to the extent of financial fragmentation in U.S. banking markets that is sustained by costly state-level branching restrictions.

The remainder of the dissertation is organized as follows: Chapter (2), titled "Does Proxy Access Increase Shareholder Wealth? Evidence from a Natural Experiment", discusses shareholder empowerment via greater proxy access and presents an analysis of the market's perspective on its expected benefits and cost. Chapter (3), titled "Geographic Diversification, Competition and Bank Survival", follows up by investigating the effect from geographic portfolio diversification and banking competition on bank stability. Chapter (4) concludes.

2.0 DOES PROXY ACCESS INCREASE SHAREHOLDER WEALTH? EVIDENCE FROM A NATURAL EXPERIMENT

2.1 INTRODUCTION

Financial systems have long been regarded crucial engines of economic growth (Bagehot, 1873; Hicks, 1963; Schumpeter, 1912; King and Levin, 1993; Levin and Zervos, 1998; Rajan and Zingales, 1998). Recent cross-country empirical work points in particular towards the importance of legal institutions that define the separation of ownership and management in public firms as a determinant of capital formation and economic growth. La Porta et al. (1997, 1998) for example find that across countries, stronger minority shareholder rights correlate with a greater ownership dispersion and greater market capitalization, which is positively correlated with economic growth. This in turn provides a public policy rationale for improving shareholder rights. Cross-country studies may however suffer from endogeneity issues. Evidence from a within-country setting – and optimally from a natural experiment – would therefore be preferable but is hard to come by as it requires an exogenous source of variation in shareholder rights across public firms in the same jurisdiction. This paper uses such an exogenous shock to shareholder rights in the U.S. financial market, namely the surprising repeal of a securities law by a U.S. Court of Appeals to determine the extent to which shareholder rights impact shareholder wealth, and thus firm profitability.

Central to shareholder rights are the procedures by which shareholders can nominate and elect directors to the board which, in turn, oversees the firm's management. Allowing investors to nominate their own candidates to the board of directors – so-called proxy access – has however been a contentious topic for many years in the United States. Director candidates are required to be included in the proxy filing that is sent out ahead of the annual meeting to all shareholders. Access to the company's proxy statement so that shareholders can nominate their own candidates is thereby a principle avenue to influence a firm's management and to keep it accountable. Proxy access thus lies at the heart of shareholder control and has far-reaching consequences in the balance of power between shareholders and management. Recognizing the importance of the rules that govern proxy access for overall shareholder rights, this paper analyzes the market reaction to the repeal of a proxy access reform that was initiated by the Wall Street Reform and Consumer Protection Act (henceforth, Dodd-Frank Act) in July 2010, implemented by the Securities and Exchange Commission (SEC) in August 2010, and vacated by the D.C. Circuit Court of Appeals in July 2011.

The analysis finds that the repeal of proxy access reform resulted in a decline of firm valuation for firms with potential agency issues, for smaller firms in which investors could have made greater use of enhanced proxy access, and for firms in which more investors qualified to make immediate use of greater proxy access. Further, the results indicate that proxy access had rather weak effects: we observe no valuation changes for large firms, firms with no or only few specific anti-takeover provisions, firms without any investors surpassing the prescribed threshold to use proxy access and for overall U.S. shareholder wealth. A major concern by corporations has been that greater proxy access may empower special-interest investors (pension and union funds), thereby allowing them to push through politically motivated, value-destroying policies that are not aligned with the interests of other shareholders. We do not find any evidence to support such concerns. We conclude that proxy access had very weak effects and affected only very few firms with extreme ownership or extreme corporate governance situations. In the few cases where proxy access reform was strong enough to affect firm valuations, the market valued proxy access reform positively, leading to an increase in shareholder wealth.

The chapter makes three major contributions:

1. This is the first paper to use a natural experiment to estimate the overall shareholder wealth effect of proxy access. The sharp discontinuity on the day of the court repeal combined with the fact that the repeal ended proxy access for the foreseeable future allows us to identify precise valuation effects. A precise estimate matters as shareholder empowerment via proxy access may not only provide benefits (when for example agency conflicts are present), but may also result into significant proxy contest costs as well as management and board disruption in all those firms without any agency conflicts. As a result, overall U.S. shareholder wealth may well decline despite the regulation's good intentions of empowering shareholders.
2. The aggregate U.S. shareholder wealth effect may still mask significantly different wealth effects within the cross-section (e.g., significant wealth increases for firms with agency issues may in the aggregate mask wealth decreases in firms with special-interest investors). We therefore analyze in depth the cross-sections of potentially affected firms. Specifically – following earlier cost-benefit arguments of supporters and critics – we investigate for the first time the wealth effects on firm portfolios with potential agency issues and the wealth effects for small firms which are ill-equipped to incur large contest costs. We also analyze whether the market agreed that the empowerment of special-interest investors (unions and pension funds) may lead to wealth destruction. This is the first paper to use direct ownership information of such investors and of potential coalitions thereof and which disentangles investment holdings that qualify from those that do not qualify for proxy access. These estimates quantify the benefits and costs that supporters and critics have argued over in the past and may be informative for

any future regulatory attempts to provide investors with greater proxy access.

3. Finally, we analyze firm valuation changes for several corporate governance provisions that have been previously linked to agency conflicts. If, for example, a staggered board or a poison pill was indeed entrenching the management and destroying shareholder wealth, then shareholder empowerment should have increased the likelihood that such provisions would be dropped. The repeal of greater proxy access thus should have been met with a decline in firm valuations where such agency-linked corporate provisions are in place. The court repeal thus allows us to learn the market's view on specific governance provisions from setting of a natural experiment and in a moment when shareholder rights abruptly changed.

The remainder of the chapter is organized as follows: Section (2.2) provides some background information on proxy access regulation, its reform and subsequent repeal. Section (2.3) discusses two competing theories that portray proxy access as either beneficial or detrimental to overall shareholder wealth and derives hypotheses. Section (2.3) also provides a review of previous literature on the topic. Section (2.4) then introduces the methodology and data sources used in the rule's analysis while section (2.5) presents the results. Section (2.6) concludes.

2.2 INSTITUTIONAL BACKGROUND OF PROXY ACCESS (REFORM)

The dispute around the optimal legal arrangements of proxy access have been long and contentious. Institutional and activist investors have been lobbying hard for easier proxy access for many years while businesses have vigorously opposed any change, warning about the costs such a move might entail. Fisch (2011) discusses proxy access reviews reforms by the SEC as early as 1942 and 1977. A renewed regulatory push to reform occurred in the early 2000s and was again abandoned in 2003. The momentum for a far-reaching reform only resurfaced in the aftermath of the financial crisis of 2008 as boards were blamed for having failed to effectively monitor management as they engaged in excessive risk-taking. As a result, on July 21, 2010, Congress passed the Dodd-Frank Act that included an authorization to the SEC to rewrite the existing proxy regime.

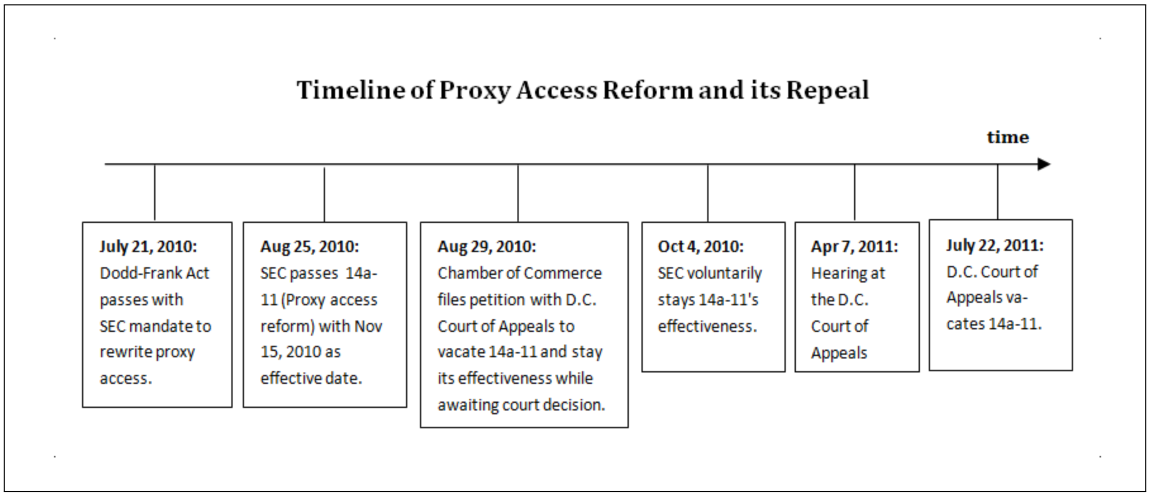

Figure 2.1: Timeline of Proxy Access Reform and its Repeal

With several earlier attempts to reform proxy access and a revised and commented-upon reform proposal from June 2009, the SEC was prepared to act fast: on August 25, 2010 the SEC adopted a modified version of SEC Rule 14a-11 which regulates proxy access (SEC, 2010). Summarized, the new proxy access rules allowed access to a company's proxy and the right to nominate up to 25% of the seats on the board if a shareholder – or coalition of shareholders – owned a combined 3% stake in the corporation for at least 3 years (henceforth, the 3%-3 year rule/threshold). The new regulation was set to go into effect for all publicly listed firms in the U.S. with a market capitalization above $75 million on November 15, 2010. (Firms below $75 million were excluded until November 15, 2013.)

On August 29, 2010, the U.S. Chamber of Commerce and the Business Roundtable filed a legal challenge with the D.C. Circuit Court of Appeals against the SEC's proxy access reform arguing that the new regulation violated the First Amendment by forcing public companies to carry campaign speech of third party outsiders, satisfied the legal description of "arbitrary and capricious" as defined by the Administrative Procedure Act (APA), and overstepped the SEC's mandate by entering the realm of state law. With a pending court review, the SEC stayed the modified Rule 14a-11's effectiveness on October 4, 2010. While most observers argued that the petition was unlikely to overturn proxy access, the Court surprisingly vacated Rule 14a-11 on July 22, 2011 for violating the APA, arguing that "the Commission acted arbitrarily and capriciously for having failed [to] adequately assess the economic effects of a new rule" (D.C. Circuit Court of Appeals, 2011a: 7). In section 3, we argue that this court ruling provides the setting for a natural experiment that allows for the very analysis of the costs and benefits that the Court requested in its ruling.

2.3 COMPETING THEORIES ABOUT GREATER PROXY ACCESS

Relaxing the rules by which investors can add their own board candidates to the slate of nominees has consistently faced vigorous and "nearly unanimous opposition" by corporate America (SEC, 2004: II). The U.S. Chamber of Commerce for example calls proxy access "extremely significant ... [with an] enormous impact" and has vowed that killing any potential reform will remain among its top 5 priorities (Scannell, 2010). Corporate law firm Wachtell, Lipton, Rosen & Katz credits proxy access reform with the potential to "wreak havoc with American business" and refers to it as "dangerously unwise and unnecessary". Proponents of greater proxy access claim that any reform would be "highly beneficial to investors", "new and powerful", "historic", "ground-breaking" and "long overdue". One observer refers to proxy access as "the biggest change relating to corporate governance ever proposed by the SEC."[1] Proponents of greater proxy access such as the Council of Institutional Investors (representing $3 trillion in assets under management) argue that the reform is necessary so to "effectively end the board of directors' monopoly over the director nomination process" and to "invigorate board elections, [to] make boards more responsive to shareholders and more vigilant in their oversight." (CII, 2011: 1). Supporters further point to academic research that credits shareholder activism with firm valuation increases (e.g., Brav et al., 2007; Klein and Zur, 2011); despite the potential of activism, only very few proxy contests however occur annually, arguably due to the hefty price tag that a proxy contest typically carries.

2.3.1 The Entrenchment Perspective

Shivdasani and Yermack (1999) show that the market is well aware of the agency problem that arises when the CEO is part of the board that ought to supervise the management. For a sample between 1994-1996, the authors show that stock price reactions to the announcement of a board nomination are significantly lower if a CEO is involved in the nomination process. This is in line with their finding that board nominees are more often insiders (i.e., subordinates of the CEO) or outside directors with conflicts of interests ("gray directors") when the CEO himself is involved in the nomination process. Several other studies have further documented a significant correlation between a firm's market valuation and its corporate governance level: Gompers, Ishii and Metrick (2003) and Bebchuk, Cohen and Ferrell (2005, 2009) construct corporate governance indices (henceforth, GIM-Index and E-Index) based on the number of anti-takeover provisions in corporate bylaws. Anti-takeover provisions (ATP) empower the management and board relative to investors so to reduce the likelihood of hostile takeovers but can also lead to agency issues and man-

[1] Quotes from Bebchuk (2007), Kahan and Rock (2010), Schuster (2010), and CII (2010).

agerial entrenchment. The two corporate governance indices have resulted in numerous follow-up studies on agency issues. While such studies may suffer from endogeneity, and disagreement persists as to the direction of causality between firm value and anti-takeover provisions (see, e.g., Lehn, Patro and Zhao, 2005) both indices have become staples in financial studies.

Bebchuk (2007) points out that there were only 24 contested elections among publicly listed firms with a market capitalization of more than $200 million between 1996 and 2005 where shareholders put a rival slate to the current board's nomination. In only eight of those cases the rival actually succeeded over the current board's nominee. Similarly, Cai et al. (2009) find only 4 contested elections among 2,488 Russell 1000 board elections between 2003-2005. Further, an analysis of about 166,000 director-years of S&P 1500 boards between 1996-2006 shows that a re-nomination is 3-4 times more likely for a director that serves on the nomination committee than for a director that is not on the committee. Moreover, once a director joins the nomination committee, the likelihood to rejoin the nomination committee the following year is 6 times higher than for a non-committee director.[2] While those statistics cannot serve as evidence of agency issues, they suggest prima facie that agency issues may exist in some companies.

Among the major problems of activist shareholders is that boards do not have to include any shareholder nominations into the company's proxy statement. As a result, if a shareholder seeks to nominate a board member that is not supported by the current board, he has two options: first, to ask the board to voluntarily include the candidate[3], or second, to engage in a proxy contest by sending out his own proxy statement to all shareholders. A proxy contest can however become prohibitively expensive: Bebchuk (2007) estimates the

[2] Results based on data from RiskMetrics Governance and Directors database.

[3] Boards only rarely do so voluntarily: only 5 out of 4,000 firms tracked by data service FactSet SharkWatch allow proxy access as of 2010 (McDonnell, 2005; WSJ, 2010).

average proxy contest costs between 2003 and 2005 at $368,000. In one prominent example, Red Zone LLC versus Six Flags, the activist investor incurred $3,950,000 in proxy contest costs. While the activist incurs significant costs, incumbents and nominees supported by the board can use corporate funds to counter activists' nominations. Facing those institutional obstacles, many investors choose to follow the "Wall Street Rule": sell a stock rather than try to change the company's policies.

Despite those limited options, prior research has identified real costs associated with potential agency issues: Masulis et al. (2007) find that acquirers with boards that have more anti-takeover provisions experience significantly lower abnormal announcement returns. Thus, managerial entrenchment may lead to greater value-destruction during mergers and acquisitions due to a lower disciplinary power by shareholders and the market for corporate control. Harford, Mansi and Maxwell (2008) confirm this finding by showing that poorly governed firms dissipate cash through acquisitions. Dittmar and Mahrt-Smith (2007) analyze the effect of governance on the value of cash holdings and find a significantly lower valuation of excess cash for firms with worse governance. The authors explain this finding by showing that firms with worse governance choose less profitable investments, thereby destroying firm value. Denis et. al (1997) find evidence that the level of firm diversification is negatively related to managers' equity ownership and that a decrease of diversification is associated with external control threats. These findings suggest that agency issues may be responsible for value-reducing diversification strategies. Other authors such as DeAngelo and Rice (1983), Bertrand and Mullainathan (2003), and Cremers and Nair (2005) also find that that anti-takeover provisions may shelter management from the discipline and scrutiny of the market for corporate control. In a study of board elections, Cai et al. (2009) confirm that even in severely underperforming firms, board directors still receive well above 90% of votes. Thus, agency issues can result in real costs to shareholders with few direct consequences to directors. Very few annual proxy contests, almost no company providing proxy access voluntarily and a hefty price tag for starting a proxy initiative has convinced proponents of proxy access of recurring managerial and board entrenchment. Greater proxy access in turn is seen as a way to mitigate such agency issues and to allow owners to take back control in firms with unresponsive management. As agency issues have been shown to be costly, greater proxy access is thereby expected to increase firm value.

Contrary to the above expectation, corporate governance regulation may however not matter at all. First, product market competition may force firms to minimize costs; hence, to secure external capital at the lowest possible price, corporations have an intrinsic motivation to comply with the demands of shareholders. Alchian (1950) and Stigler (1958) provide general economic frameworks for such an evolutionary approach. More firm-specific, Alchian and Demsetz (1972) and Fama and Jensen (1983) provide theoretic frameworks in which the contractual relationship between managers and owners are the endogenous outcome to the risk-bearing and monitoring possibility of the contractual environment; thus, any observed outcome in the market is already optimized given its specific environment. Second, the Coase Theorem (1960) suggests that (assuming no transaction costs) bargaining between management and shareholders may lead to an efficient outcome: specifically, providing management with equity allows to “trade away” the negative externality that arises from the separation of ownership and control. Thus, with sufficient managerial incentivization through equity compensation, any agency issues disappear and management’s incentives are perfectly aligned with those of shareholders. Third, Demsetz and Lehn (1985) argue that the structure of corporate ownership is endogenously and efficiently chosen by owners (rather than managers), thus challenging the classic narrative by Berle and Means (1932) of an increasing separation of ownership and control due to ever greater dispersion of ownership. All three accounts suggest that corporate governance legislation is unnecessary and that observed outcomes are already optimized given the contractual environment so that firms and managers by themselves will choose to engage in the value-maximizing behavior.

This leads to the first hypothesis:

Hypothesis $\mathbf{H_1}$: As agency issues are costly, greater monitoring and disciplining power of shareholders leads to an increase in firm value.

Alternative $\mathbf{H_{1A}}$: Corporate governance levels are endogenous and firms are already at their optimal level; thus proxy access does not impact firm value.

2.3.2 The Board Disruption Perspective

Critics of proxy access argue that the governance situation is not as dire: in a trend that has recently picked up, ever more companies are adjusting their bylaws from plurality voting towards majority voting. Under the new voting regime, uncontested director nominees only get elected if they receive at least 50% of the casted votes. This trend has been accompanied by a rise of "just vote no" campaigns, in which disgruntled investors lobby other shareholders to withhold their votes during board elections. Recent empirical evidence shows that this low-cost type of activism succeeds in forcing boards to take action, specifically by improving operating performance and increasing abnormal disciplinary CEO turnover (Del Guercio et al., 2008). Further, an increasing number of boards have chosen to destagger in recent years, exposing themselves to a greater risk of being removed from office.[4] Ganor (2008) for example shows that the likelihood of dismantling a staggered board increases with shareholder pressure, indicating that directors are responsive to shareholder wishes. In addition, there are frequent behind-the-scene talks between the management/board and major investors who use, for example, the threat of exiting the stock to influence corporate

[4] In staggered boards, director are split into classes, each serving a term as long as the number of classes. Destaggering the board implies that all directors have to stand annual elections at the shareholder meeting.

decisions (Bharath et al., 2010; Gallagher et al., 2011). Besides unobserved investor influence, behind-the-scene concessions may also result in settling some looming proxy fights before they ever become public, thus downward biasing statistics about the actual number of proxy contests that would have occurred if management and boards were truly unresponsive.

Yet, even if proxy access rules were relaxed and boards became indeed more responsive to shareholder wishes, it is unclear whether this would in fact lead to increased firm valuations. In its petition to the D.C. Court of Appeals, the U.S. Chamber of Commerce writes:

> "The appropriateness of a proxy access rule has been under discussion by the Commission on and off for decades. [..] Few issues in corporate governance have generated more disagreement or stronger passions, in part because of the serious disruptions that issuers of securities and others have long feared would result. Those disruptions include the threat of an access candidate being used as leverage to achieve other, special interest objectives of the nominating shareholder(s); the distraction of directors and officers from other responsibilities and the direct costs to shareholders of an election contest; and disruption in the operation of the board itself if an access nominee is elected." (U.S. Chamber of Commerce, 2010)

An increase in a board's responsiveness to its shareholders may thus decrease shareholder wealth as firms could face board disruptions and contest costs. As most firms do not have agency issues but would be exposed to such costs overall U.S. shareholder wealth could also decline. On the other hand, earlier literature credits greater shareholder activism with valuation increases rather than decreases (e.g., Brav et al., 2007; Klein and Zur, 2011), and thus all firms should benefit (or at least not be hurt) by proxy access. This provides us with the second hypothesis:

Hypothesis H_2: Most boards and management do not have any agency issues but proxy access (and its costs) will apply to *all* firms. This will lead to a decline of overall U.S. shareholder wealth.

Alternative H_{2A}: Greater proxy access reduces the costs of shareholder activism which is shown to increase value. Hence, there is an increase (or, assuming no agency issues at the average firm, at least no change) in overall U.S. shareholder wealth.

In its petition to the Court, the Chamber of Commerce further estimated proxy contest costs in the range between $4 million to $14 million for large companies and $800,000 to $3 million for small issuers. While the SEC maintained that shareholder activism is beneficial and many boards would choose to not fight shareholder nominees (thus avoiding a large part of such price tags), the Chamber upheld that a board might indeed be bound by its fiduciary duty to fight a nominee if it considered the candidate unfit. Extensive proxy contest costs in turn could significantly depress earnings, particularly from smaller issuers.

This leads to the third hypothesis:

Hypothesis H_3: Small firms will be particularly hit by proxy access as (a) it is easiest to cross the 3%-3 year threshold in small firms and (b) board disruption and proxy contest costs are larger relative to profits.

Alternative H_{3A}: Shareholder activism is beneficial independent from firm size; thus it should also be valuable to small firms.

One reason that we expect small firms to be more affected by proxy access is because it is easier for activist shareholders to accumulate and hold 3% of the outstanding shares. For an alternative (and more direct) way of measuring the likelihood of being affected we can also turn towards the current ownership structure. As the court repeal came as a surprise to the market (as further discussed in (2.4.1)), we expect to see a larger shock to firm valuations whenever there was a larger number of investors qualifying (individually or as a coalition) to make immediate use of proxy access. In other words, if the market saw a benefit from greater proxy access, we would expect to see a larger firm valuation decline upon the court repeal for those firms which had already investors (or coalitions thereof) qualifying. On the other hand, firms without any qualifying investors (or coalitions) would remain unaffected for at least 3 more years until an investor had held a newly accumulated $\geq$3% share for the required 3-year period.

This provides us with the fourth hypothesis:

Hypothesis $\mathbf{H_4}$: The more investors (or coalitions thereof) qualify for proxy access in a firm's investor base, the greater is the firm's valuation decline.

Alternative $\mathbf{H_{4A}}$: Proxy access creates value in firms with agency issues; thus, we will not observe any valuation declines as the number of qualifying investors (or coalitions thereof) increases.

Finally, a prominent argument holds that proxy access empowers special-interest investors (such as union and pension funds) and enables them to push through political or personal goals. Romano (1993: 799-820) recounts several instances in which public pension officials faced political pressure to finance state-related investments, limit investments to firms with prevailing wages or other work benefits, or to inject capital into distressed local companies to avoid local job losses. Further, officials in public pension funds may be motivated by private benefits such as seeking publicity so to run for public office or to advance a private consulting career. Such conflict of interests would be at odds with the profit-maximization interest of general shareholders. Romano's anecdotal evidence is supported by systematic empirical evidence: Woidtke (2002) for example analyzes firm value by the degree of ownership level of public and private pension funds and finds that Tobin's Q is negatively related to the ownership level of activist public pension funds. This supports the notion that investors perceive the influence of public pension funds to be value-destroying. Del Guercio and Woidtke (2011) find that directors who comply with requests by unions and pensions funds suffer reputational damage in the labor market for directors; assuming efficient director labor markets, this implies that union and pension fund interests are not aligned with those of other shareholders.

An analysis of shareholder proposals confirms that just a few special-interest investors make up a large share of activism (as measured by shareholder proposals): between 1996 and 2010, unions and pension funds filed 2,150 (or 40.7%) out of 5,289 shareholder proposals recorded in annual reports by Georgeson. Data on 2,750 shareholder proposals collected between 2006 and 2012 by Proxy Monitor – an alternative data source – classifies 625 proposals (22.7%) as filed by public pension funds or labor union. While this is a significantly lower estimate, also in this data set just 20 special-interest investors account for 554 (or 20.1%) of all proposals.

Despite the activism and the potential for misaligned incentives by union and pension funds, it is however not clear whether proxy access indeed empowers special-interest investors sufficiently to push through politically motivated agendas. First, it is unclear whether unions and pension funds hold sufficiently large stakes to cross the 3%-3 year threshold that allows access to the proxy. Fisch (2011: 27), for example, argues: "Public pension funds, union pension funds, foundations and the like virtually never hold as much as 3% of a company – holdings of even 1% are comparatively rare, because such concentrated holdings increase the risk of the institution's portfolio." Second, even if a union or pension fund crossed the 3%-3 year threshold and was allowed to nominate its own director candidate, it would still need to convince a majority of the remaining shareholders that its candidate was superior to the one of the current management. If shareholders suspected a public pension fund or union fund to have a politically-oriented agenda (e.g., due to previous such episodes in other companies), they may deny their support. This leads to the fifth and final hypothesis:

Hypothesis $\mathbf{H_5}$: Empowering special-interest investors (unions, pension funds) will allow them to push through political rather than profit-maximizing goals; this hurts firm profits and leads to lower firm valuations.

Alternative $\mathbf{H_{5A}}$: Special-interest investors rarely hold sufficiently large and long-term stakes to make use of proxy access. Even if they do, proxy access does not provide sufficient empowerment to push through value-destroying policies.

2.3.3 Board Trends 1995-2011

A key disagreement between proponents and critics of the reform is about the number of unobserved proxy fights and whether boards have become more responsiveness to shareholders. Specifically, critics of proxy access argue that recent trends toward destaggering boards, majority voting and a greater willingness of management and board to accommodate shareholder concerns are signs of a growing board flexibility that renders greater proxy access obsolete. To quantify those arguments, Table (2.1) shows the development of three trends: (1) the number of annual proxy contests, (2) several voting-related governance measures, and (3) the change in composition of board members.

Table 2.1: Board Trends, 1995-2011

	PROXY CONTESTS		GOVERNANCE				DIRECTOR CLASSIFICATIONS						
	Intent of	Proxy	**Staggered Boards**		Cumul.	Major.	**Insiders**		**Linked**		**Independent**		Dual Role
	Contest filed	Contests	EDGAR	S&P 1500	Voting	Voting	Pct.	Tenure	Pct.	Tenure	Pct.	Tenure	(CEO &
Year	(PREC14A)	(DEFC14A)	universe				(%)	(avg.yrs)	(%)	(avg.yrs)	(%)	(avg. yrs)	Chairman)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1995	44	32	29%	60%	14%	-	-	-	-	-	-	-	-
1996	85	58	28%	-	-	-	21%	-	22%	-	57%	-	67%
1997	112	81	31%	-	-	-	22%	-	21%	-	57%	-	69%
1998	108	81	33%	58%	12%	-	22%	9.9	22%	10.5	56%	7.5	84%
1999	123	87	34%	-	-	-	21%	9.7	22%	10.4	56%	7.4	82%
2000	130	114	34%	58%	10%	-	21%	9.6	22%	10.1	57%	7.2	82%
2001	115	85	34%	-	-	-	21%	11.8	21%	10.1	58%	8.4	80%
2002	104	82	34%	59%	9%	-	19%	10.0	19%	11.5	62%	7.4	82%
2003	135	84	33%	-	-	-	18%	10.3	18%	11.7	64%	7.4	80%
2004	79	63	33%	60%	9%	-	17%	14.7	18%	14.4	65%	8.6	78%
2005	90	60	32%	-	-	-	16%	10.9	18%	12.5	66%	7.4	75%
2006	99	69	32%	57%	8%	-	16%	10.8	18%	12.0	67%	7.4	69%
2007	125	86	35%	55%	8%	-	16%	10.7	14%	13.5	71%	7.5	53%
2008	130	112	33%	54%	8%	25%	15%	12.0	14%	13.8	71%	7.9	64%
2009	136	98	35%	52%	8%	32%	15%	11.1	14%	13.9	71%	7.8	63%
2010	98	76	35%	50%	7%	35%	15%	11.4	13%	14.3	72%	8.0	62%
2011*	57	28	35%	-	-	-	-	-	-	-	-	-	-

Data sources: Columns (1)-(2) show the number of public firms that had at least one PREC14A/DEFC14A filed with the SEC in a given year. The filings were directly obtained from the SEC's EDGAR database. Column (3) shows the percentage of all public firms with staggered boards, where a firm's board is classified as staggered when its annual proxy filing (DEF14A) filed with the SEC mentions classified directors keywords: ("Class I director", "Class II director", ... with Roman or Arabic-based numbers). Columns (4)-(13) are based on RiskMetrics's directors and governance database that covers S&P 1500 firms. *2011 data is based on Q1 and Q2 filings only.

As soon as an investor considers initiating a proxy contest, the investor is required to file a preliminary proxy statement (PREC14A) with the SEC followed by a definite proxy contest statement (DEFC14A) if the proxy contest advances. Columns 1 and 2 show the number of firms that were targets to preliminary and definite proxy contest filings.[5] The number of actual plus threatened proxy contests has remained mostly stable over the past 18 years with an average of about 100 per year and peaks during times of economic downturns. About one third of initiated contests (PREC14A) never occur and seem to have been either settled or abandoned. Despite a decade of overall rising shareholder activism, there seems to be no clear time trend towards a greater investor assertion via proxy contests. The observation is consistent with two explanations: first, as the proponents of the entrenchment perspective would argue, it is a sign of prohibitive costs to proxy activism. Alternatively, it may suggest overall little discontent among investors regarding the responsiveness of directors towards shareholders' demands.

Columns 3 and 4 show the percentage of firms with staggered boards in which only a fraction of the board is elected each year. While column 3 shows the percentage of all public firms with staggered boards, column 4 shows the share of firms with staggered boards among the more prominent S&P 1500. While there is no obvious trend towards destaggering in the universe of public firms, 10% of S&P 1500 firms destaggered between 2004 and 2010. Columns 5 and 6 provide data on changes in board voting procedures: at the same time as cumulative voting has been largely abandoned by firms (from 14% in 1995 down to 7% in 2010), the less powerful majority voting has picked up. As of 2010, over one-third of the S&P 1500 firms have introduced majority voting.

Columns 7-13 shed light on trends in board composition: columns 7, 9 and 11 pro-

[5] The same methodology is used by Fos (2011). Note that while this method identifies actual as well as threatened (and later settled or abandoned) contests, it still does not capture *all* of the behind-the-scene interaction between investors and management where an implicit threat of a proxy contest might have led to management concessions.

vide the percentage of inside directors (employees), linked directors (e.g., relatives, past employees, interlocked) and independent/outside directors in the average board per year. This is supplemented by the average tenure of directors on firms' boards in columns 8, 10 and 12. Several trends can be detected: first, the percentage of independent directors has strongly increased relative to linked and inside directors (not least due to new listing requirements by stock exchanges and new regulation such as the 2002 Sarbanes-Oxley Act). Simultaneously, the average tenure of insiders and linked directors has increased considerably: on average, linked directors in 2010 had a tenure of 14.3 years versus just 8 years for independent directors. The greater "staying power" of linked and inside directors however need not signal entrenchment: the rising average tenure of linked directors could be the result of boards retaining their best-performing linked and inside directors while replacing their worst-performing ones with new outside directors. Finally, column 13 shows the share of S&P 1500 firms in which the CEO also holds the position as the Chairman of the board. While the number of dual roles first rose to 82% in 2002, it has since come down significantly (62% as of 2010). While this could be understood as a considerable improvement from a shareholders' perspective, it is about the same level that markets had previously seen in the mid 1990s.[6]

Overall, Table (2.1) provides mixed evidence: neither can a clear trend towards greater shareholder empowerment be observed (number of proxy contests, staggered boards, cumulative voting), nor can it be claimed that there has been no change at all (number of independent board members, majority voting, destaggering of boards among S&P 1500 firms). With mixed evidence and conflicting theoretical arguments about the costs and benefits from greater proxy access, the question whether greater proxy access can create value for shareholders ultimately becomes empirical.

[6]Note that there is disagreement whether a separation of the CEO and Chairman position is indeed beneficial to shareholders: Faleye (2007) for example finds that – depending on firm and CEO characteristics – shareholder wealth may in fact decrease under a separation of the CEO and Chairman position while Balsam et al. (2011) find that an outside board chair impacts firm performance positively.

2.3.4 Proxy Access Literature

Proxy access reform ranks among the most debated regulatory issues the SEC has dealt with in years. An examination of SEC comment letters on proxy access reforms filed by investors and businesses between 2003-2010 results in a count of 2,332 comment letters with an additional 52,543 form letters.[7] This compares to just 1,572 comment letters filed with the SEC between 2002-2004 on 21 different proposal originating from the prominent Sarbanes Oxley Act.[8] While there are numerous articles in law journals discussing existing rules and ways for potential reform, few empirical studies exist. Harvard Law professor John C. Coates explains in his testimony before the U.S. Senate's Subcommittee on Securities, Insurance and Investments why:

> "[T]o my knowledge, there is no reliable large-scale empirical evidence – good or bad – on the effects of shareholder access to a company's proxy statement (..) there is no general body of data that is capable of revealing whether such a system would consistently have good or bad effects on shareholder welfare – and no such data will exist unless and until a large number of companies voluntarily adopt such a system or are required to by law." (Coates, 2009: 4)

Since then, four empirical studies have appeared. **Akyol et al. (2011)** use 14 event dates between 2006 and 2009 on which the likelihood of a proxy access reform increased or decreased and compare the change in the returns of a portfolio of 5,128 U.S firms on events days to the return of two benchmark indices (a Canadian and a Global stock index). The authors find statistically significant abnormal returns on six of the 14 event days and find (when the events are aggregated) the returns to be significant and inversely associated to the likelihood of proxy access reform. The authors conclude that greater proxy access

[7] An additional 890 comment and 10,100 form letters have been filed on a related 2002 proxy voting proposal.

[8] Source: Proposals' comment pages at http://www.sec.gov/rules/proposed.shtml.

destroys shareholder wealth. The study suffers from three limitations: first, in five of the 14 events between 2006-2007, proxy access reform was considered dead by most observers (Schuster, 2010: 1044-1045), other dates do not coincide with those proxy event dates of a second similar study by Larcker et al. (2011), and there are no dates from the 2010/2011 period which saw most regulatory activity. Second, any changes in the U.S. stock market relative to the Canadian and Global benchmark indices could also originate from other events that moved the U.S. stock market on that day but to a lesser degree the benchmark indices. Two such problematic dates (also used by Larcker et al., 2011, discussed below) include March 10, 2009, which saw the biggest stock market rally in 5 months and March 18, 2009, which saw another stock market rally and the largest drop in 10-year treasury yields since 1987 due to a FED announcement that day to buy up $300 billion in Treasury bonds. Attributing the differences in the overall U.S. stock market reaction (relative to a global or Canadian benchmark index) of such macroeconomic shocks to a change in the probability of proxy access regulations seems problematic. Third, the analysis considers only total U.S. shareholder wealth but does not analyze in-depth the impact of proxy access in the cross-section (e.g., firms with potential agency issues versus those without); thus, wealth increases by one set of firms may be masked in the aggregate by wealth decreases of other types of firms, or vice versa.

In a related study, **Larcker et al. (2011)** identify event dates that increased or decreased the probability of federal regulation on proxy access as well as executive payment restrictions. For proxy access, the authors find abnormal returns in 4 out of 10 event dates. Of the four significant events, three events relate to an effort by the Delaware Congress to pre-empt a federal law through a state law (§112 DGCL): (1) On March 10, 2009, the Delaware House of Representatives introduced a bill to allow (but not to require) corporations to voluntarily adopt bylaws permitting proxy access to shareholders. (2) On March 18, the law passed Delaware's House and (3) on April 8, it passed its Senate. Becker, Bergstresser and Subramanian (2010) however point out that the Delaware Bill was simply a formality:

> "It is well-known that the Corporate Law Section of the Delaware Bar Association, not the Delaware legislature, creates Delaware corporate law. Once the Corporate Law Section voted in favor of a shareholder access amendment on February 26, 2009, its implementation in Delaware became virtually a foregone conclusion. Both the Akyol study and the Larcker study examine the introduction of the shareholder access bill in the Delaware House of Representatives (March 10, 2009), the passage of the bill in the House (March 18), and the passage of the bill in the Delaware Senate (April 8), but fail to examine the recommendation from the Corporate Law Council that occurred on February 26. If the marketplace fully anticipates an event, then wealth effects around the event date can be meaningless."
>
> (Becker, Bergstresser and Subramanian, 2010:16-17)

Becker et al.'s criticism is supported by the fact that both the House as well as the Senate voted unanimously in support of the bill (Delaware General Assembly, 2009). Moreover, even though *three* of the four significant dates are related to this legislation, Larcker et. al concede that the Delaware bill did in fact not change actual law or practice: "Interestingly, proxy access was already voluntary prior to the Delaware law. In this regard, the Delaware amendment merely codified existing case law." (Larcker et al., 2010: 16) Finally, the last significant event took place two years earlier in June 2007, at a time when proxy access was considered dead by most observers (Schuster, 2010: 1044-1045). For the remaining 6 proxy access event dates, no coefficient is significant and all have magnitudes less than one-tenth of those on the 4 significant dates.

Becker et al. (2011) and Cohn et al. (2011) are the two latest empirical studies on proxy access reform and closest to this one. Becker et al. (2011) use the surprise announcement by the SEC on October 4, 2010, to stay the effectiveness of Rule 14a-11 (which was due to go into effect on November 15, 2010) pending the court review. The authors find that those firms among the S&P 1500 that would have been most affected by proxy access (as measured by an index of institutional ownership) lost most value when the delay was announced. The authors further find that firms that were incorporated in Delaware suffered fewer losses which is relevant as Delaware changed preemptively its state laws to allow companies to adopt bylaws permitting greater proxy access. The authors' results point towards proxy access being value-creating rather than value-destroying. Two concerns for any natural experiment are (1) the exogeneity assumption of the experiment and (2) the assigned meaning of any identified discontinuity: first, the U.S. Chamber of Commerce had petitioned the Court of Appeals already two months earlier to stay 14a-11's effectiveness pending court review. Once the Court had accepted the petition, a voluntary stay by the SEC or an ordered stay through the Court of 14a-11 was to be expected, thus only leaving the exact timing but likely not the stay itself a surprise. If an efficient market had anticipated with some probability that a stay was likely to occur after the petition had been accepted, this would introduce a downwards bias into the authors' estimates by said probability. Further, as we will argue shortly, the market's expectation at that point was that the review would merely delay greater proxy access – potentially to proxy season 2012 – but would not result in a repeal of it. As a result, even when assuming that the market was surprised by the stay, the event date's estimate might measure the value of the delay of greater proxy access by one year but not the value of greater proxy access itself.

Finally, **Cohn et. al (2011)** use three event dates on which the ownership thresholds in the proxy access reform proposal changed as natural experiments: on June 16, 2010, Senator Dodd proposed that an investor would have to hold a universal 5% to access the proxy instead of the 1%, 3% and 5% thresholds the SEC had previously suggested for firms with market capitalizations <\$75 million, \$75-700 million and >\$700 million. On June 24, 2010, the 5% threshold was again dropped during negotiations between the House and the Senate and the SEC's thresholds were back on the table. Cohn and his co-authors analyze how the valuations of firms with activist investors changed on dates at which firms saw their applicable thresholds change. The authors find that firm valuations decreased (increased) around events that increased (decreased) the hurdles to proxy access, concluding that proxy access increased shareholder wealth. Importantly, the authors only include firms that are in the portfolio of so-called "SharkWatch50 investors." SharkWatch50 is a compilation of 50 significant activist investors; inclusion into the list depends on the number of publicly disclosed activist campaigns and proxy fights waged as well as the past success rate in affecting change at targeted companies (SharkRepellent, 2008). As a result, the authors' findings are not applicable to the whole market, but only to the subset of firms in which a number of very successful activist investors had previously invested into. Put differently, the results provide estimates of the value of greater proxy access to those investors that use the tool most aggressively and for those firms that had been previously targets of such investors; it is however unclear whether those results can be generalized to the average firm and the average investor. As a result, we cannot exclude the possibility that greater proxy access may have been indeed harmful to firms that were not part of the SharkWatch50 investors' portfolios or to firms with other specific characteristics (e.g., small issuers or firms without agency issues).

2.3.5 Contribution

This paper contributes to the existing literature in several ways. First, this is the first paper that uses the repeal of proxy access regulation by the U.S. Court of Appeals that effectively ended proxy access reform for the foreseeable future. It thereby does not require us to pick dates from the regulatory process that are noisily related to the reform. Second, we investigate valuation changes for the cross-section of U.S. firms instead of the U.S. market as a whole; as a result, we do not have to rely on international benchmark comparisons between the U.S. and other countries. Third, as the repeal came as a major surprise to the market (as argued in the next section) and is considered the end of proxy access reform for the foreseeable future, the subsequent firm valuation changes provide us with the most accurate estimates to date about the value of greater proxy access. This compares favorably to the mere temporary stay of greater proxy access by one year that occurred on Nov 15, 2010, or the market's expectations between 2006 and 2009 about changes in the probability of future proxy access regulation. Fourth, we analyze for the first time valuation changes for several corporate governance provisions that have been previously linked to agency conflicts (e.g., staggered board, poison pill). This allows us to understand the value of greater proxy access in the cross-section of firms sorted by the nature and number of corporate governance provisions. Further, since critics of the reform have argued that greater proxy access will also hurt the valuation of firms that do not have any agency issues, we investigate the effect of proxy access on firms without agency issues, on overall U.S. shareholder wealth and by firm size to determine if we can find significant negative impacts for certain subsets of firms. Finally, we investigate the popular argument that empowering special-interest investors (unions, pension funds) would diminish shareholder wealth. This is the first paper that does so by using direct ownership information of such investors (or potential coalitions thereof) to determine the valuation changes in firms in which special-interest investors would have immediately qualified for greater proxy access.

2.4 METHODOLOGY AND DATA

2.4.1 Natural Experiment

We use the court repeal of Rule 14a-11 on July 22, 2011 as a natural experiment to estimate the shareholder wealth effects of greater proxy access. This assumes that the repeal of the SEC's proxy access reform came as a surprise to the market. We argue that this is the case for three reasons:

1. Timing: The Court had not issued any pre-announcement of a forthcoming ruling and the Court's statutes do not prescribe any time limits as to when a ruling needs to be issued (D.C. Circuit Court of Appeals, 2011b). Further, while the SEC had initially expected a resolution already in late Spring and despite extensive coverage of proxy access reform in the popular media in early 2011, there was no news about an imminent decision by the D.C. Circuit Court of Appeals in the days prior to July 22, 2011: A Lexis-Nexis and Factiva news search finds no single news article between July 1-21 including the words `''court of appeals'' + proxy`, but 18 (27) such articles on July 22 and 17 (7) more articles on July 23 on Lexis-Nexis (Factiva).[9] Further, while the Court made its opinion public at around 11.30am, it took Bloomberg until 2.13pm to issue a news alert (Bloomberg, 2011) and Associated Press until 4:25pm when the market had already closed for the weekend, indicating that even the business media was unaware of the impending decision.

2. Content: Legal experts did not expect the challenge to uphold in court. Not only was the SEC explicitly authorized by Congress to rewrite proxy access regulation, but the SEC had also spent considerable time and resources – 21,000 staff hours valued at $2.5 million (SEC, 2011) – to propose rules, seek feedback and research its impacts. While the final rule included an 80 page cost-benefit analysis, the Court's "insufficient cost-benefit analysis" ruling surprised even outspoken legal critics of proxy access reform. Stephen Bainbridge for examples writes: "[C]andidly, while I am pleased, I'm also surprised. I had thought – and said publicly – that this suit was a long shot." (Bainbridge, 2011) His surprise is echoed by Brown (2011) arguing that "The DC Circuit struck down the rule, imposing a 'nigh impossible' standard with respect to the applicable economic analysis [upon the SEC]." Keller (2011) concurs "There are many (and I am one) who, although believing the SEC acted unwisely in adopting proxy ac-

[9] We also tried other combinations of the terms `proxy, proxy access, 14a-11, SEC + Chamber of Commerce, Court of Appeals`.

cess, at least in the form of Rule 14a-11, are concerned about the high, nigh impossible, bar the Court set that could put in jeopardy most SEC rulemaking of any complexity or controversy. It remains to be seen whether the high bar established by the Court in this case will be limited in subsequent cases." Finally, the surprise about the verdict was confirmed in a private conversation with a corporate lawyer from K&L Gates who followed the proceedings.

3. Empirical Tests: Perhaps most convincing, we test for early portfolio price movements in the days prior to the repeal. Specifically, we provide in all our results the portfolio returns of day -1 (Thursday, July 21, 2011) to test for significant abnormal returns the day before the repeal.[10] We further compute for all our results the 200 trading day empirical distribution [-100, +100] of the average daily abnormal return of the respective portfolio so to be able to rank the event window's coefficient relative to the portfolio returns in the 200 days around the repeal. As will become clear in the empirical analysis in section (**??**), both measures (classical statistical significance that assumes normality of portfolio returns and significance based on the empirical distributions) give no indication that the market expected the court repeal.

For those reasons – (1) the unforeseen release of the verdict on July 22, 2011, (2) legal critics being surprised about the repealed, and (3) the significance obtained from our empirical distributions – we argue that the court repeal provides us with an ideal setting for a natural experiment. Note however that if – for whatever reason – investors were not surprised by the court's decision, this would bias us against finding any significant treatment effect on July 22, 2011 as the repeal of proxy access would have already been priced into stocks in the prior days or weeks.

[10]Note that day -1 is typically included in the treatment window of event studies (often, [-1,1]); using day -1 as a placebo treatment is thus a very conservative robustness test that assumes that there was no (or at the least very little) prior leakage of the Court's decision.

2.4.2 Estimation of Shareholder Wealth Effects

We estimate the shareholder wealth effect of greater proxy access by comparing the average daily abnormal return of a portfolio of firms that should have been affected to the abnormal returns of a firm portfolio that should not have been affected by the repeal. We compute portfolio abnormal returns using the standard Schipper and Thompson (1983) portfolio methodology rather than individual firm abnormal returns as we have an identical event day (July 22, 2011) for all firms, which can otherwise lead to cross-correlation among abnormal returns and biased standard errors. An alternative approach to account for the cross-correlation of returns is to use an FGLS estimation which requires an estimation of the variance-covariance matrix. We decide against the FGLS approach and in favor of the Schipper and Thompson portfolio methodology since "[FGLS] requires accurate estimation of the covariance matrix of the residual returns, which is not normally possible in finite samples, especially as the number of firms increases. [..] Chandra and Balachandran (1990) further argue that GLS is highly sensitive to model misspecification, which may lead to inefficient test results even if the covariance matrix is known. They conclude that GLS should be avoided in event studies because the correct model specification is rarely known for certain." (Kolari and Pynnönen, 2010: 3997-8).

All abnormal returns are obtained with the traditional Capital Asset Pricing Model (CAPM) and the Fama-French 3-factor (FF3) and 4-factor (FF4) asset pricing models while equally-weighting as well as value-weighting portfolios.[11] We do not report FF3 results as they are almost identical to FF4 results. We also do not report value-weighted results as there is a firm size effect (more on this later); value-weighted portfolio results are however in almost all results qualitatively the same.

Specifically, we run the following specifications (Schipper and Thompson, 1983):

[11] We use the market capitalization of firms at the end of Q4-2010 for value-weighted results.

$$\begin{aligned}\textbf{CAPM:}\quad \bar{r}_t &= \alpha + \beta \text{MktRf}_t &&+ \gamma \text{dEventWindow}_t + \epsilon_t\\ \textbf{FF4:}\quad \bar{r}_t &= \alpha + \beta_1 \text{MktRf}_t &&+ \beta_2 \text{SMB}_t + \beta_3 \text{HML}_t + \beta_4 \text{UMD}_t\\ & &&+ \gamma \text{dEventWindow}_t + \epsilon_t\end{aligned}$$

where $\bar{r}_t$ is the excess portfolio return on day t (we use 366 trading days; July 21 2010 to December 31, 2011), $\texttt{MktRf}_t$ is the market return on day t in excess of that day's risk-free rate, $\texttt{SMB}_t$ and $\texttt{HML}_t$ are the Fama-French risk factors for day t while $\texttt{UMD}_t$ is the Carhart momentum factor for day t. Finally, $\texttt{dEventWindow}_t$ is a treatment/indicator variable that is 0 on days outside the event window and 1 on days in the event window. Hence, the coefficient of interest γ captures the daily portfolio excess return that cannot be explained by risk and momentum factors. Any constant effect that is not captured by the risk factors and does not belong to the treatment is further absorbed by the intercept term. We report the trading day event windows [0,0], [0,1], [0,2], [0,3] and, as a placebo treatment, [-1,-1]. Note that if proxy access was considered by the market a beneficial (detrimental) regulation for the portfolio firms with its expected benefits (costs) exceeding the its expected costs (benefits), we would expect a negative (positive) coefficient γ upon the regulation's repeal.

Although the coefficient of interest γ already provides us with the average daily abnormal returns that occurred during the treatment period, one could still argue that the treatment effect may be due to other market forces in the event window that affected all firms. To answer to such criticism, we run the above regressions twice, once for a portfolio of firms that should have been affected by greater proxy access and once for a portfolio of firms that should have been less (or not at all) affected by greater proxy access. If the abnormal returns in the event window were due to greater proxy access, one would expect to find that the abnormal return coefficients differed significantly across the two portfolios. Moreover, one might expect that the abnormal returns should be larger in magnitude and more significant in those portfolios that were more affected by proxy access reform, providing us with additional testable implications. We report in all our cross-sectional specifications the difference between affected and non-affected portfolios.

At the latest since Mandelbrot (1963) and Fama (1965) it is well-known that portfolio returns exhibit fat tails, with the result that classic significance measures that assume asymptotic normality of portfolio returns might be biased. We therefore also compute the empirical distribution of the indicator coefficient based on a 200 trading day window around the court repeal. Specifically, for example for the 1-day event window, we set $\texttt{dEventWindow}_t$ equals to 1 (else 0) separately for each day between trading days -100 and +100 and re-run our CAPM or FF4 specification 201 times. We thereby gain information on the ranking of our coefficient on day 0 (July 22, 2011) relative to all the other coefficients on the 200 trading days (or, 10 months) around day 0. We report the percentile at which the event day coefficient lies in its empirical distribution.

2.4.3 Data

We use stock data and balance sheet information from CRSP and COMPUSTAT. Corporate governance data originates from RiskMetrics Analytics Governance/Directors databases and Georgeson Annual Corporate Governance Reviews while the Gompers-Ishii-Metrick (GIM) index and the Bebchuck-Cohen-Ferrell (E) index are downloaded from the authors' webpages.

Institutional ownership information is obtained from quarterly 13-F filings available at SEC's EDGAR database. These filings report the amount of shares and the current value of each of the investor's investments. We download all 13-F filings from the SEC's EDGAR database between July 1, 2008 and Aug 30, 2011 (57,887 filings), thereby covering the 3-year holding period (Q2-2008 to Q2-2011) that an investor needs to satisfy such that his stocks become eligible for proxy access. We then extract 11,078,553 investment positions for 4,082 distinct 13-F filers[12] and eliminate all investments that were held for less than 12 consecutive quarters. For each remaining investor-firm position we keep only the lowest number of shares that the investor held across all 12 quarters. This leads to 148,698 investment positions that were held for 12 consecutive quarters. Next, we obtain the shares outstanding by firm and quarter and compute the percentage of ownership each investor held in each of the target firms at the end of June 2011 that is eligible to be used under the new proxy access rules. Finally, we identify those firms in which there existed individual investors exceeding 3% for 3 years and in which a shareholder coalition of up to 3 investors can cross the 3%-3 year threshold.

To test the effect from greater proxy access onto firms with special-interest investors, we further identify all special-interest investors (52) among all 13-F filers (4,082) and identify the targets, the sizes and durations of all their shareholdings.[13,14] The list of special-interest investors included in our analysis is provided in Appendix (A). We create a portfolio of firms in which special-interest investors exceed 3% ownership for at least 3 years, and – as a control group – a portfolio of firms in which there is at least one non-special-interest investor exceeding 3% for 3 years but no significant stake of a special-interest investor. We repeat this process for different thresholds (1% and 0.5% instead of 3%) and different holdings

[12]The parent of related money managers file 13-Fs together so that the actual number of investors is much greater. (Example: "Deutsche Bank AG" files one 13-F for 19 subsidiary money managers.)

[13]We research online the names of all 4,082 institutional investors (the most frequently used internet sources are the investors' own websites, businessweek.com, forbes.com and finance.yahoo.com). We also obtain membership lists of the AFL-CIO (the umbrella organization of American unions) and the Council of Institutional Investors (self-described as "a nonprofit association of pension funds and employee benefit funds, foundations and endowments with combined assets that exceed $3 trillion") and check whether their members are among the list of investors.

[14]As only investors with investment holdings exceeding $100 million have to file 13-F schedules, this method does not give us the universe of all special-interest investors. Since, however, a 3% stake in the mean (median) public firm affected by proxy access reform constitutes an investment of $109 ($17) million, we are foremost interested in investors that can make such large investment over a >3 year period without sacrificing too much portfolio diversification. As a result, the $100 million holding requirement should not pose a serious limitation to our analysis.

periods (2 years, 1 year and 0 years). We also repeat this process to create treatment and control group portfolios in which special-interest investors can form coalitions (unlimited in the number of members) to jointly cross 3% (alternatively, 2% and 1%) for a holding period of 3 years (alternatively, 2 years, 1 year and 0 years).

2.5 RESULTS

2.5.1 Corporate Governance and Proxy Access

Our first investigation concerns corporate governance levels since the main objective of proxy access was to empower shareholders in firms with unresponsive management and agency issues. Tables (2.2) and (2.3) show how the proxy access repeal affected firms in the cross-section of corporate governance levels. Table (2.2) shows the abnormal portfolio return to firms that are considered "plausibly entrenched" (E6 and G-high) versus "non-entrenched" (E0 and G-low) as classified by the E-Index (Bebchuk, Cohen and Ferrell, 2009) and the GIM-Index (Gompers, Ishii and Metrick, 2003). The E0-portfolio consists of 59 firms which had in the latest 2 years of the index (2007, 2008) none of the six major anti-takeover provisions (ATPs) that Bebchuk et al. relate to managerial entrenchment.[15] Conversely, the E6-portfolio consists of 72 firms that had all six of the major ATPs. Similarly, the G-low portfolio consists of 54 firms that had (in 2006, the last available year of the index) five or less of the 24 ATPs that Gompers et al. relate to managerial entrenchment, while G-high consists of 63 firms with at least 14 ATPs.[16] Note that we do not need to take sides on the debate whether the presence of several ATPs lead to a lower firm value or whether a lower firm value leads to a greater number of ATPs. In either case, greater proxy access aims at giving (activist) investors more influence onto firm decisions, which

[15] Those provisions are staggered boards, poison pills, golden parachutes, limits to shareholder bylaw amendments and supermajority requirements for mergers and charter amendments.

[16] We choose 5 and 14 ATPs as those delineate the lowest and highest deciles.

can be valuable to investors in both cases, entrenched as well as under-performing firms.

Table 2.2: Proxy Access and Managerial/Board Entrenchment

Event Window	Benchmark Model	E0 (n=59) (1)	E6 (n=72) (2)	Diff: E6-E0<0 (3)	G-low (n=54) (4)	G-high (n=63) (5)	Diff: G high-G low<0 (6)
$[-1,-1]$	CAPM	0.0000	-0.0050	-0.0049	-0.0009	-0.0040	-0.0031
	Placebo	[0.00]	[-1.14]	[-0.83]	[-0.19]	[-0.92]	[-0.48]
	FF4	0.0036	-0.0027	-0.0063	0.0024	-0.0030	-0.0039
	Placebo	[1.24]	[-0.89]	[-1.05]	[0.77]	[-0.89]	[-1.18]
$[0,0]$	CAPM	-0.0011	-0.0096**$^{\gamma}$	-0.0085*$^{\beta}$	0.0029	-0.0076*$^{\beta}$	-0.0047$^{\alpha}$
		[-0.27]	[-2.23]	[-1.43]	[-0.61]	[-1.77]	[-0.74]
	FF4	-0.0003	-0.0075***$^{\gamma}$	-0.0072**$^{\beta}$	-0.0009	-0.0053$^{\alpha}$	-0.0045$^{\alpha}$
		[-0.10]	[-2.46]	[-2.29]	[-0.28]	[-1.61]	[-0.98]
$[0,2]$	CAPM	-0.0007	-0.0048*$^{\beta}$	-0.0041$^{\beta}$	-0.0029	-0.0058***$^{\gamma}$	-0.0029$^{\alpha}$
		[-0.29]	[-1.92]	[-1.19]	[-1.06]	[-2.34]	[-0.79]
	FF4	0.0006	-0.0032*$^{\gamma}$	-0.0039**$^{\beta}$	-0.0011	-0.0047***$^{\gamma}$	-0.0035*$^{\beta}$
		[0.39]	[-1.84]	[-1.65]	[-0.61]	[-2.44]	[-1.35]

Table (2.2) shows average daily abnormal portfolio returns as obtained with CAPM and FF4 for "entrenched" versus "non-entrenched" firms as classified by the GIM index (Gompers, Ishii and Metrick, 2003) and the Entrenchment index (Bebchuk, Cohen and Ferrell, 2009). Specifically, the E0-portfolio consists of firms which had in the latest 2 years of the index (2007, 2008) none of the six major ATPs while E6 is a portfolio of firms which had all six major ATPs. Likewise, the G-low portfolio consists of firms that had 5 or less ATPs while G-high consists of firms with at least 14 ATPs in 2006 (the last available year of the index). The numbers in the table represent the coefficient γ on `dEventWindow` in the empirical asset pricing regressions in section (2.4.2). For ease of reading, t-statistics are shown in square brackets. *,**,*** shows statistical significance assuming portfolio returns are normally distributed at the 10%, 5% and 1% level while α, β, γ show statistical significance in the empirical distribution of the respective portfolio (or difference between portfolios). Specifically, α, β, γ means that the coefficient ranks in the 10th, 5th, 1th percentile of the 200 trading day empirical distribution around the announcement date.

We first note that there are no significant abnormal returns in the placebo event window [-1,-1] (rows 1 and 2) in both CAPM and FF4 specifications. Additionally, none of the abnormal returns in [-1,-1] rank in the bottom 10% of the [-100,+100] empirical distribution of the 1-day returns. Both are indications that the court repeal surprised the market. To the contrary, in the two specifications in which we do expect a significant effect (portfolios E6 and G-high), the coefficients turn highly significant in the treatments that include the day of the court repeal, [0,0] and [0,2]. In addition, the coefficients rank in the bottom 5% or 1% of their respective empirical distributions; in the case of E6 at [0,0] and G-high at [0,2], the coefficients comprise the largest portfolio value reductions in the complete 10-month empirical distribution window. In all treatments, we find significant negative abnormal returns, pointing toward a significant reduction in firm valuations due to the repeal of the law. This indicates that the market valued proxy access positively for plausibly entrenched firms. The magnitude of the effect is between 53 and 96 basis points for the day of the repeal. Further, there are no significant abnormal returns to the portfolios of firms with few ATPs (E0 and G-low in columns 1 and 4), indicating that the repeal of proxy access reform did not impact the valuation of firms which were unlikely to suffer from managerial entrenchment.

Columns 3 and 6 show the difference-in-difference estimates between the high versus low-entrenchment firm portfolios. While the differences are not significant on day -1, they turn significant in column 3 in all specifications that include the day of the repeal. Furthermore, the results are also highly significant in their respective empirical distributions (bottom 5%). While we obtain a significant firm value decline of 72 to 85 basis points between E6 and E0 firms, significance levels are lower for most specifications using the GIM-index in column 6. This may possibly be the case as the most recent GIM-index dates back to 2006 and might be thus more noisy than the more recent E-Index; additionally, a high GIM-score may still exclude some of the more severe anti-takeover provisions that a firm in the E6 portfolio includes.[17] Nonetheless, the difference between the G-high and G-low portfolios are still firmly negative and are located in the bottom 5% or 10% of their respective empirical distributions.

We next investigate several specific corporate governance bylaws: a staggered board, the lack of majority or cumulative voting, the existence of a poison pill or a golden parachute, dual class shares to concentrate voting power, having faced considerable shareholder opposition in the most recent 2011 board elections, having had three or more board- or voting-related shareholder proposals in the recent three years, and being in the top or bottom decile in the number of independent directors. In each of those cases, investors and management/board may be particularly affected from greater proxy access. For compactness and ease of reading, Table (2.3) shows only the difference in the average daily abnormal returns (similar to columns 3 and 6 in Table (2.2)). Column 1, for example, shows the difference in the abnormal daily returns to a portfolio of firms with a staggered board relative to a portfolio of firms without staggered boards.

[17] In the GIM-index, a firm earns one point for each of 24 unique governance rules that strengthen the rights of the management relative to shareholders. The E-index however focuses only on the 6 most severe anti-takeover provisions.

Table 2.3: Corporate Governance and Proxy Access

Event Window	Bench-mark Model	Diff: Stagg.Board (n_1=737; n_2=744) (1)	Diff: No Maj.Voting (n_1=960; n_2=521) (2)	Diff: Poison Pill (n_1=310; n_2=1,171) (3)	Diff: Dual Class (n_1=90; n_2=1,391) (4)	Diff: Previous Opposition (n_1=33; n_2=115) (5)	Diff: D1 vs. D10 of Indep. Directors (n_1=174; n_2=225) (6)
$[-1,-1]$	CAPM	-0.0003	-0.0013	-0.0005	0.0025	-0.0022	-0.0006
	Placebo	[-0.07]	[-0.28]	[-0.11]	[0.48]	[-0.43]	[-0.12]
	FF4	0.0006	0.0016	0.0009	0.0033$^{\alpha}$	-0.0034	0.0000
	Placebo	[0.22]	[0.58]	[0.36]	[1.03]	[-0.70]	[0.00]
$[0,0]$	CAPM	-0.0032$^{\gamma}$	-0.0014	0.0018	0.0007	0.0025	-0.0011
		[-0.66]	[-0.29]	[0.35]	[0.13]	[0.50]	[-0.22]
	FF4	-0.0029$^{\gamma}$	-0.0006	0.0016	0.0006	0.0030	0.0010
		[-1.10]	[-0.21]	[0.61]	[0.20]	[0.62]	[0.34]
$[0,3]$	CAPM	-0.0005	-0.0011	-0.0001	0.0008	0.0019$^{\alpha}$	0.0008
		[-0.21]	[-0.47]	[-0.02]	[0.29]	[0.76]	[0.33]
	FF4	-0.0001	0.0000	0.0005	0.0012	0.0014	0.0017$^{\beta}$
		[-0.07]	[0.02]	[0.34]	[0.72]	[0.58]	[1.12]

Table (2.3) repeats columns 3 and 6 from Table (2.2) and shows only the *difference* of the average daily abnormal returns (CAPM and FF4) to two firm portfolios: one portfolio that includes firms with a specific corporate governance bylaw that have been related to managerial entrenchment and the other portfolio including firms that do not have such a bylaw. Shown in brackets is the t-statistic of the difference, and *,**,*** indicating the 10%, 5% and 1% statistical significance levels assuming normal portfolio returns for the *one-sided* directional test of the difference being either above or below zero. α, β, γ show the statistical significance in the empirical distribution of the difference between the two respective portfolios. Specifically, α, β, γ means that the coefficient ranks in the 10th, 5th, 1th percentile of the 200 trading day empirical distribution around the announcement date. **Other provisions checked** but with no significant differences: Golden parachute, cumulative voting, three or more board- or voting-related shareholder proposals in recent three years. **Data sources:** Columns (1)-(5) include all S&P 1500 firms. Data originates from RiskMetrics Analytics Governance database for 2010. Column (5) shows the difference in abnormal returns between S&P 500 firms who faced 30% or more opposition in 2011 board elections and those S&P 500 that did experience less or no opposition in 2011 board elections. Column (5) data originates from the ISS 2011 U.S. Postseason Report. Column (6) data originates from the RiskMetric Analytics Director database for 2010 and shows the difference in abnormal returns between S&P 1500 firms in the highest decile of firms with independent directors versus S&P 1500 firms in the lowest decile of firms with independent directors. Finally, results on firms that received three or more board- or voting-related shareholder proposals between 2008 and 2010 and those that did not (results omitted) are based on data extracted from the Georgeson Annual Corporate Governance Reviews for 2008-2010.

The principle result from Table (2.3) is that only one corporate governance provision – a staggered board – reaches statistical significance (coefficient in the lowest 1% of its empirical distribution in [0,0]). This is consistent with the argument that if there were indeed a number of corporate governance provisions that were value-destroying, shareholders would not allow them and/or boards would not adopt them. Instead, combining the evidence from Tables (2.2) and (2.3), it seems that only the presence of several major anti-takeover provisions at the same time (e.g., all 6 ATPs of the E-index) might indicate actual agency issues with the result that only in such rare cases empowering shareholders relative to the management is value-creating. Perhaps most surprising are the results from columns 5 and 6: while one might expect that firms with a greater share of inside directors or firms with considerable opposition in recent director elections would have seen their valuations decrease after the repeal, we do not find such an effect. Further, no sub-sample of firms in Tables (2.2) and (2.3) has positive abnormal returns. Specifically, firms without any agency issues (as measured by ATPs in the E0 and G-low portfolios) have insignificant abnormal returns. This indicates that the market did not expect any significant net costs to firms without any agency issues. We therefore conclude in favor of hypothesis H_1: a greater monitoring and disciplining power for shareholders leads to an increase in firm value when potential agency issues are present. To further analyze the effect of proxy access on the average firm in the market, we turn next to overall U.S. shareholder wealth.

2.5.2 Proxy Access and U.S. Shareholder Wealth

Hypothesis 2 addresses the concern that greater proxy access may lead to an overall decline of U.S. shareholder wealth. This could occur if the costs from board disruption and proxy contests which affect *all* firms overwhelmed any potential benefits that could be found in firms that suffered from agency issues. To test for significant U.S. shareholder wealth changes, we analyze the 1-day, 2-days and 3-days return of several U.S. market indices. We not only consider the largest available U.S. indices S&P 1500, NASDAQ Composite and Russell 3000, but also specific large and small cap indices (Dow Jones Industrial Average, S&P 500, and S&P 600 Small Cap). We also compare several of the U.S. indices to international benchmark indices from Canada and the U.K. (both arguably the closest international matches for the U.S. market).

Note that this test should only be considered a "one-sided" test: any significant changes in the U.S. shareholder wealth relative to the benchmark indices could not only stem from a repeal of proxy access regulation, but also from other market-relevant events in both countries on the day of the repeal. If it was however true that overall shareholder wealth had been depressed due to pending proxy access regulation, we would expect to see a significant increase in the U.S. market indices upon repeal relative to their international benchmarks. If we do not find any significant change in the shareholder wealth, then this can be interpreted as evidence against hypothesis 2, which states that greater proxy access diminishes U.S. shareholder wealth.

As Table (2.4), rows 1-5 show, we do not find any significant U.S. shareholder wealth changes on and around the court repeal date. None of the t-statistics (that assume normality of index returns) is significant on any of the traditional significance levels. Also, none of the 1-day, 2-days or 3-days returns lie in the upper or lower tail of their respective 366 trading day empirical distribution (July 21, 2010 to December 31, 2011). Columns 7-10 compares the performance of selected U.S. indices (Russell 3000, S&P 500 Large Cap and S&P 600 Small Cap) relative to their corresponding international benchmark indices from Canada and the U.K. We test if the return difference between the U.S. index and its corresponding international benchmark is significantly different from 0 on or around the day of the court repeal. In all specifications, we again do not find any significant differences. Most return differences from July 22, 2011 in fact lie at about the median of their 366 empirical distribution.

Table 2.4: **U.S Shareholder Wealth on and around the Day of Court Repeal**

	Index		**1-day return**	**2-days return**	**3-days return**
(1)	S&P 1500	return	0.09%	1.41%	1.32%
		t-statistic	[0.04]	[0.82]	[0.59]
		percentile	(51%)	(84%)	(77%)
(2)	Russell 3000	return	0.13%	1.42%	1.33%
		t-statistic	[0.05]	[0.71]	[0.51]
		percentile	(52%)	(80%)	(74%)
(3)	DIJA	return	0.34%	0.87%	0.74%
		t-statistic	[-0.34]	[0.47]	[0.29]
		percentile	(28.4%)	(71%)	(63%)
(4)	NASDAQ Composite	return	0.86%	1.59%	1.14%
		t-statistic	[0.56]	[0.75]	[0.40]
		percentile	(78%)	(80%)	(64%)
(5)	S&P 500 Large Cap	return	0.09%	1.45%	1.38%
		t-statistic	[0.03]	[0.76]	[0.56]
		percentile	(50.4%)	(82%)	(77%)
(6)	S&P 600 Small Cap	return	-0.18%	0.95%	0.56%
		t-statistic	[-0.14]	[0.33]	[0.11]
		percentile	(41%)	(63%)	(51%)
	Difference to International Indices		**1-day return**	**2-days return**	**3-days return**
(7)	Russell 3000 - S&P TSX Composite	return	-0.32%	0.26%	0.11%
		t-statistic	[-0.45]	[0.17]	[0.00]
		percentile	(30%)	(56%)	(48%)
(8)	S&P 500 - S&P TSX 60	return	-0.24%	0.30%	0.21%
		t-statistic	[-0.36]	[0.20]	[0.06]
		percentile	(34%)	(58%)	(51%)
(9)	S&P 500 - FTSE 100	return	-0.50%	0.06%	-1.13%
		t-statistic	[-0.60]	[0.00]	[-1.14]
		percentile	(23%)	(49%)	(11%)
(10)	S&P 600 - S&P TSX Small Cap	return	-0.66%	0.04%	-0.56%
		t-statistic	[-0.54]	[-0.05]	[-0.38]
		percentile	(26%)	(47%)	(31%)

Table (2.4), Rows 1-6 show the 1-day, 2-days and 3-days raw returns of several major U.S. indices on July 22, 2011 – the day of the court repeal. Columns 7-10 show the 1-day, 2-days and 3-days difference in the returns between several major U.S. indices and their respective international benchmark indices for Canada and the U.K. Shown in square brackets is the *t*-statistics of the return based on returns of the index in the 366 trading days window between July 21, 2010 and December 31, 2011 while assuming normality. Finally, in round brackets, we drop the normality assumption and show the percentile of the July 22, 2011 return in its respective 366 trading day empirical distribution.

Indices: The S&P TSX Composite includes about 300 Canadian firms and comprises 70% of the market capitalization of all public firms listed on the Toronto Stock Exchange. S&P TSX 60 includes the largest 60 publicly listed Canadian firms while S&P TSX Small Cap includes about 250 small Canadian firms with an average market cap of C$ 470 million. The FTSE 100 includes the largest 100 stocks at the London Stock Exchange.

The results in Table (2.4) lend support to H_{2A}: proxy access does not significantly depress overall U.S. shareholder wealth. We next turn toward analyzing specific subsamples of firms for which we might expect to find a differential effect.

2.5.3 Firm Size and Proxy Access

In its complaint to the Court of Appeals, the U.S. Chamber of Commerce was particularly worried about the costs that a proxy contest may entail for small firms. Specifically, in its petition, the Chamber had estimated the costs of recent proxy contests at larger companies to range between \$4 million and \$14 million and at smaller companies between \$800,000 and \$3 million (U.S. Chamber of Commerce, 2010: 3). Following this argument, we would expect positive abnormal returns particularly for smaller firms upon the repeal of proxy access reform. Alternatively, proponents of proxy access might argue that shareholder activism is beneficial independent from firm size and thus the benefits from proxy access might be even greatest for smaller firms since a larger set of investors is able to cross the 3%-3 year threshold.

Table (2.4) presents the results from portfolios based on firm size. We first analyze in column 1 a pooled sample of all publicly listed firms that had a market capitalization greater than \$75 million at the end of Q4-2010 (the threshold below which firms were exempted from proxy access for 3 years). As this is similar to the return on market indices in Table II, it is not surprising that we do not find any significant valuation change for the portfolio of all firms for which proxy access was mandated. Column 2 consists of firms at the opposite end of the spectrum with market caps below \$75 million (1,576 firms) and thus exempted from proxy access for 3 years.[18] As expected, the repeal does not have any

[18] In an earlier version of this paper we tried to utilize the \$75 million market cap cutoff as an instrument in a regression discontinuity design. While the cutoff appears sharp at first, it is applied annually. As a result, firms that are this year below the cutoff might be the next year above the cutoff (and vice versa). This issue is worsened by the fact that prices of very small firms are typically more volatile than those of large firms. As a result, the 3-year exclusion from (or inclusion into) greater proxy access may not apply

significant impact on firm valuations excluded from greater proxy access.[19] Next, columns 3 to 7 break down the pooled firm sample by firm size and provide the abnormal returns to each market cap quintile of public firms larger than $75 million. While no single quintile by itself is statistically significant, we can see a gradual decline in the coefficient (and t-statistic) across the quintiles: for example, the coefficients in event window [0,3] decrease from +6 basis points in quintile 5 to -3 basis points in quintile 4, -8 in quintile 3, -17 in quintile 2 and finally to -25 basis points in quintile 1. The same declining monotonic trend can be observed in the event windows [0,0] and [0,1] in both CAPM and FF4 specifications, but *not* in the placebo window [-1,-1]. Columns 8 and 9 present the difference between the quintiles 1 and 5 and the difference between quintile 1 firms ($75 to $184 million market cap) and firms smaller than $75 million that would have been (for the time being) exempted from the reform. The differences between quintiles 1 and 5 range between -23 and -38 basis points and are significantly below 0 at the 5% and 10% level in [0,1] and [0,3]. Further, the coefficients rank in the bottom 5-10% of their respective empirical distributions. Though the difference between quintile 1 and exempted firms are even larger (quintile 1 firms experience an average abnormal return on July 22nd between 47 and 55 basis points lower than the one of exempted firms) the differences are only statistically significant in their respective empirical distributions.[20]

to all firms that are currently below (above) the cutoff. Additionally, a management of a firm close to the cutoff may try to influence its valuation ahead of the annual deadline that determines the rule's application to the firm, thereby introducing noncompliance and endogenous sorting. Perhaps not surprising, besides these methodological issues, we also did not find any significance with this instrument.

[19]Firms that were excluded for 3 years could still have seen a valuation change (1) in expectation of the regulation applying in three years time, and (2) in expectation of a firm's market value surpassing the threshold within the next 3 years. We would expect this change however to be noticeably lower than the one for firms which would have been immediately under the mandate of proxy access.

[20]Note that for reasons discussed in footnote 18 the discontinuity may not be as sharp as the threshold may at first indicate, thus inducing noise into the estimate of the difference between Q1 firms and exempted firms.

Table 2.5: Proxy Contest Costs and Firm Size

Event Window	Benchmark Model	All firms (1)	Exempted firms (2)	Quintile 1 portfolio (3)	Quintile 2 portfolio (4)	Quintile 3 portfolio (5)	Quintile 4 portfolio (6)	Quintile 5 portfolio (7)	Diff: (Q1-Q5) (8)	Diff: (Q1-Exempted) (9)
$[-1,-1]$	CAPM	-0.0007	-0.0012	-0.0034	-0.004	-0.0033	-0.0047	-0.0025	-0.0009	-0.0022
	Placebo	[-0.26]	[-0.14]	[-1.00]	[-0.10]	[-0.87]	[-1.59]	[-1.74]	[-0.23]	[-0.24]
	FF4	0.0004	-0.0019	-0.0013	0.0031	0.0004	-0.0016	-0.0013	0.0000	0.0006
	Placebo	[0.29]	[-0.22]	[-0.47]	[1.47]	[0.29]	[-1.02]	[-1.01]	[0.01]	[0.06]
$[0,0]$	CAPM	-0.0007	0.0041	-0.0014	-0.0029	-0.0014	0.0010	0.0011	-0.0025	-0.0055^{β}
		[-0.26]	[0.49]	[-0.43]	[-0.67]	[-0.37]	[0.33]	[0.74]	[-0.68]	[-0.62]
	FF4	0.0004	0.0044	-0.0005	0.0003	0.0019	0.0006	0.0044	-0.0009	-0.0047^{β}
		[0.29]	[0.54]	[-0.25]	[0.19]	[1.20]	[0.48]	[0.53]	[-0.30]	[-0.54]
$[0,1]$	CAPM	-0.0018	0.0012	-0.0031	-0.0036	-0.0021	-0.0008	0.0007	$-0.0038*^{\beta}$	-0.0043^{β}
		[-0.91]	[0.20]	[-1.30]	[-1.18]	[-0.80]	[-0.36]	[0.68]	[-1.46]	[-0.67]
	FF4	-0.0003	0.0012	-0.0018	-0.0011	0.0000	0.0007	0.0007	$-0.0025*^{\alpha}$	-0.0030^{β}
		[-0.30]	[0.20]	[-0.91]	[-0.73]	[-0.01]	[0.61]	[0.80]	[-1.27]	[-0.48]
$[0,3]$	CAPM	-0.0009	-0.0002	-0.0025	-0.0017	-0.0008	-0.0003	0.0006	$-0.0030**^{\beta}$	-0.0022^{α}
		[-0.68]	[-0.05]	[-1.44]	[-0.80]	[-0.45]	[-0.21]	[0.80]	[-1.66]	[-0.50]
	FF4	0.0002	-0.0002	-0.0014	-0.0002	0.0007	0.0009	0.0009	$-0.0023*^{\alpha}$	-0.0012^{α}
		[0.28]	[-0.05]	[-1.00]	[-0.16]	[0.89]	[1.15]	[1.35]	[-1.48]	[-0.27]

Table (2.5) shows the average daily abnormal portfolio returns (measured with CAPM and Fama French 4-factor model) in several event windows around July 22, 2011. The "exempted portfolio" consists of all publicly listed firms at NYSE/NASDAQ/AMEX that have a market capitalization at the end of Q4-2010 below the $75 million threshold and which are therefore exempted from greater proxy access for 3 years (1,576 firms). Q1 to Q5 represent quintile portfolios based on firm size (market value of equity), each of which consists of 1,005 publicly listed firms with market capitalization above $75 million. Market valuations of firms and quintile cutoff points were obtained from the last trading day in 2010 with data availability. The numbers in the table represent the coefficient γ on `dEventWindow` in the empirical asset pricing regressions in section III. For ease of reading, t-statistics are shown in square brackets; columns (8) and (9) show *one-sided* directional t-statistics. *, **, *** represent statistical significance at the 10%, 5% and 1% level respectively where portfolio returns are assumed to be normal. α, β, γ indicate statistical significance in the empirical distribution of the respective portfolio (or difference between portfolios). Specifically, α, β, γ means that the coefficient ranks in the 10th, 5th, 1th percentile of the 200 trading day empirical distribution around the announcement date.

The results from Table (2.5) show no indication that smaller or larger firms would have been negatively affected by proxy access regulation. To the contrary, there is some evidence that smaller firms saw a significant reduction in firm values relative to very large firms on the day of the repeal. The result of no significant change for large firms is perhaps not surprising when bearing in mind that the median firm in the Q5 portfolio had a market valuation of $7.2 billion, thus requiring a $216 million investment by an investor for a duration of three years to be affected by proxy access. We thus conclude against hypothesis H_3 and conclude that small firms did not experience significant declines in firm value due to greater proxy access.

2.5.4 Eligible Investors and Proxy Access

In Table (2.5), firm size served as a proxy for the impact of contest costs as well as the likelihood that an investor could accumulate and hold a 3% stake and thus could become eligible for greater proxy access. Instead of using this likelihood, Table (2.6) analyzes the value of proxy access reform when a number of 3%-3 year investors (henceforth "eligible investors") are already present in a firm's investor base and thus could immediately make use of greater proxy access. To do so, we create firm portfolios in which there is (a) no single eligible investor, (b) at least 1 eligible investor, (c) at least 2 eligible investors and (d) at least 3 eligible investors in the investor base. Further, we create a portfolio of firms in which a coalition of up to three institutional investors can jointly cross the 3%-3 year threshold. Finally, we create a control group portfolio that consists of firms in which there is no single eligible investor and no coalition of shareholders (with up to 3 members) able to cross the threshold.

Table 2.6: Institutional Holdings and Proxy Access

Event Window	Bench-mark model	No elig. investors (Control) (1)	Coalition (max.3 investors) (2)	At least 1 eligible investor (3)	At least 2 eligible investors (4)	At least 3 eligible investors (5)	Diff. (3)&(1) (6)	Diff. (4)&(1) (7)	Diff. (5)&(1) (8)
[-1,-1]	CAPM	-0.0024	-0.0047	-0.0054	-0.0043	0.0043	-0.0030	-0.0019	0.0067$^{\alpha}$
	Placebo	[-0.82]	[-1.35]	[-1.35]	[-0.75]	[0.72]	[-0.60]	[-0.29]	[1.01]
	FF4	0.0002	-0.0015	-0.0017	-0.0004	0.0090$^{**\beta}$	-0.0019	-0.0007	0.0089$^{**\beta}$
	Placebo	[0.12]	[-1.15]	[-1.23]	[-0.11]	[2.17]	[-0.81]	[-0.16]	[1.95]
[0,0]	CAPM	0.0000	-0.0025	-0.0036	-0.0061	-0.0131$^{**\gamma}$	-0.0036$^{\beta}$	-0.0061$^{\beta}$	-0.0131$^{**\gamma}$
		[0.00]	[-0.72]	[-0.91]	[-1.06]	[-2.21]	[-0.73]	[-0.94]	[-1.97]
	FF4	0.0010	-0.0006	-0.0015	-0.0030$^{\alpha}$	-0.0111$^{***\gamma}$	-0.0025$^{\alpha}$	-0.0040$^{\alpha}$	-0.0121$^{***\gamma}$
		[0.80]	[-0.43]	[-1.07]	[-0.81]	[-2.69]	[-1.04]	[-0.96]	[-2.66]
[0,1]	CAPM	-0.0014	-0.0027	-0.0036$^{\alpha}$	-0.0044$^{\alpha}$	-0.0078$^{*\beta}$	-0.0022$^{\alpha}$	-0.0030$^{\alpha}$	-0.0064$^{*\gamma}$
		[-0.65]	[-1.08]	[-1.25]	[-1.08]	[-1.86]	[-0.62]	[-0.66]	[-1.37]
	FF4	0.0000	-0.0005	-0.0011	-0.0013	-0.0051$^{*,\beta}$	-0.0011	-0.0013	-0.0051$^{*\beta}$
		[0.02]	[-0.54]	[-1.11]	[-0.49]	[-1.75]	[-0.65]	[-0.44]	[-1.59]
[0,2]	CAPM	-0.0009	-0.0022	-0.0029	-0.0040$^{\alpha}$	-0.0070$^{**\beta}$	-0.0020$^{\alpha}$	-0.0031$^{\alpha}$	-0.0060$^{*\beta}$
		[-0.53]	[-1.07]	[-1.25]	[-1.20]	[-2.02]	[-0.69]	[-0.82]	[-1.57]
	FF4	0.0004	-0.0003	-0.0008	-0.0019	-0.0046$^{*\beta}$	-0.0011	-0.0017	-0.0049$^{**\beta}$
		[0.34]	[-0.33]	[-0.95]	[-0.62]	[-1.91]	[-0.83]	[-0.71]	[-1.87]
[0,3]	CAPM	-0.0008	-0.0017	-0.0021	-0.0025	-0.0055$^{*\beta}$	-0.0013$^{\alpha}$	-0.0017	-0.0047$^{*\beta}$
		[-0.53]	[-0.94]	[-1.06]	[-0.85]	[-1.82]	[-0.53]	[-0.51]	[-1.39]
	FF4	0.0003	-0.0002	-0.0005	-0.0006	-0.0035$^{*\beta}$	-0.0008	-0.0009	-0.0038$^{**\beta}$
		[0.34]	[-0.26]	[-0.70]	[-0.30]	[-1.67]	[-0.68]	[-0.43]	[-1.66]

Table (2.6) shows the average daily abnormal portfolio returns (measured with CAPM and Fama French 4-factor model) for five firm portfolios in several event windows around July 22, 2011. The control portfolio in column (1) consists of 2,901 firms in which no single institutional investor has a holding that satisfies the 3%-3year threshold and qualifies for immediate proxy access. The portfolios in columns (3), (4) and (5) consists of 945, 241 and 31 firms respectively, in which there are at least 1, 2 or 3 institutional investors eligible to make immediate use of greater proxy access. Column (2) consists of 1,596 firms in which a coalition of up to three investors can jointly cross the 3%-3 year threshold. The numbers in columns (1) to (5) represent the coefficient γ on `dEventWindow` in the empirical asset pricing regressions in section (2.4.2). For ease of reading, t-statistics are shown in square brackets; columns (6)-(8) show *one-sided* directional t-statistics. *, **, *** represent statistical significance levels of 10%, 5% and 1% respectively under the assumption of normality for portfolio returns. α, β, γ indicate a value in the 10th, 5th and 1st percentile of the 200 trading day empirical distribution of the respective portfolio (or difference between portfolios).

Rows 1 and 2 in Table (2.6) show that (with one exception) there are no significant portfolio valuation changes in the placebo treatment window [-1, -1].[21] Further, on the day of the repeal, the abnormal returns are negative in all specifications in which there exists at least a coalition of eligible investors. The exception to this is the control group portfolio (column 1; firms with no single eligible investor) which experiences insignificant positive as well as negative abnormal returns. The magnitude and significance level of the abnormal returns monotonically increases from a coalition of investors (column 2) toward the extreme case where there are at least three eligible investors among the firms' shareholder base (column 5). On the day of the repeal for example, the FF4 abnormal returns monotonically decline from +10 basis points in the control group portfolio to -6 basis points, -15 basis points, -30 basis points and -111 basis points for the portfolios with a coalition, 1, 2, and 3 eligible investors respectively. The same monotonic tendency can be observed in all the other event windows [0,1], [0,2] and [0,3] for both CAPM and FF4, but *not* in the placebo window [-1,-1]. The strongest and highly significant valuation decline of 111 basis points occurs on the day of the court repeal for the portfolio in which there are at least three eligible investors in firms' investor bases. Columns 6 to 8 provide the difference-in-difference estimates between firms without any eligible investors (column 1) and those that have at least 1, 2 or 3 eligible investors. On the day of the court repeal, all differences are negative, indicating that the valuations of firms with eligible investors dropped relative to those that had no eligible investors. Most of those differences in columns 6 to 8 also rank in the bottom 5% or 10% of their respective empirical distributions (some in the lowest 1%) and we obtain statistical significance up to the 1% level when there are at least three eligible investors (column 8).

The results in Table (2.6) indicate that once the court repealed proxy access for share-

[21] In column (5) where at least three institutional investors cross the 3%-3 year threshold, we find a positive and significant abnormal return in the FF4 specification on day -1. Note that the sign of the abnormal return however flips and the coefficient becomes strongly negative and significant (and remains so) the very next day as the court repeal became publicly known.

holders, firm valuations declined among those firms in which it would have been most likely utilized. The results are again consistent with the notion that whenever proxy access was strong enough to make an impact on firm valuation, it was perceived positively by the markets. The fact that we find significant valuation changes only in firms with extreme ownership situations further highlights that the effects from proxy access reform were fairly weak. This is consistent with the argument of proponents that the 3%-3 year threshold is a very high bar for proxy activism (e.g., Fisch 2011; Schuster, 2010).

One potential concern with the results from Table (2.6) could be that activist investors may have started changing their portfolios in anticipation of greater proxy access. As a result, on the day of the court repeal on July 22, 2011, many activist investors would not have held their investment positions for 3 years yet (and those firms might have been included in the control group of Table (2.6)), leading to a downwards bias. To investigate this concern, we analyze the holdings of activist investors that are part of the SharkWatch50 index. The SharkWatch50 index is a compilation of 50 significant activist investors; inclusion into the list depends on the number of publicly disclosed activist campaigns and proxy fights waged as well as the past success rate in affecting change at targeted companies (SharkRepellent, 2008). If investors had indeed changed their investment positions in anticipation of greater proxy access, we would expect to find traces of such a behavior among this selected group of investors.

Table 2.7: SharkWatch 50 Holdings, 2009-2011

Quarter	Average firm holdings by Sharkwatch 50 Investors: E6	E4-E5	E0-E3	E0-E5
2009-06	2.4%	2.1%	2.1%	2.1%
2009-09	2.4%	2.2%	2.1%	2.2%
2009-12	2.6%	2.2%	2.1%	2.2%
2010-03	2.6%	2.1%	2.0%	2.1%
2010-06	2.7%	2.2%	2.1%	2.1%
2010-09	2.8%	2.3%	2.1%	2.2%
2010-12	2.9%	2.1%	2.0%	2.1%
2011-03	2.7%	2.0%	1.9%	1.9%
2011-06	2.6%	2.0%	1.8%	1.9%
2011-09	2.7%	2.1%	1.8%	1.9%
Avg. # of holdings per quarter	52	454	548	1,004

Table (2.7) shows the average holding (as a percentage of market capitalization of firms) held by SharkWatch50 activist investors between June 2009 and September 2011 by E-Index and as disclosed in quarterly 13F filings with the SEC. SharkWatch50 is a compilation of 50 significant activist investors that frequently engage in proxy fights (SharkRepellent, 2008). Share prices and shares outstanding are obtained from CRSP.

Column 1 of Table (2.7) shows the average combined size of all SharkWatch50 investor positions in firms with potential agency issues (E6).[22] We present holding data from quarterly 13-F disclosures since June 2009 (one year before the Dodd-Frank Act). Naturally, there are fewer firms in the E6 category than in the remainder categories as there are fewer E6 firms in the overall market (a total of 72 E6 firms compared to 1,504 firms in the categories E0 to E5). The results are mixed: the average holding by SharkWatch50 investors in firms with potential agency issues (E6) indeed continuously increased from 2.4% in June 2009 to 2.9% in December 2010 before declining to 2.7% in September 2011. The decline however already starts in early 2011 and thus well before the court repeal. Further, there is no abrupt decline observed in September 2011 after the Court repealed proxy access.[23] While E6 holdings increased, columns 3 to 5 show that the average holdings in E4-E5 firms, E0-E3 firms and E0-E5 firms remained constant or slightly decreased in the same time period. As a result, it is not clear whether the coefficients of our control group in column 1 of Table (2.6) indeed suffer from a downwards bias. If this was indeed the case, the coefficients in columns 6-8 of Table (2.6) (difference between treatment and control group) would have indeed an upwards bias and the effect of the proxy access repeal could have been larger.

With or without a bias, the results from Table (2.7) lends support for the alternative hypothesis H_{4A} which states that firm valuations will remain unchanged or will increase as the number of eligible investors increase.

[22] As in Table (2.2), E<n> refers to firms that had as of 2007/2008 <n> of the six major anti-takeover provisions as identified by Bebchuk et al. (2009). We choose to investigate firms by their E-Index as the major policy goal for enhanced proxy access was to address agency issues by increasing the monitoring and disciplining power of shareholders.

[23] One potential explanation for the latter could be that investors require time to divest.

2.5.5 Special-Interest Investors and Proxy Access Reform

A major concern put forth by critics of greater proxy access is that "union [and pension] funds were among the most active shareholders and often pursued changes that furthered union interests rather than the company's or shareholders'." (U.S. Chamber of Commerce, 2010: 5). In its ruling the Court of Appeals mirrored those concerns:

> "Notwithstanding the ownership and holding requirements, there is good reason to believe institutional investors with special-interests will be able to use the rule [..] Nonetheless, the Commission failed to respond to comments arguing that investors with a special-interest, such as unions and state and local governments whose interests in jobs may well be greater than their interest in share value, can be expected to pursue self-interested objectives rather than the goal of maximizing shareholder value, and will likely cause companies to incur costs even when their nominee is unlikely to be elected. [..] By ducking serious evaluation of the costs that could be imposed upon companies from use of the rule by shareholders representing special interests, particularly union and government pension funds, we think the Commission acted arbitrarily." (Court of Appeals, 2011: 14-15)

Although the incentives of special-interests investors may well diverge from those of the general shareholder base, it is ex-ante not clear if greater proxy access in its proposed form would have indeed empowered special-interest investors sufficiently to inflict damage onto public firms. After all, greater proxy access allows only to nominate a board candidate, while a majority of the shareholders still need to vote for the dissident nominee over the board's candidate. Further, as for example Schuster (2010: 1068-9) points out, with the practice of diversified portfolio management to reduce risk, most special-interest investors are unlikely to cross the 3%-3 year threshold.[24]

To investigate whether the market agrees that a potential abuse of greater proxy access by special-interest investors (union and pension funds) would hurt firm valuations,

[24] As an example: The median S&P500 company on 12/31/2010 had a market cap of $11.2 billion. Hence, an investor has to continuously hold a $334 million investment position for 3 years to cross the threshold so to be allowed to nominate a candidate.

we investigate all publicly disclosed shareholdings by special-interest investors. To do so, we manually identify all special-interest investors among the 13-F filers and extract their shareholdings. We then form firm portfolios in which a single special-interest investor – or a coalition thereof – holds 3% (alternatively, 1% or 0.5%) for 3 years (alternatively, 2, 1 and 0 years) continuously.

Table (2.8) shows the results when requiring a 3-year holding period. The first three columns show portfolios of firms in which special-interest investors (unions and pension funds) held a 3%, 1%, or 0.5% stake for at least 3 years. Columns 4 and 5 use firm portfolios where a potential coalition of special-interest investors (of any size) jointly crosses the 3% or 1% threshold. Finally, columns 6 to 8 provide the returns to firm portfolios in which investors (who are not pension funds or unions) cross the 3%, 1% or 0.5% ownership threshold with a holding period of 3 years and there is no special-interest investor invested with a greater than 0.5% eligible shareholder stake. Columns 6 to 8 thereby serve as our control group.

Noteworthy, we find only 12 firms in which a single special-interest investor overcomes the 3% ownership threshold for 12 consecutive quarters (Q3-2008 to Q2-2011). As we reduce the ownership threshold to 1% and 0.5% the number of firms increases to 77 and 1,093 firms respectively. This indicates that most investments that are held by special-interest investors for a long period of time remain below the 1% threshold.[25] Allowing for the formation of special interest coalitions (columns 4 and 5), the number of firms in which the 3% and 1% threshold is jointly crossed jumps to 33 and 1,245 firms respectively.

[25] This is consistent with what Fisch (2011) argues: "Public pension funds, union pension funds, foundations and the like virtually never hold as much as 3% of a company – holdings of even 1% are comparatively rare, because such concentrated holdings increase the risk of the institution's portfolio." (ibid: 27) Likewise, this is supported by a comment letter by the National Coalition for Corporate Reform (NCCR) received by the SEC in 2004 during an earlier attempt to reform proxy access: "[T]he combined ownership [of the three largest public pension funds at the time, CalPers, CalSTRS and NYSRF] exceeds 2% in only one instance and exceeds 1.5% in only twelve instances." (SEC, 2004: VII.E2)

Thus, even with the potential of coalitions among pension and union funds, only 33 firms could have faced dissident nominees put forth by a coalition of special-interest investors that would have immediately qualified for greater proxy access.

The results in Table (2.8) show that there were no significant changes in firm valuations on the day of the repeal or thereafter when special-interest investors held alone or in a coalition a large eligible ownership stake. This holds for the 3% threshold but also for a 1% or even a 0.5% threshold. Peculiarly, we find some negative and significant abnormal CAPM returns the day before the court ruling in the case where special-interest investors cross 1% (column 2) or when a coalition can jointly cross 3% (column 4). The significance however disappears after controlling for the Fama-French 4 factors. Note that if those abnormal returns were to represent an early incorporation of leaked information into stock prices, the negative abnormal returns would imply that markets had valued proxy access for special-interest investors. We do not argue that this is the case as we do not find any other statistical significance (neither while assuming returns to be normally distributed nor with the respective empirical distributions).

Table 2.8: Special-Interest Investors and Proxy Access

Event Window	Benchmark Model	Special-Interest Investors ...with >3% (n=12) (1)	...with >1% (n=77) (2)	...with >0.5% (n=1,093) (3)	Coalition of Special-Interest Inv. ...with >3% (n=33) (4)	...with >1% (n=1,245) (5)	Non-Special Interest Investors (Control Group) ...with >3% (n=251) (6)	...with >1% (n=473) (7)	...with >0.5% (n=600) (8)
[-1,-1]	CAPM	-0.0111	-0.0085**$^{\beta}$	-0.0043	-0.0084*$^{\beta}$	-0.0036	-0.0019	-0.0034	-0.0019
	Placebo	[-1.14]	[-2.05]	[-1.14]	[-1.75]	[-1.18]	[-0.46]	[-0.13]	[-0.09]
	FF4	-0.0107	-0.0051	-0.0004	-0.0050	-0.0004	-0.0013	-0.0058	-0.0037
	Placebo	[-1.10]	[-1.48]	[-0.28]	[-1.12]	[-0.29]	[-0.31]	[-0.22]	[-0.18]
[0,0]	CAPM	-0.0002	0.0031	-0.0029	0.0024	-0.0021	-0.0003	0.0016	0.0019
		[-0.02]	[0.73]	[-0.75]	[0.50]	[-0.69]	[-0.08]	[0.06]	[0.09]
	FF4	0.0012	0.0035	-0.0013	0.0018	-0.0011	-0.0001	0.0025	0.0026
		[0.13]	[1.04]	[-0.85]	[0.40]	[-0.86]	[-0.02]	[0.09]	[0.12]
[0,1]	CAPM	0.0009	0.0012	-0.0026	0.0000	-0.0018	-0.0016	-0.0018	-0.0009
		[0.13]	[0.40]	[-0.97]	[-0.01]	[-0.81]	[-0.55]	[-0.10]	[-0.06]
	FF4	0.0012	0.0025	-0.0005	0.0005	-0.0001	-0.0013	-0.0019	0.0009
		[0.30]	[1.03]	[-0.44]	[0.17]	[-0.17]	[-0.44]	[-0.10]	[-0.06]
[0,2]	CAPM	0.0023	0.0000	-0.0024	-0.0001	-0.0015	-0.0000	-0.0010	-0.0007
		[0.40]	[0.01]	[-1.10]	[-0.03]	[-0.82]	[-0.00]	[-0.06]	[-0.06]
	FF4	0.0030	0.0013	-0.0005	0.0007	0.0000	0.0004	-0.0014	-0.0010
		[0.59]	[0.66]	[-0.62]	[0.27]	[-0.03]	[0.18]	[-0.09]	[-0.09]
[0,3]	CAPM	-0.0013	0.0000	-0.0014	-0.0009	-0.0011	-0.0003	-0.0013	-0.0010
		[-0.26]	[0.02]	[-0.73]	[-0.35]	[-0.69]	[-0.15]	[-0.10]	[-0.10]
	FF4	-0.0006	0.0014	0.0002	0.0003	0.0002	0.0001	-0.0022	-0.0016
		[-0.12]	[0.83]	[0.24]	[0.14]	[0.29]	[0.05]	[-0.16]	[-0.15]

Table (2.8) shows the average daily abnormal portfolio returns (measured with CAPM and Fama French 4-factor model). The first three columns use portfolios of firms in which special-interest investors (unions and pension funds) held a 3%, 1%, or 0.5% stake for at least 3 years. Columns 4 and 5 use firm portfolios where a coalition (of any size) of special-interest investors can jointly cross the 3% or 1% threshold. Finally, columns 6 to 8 provide the returns to control portfolios in which investors who are *not* pension funds or unions cross the 3%, 1% or 0.5% ownership threshold with a holding period of 3 years and no special-interest investor holds more than a 0.5% eligible share. The numbers in columns (1) to (8) represent the coefficient γ on `dEventWindow` in the empirical asset pricing regressions in section III. T-statistics are shown in square brackets. *, **, *** represent statistical significance levels of 10%, 5% and 1% respectively under the assumption of normally distributed portfolio returns. α, β, γ indicate a coefficient in the 10th, 5th and 1st percentile in the empirical distribution of the respective portfolio obtained from a 200 trading day window around the day of the repeal. None of the differences between columns (1) to (5) with their respective control portfolio in columns (6) to (8) are statistically significant (not shown in table). **Also checked but not shown in table:** Holding periods of 2 years, 1 year and 0 years.

Further, no difference between the treatment portfolios (columns 1 to 5) and the respective control group portfolios (columns 6-8) are significant (output omitted). In unreported results, we repeat the analysis and find the same results with holding period requirements of 2 years, 1 year and without any holding period requirement at all. We also repeat the analysis while value-weighting firm portfolios for 3 years, 2 years, 1 year and 0 years holding periods and also do not find any significant differences. As a result, we do not find any support for hypothesis 5 that the market expected public firms to face greater costs due to a potential abuse of proxy access by special-interest investors. This result is perhaps not surprising when recalling that after the nomination, an activist special-interest investor would still need to convince the majority of shareholders to vote for its dissident candidate over the management's candidate. Further, most special-interest investors' own positions well below 1% and rarely cross the required 3% threshold.

2.6 CONCLUSIONS

We investigate the shareholder wealth effects from proxy access reform as introduced by the SEC in August 2010. To do so, we use the surprise repeal of proxy access reform through the D.C. Circuit Court of Appeals on July 22, 2011. We argue that this event serves as a natural experiment as neither the timing nor the Court's decision was anticipated by the market. We confirm the surprise of the market through a placebo treatment on the day prior to the repeal as well as by comparing how our estimates rank in their respective empirical distributions.

First, the results indicate that the effects from proxy access reform were rather weak. We only find significant effects in extreme ownership situations, in extreme corporate governance situations and for the difference between very small and very large firms. Wherever we do obtain significant effects, they are consistent with the notion that the market valued proxy access reform positively. Specifically, while proxy access is valuable to firms that have many of the anti-takeover provisions (ATPs) associated with agency issues, we do not find any significant valuation changes for any one specific ATP with the exception of staggered boards. We further do not find any negative impact on firms that have few or no ATPs. Second, we analyze overall U.S. shareholder wealth effects by (1) comparing the returns to several U.S. market indices to those of international benchmark indices, and (2) by estimating the abnormal returns to all those firms that were mandated to provide greater proxy access. In both cases, we do not find any positive or negative abnormal returns, which indicates that total U.S. shareholder wealth was not affected by proxy access. Third, we do find a differential impact by firm size: while large firms do not experience any significant valuation changes, we find a monotonically increasing valuation decline the smaller a firm becomes. This firm size effect – strongest for the smallest quintile of firms with market capitalizations between \$75 million and \$184 million – does however not exist for very small public firms (<\$75 million market cap) which had been exempted from proxy access reform for 3 years. We further find a significant difference of 23 to 38 basis points between the smallest quintile of affected public firms and the largest quintile of public firms. The results thereby do not lend any empirical support to concerns that small firms could have become overwhelmed by potential proxy contest costs; rather, they provide some indication that the market expected small firms to also benefit from greater proxy access. Fourth, we investigate institutional holdings. We find that firm valuation declined upon the repeal in the number of eligible investors. The results however again indicate that the reform was rather weak: having a coalition or just one or two investors crossing the threshold does not yet yield a significant change in valuation. Only in the rare case with three or more eligible investors in the investor base we find (large negative) significant valuation changes. Nonetheless, all coefficients (also in less severe ownership cases) are firmly negative and several rank in the lowest 5-10% of their respective empirical distributions. Our last piece of evidence concerns special-interest investors. Critics of greater proxy access have been particularly outspoken about the potential of shareholder wealth destruction through unions and pension funds abusing proxy access. We do not find any evidence that the market agrees with this argument for the prescribed 3%-3 year threshold, but also for lower ownership thresholds and shorter holding period requirements.

To summarize, the evidence supports the notion that greater proxy access is beneficial to firms with potential agency problems, while not adversely impacting smaller firms, firms with few anti-takeover provisions or firms with special-interest investors. The evidence thereby corroborates results from the greater literature on the benefits from shareholder activism and provides support (from a natural experiment in a within-country setting) for international evidence that greater shareholder rights lead to greater shareholder wealth.

3.0 GEOGRAPHIC DIVERSIFICATION, COMPETITION AND BANK SURVIVAL

3.1 INTRODUCTION

Banks fail when they cannot meet their obligations to depositors or creditors; this, in turn, is typically preceded by a shock to a bank's mortgage and loan portfolio or by depositors drawing down their savings. Bank instability can also be triggered by a shock to another financial institution or a shock to some asset class that propagates through financial channels such as payments systems, interbank markets or other asset markets (Bandt and Hartmann, 2002). This paper focuses exclusively on the former source of bank instability: the one that arises from portfolio shocks that are due to severe declines in local real estate and labor markets. As will be discussed in more detail in later sections, such portfolio shocks lie at the core of hundreds of commercial bank failures in the U.S. between 2008-2011.

Differently from the bankruptcy of a manufacturing firm, the failure of a financial institution may lead to large negative externalities and social costs. The default of a large interconnected bank may for example reduce the survival probability of financial counterparties in interbank, securities or derivative markets. Counterparty exposures are however rarely transparent to other market participants; thus, also a healthy financial firm may find itself cut-off from financial markets as distrust and uncertainty creeps into the financial system. Liquidity needs may further spur asset fire sales that depress asset prices and cause real losses and write downs, setting off margin calls and prompting further asset fire sales, thus producing a spiral of financial distress that also affect healthy institutions. In an alternative scenario, the failure of a small financial institution may lead to a bank run, which – with few costs to retrieving one's money and potentially large costs to not doing so for other banks' customers – has the potential to snowball into a general bank run in which even healthy banks fall prey to the banking-inherent maturity mismatch between assets and liabilities. Whenever the social costs exceed the private costs of a default, a government intervention may thus become warranted. Consequently, after several such bank runs during the Great Depression, the U.S. government provided in 1934 a taxpayer-backed deposit guarantee to break this cycle. The potential of a small shock to escalate into a widespread crisis of confidence and to impose large costs on society thus distinguishes the defaults of financial firms from those of manufacturing firms.

Branching into other counties and states has been credited with allowing banks to diversify away from local economic shocks in real estate and labor markets and thus to smooth both asset volatility (the values of loans and mortgages) and liability volatility (the deposits by savers). The idea that greater geographic branching may result in a more stable and more competitive banking system has been around for more than a century (cf. Sprague, 1902) and was among the key rationales of the 1994 Riegle-Neal Interstate Banking and Branching Efficiency Act (IBBEA) that sought (unsuccessfully) to eliminate restrictions on interstate banking as of 1997. From a theoretical perspective, bank branching should lead to greater financial stability in the banking sector as it leads to bank portfolios being spread out over more banking markets, thus smoothing asset and liability volatility (e.g., Friedman and Schwartz, 1963; Gart, 1994; and Calomiris and Mason, 2001 among others). The empirical evidence however is decidedly mixed: on the one hand, branching has been found to increase individual bank stability due to a greater geographic diversification of bank portfolios and to increase overall bank system's stability due to greater competition that removes weaker and inefficient banks prior to a crisis (Grossman, 1994; Wheelock, 1995; Calomiris, 2000). At the same time however there is also empirical evidence that greater competition reduces profit margins thereby eroding a bank's charter value and leading to greater risk-taking by bank managers (Keeley, 1990; Hellman, Murdock and Stiglitz; 2000, Jiménez, Lopez and Saurina, 2007). Further, there is empirically evidence that banks may decrease their capital reserves and increase credit risk as they diversify (Demsetz and Strahan, 1997; Calomiris and Mason, 2001; Carlson, 2004) thus intentionally offsetting some or all diversification gains. As a result, while the theoretic literature predicts branching and geographic portfolio diversification to increase bank stability, the accompanying increase in competition and reduction in capital reserves may offset any or all diversification benefits and may even lead to a decline in stability.

This chapter has three objectives. First, it examines whether greater bank branching affected banks' survival rates in the context of the recent 2008-2011 U.S. banking crisis in which more than 5% (10%) of U.S. banks failed (ceased to exist). Second, the paper estimates the effect from portfolio diversification on the probability of bank survival and disentangles the effect from the one of banking competition. The findings thereby contribute to the ongoing debate whether banking competition increases or decreases bank stability. Third, I analyze whether banks decreased capital reserves at the same time while they were enlarging their geographic footprint prior to the 2008 crisis, thereby offsetting the portfolio risk decline achieved by a greater geographic diversification of loans and mortgages.

Analyzing geographic diversification *assumes* that local economic fundamentals that occur within a bank's branch network actually matters for its portfolio and its performance. This assumption is not as obvious as it may seem: on the asset side of the balance sheet, new financial innovations such as syndicated corporate loans or asset backed securities (mortgages, auto, credit card, tuition) that are spread across the country may allow a bank to diversify independently from its geographic footprint. On the liabilities side, online banking and brokered deposits may allow banks to obtain deposits from outside its geographic reach. Furthermore, many banks sell conforming mortgages in secondary mortgage markets and can thereby reduce the risk from and exposure to the local economy's business cycle. As a result, I investigate in a first step whether the assumption that local economic fundamentals still matter to banks holds up empirically during 2008-2011 period.

This chapter contributes to the existing literature in several ways. First, to the best of my knowledge, this is the first paper that analyzes the benefits of branching and geographic diversification in the context of the 2008-2011 U.S. banking crisis. This matters because the benefits from branching may differ today significantly from those found in previous banking crises which have been investigated in the existing literature (the Great Depression in the 1930s and the Savings and Loan crisis in the 1980s). The benefits may differ because of a much larger availability of financial innovation that allows less geographically diversified banks to economically diversify nationwide without an actual physical branch network, and – owing to a more activist Federal Reserve – a reduced likelihood of bank runs than during earlier banking crises. Further, the U.S. banking landscape has changed significantly since the most recent banking crisis: between 1994 and 2007 alone, the number of U.S. banks has shrunk by 34% while the number of bank branches simultaneously increased by 16%. Today, the average distance between a bank's headquarter and its branches has more than doubled from 9.31 miles to 21.62 miles. These numbers suggest large changes to banking competition and geographic diversification since the last major banking crisis in the 1980s, thus raising doubts about the applicability of results that are based on banking crises in the 1930s or 1980s.

Second, I introduce a novel and arguably superior measure for geographic diversification. The existing literature has traditionally focused on measures of geographic *spread* of a bank's network to measure geographic *diversification* (for example, the average distance between a bank's headquarter and its branches or whether a bank operates out-of-state branches), thereby conflating the effects from portfolio diversification with those from being exposed to more banking competition. I construct separate variables that aim at disentangling both effects. Specifically, my measure of portfolio diversification is based on portfolio theory: as bank loan and mortgage portfolios are unobserved, I consider a U.S. county as an asset into which the bank can invest by establishing local branches. I further use the share of local deposits a bank derives from each U.S. county (relative to its total deposit base) as the portfolio weight with which the bank is invested into that asset. The portfolio approach assumes that banks invest into mortgages and loans in those counties where it has established branches and thus its loan and mortgage portfolio is affected by local economic shocks to those counties.[1] Using monthly county unemployment numbers between 1990 and 2007 as a proxy for county economic conditions and local business cycles, I then estimate the portfolio risk by computing the historical variances and covariances of all U.S. county labor markets into which a bank has invested (and thus of its unobserved loan and mortgage portfolios in those counties). The resulting portfolio risk measure provides a more exact estimate for the degree of a bank's portfolio diversification than previous spread-related measures.

Third, to deal with potential endogeneity in the results, I employ two novel instrumental variables. I use exogenous topographic variation (oceans and international borders) and the availability of distinct local business cycles nearby bank headquarters so to instrument the *actual* degree of portfolio diversification with the *potential* of banks to geographically diversify. This instrument is based on the well-established observation that banks do not

[1]To ensure that this is a reasonable assumption, I analyze in section (3.5.1) whether bank performances are indeed related to county economic conditions.

branch into far-flung regions (typically explained by increasing costs of monitoring far-off branches, marketing costs and less knowledge about far-off markets and borrowers) but typically branch out along the boundaries of their existing network. The instrument thus estimates how much portfolio diversification *could be* achieved by a bank within a 200 miles radius around its headquarter. For example, while certain Midwestern banks have plenty of potential counties with diverse local business cycles within a 200 miles radius to invest into, banks in Florida are surrounded by oceans and banks in Michigan are limited by the Great Lakes, the international border with Canada and an automotive industry that imposes similar business cycles on nearby counties. I further instrument the amount of competition a bank was exposed to prior to the 2008 U.S. crisis using state-level restrictions on interstate branching. While the 1994 Riegle-Neal Act (that went into effect in 1997) reduced federal restrictions on interstate branching, it allowed states to introduce their own state-level restrictions for out-of-state banks that attempt to enter their markets. Subsequently, between 1994 and 2005, most U.S. states established restrictions for out-of-state banks, often entering into reciprocity agreements with other states. This – combined with the geographic distance between states – provides exogenous time-series and cross-sectional variation for the amount of competition a bank faced from out-of-state competitors prior to the 2008 banking crisis. Using such a market contestability measure for the degree of banking competition also mitigates well-known concerns that traditional concentration-based competition measures (Hirschman-Herfindal index or the number of competitors) are poor empirical proxies for the amount of actual competition taking place (see, for example, Beck, Coyle, Dewatripont, Freixas and Seabright, 2010: 17-23).

I find that both portfolio diversification and banking competition are positively correlated with bank survival, reducing the probability of failure (conditional on other bank covariates) by 5.8% per standard deviation of portfolio diversification and by 1.6% per standard deviation of banking competition. These are very large effects given an *unconditional* probability of failure during 2008-2011 of 5.2% and are robust to a range of verification tests. The findings are also confirmed with a number of alternative bank distress measures: on the extensive margin, the volatility of earnings, the distance from failure or insolvency and the proportion of at-risk loans; on the intensive margin, the length of survival for non-surviving or failing banks. Finally, the degree of geographic diversification is shown to also play a relevant role outside the crisis period, even though its strongest stabilizing impact is experienced during the crisis. These findings are relevant to banking regulators as both the U.S. and European banking markets continue to be characterized by financial fragmentation and bank instability, and as new regulatory frameworks introduce implicit incentives for banks to increase their degree of geographic diversification.

The remainder of the paper is organized as follows. In section 2 I shortly describe the severity of the 2008-2011 U.S. banking crisis as well as recent regulatory changes to increase the stability of the banking system by inducing a greater level of geographic diversification. Section 3 provides a brief overview of the past literature on banking competition, geographic diversification and bank stability. Section 4 then introduces the methodology and the data while section 5 presents the empirical findings. Section 6 concludes.

3.2 THE 2008-2011 U.S. BANKING CRISIS AND CURRENT REFORMS

3.2.1 The Banking Crisis

Much has been written about the causes and consequences of the 2007 U.S. financial crisis; a review of the financial crisis or its literature is outside of the scope of this paper and I will instead content here with a brief description of the effects of the financial crisis on the banking sector.

Between 2008 and 2011, the FDIC closed 427 banks as their risk-adjusted capital reserve ratios had fallen below the mandatory 3% threshold.[2] During the same time another 486 banks were taken over by competitors, often during financial distress. As a result, the number of banks dropped between January 2008 and December 2011 by a staggering 913 banks, or 10.6% of the U.S. banks that had existed in January 2008. These numbers compare to a total of just 575 FDIC-closed banks in almost 50 years (11 failures per year) between 1934 (the inception of FDIC deposit insurance) and 1981 (shortly before the start of the Savings and Loan crisis) and just 73 bank failures (or 6 per year) for the 14 years between 1994 and 2007.

If we restrict our attention to only those banks that were publicly listed on one of the U.S. stock exchanges (NYSE, NASDAQ, AMEX), we can use the market valuation of banks to learn the investors' view about the severity of the crisis. Figure (3.1) shows the daily combined market valuation of all publicly listed U.S. banks (solid line) and its standard deviation based on a 3-month rolling window (dashed line) between January 2005 and December 2010. At the height of the crisis the total market value of all U.S. public banks had fallen from a peak of $1.72 trillion in February 2007 to a low of $426 billion in March 2009 – a staggering decline of 75.3%. At the same time, the standard deviation of U.S. banks' total market valuation tripled from an average of $25.8 billion between January 2005 and February 2007 to an average of $72.8 billion between March 2007 and July 2009.

Figure (3.2) provides another cut of the data to show the calamity of the crisis: it displays the number of publicly listed U.S. banks by their market valuation change between January 2007 and December 2009. Even though the worst period of the market decline had ended months earlier (cf. figure (3.1)), among the 506 publicly listed banks that survived

[2] Another 50 banks were closed between January 1, 2012 and December 31, 2012.

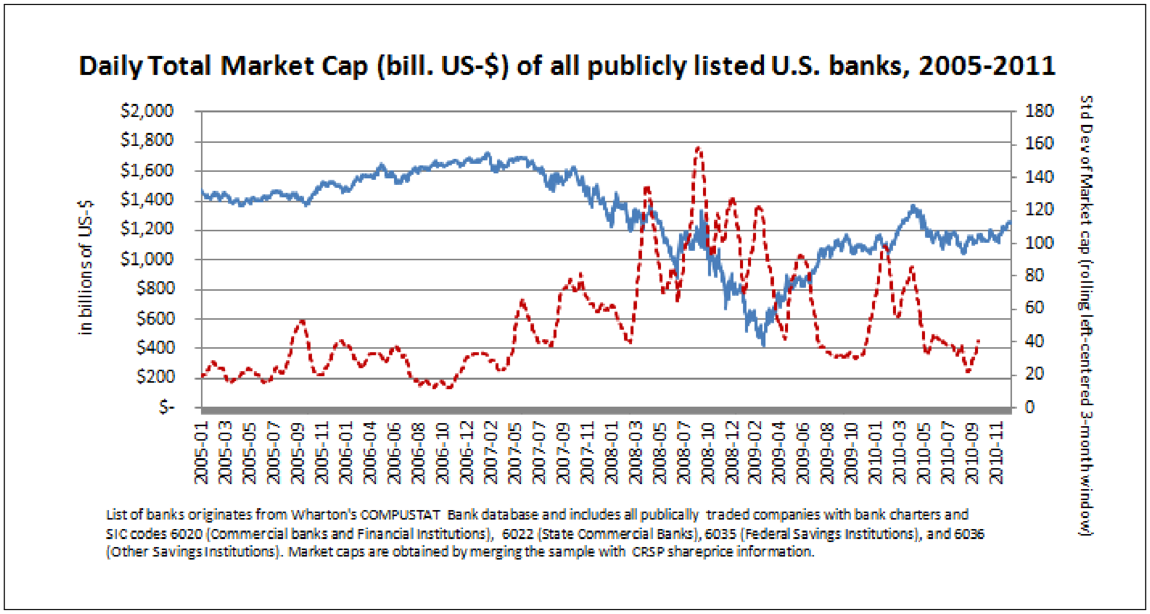

Figure 3.1: Daily Market Capitalization of Public U.S. Banks, 2005-2011

until December 2009, 56 banks had still market valuation declines in excess of 90% and more than half of all the banks (266 banks) continued to have valuation declines in excess of 50%. An additional 135 banks had delisted between 2007-2009.

A major factor that led to a stabilization of the U.S. banking sector was a federal recapitalization program for struggling banks in 2009. By December 31, 2009, the U.S. Government had injected a total of $200 billion as part of TARP's Capital Purchase Program (CPP) into 704 bank holding companies that owned 742 banks. In 657 (or 90.2%) of those injections, the government received preferred stocks, thus effectively nationalizing part the U.S. banking sector.[3] By June 2012, 341 institutions had repaid TARP funds,

[3] In the remaining 9.8%, it received subordinated debentures thereby becoming a non-collateralized

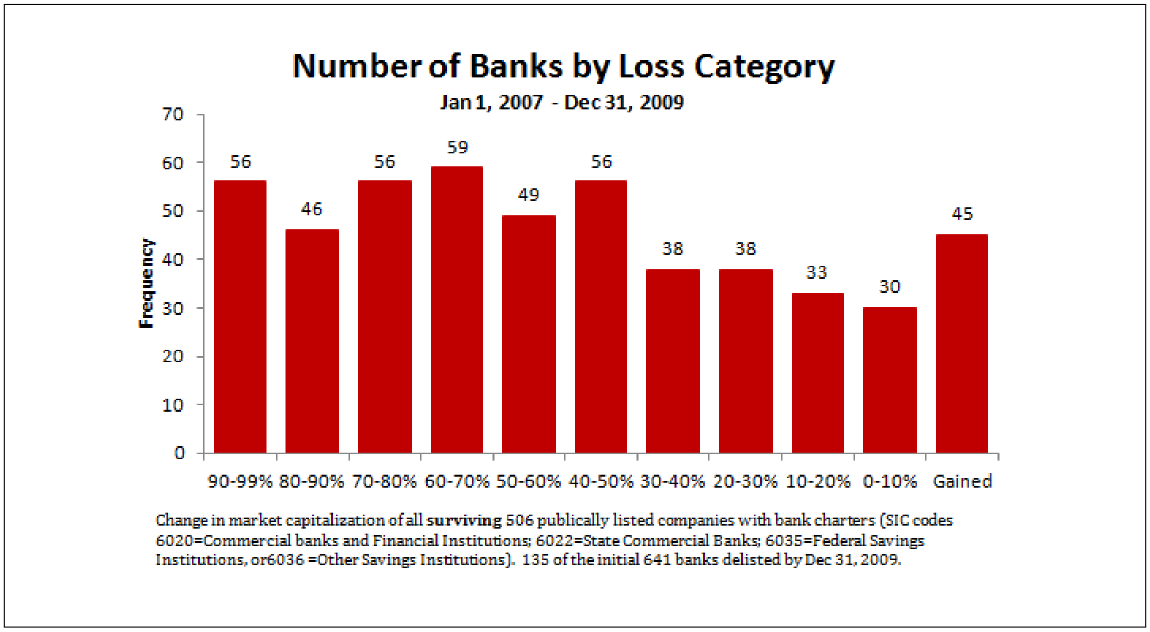

Figure 3.2: Losses in Market Capitalization 2007-2009 among Public U.S. Banks

while another 401 banks were still partly owned by the government. Nonetheless, in another sign of continued bank distress, 921 U.S. banks with combined assets of $349 billion remained on the FDIC's (unofficial) list of "problem banks" as of July 2012.[4] Combining these facts, the 2008-2011 period qualifies as one of the worst banking crises in modern U.S. history.

Notably, 249 out of the 427 bank failures in our sample occurred in 2010 or 2011 – long

creditor. (Data based on an analysis of the CPP transaction lists in Office of the Special Inspector General for the Troubled Asset Relief Program (2010: 173-198; 2012: 239-256).

[4]The FDIC does not make its list of problem banks public. Various sources however compile an unofficial list by collecting the publicly available FDIC enforcement letters to banks (consent orders, cease and desist orders, etc.). The reported numbers are based on a list compiled in July 2012 by calculatedriskblog.com.

after the panic of the Lehman failure in September 2008, many months after the market valuations of public banks had recovered (cf. figure (3.1)) and well after the U.S. Government had injected TARP funding into struggling banks. Owing to a robust intervention by regulators, the majority of 2008-2011 U.S. bank failures had not been triggered by the propagation of a large bank default shock via payment systems or counterparty exposures in the asset markets. Instead – as section (3.5.1) empirically shows – the majority of U.S. bank failures were due to sharp declines in local real estate and labor markets affecting bank portfolios and performances, which could potentially have been mitigated by a greater degree of geographic diversification in banks' mortgage and loan portfolios.

3.2.2 Current Reforms in Banking Regulation

In a special edition of *Central Banker*, FED economists Jim Fuchs and vice president for Banking Supervision and Regulation Timothy Bosch identify the failure to diversify among the four major reasons for bank failures during the most recent crisis (Fuchs and Bosch, 2009:4). Consequently, newly proposed banking regulation aims at increasing the strength of banks and the overall banking system by increasing the diversification of bank funds and bank portfolios.

The Basel Committee on Banking Supervision for example proposes in its latest Basel III framework the introduction of a Liquidity Coverage Ratio (LCR) and a Net Stable Funding Ratio (NSFR). The LCR requires any bank to hold sufficient high-quality liquid assets so to be able to survive net cash outflows lasting 30 days. The NSFR requires banks to show evidence that the available stable funding exceeds the required amount of stable funding for a one year period of financial stress. Since core deposits represents in the average U.S. bank 70% of bank funding, the requirement falls by and large upon deposits as the main funding source. Thus, branching into economic regions that operate on separate local economic business cycles (so to avoid a quick drawndown of deposits during a local labor market downturn in one region) becomes key to avoiding a shortfall in stable funding. In addition, Basel III recommends a new counter-cyclical capital buffer of up to 2.5% that strengthens the rationale for greater fund diversification to reduce the effect of business cycles. The U.S. Federal Reserve announced on December 20, 2011 that it would fully implement those Basel III recommendations.

While new banking regulation encourages greater diversification of bank funds and calls for greater branching into diverse economic regions so to insulate bank portfolios from business cycle volatility, it is however not yet fully understood how geographic diversification impacts bank stability. Section 3 discusses this point in greater detail.

3.3 BRANCHING, DIVERSIFICATION, COMPETITION AND BANK STABILITY

3.3.1 Bank Branching, Diversification and Bank Stability

Discussing restrictions to interstate branching, Sprague (1903) is among the earliest references to argue that branching allows for a spreading of risk and a more effective use of bank funds:

> "The danger of heavy losses at any one time is reduced if the bank is engaged in business over a wide geographic area (..) [Further,] a bank must actually hold or be able to get at all times enough money to meet any demands which, upon the most conservative estimate, are likely to be made upon. The larger number of depositors and the more varied their business, the less likely these demands to come at any one time. (..) The greater efficiency of reserves may result not only in greater safety, but also in an important economy of the cost of banking facilities. In Canada [where there are no branching restrictions], cash holdings normally run between 7 and 8 per cent of demand liabilities, while in the United States the proportion is in the neighborhood of 15 per cent."
> (Sprague, 1903: pp. 243-4)

Much of Sprague's argument has been reaffirmed in later studies. In their detailed account of the Great Depression, Friedman and Schwartz (1963) for example attribute the high failure rate of banks during the Great Depression to the lack of bank branching at the time. Wheelock (1995) and Calomiris (2000) find empirical evidence of this: U.S. states and regions that had greater bank branching experienced indeed lower failure rates, suggesting more stable state banking systems due to branching. Gart (1994) suggests that interstate branching mitigated losses and bank failures during the 1980s Savings and Loan crisis, and Grossman (1994) finds support that countries that had banking systems with greater branching during the Great Depression were less likely to experience a banking crisis. Finally, much of the rationale for the 1994 Riegle-Neal Interstate Banking and Branching Efficiency Act (IBBEA) was based upon the presumed expected benefits that greater geographic diversification would bring for efficiency and stability (Shiers, 2002).

While greater bank stability in the aggregate (usually, measured at the state level) has generally been attributed to geographic diversification and branching, Calomiris and Mason (2000) and Carlson (2004) analyze individual bank-level data during the Great Depression and find the opposite result: branch banks were more likely to fail and tended to fail sooner than unit banks. This, so the authors argue, was due to the lower capital reserves that banks with branches held relative to unit banks – a point already made by Sprague (1903) in the above quote. Thus, instead of retaining the lower bank risk attained from diversification, bank managers during the Great Depression sought higher expected returns by lowering capital reserves. Demsetz and Strahan (1997) find a similar conflict between greater diversification and lower capital ratios in a more recent data set: the authors analyze market measures of diversification for 150 publicly listed bank holding companies between 1980 and 1993. While larger bank holding companies have higher measures of diversification than smaller ones, the stocks of both exhibit historically similar risk. The authors explain this inconsistency via greater risk-taking: any diversification benefits that larger banks accrue are offset by lower capital ratios and larger credit risks.

Carlson and Mitchener (2006) suggest an alternative channel to reconcile the two conflicting findings that fewer state branching restrictions lead to more stable state banking systems in the aggregate but also to greater failure rates for branch banks relative to unit banks. The two authors argue that branching allows more efficient banks to enter the markets of inefficient banks, thereby purging the banking system (prior to the arrival of a banking crisis) from the weakest and most inefficient banks – a point made by the efficient structure hypothesis (cf. section (3.3.2)). While fewer branching restrictions and the ensuing competition may therefore leave the banking system more resilient in the aggregate, it is consistent with the observation that branch banks may fail earlier and more often than unit banks due to lower capital buffers.

The existing literature thus suggests that greater geographic diversification may increase overall bank stability through a greater level of diversification of bank portfolios, thereby isolating banks against local economic shocks in labor or real estate markets. The literature also suggests that those benefits may be offset by banks lowering their capital reserves, thereby increasing their exposure to unforeseen shocks. If this was true, new banking regulation that incentivizes banks to diversify geographically may well be rendered ineffective by bank managers' subsequent decision to reduce capital buffers. Finally, greater geographic diversification however also increases a bank's exposure toward competition, whose effect on bank stability – as further discussed in the next subsection – remains unresolved in the literature.

3.3.2 Banking Competition and Bank Stability

Does banking competition increase bank stability? The question remains unresolved. Both the theoretical and empirical literature are ambiguous about the relationship between banking competition on the one hand and individual bank stability or aggregate bank stability on the other. While theoretic ambiguity typically renders the discovery of a relationship to empiricists, this is complicated in this case by the absence of an agreed-upon method to measure banking competition (see, e.g., Bikker and Spierdijk, 2010). As a result, the empirical literature has employed different methods and measures and has found contrary results.

Competition in the non-banking industry is typically associated with more innovation, improved efficiency, lower prices, greater product variety and an overall increase in consumer welfare. There are however defining market aspects specific to the financial sector which makes competition in this sector depart from the textbook version of competition.[5] Specifically, while fierce competition increases consumer welfare, it also entails thinner profit margins which might increase a bank's vulnerability to a shock to its portfolio. This effect may further get amplified by a deposit insurance scheme that frees depositors from monitoring banks' financial conditions and incentivizes them to shop for the highest deposit interest rates. Thus, troubled banks may engage in an aggressive asset growth strategy by offering high interest rates, while healthy banks become vulnerable to sudden deposit withdrawals, thereby exacerbating the maturity mismatch of banks' assets and liabilities. Once a bank is in distress, the downside for shareholders, employees and management in

[5] These include for example asymmetric information, network effects, customer switching costs or negative externalities in case of firm bankruptcy.

turn is truncated while the upside implies firm survival; thus, excessive risk-taking becomes attractive leading to magnified social losses if the gamble turns bad. With fewer and on average larger banks, these gambles may grow further in size and may involve a greater number of counterparties, thus increasing aggregate risk. As a result, greater competition may reduce individual as well as aggregate bank stability. An earlier and much related theory argues that less competition and accompanying higher profit margins increase banks' charter (or franchise) value, thereby incentivizing bank managers to reduce risk-taking in order to avoid bankruptcy and forgoing future super-profits (see, e.g., Hellman, Murdock and Stiglitz, 2000).

While there is the theoretic potential for competition to worsen bank stability, competition may however also have the potential to do just the opposite, i.e. increase individual and aggregate bank stability. Endogenizing for example entrepreneurial effort by making it a function of banks' interest rates (which in turn impacts entrepreneurial payoff and thus her effort to succeed) may reduce bank portfolio risk. It thus becomes an empirical question which effect – greater instability due to lower profit margins or less instability due to greater entrepreneurial effort with an accompanying reduction in loan riskiness – dominates (Boyd and De Nicoló, 2005). Further, competition can also lead to ambiguous results via the interbank market: banks with surplus liquidity may withhold liquidity from banks that suffer from liquidity problems. Or, they may provide more liquidity to avoid contagion and a fire sale of assets that may reduce the valuation of their own assets (Acharya, Gromb and Yorulmazer, 2012).[6]

As if theory was not yet troublesome enough, the literature is further unclear on how to empirically measure banking competition. While many studies (and regulators) often rely on concentration measures (e.g., HHI, C3, C5), the relationship between concentration and

[6]For a historical example of the latter, see the Great Panic of 1907.

competition relies on a vague structure-conduct-performance (SCP) hypothesis. It is however not clear whether fewer banks indeed implies less competition among banks, a point made by the efficient structure hypothesis. According to the efficient structure hypothesis, more efficient banks grow faster and less efficient banks lose market share, are taken over or are forced to exit the market; this process of fighting for market share – at least while still ongoing – implies fierce competition among banks even if there are only few around (Berger, Demirgüç-Kunt, Levine and Haubrich, 2004). Alternative micro-founded competition measures do exist (e.g., Lerner-index, H-statistic), but require detailed input costs and product price information that is often unavailable while still often ignoring bank size, and product and geographic markets (Bikker and Spierdijk, 2010; OECD, 2010). As a result, many authors prefer regulatory-based measures that impact the competitive environment of banks (e.g., the openness to international competitors or regulatory restrictions to specific banking activities), often referred to as market contestability measures. The benefits of such measures are however tempered by their rarity and often crudeness.

Finally, the empirical evidence on competition's impact on bank stability is further mixed. Keeley (1990) and Jiménez, Lopez and Saurina (2007) provide evidence for the charter value hypothesis – more competition eroding bank charter values and leading to greater risk-taking by bank managers – for the U.S. and Spain. To the contrary, cross-country studies predominately find that both concentration and competition increase aggregate bank stability. Beck, Demirgüç-Kunt and Levine (2006) analyze how banking concentration measures are related to the likelihood of a financial crises for 47 crisis episodes across 69 countries between 1980-1997. Controlling for the differences in regulatory policies and macroeconomic conditions, the authors find that a higher degree of concentration is associated with a decline in the likelihood of a crisis. Additionally, however, the authors also find that countries with mechanisms that foster competition (e.g., more openness to international competitors or fewer restriction on non-loan generating activities) experience fewer banking crises. To reconcile both findings, the authors suggest that concentration measures are inapt measures of competition. Schaeck, Cihak and Wolfe (2006) confirm those results when measuring banking competition with the H-statistic. Reviewing a large set of literature, Beck (2009: 14) concludes that the majority of cross-country studies find a positive relationship between competition and stability and mixed evidence between concentration and stability. Within-country study results are however more ambiguous as such studies do not control for regulatory framework.

3.4 DATA AND METHODOLOGY

3.4.1 Data

3.4.1.1 Bank branch networks and branch deposits I collect all U.S. bank branches with their addresses between 1994 and 2011 from the FDIC's Summary of Deposits database. In total, the data set covers 28,201 distinct depository institutions and a total of 1,597,842 branch-year data points. Table 1 provides summary statistics. Column 1 shows that between 1994 and 2011 the number of banks declined by over 40% from 12,980 to 7,512. At the same time, the total number of branches simultaneously increased by 21 percent from 80,788 to 97,678. As a result, the average (surviving) bank more than doubled the number of its branches from 6.22 to 13.00, corresponding to an average annual growth rate in the number of branches of 4.4 percent. Several spread-related measures of branching also show increases in geographic reach: the mean distance for the average bank between its headquarter and its branches (column 7) increased from 9.31 miles to 25.38 miles and the number of counties the average bank is invested in (column 8) has increased from 1.89 to 3.54. Nonetheless, the percentage of institutions that operate branches outside their home state (column 9) increased in the aftermath of the Riegle-Neal Interstate Branching Act from just 0.7 percent to 8.7 percent.[7] Also the percentage of banks that operate branches farther than 100 miles away from their headquarters (column 10) tripled from 4.4 percent in 1994 to 11.2 percent as of 2011 and the number of population living within the average bank's network (column 11) increased by 72% from 950,000 to 1,634,000.

I further collect the amount of deposits obtained from each branch between 1994 to 2011 from the FDIC's Summary of Deposits database. Between 1994 and 2011, total deposits (column 3) increased from 2.82 to 10.46 trillion dollars (in constant 2000 dollar), which corresponds to an annual increase of 8%. Importantly, a steady share of about 70% of deposits are accounted for at local branches rather than at the headquarter (column 5), an interesting finding given an increased prevalence of brokered deposits.[8] Similarly interesting is that deposits account for over 70% of bank liabilities in most years (column 6). Thus, when new banking regulation requires evidence that stable available bank funds exceed required bank funds for an extended amount of time (the net stable funding ratio of Basel III, see section 2.2), the requirement by and large falls upon bank deposits as the main funding source.

[7] Part of this increase is likely due to bank holding companies consolidating their individual institutions in the aftermath of the 1994 Riegle-Neal Act.

[8] Brokered deposits are certificates of deposits that financial institutions can purchase from a broker who pools many small deposits. The price is a fee that is embedded in the interest rate which the purchasing bank needs to pay and which is higher than the one that the broker pays to the ultimate depositors. The counterpart to brokered deposits are core deposits which a bank directly obtains via its branch network from customers. Brokered deposits are typically accounted for at the bank headquarter.

Table 3.1: Summary Statistics

Year	Banks	Branches	Branch Deposits				Diversification Measures						Bank Distress Measures			
			All (trill.)	Excl. HQ (trill.)	Branches in %	Deposits as % of total	Avg. Distance	No. of counties	% inter-state	% dist. > 100 miles	Avg. Popul. in net-work	Portfolio Risk	Failure	Joined TARP	Left TARP	Under TARP
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1994	12,980	80,788	2.82	1.89	67.10%	78.70%	9.31	1.89	0.70%	4.40%	950	1.878	15	-	-	-
1995	12,266	80,473	2.93	2.00	68.30%	77.10%	9.90	1.96	0.80%	4.70%	957	1.872	8	-	-	-
1996	11,671	80,827	3.09	2.14	69.40%	76.90%	10.79	2.05	1.30%	5.00%	957	1.869	6	-	-	-
1997	11,168	81,541	3.31	2.30	69.50%	75.40%	11.31	2.15	1.90%	5.00%	979	1.865	1	-	-	-
1998	10,719	82,722	3.50	2.48	70.80%	74.10%	12.12	2.25	2.50%	5.30%	1,026	1.860	3	-	-	-
1999	10,328	83,703	3.67	2.60	70.90%	72.40%	13.39	2.36	3.00%	5.80%	1,085	1.858	8	-	-	-
2000	10,100	84,871	3.97	2.82	71.00%	70.50%	14.76	2.45	3.60%	6.20%	1,131	1.860	7	-	-	-
2001	9,739	85,440	4.39	3.07	69.90%	71.20%	15.89	2.56	4.10%	6.60%	1,183	1.857	4	-	-	-
2002	9,456	85,951	4.74	3.34	70.40%	71.50%	16.78	2.63	4.40%	7.00%	1,201	1.857	11	-	-	-
2003	9,242	87,151	5.40	3.81	70.50%	72.00%	17.75	2.71	4.90%	7.40%	1,234	1.855	3	-	-	-
2004	9,050	89,152	5.91	4.15	70.10%	71.10%	18.06	2.78	5.30%	7.60%	1,277	1.855	4	-	-	-
2005	8,840	91,407	6.63	4.81	72.60%	70.30%	19.07	2.90	5.90%	8.10%	1,321	1.851	0	-	-	-
2006	8,750	94,091	7.43	5.34	71.80%	70.10%	20.05	3.00	6.40%	8.80%	1,382	1.849	0	-	-	-
2007	8,588	96,624	7.95	5.81	73.00%	69.70%	21.62	3.12	7.10%	9.20%	1,456	1.851	3	-	-	-
2008	8,425	98,528	8.52	6.14	72.10%	67.80%	22.75	3.23	7.50%	9.90%	1,521	1.849	30	265	0	265
2009	8,169	98,943	9.25	6.73	72.80%	70.90%	23.56	3.33	7.80%	10.40%	1,571	1.845	148	576	70	841
2010	7,809	97,952	9.53	6.93	72.70%	72.60%	23.85	3.43	8.10%	10.70%	1,570	1.838	157	-	103	771
2011	7,512	97,678	10.46	7.46	71.30%	74.30%	25.38	3.54	8.70%	11.20%	1,634	1.833	92	-	215	668

Table (3.1) shows summary statistics and trends over the sample period on several of the key measures used in this study. Columns (1) and (2) show the number of banks (with unique FDIC certificates) and the number of physical bank branch locations. Column (3) shows the total deposits in banks in trillion $ across all banks and branches (in 2000 constant dollars). As brokered deposits have become more prevalent in recent years, we exclude the HQ at which brokered deposits are usually accounted for in column (4) and provide the ratio of deposits held in branches relative to total deposits in column (5). Columns (7) to (9) show the average distance between branches and bank headquarters in miles, the number of counties the average bank is represented in and the percentage of banks that have branches outside of their home state. Columns (10) and (11) show the percentage of banks that have bank branches farther than 100 miles and the market size (as measured by the population in those counties that a bank is represented in) of the average bank. Column (12) gives the portfolio risk from local business cycles that the average bank is exposed to via its bank branch network. Finally, columns (13) to (16) provide the number of bank failures and the annual number of banks entering and leaving the TARP bailout program. Data sources: Columns (1) and (2) originate from FDIC's institutions directory, columns (3) to (6) from the FDIC's Summary of Deposits Database. Columns (7) to (10) are computed by the author using bank branch data address data from the FDIC's institutions directory. County population data used in columns (11) is obtained from the FRED database of the St. Louis Federal Reserve. Column (16) is based on the failed banks list of the FDIC and columns (17) to (19) from the July 2012 Quarterly Report to Congress by the Office of the Special Inspector General for TARP (Appendix D, pp.239-258).

3.4.1.2 Measures of Bank Survival and Bank Distress As the goal is to analyze bank survival, I use the most direct measure – namely, whether a bank failed or not during the crisis – as the main measure of bank performance/stability during the crisis. Bank failure occurs if a bank is involuntarily closed by the FDIC for falling below the minimum risk-adjusted capital ratio of 3%. Between 2008-2011, the FDIC closed 427 bank. Many banks that did survive the crisis until the end of 2011 may still have experienced significant bank distress or came close to failing. To quantify how close a bank came to failing, I further compute for each bank the minimum capital reserve ratio it attained during the crisis period. While the previous two measures relate to the extensive margin, another measure aims at the intensive margin: for banks that did fail (or were acquired) during the crisis period, I measure the length of survival between the start of the crisis and the date when they failed (or ceased to exist). Finally, I relate portfolio diversification and competition to traditional book-related measures of bank distress, namely the noncurrent loans to asset ratio, the nonccurent loans to total loans ratio, return on equity, return on assets and a rolling window of the standard deviation of return on assets.

3.4.1.3 Bank performance data Besides bank survival measures, I collect bank balance sheet items between 1990 and 2011 from quarterly bank call reports made available in the Statistics on Depository Institutions (SDI) and Uniform Bank Performance Reports (UBPR) databases from the FDIC. Specifically, I obtain items related to firm size (assets, deposits), risk-taking/profitability (return on equity, return on assets, net income, net operating income), investment opportunities (asset growth rate) and bank risk (risk-weighted capital ratio, bank equity, noncurrent loans, and total loans).

3.4.1.4 County business cycle data Further, the measure on portfolio diversification (discussed in detail in section (3.4.2.1)) requires local economic performance data. I obtain monthly unemployment levels for all 3,141 U.S. counties from January 1990 to December

2007 from the Bureau of Labor Statistics so to compute the variances and covariances among county business cycles. Finally, to not only consider county business cycles from a labor market perspective, I also collect data on county housing markets. Unfortunately, there is no housing price index available on the county level.[9] A proxy for the county-level can however be obtained from the Building Permits Survey Database of the U.S. Census which provides information on imputed and reported annual construction costs of all new residential housing in a county for the years between 1996-2011.[10]

3.4.1.5 Banking competition and branching regulation Unfortunately, a well recognized problem in the banking literature is that banking competition cannot be directly measured since often costs and prices for specific bank products are unavailable. While concentration-based measures (such as the Herfindahl-Hirschman index) are widely used in applied work, there is plenty of evidence that concentration-based measures are only very poor proxies of actual competition (see, e.g., Berger, 1995; Bikker and Haaf, 2002). In a cross-country study, Claessens and Laeven (2004) for example find that bank concentration are positively instead of negatively related to competition.

In contrast, several papers use banking regulation that restrict market-entry for competitors as a measure for the degree of banking competition. Claessens, Demirguc-Kunt, and Huizinga (2001) for example analyze how the entry by foreign banks makes domestic banking systems more efficient by reducing profit margins. Barth, Caprio and Levine (2004) investigate the effect from regulatory restrictions across 107 countries and find that more stringent entry restrictions limit competition, determine bank efficiency and impact bank stability. The advantage of such market contestability measures (when available) is

[9] The two most detailed housing price indices are the Case-Shiller Housing Price Index that reports housing prices for 20 MSAs and the national housing price index by the Federal Housing Finance Agency that is available on the state-level.

[10] A downside of this data source for researchers is that it does not provide an option to download data in bulk, but only separately by state and year. A web-crawling algorithm however is able to download and extract the data and is available upon request.

that less stringent restrictions are unlikely to decrease competition; thus greater contestability is increasing competition or has no effect on competition leaving at the very least the directional impact right.

To side-step the concerns raised over concentration-based competition measures, I collect information from Johnson and Rice (2008) on the evolution of interstate bank regulations after the 1994 Riegle-Neal Act went into effect in 1997. Specifically, while the Riegle-Neal Act removed federal restrictions that banks could not cross state borders, it provided in a political comprise U.S. states the opportunity to opt out of federal defaults for interstate legislation by creating state restrictions to the entry of out-of-state banks.[11] What followed was a complex web of state level restrictions affecting the ability to establish new and to acquire existing in-state banks by out-of-state banks.

Yet another group of states eased restrictions under a reciprocity principle: fewer restrictions applied if the home state of an out-of-state bank likewise provided fewer restrictions. The empirical analysis uses state regulatory changes between 1997 and 2005 and creates a panel of annual pair-wise state-to-state regulations along four restrictive dimensions of market contestability.[12] Appendix (B) and section (3.4.2.2) provide additional details on the data and variable construction.

3.4.2 Methodology

The main goal is to run the following cross-sectional baseline regression:

[11] Johnson and Rice (2008) provide an excellent review of the state-wise evolution of branching restrictions after 1997.

[12] In total, the data set consists of 78,400 bilateral restrictions (50x49 states x 8 years x 4 types of restrictions).

$$\text{Bank Survival}_{\text{i, crisis}} = \alpha + \beta_1 \text{Portfolio Diversification}_{\text{i,pre}} + \beta_2 \text{Competition}_{\text{i,pre}} + \gamma X_{\text{i, pre}} + \epsilon_i$$

where the dependent variable is a measure of bank survival during the 2008-2011 U.S. banking crisis. The main independent variables are measures of bank i's pre-crisis level of portfolio diversification and a measure of the degree of competition bank i was exposed to prior to the crisis. The coefficients of interest are thus β_1 and β_2 which provide us with estimates on the benefits from pre-crisis portfolio diversification and banking competition for bank survival during the crisis.

As there is the obvious potential of omitted variables that may be correlated with the key independent variables, the specification is supplemented in a first step with bank covariates as suggested by previous literature to control for pre-crisis bank size (assets, deposits), risk-taking/profitability (return on equity, return on assets, net income, net operating income), bank risk (risk-weighted capital ratio, bank equity) and investment opportunities (asset growth rate). Since there remains the possibility for endogeneity in this specification, in a second step I make use of two instruments for the two key independent variables portfolio diversification and banking competition. Specifically, I instrument the *actual* level of portfolio diversification with the *potential* to diversify which depends on geographic characteristics (oceans and international boarders) and the availability of distinct local business cycles in the vicinity of a bank's headquarter. Further, I make use of cross-sectional and time-series variation in interstate branching legislation between 1997 and 2005 and and bilateral state distances to instrument for the amount of competition banks faced in their home state from out-of-state competitors.

3.4.2.1 Portfolio Diversification

Portfolio diversification is the first key independent variable in our baseline regression. Previous studies use coarse measures of geographic *spread* (for example, an indicator variable whether a bank has branches outside its home county or state) to proxy for the degree of geographic *diversification* of the bank's unobserved portfolio of loans and mortgages. Instead, this measure aims at explicitly incorporating the effect from local business cycle volatility onto bank portfolios, which is desirable for two reasons: first, having branches (and thus mortgages and loans) in several counties does not automatically imply that the assets derived from those counties are uncorrelated with one another as the counties may have very similar characteristics (e.g. same industries or similar rural/urban characteristics) leading to highly correlated business cycles and mortgage and loan portfolios. Hence, the diversification benefit is not guaranteed by distance alone. Second, the most recent crisis has shown that significant differences continue to exist in local business cycles in real estate and labor markets, thus offering a diversification benefit to banks: while a few states saw massive home price depreciations (e.g., Arizona, California, Florida or Nevada), housing prices remained above their 2005 levels in many other U.S. states (e.g., Texas, Washington D.C., North Dakota or Wyoming) throughout the crisis. In fact, as of September 2011, 35 states still had housing prices above their respective 2005 levels and in 10 states housing prices even continued to rise.[13] As a result, the stark decline in the U.S. housing markets should be understood as a regional rather than a national phenomenon. Consequently, geographic diversification – i.e., having physical bank branches in different housing markets – may allow banks to reduce the exposure of their mortgage and loan portfolios to a single market.[14]

[13] Based on monthly FHFA House Price Index data between 2005 and 2011.

[14] To provide a few such examples of housing markets in relative close geographic proximity but on different housing market cycles: while the Pittsburgh MSA saw an increase in its housing prices of 7.9% between January 2007 and December 2011, the Cleveland-Elyria-Mentor MSA was down by 18%. Meanwhile, the Detroit area (Warren-Troy-Farmington Hills-MSA) saw an even starker decline of 33%. While the housing prices in the Phoenix-Mesa-Glendale MSA declined by 51%, the Dallas-Plano-Irving MSA had remained unchanged and the Houston-Sugar Land-Baytown MSA was up by 5%. Finally, even though all of California was badly hit by the housing crisis, there is still heterogeneity in its severity: the San Diego-Carlsbad-San Marcos MSA saw a decline of 30%, while the Riverside-San Bernardino-Ontario MSA

Besides the housing markets, there is also a large variation in local labor market performances across U.S. states and regions. Figure (3.3) depicts the patchwork of high and low unemployment across U.S. counties – often in close proximity to one another – at the beginning of 2011. Banks located in just one or few counties could thus be more vulnerable to local industry and unemployment shocks while banks with branches in a greater number of counties may benefit through a less volatile deposit base and a higher expected repayment rate of borrowers.

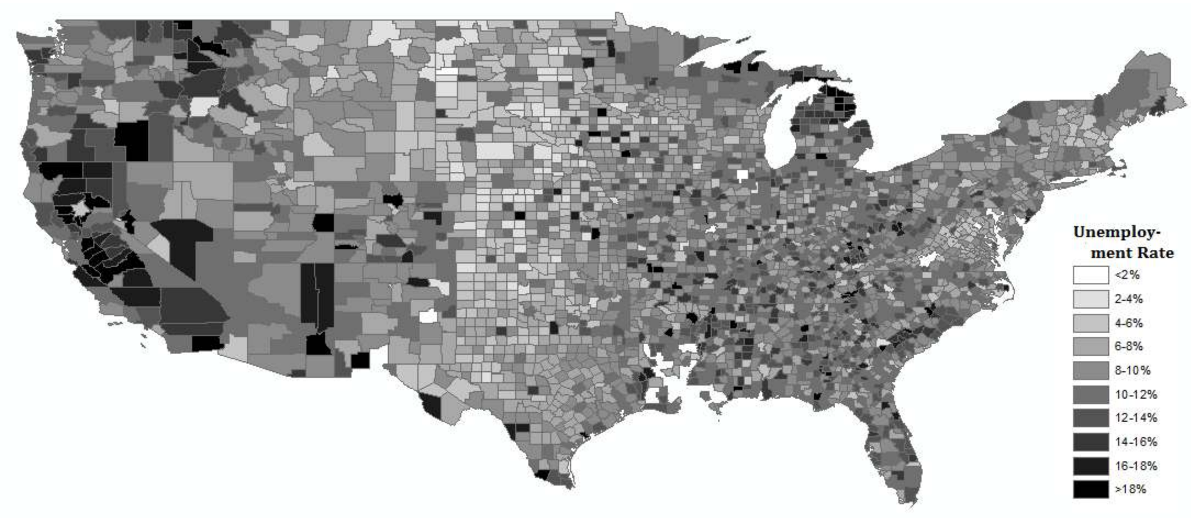

Figure 3.3: Unemployment by U.S. County (January 2011)

But how large are the deposit and loan businesses in banks' balance sheets? Are they really large enough to affect a bank's survival? At the end of 2006, the average U.S. bank had 62.4% of its assets in outstanding loans of which 33.8% were in private mortgages,

east of L.A. experienced a 52% decline. (All numbers based on seasonally adjusted purchase-only housing prices available from the Federal Housing Finance Agency for the largest 25 MSAs at http://www.fhfa.gov/Default.aspx?Page=87.)

12.2% in commercial loans and 7.5% in consumer loans. On the liabilities side, deposits made up 70.1% of total fund sources in 2006 while borrowings from other banks or financial institutions constituted only 22.1%.[15] As a result, sources of funds (liabilities) and uses of funds (assets) ought to be sensitive to the local economic conditions in housing prices and unemployment levels, which in turn affect the valuation of assets and the probability of repayment by borrowers.

To capture the benefits from geographic diversification our measure relies on basic portfolio theory. Specifically, the variance of a portfolio of n assets is calculated as:

$$\sigma_P^2 = \sum_{i=1}^{n} \sum_{j=1}^{n} \omega_i \omega_j \sigma_{ij} = \sum_{i=1}^{n} \omega_i^2 \sigma_i^2 + 2 \sum_{i=1}^{n} \sum_{j=1, j \neq i}^{n} \omega_i \omega_j \sigma_{ij}$$

where ω_i represents the portfolio weight of asset i and σ_i^2 and σ_{ij} are the variance and covariance of the historic payoffs of assets i and j. Assuming that banks obtain deposits and invest into mortgages and loans in those counties where they have a physical bank presence, I consider each county as an asset into which a bank can invest by establishing a bank branch. Hence, a branch network becomes a bank's chosen portfolio. I further use the total branch deposits derived from a county as a share of a bank's total deposits as the weight with which the bank is invested into that county. The riskiness of each county (σ_i^2) subsequently depends on the county's local business cycle in its labor market since this represents the local economic conditions that affect a bank's profitability through its lending and deposit businesses. Further, the covariance term σ_{ij} represents the covariance of county i and js' business cycles – a lower covariance thereby implies a larger diversification benefit.

Thus, I compute for each bank k the portfolio risk of its loans and mortgages in year t

[15] Numbers based on bank call reports.

via the variances and covariances of the county business cycles in which bank k has branches as of year t. The lower the portfolio risk, the more diversified is a bank. Specifically, the portfolio risk of bank k in year t is computed as:

$$\sigma_{k,t}^{P} = \left(\sum_{i=1}^{N_t} \sum_{j=1}^{N_t} 1_{ktij} (\omega_{it} \omega_{jt} \sigma_{ijt}) \right)^{\frac{1}{2}}$$

where

1. $1_{ktij}(\cdot)$ is an indicator function which is 1 if bank k has in year t at least 1 branch in counties i and j.
2. ω_{lt} is the share of deposits that bank k derives in year t from county l relative to its total deposit base.
3. σ_{ijt} is the covariance between the business cycles of counties i and j for year t based on monthly county unemployment numbers between Jan 1990 and Dec of year $t-1$.
4. N_t is the number of U.S. counties that existed in year t (e.g., 3,141 in 2005)

Two facts are worth noting. First, portfolio risk does not simply capture bank size: the correlation coefficient between bank size (measured by bank assets) and portfolio risk is not significantly different from zero.[16] Instead, since banks typically do not expand into far-off regions, a bank's portfolio risk depends in part on the covariances of local business cycles of counties that are close to the bank's existing network and which are therefore potential candidates to expand into. But do business cycles of nearby counties provide sufficient variation such that banks can achieve a meaningful diversification benefit? Figure (3.4) shows two densities of correlation coefficients of counties' business cycles. The left panel consists of 4,878,126 pair-wise correlation coefficients of all U.S. counties (the upper triangular of the 3,124 x 3,124 variance-covariance matrix) based on counties' monthly

[16] As a case in point, while Michigan's Citizens Republic Bancorp ranked with $7.6 billion assets in the top size quintile in 2007, it also ranked in the top quintile of portfolio risk. This may in part be due to the fact that Michigan counties exhibit very similar business cycles and do not offer much potential for diversification (which is discussed more in section 5.4).

unemployment levels between Jan 1990 and Dec 2006. Not surprisingly, most correlation coefficients are positive, but correlation coefficients below 0.5 are not uncommon and 83.9% of coefficients remain below a threshold of 0.75. As any investment into an asset with a correlation coefficient below 1 provides a diversification benefit, banks seem to have many counties to choose from so to diversify their portfolios. The panel on the right further shows the density of 515,294 correlation coefficients of only those counties that are within 200 miles distance of one another and which are therefore more likely candidates to expand into for banks located in one of those counties. While counties closer to one another have on average (as expected) more similar business cycles, still 63.9% of correlation coefficients remain below a threshold of 0.75. Banks thus retain a significant number of counties within a 200 miles radius to choose from so to reap a diversification benefit. Further reducing the distance to just 50 miles shifts the mass of the distribution further to the right, but still leaves 42.6% of correlation coefficients below a threshold of 0.75 (chart available upon request).

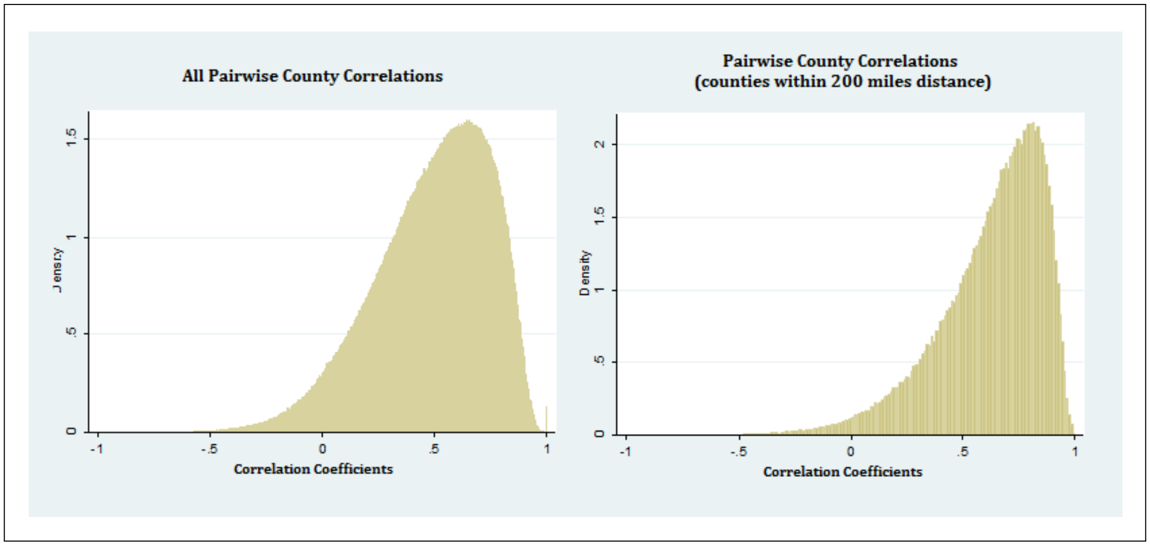

Figure 3.4: Correlations between Local Business Cycles

Second, note that a portfolio with n assets has just n variances but $n(n-1)/2$ covariance terms; thus, the greater the number of assets in a portfolio, the greater the contribution of the asset covariances to the portfolio variance. Eventually, as n becomes large, the portfolio variance approximates the weighted average of the covariances of the individual assets. This has very practical consequences for larger banks as not the variance of individual county business cycles matter any longer, but only its correlation with other counties. As a case in point, in 2007, Wells Fargo operated 3,255 branches across 532 U.S. counties. The 532 county variances in its portfolio risk formula are completely dominated by the 141,246 pair-wise county covariance terms.

Table 3.2: Portfolio Risk by Geographic Spread, 1994-2011

Year	All Banks		Unit Banks		Non-Unit Banks		Banks with Branches in up to 2 counties		Banks with Branches in 3 to 10 counties		Banks with Branches in >11 counties	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1994	12,954	1.878	4,757	1.782	8,197	1.933	11,319	1.884	1,420	1.848	215	1.744
1995	12,245	1.872	4,320	1.781	7,925	1.922	10,598	1.879	1,423	1.842	224	1.736
1996	11,661	1.869	3,965	1.779	7,696	1.915	9,963	1.877	1,476	1.834	222	1.714
1997	11,150	1.865	3,738	1.79	7,412	1.903	9,435	1.876	1,505	1.818	210	1.711
1998	10,712	1.86	3,492	1.788	7,220	1.896	8,976	1.867	1,523	1.845	213	1.714
1999	10,319	1.858	3,263	1.788	7,056	1.891	8,561	1.862	1,551	1.854	207	1.726
2000	10,093	1.86	3,169	1.79	6,924	1.891	8,302	1.866	1,567	1.845	224	1.716
2001	9,732	1.857	3,000	1.785	6,732	1.889	7,880	1.862	1,628	1.851	224	1.722
2002	9,451	1.857	2,821	1.789	6,630	1.885	7,558	1.862	1,666	1.85	227	1.71
2003	9,241	1.855	2,669	1.786	6,572	1.883	7,295	1.861	1,714	1.848	232	1.715
2004	9,048	1.855	2,559	1.789	6,489	1.881	7,059	1.863	1,769	1.839	220	1.746
2005	8,838	1.851	2,417	1.799	6,421	1.871	6,804	1.859	1,804	1.834	230	1.754
2006	8,749	1.849	2,367	1.8	6,382	1.867	6,611	1.858	1,886	1.829	252	1.756
2007	8,585	1.851	2,280	1.807	6,305	1.867	6,359	1.866	1,968	1.814	258	1.754
2008	8,424	1.849	2,140	1.803	6,284	1.865	6,159	1.866	2,003	1.813	262	1.734
2009	8,168	1.845	2,014	1.787	6,154	1.864	5,901	1.861	1,998	1.813	269	1.722
2010	7,810	1.838	1,858	1.781	5,952	1.855	5,572	1.857	1,971	1.801	267	1.712
2011	7,512	1.833	1,756	1.784	5,756	1.848	5,297	1.854	1,938	1.793	277	1.727
Average	-	1.856	-	1.789	-	1.885	-	1.866	-	1.832	-	1.728
Std dev†	-	0.691	-	0.714	-	0.678	-	0.713	-	0.612	-	0.474
% chg.	-42.00%	-2.40%	-63.10%	0.10%	-29.80%	-4.40%	-53.20%	-1.60%	36.50%	-3.00%	28.80%	-1.00%

Table (3.2) provides summary statistics about U.S. banks' portfolio risk of their bank branch networks. Portfolio risk is defined as in section (3.4.2.1). Each section shows the number of banks and the corresponding portfolio risk; the final row "% change" shows the percentage change in the number of banks or in the portfolio risk measure between 1994 and 2011. (†) The column "Std dev" shows the average annual standard deviation.

Table (3.2) provides an overview of the evolution of the portfolio risk for banks by different geographic spread between 1994 and 2011. Despite an increase in the average bank network size (cf. Table (3.1)), overall portfolio risk has not changed by a large amount: between 1994 and 2011, the portfolio risk for the average U.S. bank (column 2) declined by just 2.4% (or 6.5% of a standard deviation). Not surprisingly, the portfolio risk of unit banks (column 4) has remained constant as a unit bank's portfolio risk in year t is simply the variance of the one county business cycle in which the bank is located estimated from monthly unemployment numbers from 1990 up to December of year $t-1$. Non-unit banks however experienced a decline of 4.4% (or 12.5% of one standard deviation) in portfolio risk (column 6). Separating the banks by the number of counties into which they were invested, we see that the largest improvements occurred among those banks that invested into 3-10 counties with a decline of 3.0% (or 9.0% of a standard deviation). This raises the question why banks do not make greater use of opportunities to geographically diversify? While banks have indeed grown in geographic reach, county business cycles have simultaneously become more synchronized over the years: using 5-year rolling windows of monthly county unemployment levels, the average correlation of business cycles of counties within a 200 miles radius for example increased from 0.433 in 1994 to 0.528 in 2007. Put differently, recalculating the portfolio risk for all banks in 2011 (column 2) while using 1994 business cycle correlations (based on monthly county unemployment data from Jan 1990 to Dec 1993) leads to an average portfolio risk of 1.476 instead of 1.833. Thus – if local U.S. county business cycles had *not* become more synchronized between 1994 and 2011 – this would correspond to a decline in portfolio risk of 19.5% (or a decline of 52% of one standard deviation) instead of the observed 2.4% (or 6.5% of one standard deviation). One could therefore consider the geographic diversification of banks as an attempt to offset an increasing correlation of local business cycles and thus of the underlying loan and mortgage portfolios.

3.4.2.2 Banking Competition The final key variable concerns the degree of banking competition a bank was exposed to prior to the crisis. As discussed earlier, similar to Strahan and Rice (2010), I use state restrictions to interstate banking as market contestability measures are considered a preferred measure for banking competition. Specifically, for the first measure "Openness (to Out-of-State Banking Competition in 2007)", I determine for each bank k in 2007 the number of states that have more lenient restrictions to enter k's home state than the federal defaults established by the 1997 IBBEA. Specifically:

$$\text{openness}^k_{\text{i,2007}} = \sum_{j=1, j\neq i}^{n} \sum_{m=1}^{4} 1_{ijm_{2007}}$$

where

1. i represents the home state of bank k
2. m_{2007} represents one of the four interstate banking restrictions types in year 2007 (cf. section (3.4.1.5) and columns 3-6 in (B1))
3. $1_{ijm}(\cdot)$ is an indicator variable which is 1 if state i applies to banks from state j as lenient or more lenient regulation in restriction type m than put forth by the IBBEA federal default, else 0. Specifically:
    a. 1 if banks from state j can establish *de novo* branches in state i
    b. 1 if banks from state j are permitted to acquire in-part institutions in state i
    c. 1 if banks from state j are permitted to acquire banks in state i that hold deposits larger than 30% of state deposits
    d. 1 if banks from state j are permitted to acquire banks in state i which are younger than 5 years.

The next section discusses the empirical results.

3.5 RESULTS

This section discusses the findings to the following main questions:

1. Do local economic fundamentals (still) matter for bank survival? Or has new financial innovation meanwhile allowed banks to economically diversify independently from their geographic footprint? (In the latter case we would not expect to find any diversification benefits from bank branching.)
2. Did geographic diversification/bank branching impact the probability of bank survival during the 2008-2011 U.S. banking crisis? Further, did U.S. banks simultaneously decrease their capital reserves as they increased their level of geographic diversification?
3. If greater branching is indeed correlated to bank survival, is this due to a greater portfolio diversification, due to a greater previous exposure to competition, or both? What are the contributions and relative magnitudes of the two channels?

3.5.1 Do local fundamentals (still) matter to banks?

Financial innovations since the late 1990s may have allowed banks to economically diversify their portfolios without having to invest into a greater branching network. On the asset side, even small banks can nowadays invest into residential or commercial mortgage-backed securities that consist of mortgages or loans that are either spread across the country or focused on specific regional markets. A larger syndicate commercial loan market allows for diversification in industrial loans, and asset-back securities (auto loans, credit card receivables or student loans) allow banks to reduce their exposure to the housing market. On the liabilities side, some banks have attempted to attract greater deposits via online banking rather than by putting down physical branches. In addition, banks frequently sell mortgages in secondary mortgage markets – conforming loans often to the Federal National Mortgage Association (Fannie Mae) or the Federal Home Loan Mortgage Corporation (Freddie Mac) – and thereby have the option to manage their exposure to the local business cycle despite engaging in the local mortgage business. Thus, it is not clear from the outset by how much banks are still affected by local economic conditions.

If banks were indeed diversifying away risk incurred on the local level with nationwide investments, we would not expect to find any geographic clustering of bank failures. Hence, the first test aims to provide evidence that bank failures are geographically clustered (and not randomly spread out across the U.S.). An implicit assumption of this test is that failing banks are located in economically depressed areas and that it is this exposure to local conditions which led to their demise. The second test therefore analyzes whether local economic conditions are correlated with the occurrence of bank failures.

3.5.1.1 Geographic Clustering Figure (3.5) shows a map of the lower 48 U.S. states displaying the geographic location of the headquarters of all U.S. banks as of 2007. Figure (3.6) displays the location of 427 banks that failed between January 2007 and December 2011 as well as (underlying) a kernel density map with "hot spots" representing a greater number of banks in the area. A visual inspection of the geographic pattern of bank failures in Chart (3.6) suggests geographic clustering. As the density map however shows, many of the failures also occurred in areas with a greater overall number of banks (hot spots). In other words, a randomly selected set of banks from the bank population may exhibit a similar visual degree of geographic clustering due to the population of banks being clustered itself. I therefore compute a statistic for the degree of geographic clustering among the failed banks and compare it to the same statistic computed for many randomly drawn samples of banks from the population (thus generating an empirical distribution). Appendix (C) provides the details on the methodology to arrive at the geographic clustering statistic. I find that the degree of geographic clustering among failed banks is indeed significantly higher (lying in the outmost tail of the empirical distribution with a p-value less than 0.001) than the clustering among randomly sampled banks, which confirms that the location of banks that fail are not random.

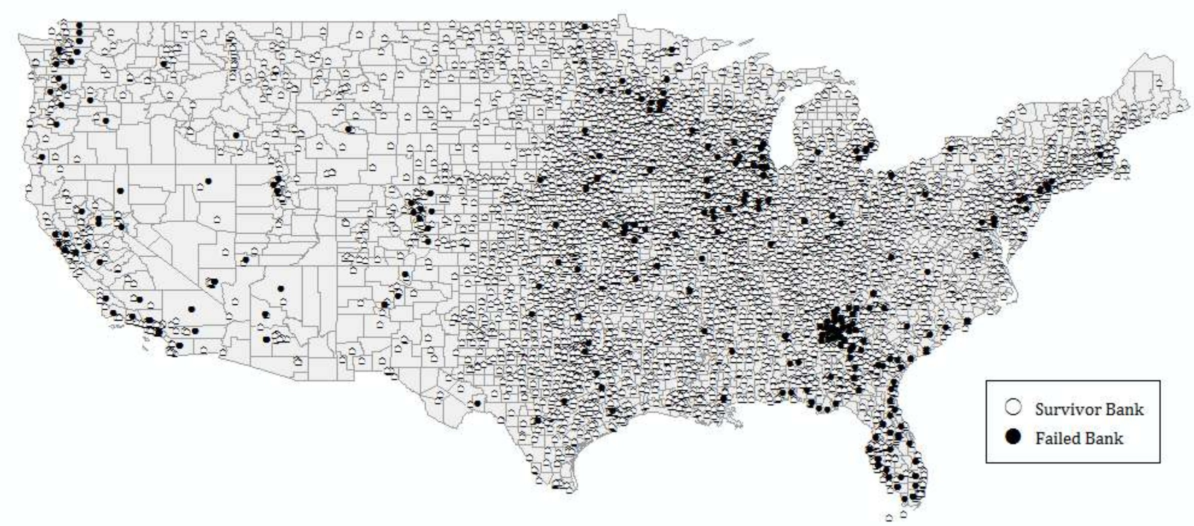

Figure 3.5: U.S. Bank Locations in 2007 and Bank Failures 2008-2011

3.5.1.2 Failed Bank Locations and Local Economic Conditions The fact that bank failures are geographically clustered implies that something inherent to those geographic locations ought to be related to bank failures. I therefore test whether local economic conditions can explain the pattern of bank failures and bank survivals in the U.S. between January 2008 and August 2012.

I compute two proxies to measure the economic downturn that occurred on the local (county) level:

1. the change in the county unemployment rate between 2008-2011 (rel. to pre-crisis)
2. the change in the county real estate markets between 2008-2011 (rel. to pre-crisis)

Monthly county-level unemployment data is readily available from the U.S. Bureau of

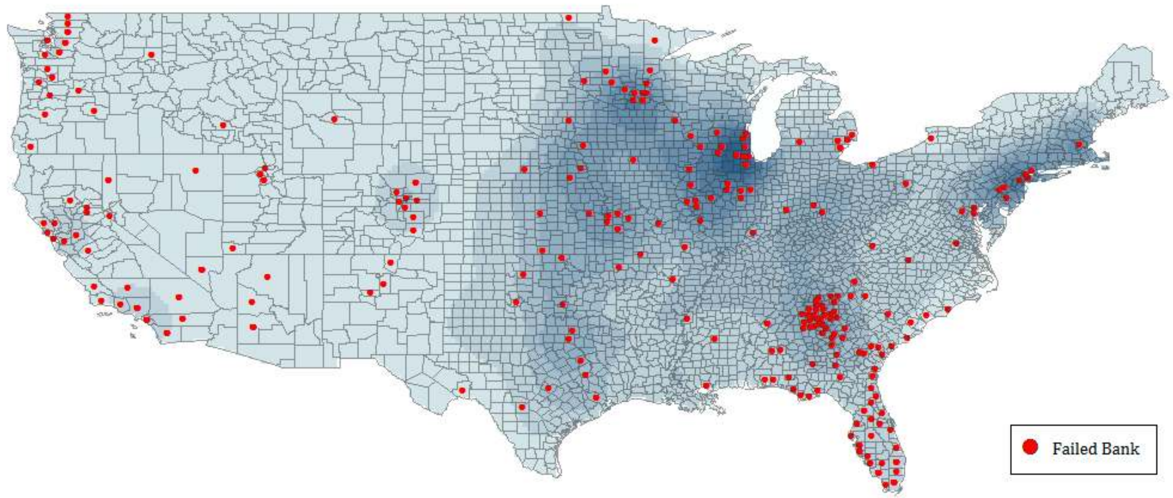

Figure 3.6: U.S. Bank Failures (2008-2011) and Density Map of Surviving Banks

Labor statistics. For each bank that existed as of 2007, I compute the average annual unemployment level that the bank faced in all the counties with at least 1 branch between 2006 and 2011 and define the variable `<<labor market decline>>` as the largest increase in the unemployment level that a bank faced in its branch network between 2008-2011 relative to the base year 2006. This measure thus proxies the extent by which the local labor market within a bank's branch network worsened during the crisis relative to pre-crisis levels. While no housing price indicator is available on the county level, county-level data from the U.S. Census Building Permits Survey provides the annual construction costs of all new residential housing in a county. For each bank I construct a variable called `<<real estate market decline>>` which represents for the largest average percentage change in real estate construction costs in all the counties in which a bank had branches between 2008-2011 relative to the pre-crisis base years. As the real estate changes for almost all counties are negative, I invert the sign so to make the results in Table (3.3) easier to read: thus, a value of 0.5 for the variable <<real estate market decline>> implies that the real estate construction market declined by 50%.[17]

Columns 1 to 4 of Table (3.3) show the results of several logistic specifications where the dependent variable is whether a bank failed (i.e., was closed by the FDIC) or not between 2008 and 2011. Reported are marginal effects at the mean and median with z-statistics in square brackets. All variables are winsorized at the 1% level to protect the results from outliers and bank covariates are standardized. I find that the mean and median probability of bank failure significantly increases with a rise in the local unemployment rate and with a decline in the construction activity within a bank's branch network. In columns (3) and (4), after controlling for a number of bank characteristics, a doubling of the unemployment rate in a bank's branch network increases the bank's failure probability at the mean (median) by between 0.9 (1.7) to 1.6 (2.7) percent. Similarly, a decline in real estate activity in a bank's branch network by 100% is associated with an increase in failure probability at the mean (median) by between 7.9 (16.6) to 15.5 (25.7) percentage points. In practical terms, the median bank experienced a 90% increase in its network unemployment level (relative to 2006) and a 78.9% decline in real estate activity, which corresponds for the median bank (after controlling for bank covariates) to a 1.53% increase in the bank failure probability due to the unemployment increase and a 13.1% increase in the failure probability due to the decline in real estate activity.

[17] As an example, consider "ESB Bank" in Pennsylvania: as of 2008, ESB Bank was represented with 23 branches in 4 PA counties: Allegheny, Beaver, Butler and Lawrence County. The highest unemployment levels in those 4 counties during the crisis period (2008-2011) were respectively 7.7%, 8.2%, 7.4% and 9.5% while the 2006 levels were 4.4%, 4.7%, 4.3% and 5.3%. Thus the largest county-level changes in the unemployment rate were respectively 75%, 74%, 72% and 79%. Taking the average of those four changes, we arrive at an average unemployment increase in ESB's bank network of 75.2%. Similarly, the maximum annual real estate construction costs in the pre-crisis period (2003-2006) for Allegheny, Beaver, Butler and Lawrence County were $396.9, $62.8, $192.4, and $27.2 million. The lowest real estate activity during the crisis period (2008-2011) were respectively $248.8, $28.3, $77.6, and $7.3, thus representing changes of -37.3%, -55.0%, -59.7% and -73.1%. Taking the average of those four declines, we arrive at an average real estate decline that ESB faced via its branch network of 56.3%.

Table 3.3: Bank Stability and Local Economic Conditions

		Bank Failure (2008-2011)				Min. Risk-Wght. Capital Reserves (2008-2011)			
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Labor Market	Mean	0.028 [3.12]	0.032 [3.92]	0.009 [1.76]	0.016 [2.33]	-2.217	-1.856	-1.252	-0.998
Decline	Median	0.028 [3.28]	0.032 [4.07]	0.017 [2.01]	0.027 [3.16]	[-2.87]	[-2.91]	[-2.54]	[-3.15]
Real Estate	Mean	0.097 [2.21]	0.211 [3.17]	0.079 [2.86]	0.155 [3.09]	-0.732	-2.107	-1.075	-0.353
Market Decline	Median	0.097 [2.13]	0.211 [3.05]	0.166 [2.77]	0.257 [3.16]	[-0.50]	[-1.52]	[-1.28]	[-0.33]
Bank Assets				0.004 [0.74]	0.025 [1.67]			2.126 [1.12]	-0.885 [-1.54]
Return on Equity				-0.002 [-0.57]	-0.045 [-2.64]			-1.722 [-2.84]	0.934 [0.67]
Return on Assets				0.005 [0.84]	0.052 [1.33]			1.687 [1.10]	-3.246 [-0.43]
Net Income				0.004 [0.73]	-0.001 [-0.04]			0.614 [-0.32]	-0.418 [-0.64]
Net Operating Income				-0.004 [-1.01]	0.069 [0.80]			7.211 [4.24]	6.961 [0.34]
Asset Growth Rate				0.012 [3.85]	0.015 [2.67]			-2.293 [-5.53]	-1.327 [-2.07]
Equity				-0.094 [-1.01]	-0.025 [-1.88]			-1.521 [-0.54]	1.404 [1.46]
Deposits				-0.003 [-0.61]	-0.001 [-0.09]			-1.293 [-1.19]	0.113 [0.14]
Risk-wght. Capital Reserves				-0.001 [-4.06]	-0.007 [-3.86]			0.865 [8.87]	1.137 [3.31]
Fixed effects for bank types		No	No	Yes	Yes	No	No	Yes	Yes
Condition		≥1 Branch	≥5 Branches	≥1Branch	≥5 Branches	≥1Branch	≥5 Branches	≥1Branch	≥5 Branches
N		8,056	2,770	7,085	2,319	7,278	2,478	7,255	2,470

Table (3.3) shows the correlation between local economic conditions (proxied by local labor market and local real estate declines) and two measures of bank stability. Columns (1) to (4) use a logistic regression as bank failure is a binary outcome; columns (5) to (8) employ a Tobit framework with a lower bound of 0% as capital reserve ratios are non-negative (result unchanged to alternative bounds of 2% or 3%). "Labor market decline" is the maximum percentage increase in the average county unemployment level that a bank faced via its branch network during the crisis period (2008-2011) relative to the baseline in the bank's network in 2006. The variable "real estate market decline" is the largest average county-level real estate decline (proxied by construction costs of new residential buildings) that a bank faced in its branch network during the crisis period (2008-2011) relative to the pre-crisis period (2003-2006). "Bank types" refer to an FDIC-determined institution's primary asset specialization, including a bank being a mortgage-, consumer-, commercial- or "other type" specialist. Balance sheet bank controls are pre-crisis averages from June 2006-June 2007 and are standardized. All variables are winsorized at the 1% level to protect the results from outliers and all regressions employ heteroskedastic error terms with clustering on the state level to allow for differences across states in banking regulation enforcement. Reported coefficients in columns 1-4 are the marginal effects at the mean and median. 2-sided z-statistics (columns 1-4) and t-statistics (columns 5-8) are reported in square brackets.

Columns 5 to 8 show the results of several Tobit regressions where the dependent variable is the lowest risk-weighted capital reserve ratio a bank attained between 2008-2011. Since the FDIC closes banks that become critically undercapitalized, this measure relates to the channel through which these bank failures occurred and quantifies how close a bank came to failing during the crisis. I employ a censured regression framework since capital ratios are non-negative and the FDIC closes a bank when its risk-weighted capital ratio falls below 3%. I find that local labor market declines (but not local real estate declines) are significantly correlated with capital reserve ratio declines. With the median bank facing an unemployment increase within its network by 90%, capital reserves declines on average by between 80 to 113 basis points.

The results suggest that bank failures are indeed geographically clustered and that local county economic conditions are significantly correlated with the probability of bank failure and bank distress. This leads to the conclusion that local economic fundamentals still matter to bank stability and that a geographic diversification of bank portfolios could be an effective strategy for banks to reduce their exposure to local economic shocks.

3.5.2 Capital Reserves and Geographic Diversification

Demsetz and Strahan (1997) analyze market measures of diversification for 150 publicly listed bank holding companies between 1980 and 1993 and find that larger holding companies have higher levels of diversification but also lower capital ratios and larger credit risks. Similarly, Carlson (2004) find that unit banks during the Great Depression had significantly higher capital ratios than non-unit banks, suggesting that banks with greater geographic diversification may also decrease their capital ratios. Thus, the positive effects on bank stability that greater geographic diversification may bring may well be offset by bank managers' decisions to lower their capital ratios.

To investigate whether such a trade-off existed among U.S. banks prior to the 2008 crisis, I next investigate the correlation between measures of geographic diversification and risk-adjusted capital reserve ratios. The dataset consists of a panel of all 8,127 U.S. banks included in the FIDC's Uniform Bank Performance Reports with data between 2002 and 2011.

Panel A of Table 4 shows univariate results for a 2002-2011 data panel as well as a pre-crisis 2006 cross-section in which banks are sorted by the number of branches and the number of counties in which they have a branch presence. While unit banks with just 1 branch had in any given year very high risk-adjusted capital reserve ratios of 23.7 percent between 2002-2011, the ratio quickly declines in the number of branches. Likewise, as the number of counties with a bank presence increases, the ratio declines. The average bank with more than 50 branches and with a presence in more than 10 counties has a risk-adjusted capital reserve ratios of just 12.8 percent – about half of that of unit banks. The marginal (frequency-adjusted) averages show the same trend from 20.4 percent to 13.2 percent as the number of counties increase and from 23.7 percent to 12.9 percent as the number of branches increase. The trend is even stronger in the pre-crisis 2006 cross-section where unit banks had on average capital ratios of 34.8 percent which declined to just 11.8 percent for the largest banks in branches and spread.

Table (3.5) reports the conditional correlation between the following measures of geographic diversification (used in previous literature) and capital ratios:[18]

1. whether a bank has branches outside its home county,

[18] Each of the 35 coefficients shown in Table 4 Panel B is derived from a separate regression where just one geographic diversification measure is included. Each specification includes standard errors that allow for heteroskedasticity with clustering on the state of the bank's headquarter so to allow for the possibility that state banking regulators may encourage different levels of capital ratios. All variables are winsorized at the 1% level to protect the results against outliers.

2. whether a bank has branches outside its home state,
3. the log number of branches,
4. the log number of zip codes in which a bank has branches,
5. the log number of counties in which a bank has branches,
6. the average distance between a bank headquarter and its branches, and
7. whether a bank has a branch farther than 100 miles away.

Column 1 uses a pooled OLS regression with Newey West standard errors to correct for autocorrelation. It regresses capital reserve ratios on measures of geographic diversification while including state and year fixed effects and finds that all measures are negative and highly significantly associated with capital ratios. This indicates that a greater geographic footprint coincides with lower capital reserves. Intra-county banks for example hold on average 5.69% more risk-adjusted capital reserves than do inter-county banks which is roughly consistent with the decline from 20.4% to 15.1% as observed in Panel A. Capital reserve ratios also decline in the number of (log) branches, (log) zip codes and (log) counties a bank is represented in, the average distance between headquarters and branches (in miles) and an indicator variable whether the bank has any branches further than 100 miles from the headquarter.

Column 2 repeats the analysis of column 1 while adding to the state and year fixed effects an extensive set of bank controls;[19] the previous finding however remains unchanged. Column 3 further adds to the set of controls and fixed effects additional bank-specific intercept terms, thereby controlling for any omitted time-invariant bank characteristics. The identification now relies on the differences between capital ratios within banks before versus after they became more geographically diversified. Understandably, the test loses power as (for example) out of the 8,127 banks in the panel only 460 changed their status

[19] The set of controls include proxies for bank size (assets, deposits), profitability (return on equity, return on assets, net income, net operating income), investment opportunities (asset growth rate) and bank equity.

from an intra-state to an inter-state bank. Nonetheless, most coefficients remain negative and significant indicating that a greater degree of geographic diversification is associated with lower levels of capital reserve ratios. Finally, column 4 uses a first-difference estimator thus making use of the time-series dimension of our data. First differences cancel out any time-invariant observables and omitted constant unobservables and relies only upon the variation from changes in our geographic diversification measures between $t-1$ and t when the variable of interest (here, some measure of geographic diversification) changes. The coefficient on "intercounty bank" for example states that a bank that transitions from an intra-county bank to an inter-county bank on average experiences an (insignificant) 0.24% decline in its capital ratio in that year (relative to banks that do not transition). 4 of the 7 measures remain significantly negative.

Table 3.4: Capital Ratios and Geographic Diversification – Univariate Results

	Number of Bank Branches	Number of Counties with Bank Presence: 1 county	2-5 counties	6-10 counties	>10 counties	Freq. adj. avg.
Annual avg. 2002-11	1 Branch	23.7	.	.	.	*23.7*
	2-5 Branches	17.5	15.8	.	.	*16.6*
	6-10 Branches	15.3	14.3	14.0	.	*13.5*
	11-50 Branches	15.1	13.8	13.5	13.9	*13.8*
	>50 Branches	.	13.6	13 .5	12.8	*12.9*
	Freq. adj. average	*20.4*	*15.1*	*13.6*	*13.2*	*17.9*
2006 only	1 Branch	34.8	.	.	.	*34.8*
	2-5 Branches	17.7	15.7	.	.	*16.7*
	6-10 Branches	15.0	14.1	16.9	.	*13.3*
	11-50 Branches	15.8	13.4	12.9	15.4	*13.6*
	>50 Branches	.	12.6	12.3	11.8	*11.9*
	Freq. adj. average	*26.2*	*15.0*	*13.7*	*13.5*	*20.9*

Table 3.5: Cap. Ratios and Geogr. Diversification – Multivariate Results

	Dependent Variable: Risk-adjusted Capital Ratio Each coefficient below is obtained from an individual regression in which just one of the measures of geographic diversification was used.			
	(1)	(2)	(3)	(4)
Intercounty Bank	-5.69	-4.48	-0.88	-0.24
	[-46.4]	[-39.2]	[-11.4]	[-0.94]
Interstate Bank	-4.30	-1.80	0.17	-0.24
	[-20.3]	[-8.65]	[1.14]	[-0.94]
Log (branches)	-3.48	-3.37	-0.82	-2.05
	[-49.0]	[-37.6]	[-11.2]	[-10.2]
Log (zip codes)	-3.59	-3.49	-0.81	-2.02
	[-48.9]	[-38.0]	[-11.2]	[-10.2]
Log (counties)	-3.69	-3.22	-0.59	-1.50
	[-45.3]	[-32.4]	[-7.36]	[-8.36]
Avg. Distance	-0.008	-0.004	-0.000	-0.003
	[-4.53]	[-2.70]	[-0.16]	[-1.74]
Max. Dist. > 100m	-4.69	-2.59	-0.35	-0.81
	[-27.1]	[-13.1]	[-2.86]	[-3.28]
Bank Controls	No	Yes	Yes	Yes
Fixed Effects	State,Year	State,Year	State,Year	State,Year
Model	OLS	OLS	Bank-FE	1st Diff.

Bank controls include measures of bank size (assets, deposits), profitability (return on equity, return on assets, net income, net operating income), investment opportunities (asset growth rate), bank equity and bank types. All variables are winsorized at the 1% level to protect the results against outliers. Bank types include indicator variables whether a bank is a mortgage specialist, consumer loan specialist, or a commercial loan specialist bank (as determined by the FDIC). Columns 1, 2 and 4 with Newey West standard errors allowing for up 3 orders of autocorrelation, column 3 with first-order autocorrelation robust standard error. 2-sided t-statistics shown in square brackets.

Overall, the results in Tables (3.4) and (3.5) indicate that greater geographic diversification coincides with lower risk-adjusted capital reserve ratios. This provides credence to the related findings by Demsetz and Strahan (1997) and Carlson (2004) who suggest that bank managers prefer higher returns when faced with the trade-off between keeping a lower risk level obtained from diversification or higher expected returns. Consequently, when incentivized by regulation to geographically diversify, banks may simply lower capital reserves so to return to what it perceives as its private optimal risk level.

3.5.3 Bank Branching and Bank Stability during the 2008-2011 Banking Crisis

Previous literature has found that greater bank branching leads to an improvement in bank survival during a crisis (Wheelock, 1995 and Calomiris, 2000 on the Great Depression; Gart, 1994 on the Savings and Loan crisis). I investigate this question in the context of the 2008-2011 U.S. banking crisis and provide in Table (3.6) the association between the number of branches (the most common proxy for geographic diversification) and several measures of bank survival.[20]

[20] A log-transformation of the number of branches shields the results from outliers driving the results. The results are qualitatively the same when using the number of bank branches.

Table 3.6: **Bank Branching and Bank Stability**

Covariates as of 2007	Measures of Bank Stability (2008-2011)							
	Bank Failures Failures	**Failed Banks: Log (days survival)**	**Bank Exists in 2011**	**Non-surviving banks in 2011: Log (days survival)**	**Std Dev. of ROA**	**Average z-Score 2008-2011**	**Minimum z-Score 2008-2011**	**Change in Avg. z-Score pre-to-post**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Branches	-0.020 [-2.33] †	0.114	0.024 [1.30] †	0.092	-0.001	11.192	3.324	-3.037
	-0.034 [-2.47] ‡	[2.33]	0.025 [1.27] ‡	[3.41]	[-1.35]	[1.73]	[1.82]	[-1.72]
Bank Assets	0.017	-0.448	-0.018	-2.43	-0.001	45.724	12.664	7.742
	[1.07]	[-2.08]	[-0.43]	[-0.87]	[-1.61]	[2.95]	[2.21]	[1.26]
Return-on-Equity	-0.043	-0.057	-0.036	-0.028	0.001	-3.76	7.505	-3.083
	[-3.02]	[-0.65]	[-1.07]	[-0.49]	[0.66]	[-0.35]	[1.20]	[-1.45]
Return-on-Assets	0.078	-2.154	0.066	-0.592	-0.003	-45.938	-37.888	-22.43
	[1.73]	[-1.85]	[0.57]	[-1.03]	[-0.65]	[-0.73]	[-1.32]	[-1.34]
Net Income	0.002	-0.06	0.004	0.012	0	-17.444	-5.09	1.124
	[0.16]	[-0.36]	[0.13]	[0.01]	[-0.26]	[-2.03]	[-1.78]	[0.33]
Net Operating Income	0.02	4.559	0.069	8.12	0.005	108.53	63.61	39.073
	[0.21]	[1.97]	[0.25]	[0.77]	[1.35]	[0.87]	[1.27]	[1.33]
Asset Growth Rate	0.02	-0.113	-0.031	-7.33	0.001	-31.407	-10.574	3.859
	[2.22]	[-1.71]	[-2.63]	[-5.69]	[3.49]	[-6.00]	[-5.95]	[2.08]
Equity	-0.021	-0.005	-0.069	0.741	0.002	-15.9	-2.062	-2.13
	[-1.85]	[-0.03]	[-3.18]	[1.03]	[3.32]	[-1.19]	[-0.61]	[-0.68]
Deposits	0.011	0.441	0.058	0.375	0	-26.568	-10.867	-7.087
	[0.65]	[1.33]	[1.43]	[0.33]	[-0.47]	[-2.09]	[-2.54]	[-1.80]
Risk-wght. Capital Reserves	-0.008	0.015	0.009	0.001	0	6.474	2.388	-0.155
	[-3.55]	[1.27]	[1.23]	[0.45]	[-0.18]	[3.52]	[5.02]	[-0.94]
Bank type Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2,442	145	2,615	452	2,501	2,510	2,510	2,501

Table (3.6) shows the association between the number of branches and several measures of bank survival for banks with at least 5 branches. Columns (1) and (3) consist of logistic specifications whether a bank failed (i.e., was closed by the FDIC) or survived (i.e., did neither fail nor was acquired) during the crisis period 2008-2011. Reported are marginal effects at the mean (†) and the median (‡) for the variables of interest and at the mean for all other independent variables. Columns (2), (4), and (5)-(8) use OLS regressions to analyze whether the number of branches is correlated to the number of days which a failed bank still survived during the crisis. Columns (6) to (8) use bank z-Scores that are typically interpreted as the distance towards insolvency. All variables are winsorized at the 1% level to shield results against the effect of outliers; bank balance sheet items are standardized. Bank type controls include indicator variables whether a bank is a mortgage-, consumer loan-, commercial loan specialist bank (as determined by the FDIC). All specifications use heteroskedastic standard errors with clustering on the state level to allow for potential differences in the enforcement of banking regulation across states.

As before, the results in Table (3.6) control for 2007 bank characteristics on size, risk-taking, profitability, investment opportunities and banks' main business model (bank types). The findings confirm that a larger number of branches is positively associated with bank survival, even after controlling for the level of pre-crisis capital reserves and deposits. Specifically, on the extensive margin, I find that a greater number of branches decreases the probability of bank failure (column 1) by 2% (3.4%) at the mean (median) and increases (though not significantly) the probability of bank survival (column 3).[21] Given that a bank fails or does not survive (the intensive margin), I further find that the length of bank survival (in log days since the start of the crisis) is also positively and significantly associated with the number of branches (columns 2 and 4). A greater number of branches also reduced (although insignificantly) earnings volatility in the crisis period (column 5). Columns 6 to 8 show that a greater number of branches is also positively correlated with a banks average and minimum distance to insolvency (z-Score) and is also correlated with a smaller decline of z-Scores during the crisis period.[22] Naturally, these specifications still suffer from several endogeneity issues which we will address in the next section.

While the number of branches has been traditionally used as a proxy of geographic bank diversification, it conflates two distinct effects: first, the effect due to a portfolio diversification as banks spread their assets and liabilities over different economic regions that may operate along different local economic business cycles, and second the effect from being exposed to more competitors prior to the crisis, thus having gained efficiency and strength once the crisis arrives.

Table (3.7) makes a first attempt towards separating both effects. Instead of using the

[21] A bank is called a survivor if it neither fails nor is acquired by a competitor.

[22] A bank z-Score (not to be confused with an Altman z-score) is computed as (ROA + capital reserve ratio)/std dev (ROA) and is typically interpreted as the distance to insolvency. Note that as capital reserves are an endogenous choice to geographic diversification (cf. section (3.5.2)), z-Scores are an imperfect measure of bank distress for this study and will not be further investigated.

number of branches, we use the portfolio risk measure as introduced in section (3.4.2.1) that is based on the variances and covariances between county labor markets in which a bank has branches. We further measure the amount of competition banks face via the openness of the bank's home state in 2007 to out-of-state competitors as described in section (3.4.2.2).

Table 3.7: Bank Stability, Portfolio Diversification and Competition, I

		Bank Failed between 2008-2011				Std. Dev. ROA 2008-2011	
		(1)	(2)	(3)	(4)	(5)	(6)
Portfolio Risk	Mean	0.011 [1.99]	0.019 [2.69]	0.010 [3.35]	0.016 [3.10]	0.001	0.001
	Median	0.011 [2.04]	0.019 [2.75]	0.017 [3.92]	0.025 [4.28]	[1.61]	[2.47]
Openness to	Mean	-0.006 [-1.26]	-0.018 [-2.54]	-0.002 [-0.79]	-0.009 [-2.24]	-0.001	-0.001
Competition	Median	-0.006 [-1.26]	-0.018 [-2.50]	-0.004 [-0.80]	-0.014 [-2.41]	[-2.64]	[-2.07]
Assets				0.003	0.026		-0.001
				[0.43]	[1.65]		[-1.56]
Return-on-Equity				-0.002	-0.043		0.001
				[-0.55]	[-3.06]		[0.67]
Return-on-Assets				0.005	0.071		-0.003
				[0.90]	[1.46]		[-0.68]
Net Income				0.006	0.001		-0.001
				[0.94]	[0.09]		[-0.27]
Net Operating Income				-0.004	0.023		0.005
				[-1.19]	[0.22]		[1.39]
Asset Growth Rate				0.120	0.018		0.001
				[3.50]	[2.41]		[3.59]
Equity				-0.005	-0.026		0.002
				[-1.20]	[-2.10]		[3.41]
Deposits				-0.002	-0.002		-0.001
				[-0.28]	[-0.14]		[-0.67]
Risk-wght. Capital Reserves				-0.001	-0.008		-0.000
				[-3.57]	[-3.82]		[-0.19]
Bank type Controls		No	No	Yes	Yes	No	Yes
N		8,661	2,921	7,470	2,442	2,512	2,501

Table (3.7) shows the correlation between (1) banks' portfolio risk in 2007 and bank failure, and (2) the degree of competition that banks faced as of 2007 and bank failure during the crisis. Balance sheet items are the average values of the 4 quarterly call reports between June 2006 and June 2007 (i.e., before the crisis). Bank type controls include indicator variables whether a bank is a mortgage specialist, consumer loan specialist or commercial loan specialist bank (as determined by the FDIC). Columns 1 and 3 show results for all U.S. banks while columns 2 and 4 show results for banks with at least 5 branches. Reported are the marginal effects at the mean and at the median for the key variables and at the mean for the remainder variables. Columns 5 and 6 use the standard deviation of return on assets as a measure of bank stability during the crisis period. All variables are standardized and winsorized at the 1% level and all specifications include heteroskedastic standard errors that are clustered at the state level to allow for potential differences in the enforcement of banking regulation across states.

Table (3.7) shows the marginal effects at the mean (and, for the key variables, at the median) from several logistic regressions in which the dependent variable is whether a bank failed or not between 2008-2011. All specifications use heteroskedastic standard errors that are clustered at the state level to allow for differences in banking regulation enforcement across states, and all variables are winsorized at the 1% level to protect the results from outliers. The results are consistent with the interpretation that an increase in the portfolio risk in 2007 (i.e., a decrease in the degree of portfolio diversification) is positively correlated with bank failure during the banking crisis. Specifically, an increase in the portfolio risk by one standard deviation is correlated with a significant increase in the failure probability at the mean (median) between 1.0 (1.7) percentage points in specification 3 (for all U.S. banks) and 1.6 (2.5) percentage points in specification 4 (only banks with at least 5 branches). The effects are less strong for pre-crisis openness to banking competition: the probability of failure only decreases significantly for banks with at least 5 branches by 0.9% (1.4%) at the mean (median) per standard deviation increase in state openness to competition in 2007. This is consistent with the finding by Carlson and Mitchener (2006) that within-state competition leads to a greater degree of bank stability.

3.5.4 Results from an Instrumental Variable Approach

An obvious concern with the results in Table (3.7) is that there might exist some unobserved variables that are correlated to bank failure and the portfolio risk or the amount of competition a bank faced prior to the crisis. For example, greater risk-aversion by bank managers may be correlated to a lower average credit risk *and* a greater degree of portfolio diversification. If risk-aversion was only incompletely controlled for, the coefficient on portfolio risk may therefore capture some of the effect of managerial risk-aversion and be downwards biased.

To make sure that our results are not just the result of such endogeneity, I suggest two instruments that offer exogenous variation. Specifically, I suggest to use the *potential* for portfolio diversification that a bank has nearby its bank headquarter as an instrument for the *actual* degree of portfolio diversification a bank achieves through its branch network. The instrument is based on the well-established observation that banks do not branch into far-flung regions (due to monitoring and marketing costs and less knowledge about far-off borrowers and markets), but typically branch out along the boundaries of their current networks. I therefore estimate for each bank how much portfolio diversification it *could* have achieved in 2007 if it had been represented with equal weight in each of the counties within a 200 miles radius around its headquarter. Specifically, I compute the potential portfolio risk for bank k as:

$$\tilde{\sigma}_{k,i}^{P} = \left(\sum_{j=1}^{3,141} 1_{kij} (\omega^2 \sigma_{ijt}) \right)^{\frac{1}{2}}$$

where

- i is the county that hosts bank k's headquarter,
- $1_{kij}(\cdot)$ is an indicator function which is 1 if the distance between the geometric centers of counties i and j is 200 miles or less, and
- $\omega = 1/N_k$ where N_k is the number of counties located within 200 miles of county i.

While, for example, Midwestern banks have plenty of potential urban and rural counties within a 200 miles radius that offer a variety of local business cycles to invest into, banks in Southern Florida are surrounded by oceans, banks in Las Vegas are restricted by the desert and banks in Michigan are limited by the Great Lakes, international borders and an automotive industry that imposes similar business cycles onto nearby counties. As a result, in part due to this geography, banks in Florida, Nevada and Michigan are "stuck" with counties nearby that offer similar business cycles and less potential to diversify. Thus, the identifying assumption is that topographic variation (oceans, deserts and international borders) and the availability of uncorrelated business cycles in the vicinity of banks' headquarters are exogenous to bank failure other than through its impact on the portfolio diversification of banks.

As an example, using a 200 miles radius around Wayne County (Detroit), Dade County (Miami) and Clark County (Las Vegas), the three counties rank among those with the lowest potential diversification options: relative to all other 3,141 U.S. counties, their counties rank in the 5th, 4th and 2nd percentile of the measure of potential geographic diversification. On the other hand, counties in the top 10 percentiles of potential portfolio diversification are frequently located in Northern Texas, Kansas and Nebraska with rural and urban areas, agriculture and manufacturing as well as some oil and gas industries nearby.

Figure (3.7) shows the actual portfolio risk measure by county (averaged over all banks that have a headquarter in that county) while figure (3.8) displays the potential portfolio risk measure within a 200 miles radius. Figures (D1) and (D2) in appendix (D) show very similar maps that use 50 or 100 miles. First, it becomes evident that the actual degree of diversification and the potential to diversify are correlated with one another (the unconditional correlation for all banks is 0.588) which is a promising sign for an instrument and the first stage regression. Further, the potential to diversify (figure (3.8)) is low (dark) in most places where we would expect it to be: Florida, and around the Great Lakes, in the North-East as well as in along the West Coast and Nevada. The highest potential for diversification (light shading) is however located in Midwestern counties and East to where the Rocky Mountains form another natural boundary.[23]

[23] It may seem surprising that the largest potential to diversify is located in the Great Plains where the population density is low and that the potential to diversify is smaller in coastal areas with high population density. Even though possibly counterintuitive, note that the portfolio risk measure is simply the average of the county business cycle covariances within a 200 miles radius and thus this is just a result borne out of the county unemployment numbers obtained from the BLS.

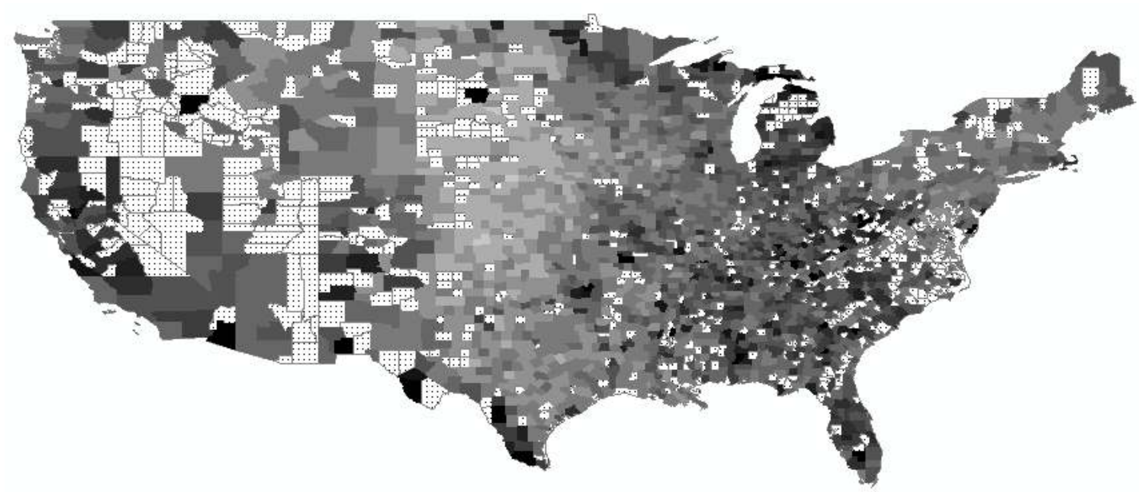

Figure 3.7: Actual Average Portfolio Risk of Banks, by U.S. County

To instrument for banking competition, I make use of the time-series dimension of interstate branching laws and reciprocity agreements between 1997 and 2005 as well as the distances between states. Specifically, for each state i, I compute for each state pair (i, j) the number of years between 1997 and 2005 in which banks from state j were granted more lenient interstate branching/banking restrictions by state i. I then add up the years across all states while inversely weighting each state pair by the distance between both states. The latter step incorporates the fact that even lenient branching restrictions may not matter as much for competition if states are very far apart:[24]

[24]As an example: As early as 1998, Hawaiian and New Jersey banks were both able to branch *de novo* into and acquire in-part banks in Maryland (banks from Maryland however had to wait until 2001 to receive the same privilege from Hawaii and could still not establish *de novo* branches in New Jersey as of 2005). Clearly, we would expect a greater increase in banking competition in Maryland from New Jersey based banks than from Hawaiian banks.

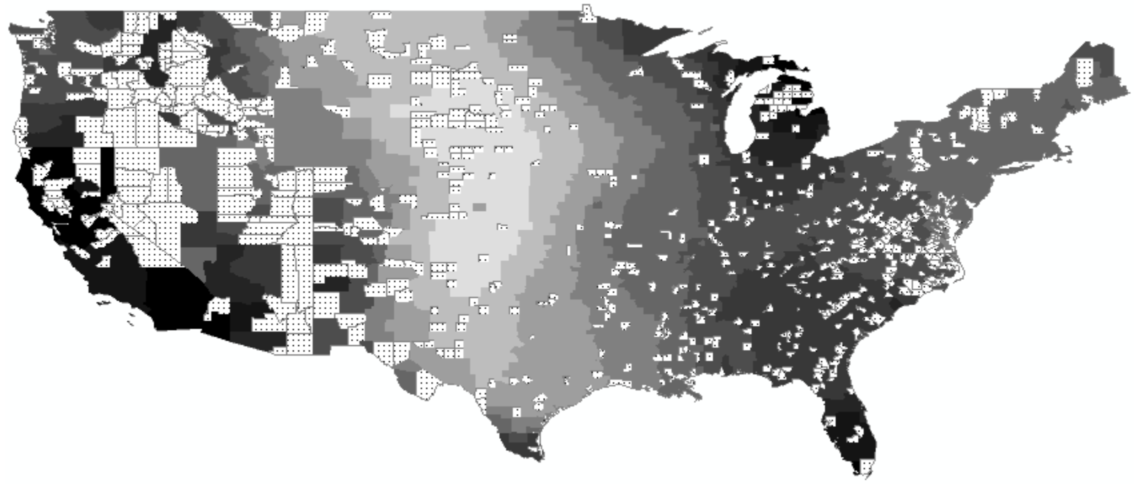

Figure 3.8: Potential Average Portfolio Risk of Banks, by U.S. County

$$\text{openness}_{\text{i,1997-2005}} = \sum_{j=1; j \neq i}^{50} \sum_{m=1}^{4} \sum_{y=1997}^{2005} w_{ij} 1_{ijmy}$$

where

- 1_{ijmy} is an indicator variable which is 1 if state i applies for banks from state j in year y more lenient regulation in restriction type m than put forth by the IBBEA federal default (cf. section 4.1.5), else 0.
- w_{ij} is a distance-related integer weight between 1 (highest state-pair distance quintile; farthest) and 5 (lowest state-pair distance quintile; closest) with intermediate weights according to their quintile rank. The distances between state pairs are computed from their nearest border locations to each other.

As in any instrumental variables (henceforth, IV) approach, two concerns are the explanatory power of our instrumental variables to explain bank failures and orthogonality with the dependent variable. To address the first concern, I provide in all IV-based results the first-stage F-tests as well as the Kleibergen-Paap rk Wald test statistic that tests for *weak identification*. Under weak identification, two serious problems arise: first, two-stage least squares (henceforth, 2SLS) estimators incur a finite-sample bias (in the same direction as the ordinary least squares estimator suffers from), and second standard errors become too small and the asymptotic distribution may be decidedly non-normal, undermining reliable hypothesis testing (Stock, Wright and Yogo, 2002). Stock and Yogo (2005) provide a formally derived test (and critical values) about when instruments become too weak and thus unreliable. Under the null hypothesis of the test, the bias of the two-stage least squares estimator is less than a fraction (for example 10% or 15%) of the bias of the ordinary least squares, thus leading to different critical values depending on that fraction and the number of instruments and endogenous variables.[25] All 2SLS results are therefore supplemented by the Kleibergen-Paap rk Wald test-statistic and the applicable Stock-Yogo critical values. Further, I provide in all IV results the p-value of the Kleibergen-Paap rk LM statistic which tests whether the equation is *underidentified*, i.e. whether the instruments are sufficiently correlated with the endogenous regressors to be relevant. Under the null hypothesis, the equation is underidentified so that a small p-value rejects underidentification (cf. Bazzi and Clemens, 2013: 165-175).

The common approach for testing the *orthogonality assumption* of instruments is with the help of the Hansen J-test, which has the joint null hypothesis that the instruments are uncorrelated with the error terms and are therefore correctly excluded from the second-stage estimation. Hansen's J-test however requires over-identification, i.e. more instruments than endogenous variables. I therefore add two additional instruments that I subsequently include into the 2SLS results in order to test the orthogonality assumption. Since

[25] See for example Murray (2006) for details.

the two additional instruments are weaker than the main instruments (as shown in table (3.8)), I do not interpret the results from the coefficients when using the weaker instruments (since they may suffer from a finite sample bias and may have too small standard errors) but only use them so to verify the orthogonality assumption. Specifically, as a second instrument for the degree of banking competition in 2007, I use pre-Riegle Neal state-level interstate branching restrictions between 1978 and 1997: the years before 1997 since a state had entered into an agreement with at least one more state to allow out-of-state banks to acquire in-state banks (cf. column(1) in (B1)). As a second instrument for portfolio diversification (or the potential thereof) I use the proportion of land under U.S. jurisdiction within a 200 miles radius around a bank's headquarter.[26] All IV specifications with over-identification thus report the Hansen J-test statistic and its p-value.

Finally, Chernozhukov and Hansen (2008) illustrate that inferences based on reduced-form IV regressions in ordinary least squares with weak instruments can easily be adjusted for heteroskedasticity, autocorrelation and clustering using standard robust covariance matrix estimators so to provide accurate standard errors. As a result, I also provide results from a reduced-form IV regression where the first stage is omitted and the instruments are directly plugged into the second stage regression.

[26] This differs decidedly from the main instrument of portfolio diversification which incorporates the variation in nearby business cycles.

Table 3.8: **Bank Stability, Portfolio Diversification and Competition, II**

	(1) 2SLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS	(6) 2SLS	(7) 2SLS	(8) Red.Form	(9) Red.Form	(10) Red.Form
Portfolio Risk	0.058	0.079	0.056	0.057	0.058	0.057	0.074	0.038	0.033	0.044
	[4.60]	[2.06]	[4.84]	[4.45]	[4.57]	[4.41]	[4.44]	[4.62]	[4.94]	[4.92]
Openness to Competition	-0.016	-0.020	-0.008	-0.016	-0.016	-0.016	-0.026	-0.015	-0.010	-0.019
	[-2.83]	[-1.88]	[-0.57]	[-2.85]	[-2.92]	[-2.94]	[-3.76]	[-3.16]	[-2.93]	[-4.21]
Bank Assets	0.009	0.011	0.009	0.009	0.009	0.009	0.050	-	0.003	0.041
	[0.86]	[1.03]	[0.82]	[0.85]	[0.86]	[0.85]	[1.52]		[0.26]	[1.18]
Return-on-Equity	-0.003	-0.009	-0.003	-0.003	-0.003	-0.003	-0.028	-	0.002	-0.023
	[-0.29]	[-1.07]	[-0.29]	[-0.28]	[-0.29]	[-0.28]	[-1.86]		[0.16]	[-1.55]
Return-on-Assets	0.017	0.010	0.018	0.017	0.017	0.017	0.096	-	0.007	0.063
	[0.60]	[0.71]	[0.62]	[0.60]	[0.60]	[0.60]	[1.65]		[0.24]	[1.00]
Net Income	0.015	0.013	0.015	0.015	0.015	0.015	-0.000	-	0.009	-0.003
	[1.61]	[1.28]	[1.68]	[1.61]	[1.62]	[1.61]	[-0.00]		[1.01]	[-0.22]
Net Operating Income	-0.030	0.013	-0.031	-0.030	-0.030	-0.030	-0.081	-	-0.017	-0.022
	[-1.19]	[1.57]	[-1.20]	[-1.18]	[-1.19]	[-1.19]	[-0.63]		[-0.70]	[-0.15]
Asset Growth Rate	0.045	0.034	0.045	0.045	0.045	0.045	0.064	-	0.040	0.060
	[3.83]	[3.89]	[3.82]	[3.83]	[3.83]	[3.84]	[4.49]		[3.60]	[4.15]
Equity	-0.015	-0.014	-0.015	-0.015	-0.015	-0.015	-0.028	-	-0.013	-0.027
	[-2.11]	[-1.83]	[-2.14]	[-2.10]	[-2.11]	[-2.10]	[-2.23]		[-1.91]	[-2.20]
Deposits	-0.003	-0.003	-0.004	-0.003	-0.003	-0.004	-0.020	-	0.001	-0.013
	[-0.34]	[-0.35]	[-0.40]	[-0.33]	[-0.35]	[-0.34]	[-0.67]		[0.16]	[-0.42]
Risk-wght. Reserve Capital	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.003	-	-0.001	-0.002
	[-2.29]	[-3.27]	[-2.25]	[-2.30]	[-2.29]	[-2.30]	[-3.05]		[-2.54]	[-3.01]
Bank Type Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Instruments used:										
Potential Portfolio Risk	x	-	x	x	x	x	x	x	x	x
Proportion Bankable Area	-	x	-	x	-	x	x	-	-	-
Openness 1997-2005	x	x	-	x	x	x	x	x	x	x
Openness 1978-1997	-	-	x	-	x	x	x	-	-	-
1st Stage F stat. (Portf. Risk)	99.2	5.9	111.1	74.7	83.9	71.3	72.6	n/a	n/a	n/a
1st Stage F stat. (Competition)	110.1	90.6	12.0	69.8	105.5	77.1	102.5	n/a	n/a	n/a
Kleibergen-Paap rk Wald F stat.	102.9	3.64	4.25	80.5	72.2	64.7	75.9	n/a	n/a	n/a
Stock-Yogo Crit. Value (10%)	7.03	7.03	7.03	13.43	13.43	16.87	16.87	n/a	n/a	n/a
Kleibergen-Paap rk LM (p-value)	<0.001	0.079	0.020	<0.001	0.001	0.001	0.001	n/a	n/a	n/a
Hansen's J Statistic	-	-	-	0.293	0.303	1.041	0.681	n/a	n/a	n/a
p-value of Hansen's J	-	-	-	0.589	0.582	0.594	0.712	n/a	n/a	n/a
N	7,370	7,554	7,370	7,367	7,436	7,367	2,553	8,141	7,370	2,554

All variables winsorized at the 1% level and standardized. Bank type controls include indicator variables whether a bank is a mortgage specialist, consumer loan specialist or commercial loan specialist bank (as determined by the FDIC). All specifications with heteroskedastic standard errors and clustered at the state level. Columns 8-10 are results from ordinary least squares (logistic specifications provide very similar results). Columns 7 and 10 only on banks with at least 5 branches.

Table (3.8) provides the results of two-staged least squares regressions and reduced-form IV specifications where the outcome variable is whether a bank failed during the crisis. All specifications use heteroskedastic standard errors with clustering at the state level. Column 1 shows the main specification where actual geographic diversification is instrumented with potential geographic diversification and openness to banking competition in 2007 is instrumented with a bank's home state's openness to competition between 1997 and 2005. The results are qualitatively consistent with those found in Table 6, but the effects have strengthened: a one standard deviation increase in portfolio risk increases the probability of failure by 5.8% while a one standard deviation increase in openness to competition decreases the failure probability by 1.6%. The F-statistics of the first stages and the Kleibergen-Paap statistics are well above the critical values (a value of 10 for the first-stage F-statistics and 7.03 for the Kleibergen-Paap statistics, cf. Stock and Yogo (2005)). Among the bank covariates, more aggressive asset growth rates prior to the crisis increased the probability of failure while more equity and more capital reserves significantly decreased the failure probability.

Columns 2 and 3 introduce the secondary instruments, the proportion of land nearby the bank headquarter under U.S. jurisdiction and interstate branching restrictions between 1978 and 1997. Not surprisingly, the first stages are significantly worse (and, for the instrument on the proportion of bankable land with such a low first-stage F-statistic that drawing inferences from the coefficient becomes unreliable). The sole purpose of including these inferior instruments is to achieve over-identification in specifications 4-7 so that the Hansen J-test statistic can be obtained.[27] In specifications 4-7, I subsequently use combinations of the four instruments and obtain the corresponding Hansen J-test statistics. While weak identification continues to be soundly rejected by the Kleibergen-Paap statis-

[27] Note that the joint null hypothesis of Hansen's J-test is that all instruments are uncorrelated with the error terms; adding a weak and valid instrument does not adversely impact the inference of the Hansen's J-test for the other instruments. Adding a weak or invalid instrument works against the null hypothesis and makes the rejection of orthogonality more likely.

tics, the Hansen J-statistics have p-values of 0.58 or higher, i.e. the test cannot reject that the instruments are indeed orthogonal to bank failures. Specification 7 further excludes banks that have less than 5 branches as of 2007 and finds a further strengthening of the portfolio risk and competition effect on bank failures.

Finally, following Chernozhukov and Hansen (2008), specifications 8-10 employ a reduced-form IV approach, in which I directly regress bank failure on the two instrumental variables in a single stage (while maintaining heteroskedastic standard errors that are clustered on the state level). The results are consistent with the previous findings: an increase in portfolio risk increased the probability of failure, while greater pre-crisis competition decreased the failure probability.[28] As a result, the findings thus far suggest that both portfolio diversification and banking competition increased bank stability. Further the effect from geographic diversification seems significantly larger than the effect of banking competition.

[28] Results from reduced-form IV logistic regressions are very similar and available upon request.

Table 3.9: Bank Stability, Portfolio Diversification and Competition – Alternative Distress Measures I

	Minimum Capital Reserves (2008-2011)				Length of Survival for Non-surviving Banks			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Tobit (no IVs)	Tobit Red. Form IV	2SLS	2SLS (≥ 10 br.)	Tobit (no IVs)	Tobit Red. Form IV	2SLS	2S LS (log)
Potential Portfolio Risk	-0.231	-0.712	-0.684	-0.394	-79.36	-80.54	-151.3	-0.134
	[-1.82]	[-5.77]	[-6.03]	[-2.95]	[-5.22]	[-6.59]	[-6.09]	[-5.60]
Openness to Competition	-0.042	0.096	0.094	0.037	35.02	49.96	60.84	0.060
	[-0.37]	[0.88]	[1.00]	[0.46]	[2.13]	[3.36]	[3.23]	[3.27]
Bank Assets	0.058	0.463	0.312	0.078	-144.9	-193.9	-233.5	-0.239
	[0.14]	[1.10]	[0.74]	[0.29]	[-1.66]	[-2.02]	[-2.54]	[-2.36]
Return-on-Equity	-1.926	-2.357	-2.338	-0.875	30.65	14.40	23.70	0.031
	[-9.10]	[-8.95]	[-8.11]	[-3.80]	[1.26]	[0.57]	[0.80]	[1.08]
Return-on-Assets	2.814	5.673	5.716	-0.200	-62.71	-113.5	-158.2	-0.182
	[5.34]	[4.34]	[4.04]	[-0.20]	[-1.23]	[-1.30]	[-1.62]	[-1.93]
Net Income	0.027	-0.141	-0.094	0.115	-26.16	-25.77	-28.81	-0.026
	[0.12]	[-0.70]	[-0.56]	[0.88]	[-0.96]	[-0.84]	[-0.98]	[-0.85]
Net Operating Income	0.634	-3.341	-3.387	4.445	-68.06	115.2	160.1	0.185
	[1.18]	[-1.62]	[-1.56]	[1.60]	[-1.89]	[1.16]	[1.56]	[1.80]
Asset Growth Rate	-1.510	-1.712	-1.395	-0.346	-134.2	-175.3	-192.8	-0.199
	[-13.15]	[-11.55]	[-10.10]	[-2.90]	[-6.09]	[-7.41]	[-8.42]	[-8.38]
Equity	0.295	-0.014	-0.117	-0.266	87.35	103.1	116.1	0.119
	[1.05]	[-0.05]	[-0.46]	[-0.83]	[2.75]	[3.14]	[3.40]	[3.55]
Deposits	-0.788	-0.596	-0.476	-0.057	84.35	125.3	147.1	0.147
	[-2.88]	[-2.27]	[-1.76]	[-0.21]	[1.48]	[1.94]	[2.42]	[2.11]
Risk-wght. Capital Reserves	0.268	0.295	0.290	0.300	1.307	1.010	0.680	0.001
	[31.0]	[27.7]	[12.0]	[3.77]	[2.77]	[2.49]	[1.44]	[1.71]
Bank Type Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Portfolio Risk 2005	x	-	-	-	x	-	-	-
Openness 2005	x	-	-	-	x	-	-	-
Potential Portf. Risk	-	x	x	x	-	x	x	x
Openness 1997-2005	-	x	x	x	-	x	x	x
1st Stage F stat. (Portf Risk)	n/a	n/a	100.4	98.6	n/a	n/a	55.5	55.5
1st Stage F stat. (Competit.)	n/a	n/a	107.5	186,5	n/a	n/a	156.9	156.9
Kleibergen-Paap rk Walk F stat.	n/a	n/a	101.7	96.45	n/a	n/a	59.8	59.8
Stock-Yogo Crit. Value (10%)	n/a	n/a	7.03	7.03	n/a	n/a	7.03	7.03
Kleibergen-Paap rk LM (p-value)	n/a	n/a	<0.001	0.001	n/a	n/a	<0.001	<0.001
N	7,419	7,136	7,136	1,001	1,163	1,120	1,120	1,120

All tobit specifications with lower bounds of 0 (results robust to alternative bounds of 2 or 3 percent); all 2SLS specifications with an indicator variable whether the bank failed and an indicator variable if a bank had capital ratios below 3% at any point in time. Bank types indicate whether a bank is a mortgage specialist, consumer loan specialist or commercial loan specialist bank (as determined by the FDIC). All specifications with heteroskedastic standard errors and clustered at the state level and all covariates standardized and winsorized at the 1% level. Column 4 for banks with at least 10 branches. Columns 5 and 6 with lower bound of 0 and upper bound of 1,642 days. Column 8 uses a log transformation to reduce the influence of outliers.

Tables (3.9) and (3.10) replaces the dependent variable with alternative measures of bank distress. Columns 1-4 of table (3.9) analyze the minimum risk-weighted capital ratio that a bank obtained during the crisis period 2008-2011. As the FDIC closes banks that fall below 3% of capital ratio, the decline in a bank's capital ratio is the channel through which failure occurs; it can further be understood as a measure as to how close a bank came to failing. Since capital ratios are non-negative, specifications 1 and 2 employ a Tobit specification with a lower bound of 0 while specifications 3 and 4 use two indicator variables whether a bank failed or had capital reserves below 3% at any point in time. Specification 1 employs the actual portfolio risk in 2007 and openness to banking competition as of 2007 as the two key independent variables and finds that a higher portfolio risk leads to a lower capital ratio (and thus an increase in bank distress) during the crisis. Greater pre-crisis competition however does not significantly impact capital ratios during the crisis. Specifications 2-4 revert to the main instruments, first in a reduced-form Tobit framework, and then in a two-stage least squares framework. The findings confirm those from specification 1: the minimum capital reserve ratio levels during the crisis are negatively correlated to the potential to diversify by between 68 and 71 basis points for all banks and 39 basis points for banks with at least 10 branches. Pre-crisis openness to competition however does again not affect the capital reserve ratios during the crisis.

Specifications 5-9 repeat the analysis by investigating how the length of survival during the crisis for non-surviving banks (banks that failed or were acquired by competitors) relates to pre-crisis portfolio risk and competition levels. The Tobit specifications in columns 5 and 6 includes upper and lower bounds for 0 days and 1,643 days (surviving until the end of 2011) while the 2SLS specifications in columns 7 and 8 include indicator variables whether a bank failed within 50 days or fewer or survived more than 1,600 days. To make sure that outliers do not drive the results, column 8 employs a log-transformation of the dependent variable. The findings in columns 5 to 8 are consistent with the notion that a higher pre-crisis portfolio risk decreased the length of survival while a higher level of pre-crisis openness to competition increased the length of survival. Larger banks and banks with more aggressive asset growth rates pre-crisis survived a shorter time periods, while those banks with more equity, more deposits and higher pre-crisis capital ratios survived longer. While the exact effect of portfolio risk and competition varies across the Tobit and 2SLS specifications, the signs are consistent with those found in previous tests and confirm the benefits of banking competition and portfolio diversification on bank stability.

Table (3.10) repeats the exercise with three alternative book-based measures of bank stability: the standard deviation of return on assets as a measure of earnings volatility during the crisis, the ratio of noncurrent loans relative to assets, and the noncurrent loans to total loans ratio. Specifications 1, 4 and 7 use the actual portfolio diversification and openness of home states to competition as of 2007 while the remainder specifications employ the instruments. The results are in line with those of earlier tables: a higher portfolio risk pre-crisis led to greater earnings volatility and noncurrent loan ratios during the crisis, while more competition in the pre-crisis period negatively affects earnings volatility and at-risk loans.

Table 3.10: Bank Stability, Portfolio Diversification and Competition – Alternative Distress Measures II

	Std Dev of ROA (2008-2011)			Noncurrent Loans-to-Assets Ratio (2008-2011)			Noncurrent Loans-to-Loans Ratio(2008-2011)		
	(1) No IVs	(2) Reduced form IV	(3) 2SLS (2IVs)	(4) No IVs (tobit)	(5) R.form IV (tobit)	(6) 2SLS (2IVs)	(7) No IVs (tobit)	(8) R.form IV (tobit)	(9) 2SLS (2IVs)
Potential Portfolio Risk	0.001	0.001	0.001	0.376	0.576	0.565	0.372	0.566	0.519
	[2.78]	[5.06]	[4.54]	[5.03]	[5.35]	[5.97]	[4.87]	[5.12]	[5.22]
Openness to Competition	-0.001	-0.001	-0.001	-0.086	-0.133	-0.115	-0.102	-0.147	-0.127
	[-1.87]	[-3.94]	[-3.31]	[-1.12]	[-2.23]	[-2.50]	[-1.44]	[-2.47]	[-2.81]
Bank Assets	-0.002	-0.002	-0.002	-0.444	-0.393	-0.200	-0.380	-0.333	-0.214
	[-1.83]	[-1.75]	[-1.78]	[-2.10]	[-1.89]	[-2.05]	[-1.69]	[-1.56]	[-2.38]
Return-on-Equity	0.001	0.001	0.001	-0.617	-0.530	-0.222	-0.431	-0.351	-0.149
	[0.67]	[0.81]	[0.75]	[-3.28]	[-3.11]	[-2.89]	[-2.19]	[-2.01]	[-1.95]
Return-on-Assets	-0.003	-0.003	-0.002	0.233	-0.019	0.206	-0.712	-0.939	-0.436
	[-0.69]	[-0.78]	[-0.61]	[0.27]	[-0.02]	[0.34]	[-0.84]	[-1.22]	[-0.62]
Net Income	0.000	-0.001	-0.001	0.285	0.274	0.152	0.250	0.228	0.126
	[-0.01]	[-0.27]	[-0.14]	[1.88]	[1.79]	[1.67]	[1.75]	[1.64]	[1.36]
Net Operating Income	0.005	0.005	0.004	1.994	2.305	0.510	3.271	3.599	1.604
	[1.36]	[1.38]	[1.08]	[1.01]	[1.35]	[0.45]	[1.74]	[2.15]	[1.19]
Asset Growth Rate	0.001	0.001	0.001	0.339	0.328	0.255	0.297	0.309	0.227
	[3.43]	[3.68]	[3.86]	[3.70]	[4.38]	[4.39]	[3.23]	[4.48]	[4.26]
Equity	0.002	0.002	0.002	-0.143	-0.197	-0.052	-0.083	-0.158	-0.018
	[3.84]	[3.78]	[3.97]	[-0.86]	[-1.17]	[-0.53]	[-0.47]	[-0.94]	[-0.18]
Deposits	0.000	-0.001	-0.001	0.367	0.305	0.139	0.289	0.266	0.152
	[-0.09]	[-0.14]	[-0.22]	[1.22]	[0.94]	[0.74]	[0.99]	[0.91]	[0.86]
Risk-wght. Capital Reserves	0.000	0.000	0.000	-0.041	-0.035	-0.018	-0.022	-0.012	-0.008
	[-0.43]	[0.03]	[-0.19]	[-3.08]	[-2.33]	[-3.22]	[-1.83]	[-1.17]	[-1.83]
Bank Spread Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TARP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Type Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1st Stage F stat. (Portf. Risk)	n/a	n/a	121.2	n/a	n/a	121.2	n/a	n/a	121.2
1st Stage F stat. (Competit.)	n/a	n/a	157.4	n/a	n/a	156.9	n/a	n/a	156.9
Kleibergen-Paap rk Wald F stat.	n/a	n/a	132.1	n/a	n/a	132.4	n/a	n/a	132.4
Stock-Yogo Crit. Value (10%)	n/a	n/a	7.03	n/a	n/a	7.03	n/a	n/a	7.03
Kleibergen-Paap rk LM (p-value)	n/a	n/a	<0.001	n/a	n/a	<0.001	n/a	n/a	<0.001
N	2,501	2,445	2,445	2,510	2,454	2,454	2,510	2,454	2,454

All variables winsorized at the 1% level and standardized. Banks with at least 5 branches. Bank type controls include indicator variables whether a bank is a mortgage specialist, consumer loan specialist or commercial loan specialist bank (as determined by the FDIC). All specifications with a TARP indicator variable, with bank spread controls (interstate indicator, 100 miles indicator, avg. distance between HQ and branches, no of counties with bank presence, log number of branches) and with heteroskedastic standard errors and clustered at the state level.

A concern with the previous results might be that some of the banks with greater geographic diversification may also benefit from a too-big-to-fail (TBTF) status which may yet be incompletely controlled for by bank assets and bank deposits. This TBTF-designation in turn may (through various channels) have decreased the probability of failure and thus leads to an upwards bias in the portfolio risk coefficient. Columns 1 and 2 of Table (3.11) address this concern. In column 1, an indicator variable specifies whether or not a bank was included into the TARP program. The key coefficients remain unchanged. Column 2 further adds several bank spread controls: an indicator variable whether a bank had a branch network crossing a state border, an indicator variable whether it had branches in excess of 100 miles from the headquarter, the log number of branches, the number of counties with a bank branch and the average distance between the headquarter and its branches. Again, the key coefficients on portfolio risk and openness to competition remain unchanged.[29] Columns 3 and 4 further replace the potential portfolio risk instrument that is based on the diversification potentials within a radius of 200 miles with one that is based on a 100 mile and a 50 mile radius. Since the average bank has an average distance between the headquarter and its branches of 22 miles (cf. column 7 in Table (3.1)), a smaller distance for the potential to diversify leads to a larger correlation with the actual level of diversification and thus a higher F-statistics in the first stage. In both specifications, the significance and relative magnitudes of the coefficients remain the same.

Another concern with the geographic risk instrument may be that real estate business cycles nearby natural boundaries (oceans or mountains) may be exacerbated by the lack of land supply for real estate development (Saiz, 2010; Mian and Sufi, 2011). If this was indeed the case, and if risk-seeking (risk-averse) bank managers were to endogenously locate their bank headquarters nearby (away from) such banking markets this would violate our exclusion restriction. Subsequently, as those market also provide fewer opportunities for

[29]Using alternative bank spread measures does not change the results.

diversification, this may lead to an upward bias in the portfolio risk coefficient. Before addressing this concern, it is important to realize that the potential to diversify depends on the availability of uncorrelated (labor market) county business cycles nearby. While topographic restrictions impacts this availability, a locally dominating industry may do so likewise. To rule out that the results are driven by topography alone, columns 3 to 6 employ different geographic modifications to our main specification. Column 3 excludes all banks with headquarters in states that have an ocean coastline ("salt-water states"); column 4 further excludes banks with headquarters in Michigan, Ohio and Wisconsin (states bordering the Great Lakes; "sweet- or salt-water states"). The test thus relies on the variation in diversification potential that stems from the diversity of nearby business cycles rather than those from topographic restrictions due to water bodies. While the point estimate on portfolio risk drops from 6.3 to 4.5 percent points, it is not significantly different from the coefficients in specification 2. In column 5, I further exclude all those banks that have less than 90% of their area within a 200 miles radius around their headquarters being "bankable" (i.e., it is neither water nor non-U.S. territory), effectively excluding all banks within a 200 miles band stretching along the coastlines of the Oceans, Great Lakes, and the U.S. international borders with Canada and Mexico. Column 6 recreates a measure similar to the one by Saiz (2010): I compute for each bank the average slope and standard deviation of slopes of all the land within a 50 miles radius around each headquarter.[30] Column 6 then excludes all banks whose 50 miles area has an average slope that is in the top quartile of all banks' average slope.[31] The goal is thus to exclude those banks that may suffer from greater real estate business cycles due to a considerable constraint on developable land nearby (as argued by Saiz, 2010). The coefficient on portfolio risk declines to 5.0 and 4.2 percent respectively, but again are not significantly different from earlier results. The results of columns 3-6 show that the portfolio risk coefficient is not exclusively driven by

[30] Slopes are computed from 30 arc-seconds digital elevation data obtained from the U.S. Geological Survey.

[31] An alternative test using the standard deviation of slopes instead of the average slope yields very similar results.

topography, but that the availability of local business cycles nearby is likewise important. This in turn raises a new question: Could the result be driven by new banks choosing strategically their headquarter locations to be in areas with many distinct local business cycles nearby? In other words, might headquarter location choice be endogenous? To address this concern, column 7 excludes all banks that were established after 1978, while column 8 only retains banks that were established before 1934. In both cases, it is unlikely that bank managers could have predicted the degree of local business cycle integration 30 and 70 years into the future. The results remain robust to this exclusion.

Table 3.11: Further Robustness Tests

		Bank Failed between 2008-2011									
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Potential Portfolio Risk		0.061	0.063	0.051	0.040	0.045	0.051	0.050	0.042	0.030	0.023
		[4.69]	[4.93]	[4.47]	[4.28]	[2.33]	[2.14]	[2.61]	[3.30]	[3.03]	[2.55]
Openness to Competition		-0.016	-0.015	-0.013	-0.011	-0.013	-0.024	-0.013	-0.012	-0.010	-0.007
		[-2.72]	[-2.60]	[-2.56]	[-2.45]	[-1.34]	[-1.32]	[-2.26]	[-1.31]	[-1.96]	[-1.86]
Geographic Modification	No Salt-Water States	-	-	-	-	x	-	-	-	-	-
	No Sweet- or Salt-Water States	-	-	-	-	-	x	-	-	-	-
	Bankable Area >90% (Spec. 1; land-based)	-	-	-	-	-	-	x	-	-	-
	Bankable Area Q1-Q3 (Spec. 2; slope-based)	-	-	-	-	-	-	-	x	-	-
Bank Age	Bank established before 1978	-	-	-	-	-	-	-	-	x	-
	Bank established before 1934	-	-	-	-	-	-	-	-	-	x
TARP Classification		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Spread Controls		No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Type Controls		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other Bank Controls		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1st Stage F stat. (Portf. Risk)		102.8	95.2	189.2	444.3	81.5	65.5	147.2	228.2	151.2	142.9
1st Stage F stat. (Competit.)		109.6	109.1	107.5	103.5	159.9	37.3	51.6	121.6	102.9	118.8
Kleibergen-Paap rk Wald F stat.		104.6	96.8	175.2	349.3	26.8	12.0	137.6	183.4	99.9	95.5
Stock-Yogo Crit. Value (10%)		7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03
Kleibergen-Paap rk LM (p-value)		<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001
N		7,370	7,370	7,370	7,370	4,745	4,129	5,232	4,040	5,509	4,071

All variables winsorized at the 1% level and standardized. Bank performance and bank type controls are the same as in Tables (3.7)-(3.10) and 8. Column (1) with an TARP indicator variable. Column (2) with bank spread controls (interstate indicator, 100 miles indicator, avg. distance between HQ and branches, number of counties with bank presence, log number of branches; robust to using alternative set of spread controls). Columns (3) and (4) use a radius of 100 miles and 50 miles for the potential portfolio risk instrument. Columns (5)-(8) address concerns that real estate business cycles may be worse along water bodies. Columns (9) and (10) address concerns that bank headquarter location may be chosen endogenously to have distinct business cycles nearby.

3.5.5 Geographic Diversification outside the Crisis Period

Does geographic diversification also matter outside the extreme events of the 2008-2011 banking crisis? To investigate this further, Table (3.12) shows the unconditional correlation coefficient between a measure of earnings volatility – the standard deviation of return of assets based on a rolling 4-quarter window – and geographic diversification between 1994 (the earliest available year in the FDIC database) and 2011. While the actual portfolio risk is not significantly differently from zero between 1994 and 2007 – a time of relative calm with on average just 6 bank failures per year – it becomes positive and highly significant during 2008 to 2011. As actual portfolio risk may be endogenous, column 2 shows the correlation between earnings volatility and potential portfolio risk (based on a 200 miles radius around a bank's headquarter). This time, the coefficient is positive and significant in all specifications, but particularly so in the 2008-2011 crisis period, indicating that a higher degree of geographic diversification is positively correlated with a lower degree of earnings volatility also outside the crisis period.

Table 3.12: Geographic Diversification and Earnings Volatility, 1994-2011

Standard Deviation of ROA with Portfolio Risk		
Year	**Portfolio Risk Coefficient** (1)	**Potential Portfolio Risk Coefficient** (2)
1994	0.002 [0.31]	0.040 [2.99]
1995	0.003 [0.40]	0.044 [3.38]
1996	-0.005 [-0.67]	0.069 [4.86]
1997	0.002 [0.29]	0.050 [3.56]
1998	-0.017 [-2.19]	0.006 [0.48]
1999	-0.009 [-1.02]	0.040 [2.87]
2000	0.011 [1.19]	0.079 [5.79]
2001	-0.001 [-0.07]	0.054 [3.93]
2002	0.005 [0.54]	0.060 [4.04]
2003	0.006 [0.55]	0.042 [2.94]
2004	0.015 [1.61]	0.056 [4.03]
2005	0.003 [0.32]	0.048 [3.57]
2006	-0.012 [-1.28]	0.011 [0.91]
2007	0.009 [0.86]	0.045 [3.17]
2008	0.068 [5.34]	0.229 [12.87]
2009	0.130 [8.69]	0.378 [18.99]
2010	0.120 [7.80]	0.332 [16.09]
2011	0.124 [8.47]	0.284 [14.24]

Columns (1) and (2) show the unconditional correlation coefficient and its significance level between the standard deviation of RoA (based on a rolling 4-quarters window) and the standard deviation of Portfolio Risk and Potential Portfolio Risk (obtained from a 200 miles radius around a bank's headquarter).

Figure (3.9) further splits the 2004-2011 period into a pre-crisis period (2004-2007) and a crisis period (2008-2011) and displays the noncurrent loans-to-assets ratio, the noncurrent loans-to-loans ratio, and return on assets by the quintile of portfolio risk. While the bank performance measures across the quintiles do not significantly differ from one another in the pre-crisis period, there is a clear trend towards increasing at-risk loan ratios and lower ROAs the higher the portfolio risk during the crisis period. The fact that bank performance seems little affected by geographic diversification in the pre-crisis period, but is very much so in the crisis period highlights that geographic diversification has its strongest effect still during the banking crisis.

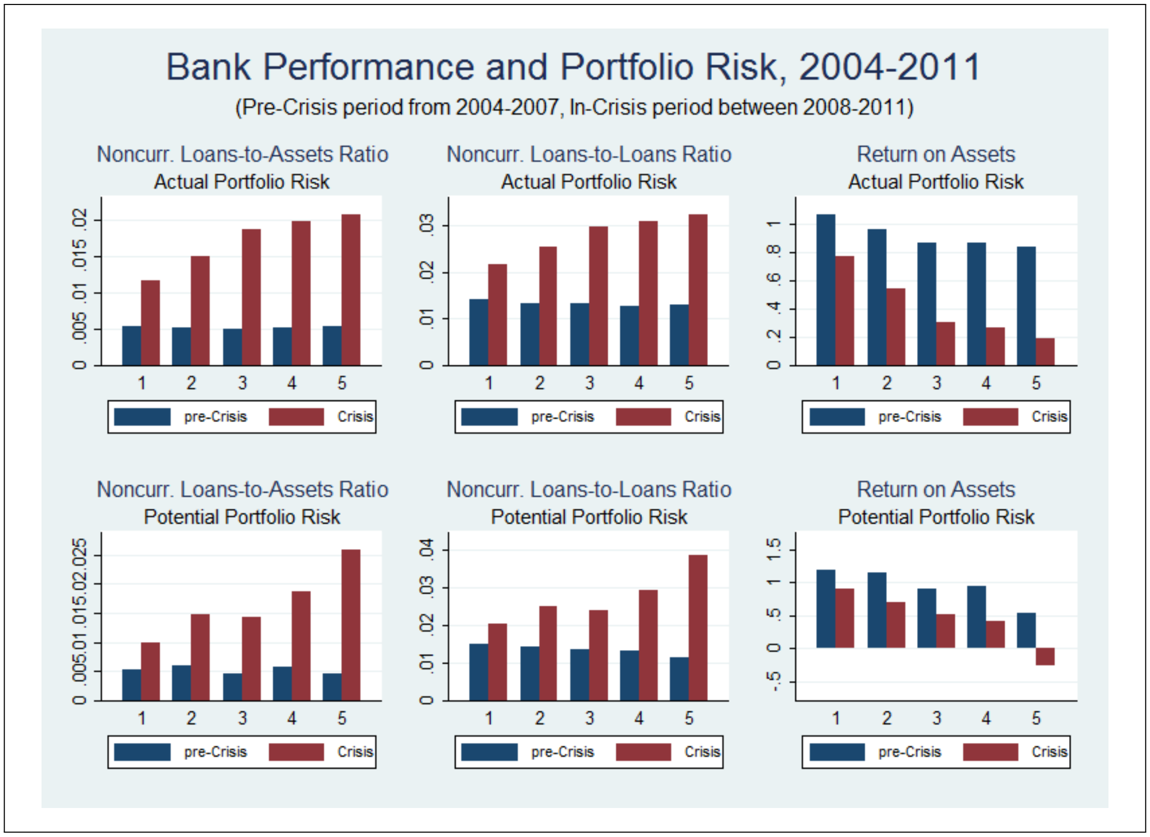

Figure 3.9: Bank Performance and Portfolio Risk, 2004-2011

3.6 CONCLUSIONS

This paper sought to answer three questions:

1. Do local economic fundamentals still matter for bank stability? Or has new financial innovation allowed banks to economically diversify independently from their geographic footprint?
2. Did geographic diversification and bank branching impact the probability of bank sur-

vival during the 2008-2011 U.S. banking crisis? Moreover, did U.S. banks decrease their capital reserves simultaneously as they increased their degree of geographic diversification?

3. Finally, is greater bank stability due to portfolio diversification or due to pre-crisis exposure to banking competition? What are the relative magnitudes of the two effects to one another?

These questions are policy relevant to bank regulators who are currently in the process of creating new regulation that aim at insulating bank portfolios from macroeconomic shocks; they receive added urgency as the great majority of recent bank failures were due to local economic fundamentals in local real estate and labor markets. Further, the findings contribute to the literature that investigate whether banking competition increases or decreases bank stability during a crisis and makes a contribution by introducing a novel measure of portfolio diversification that incorporates the volatility and correlations between local business cycles in the economic areas where banks keep their loan and mortgage portfolios.

In regard to the first question, I find that bank failures during the 2008-2011 U.S. banking crisis exhibit statistically significant geographical clustering and that banks that failed were located within counties that were particularly hard hit in their real estate and labor markets. This confirms that the large majority of bank failures between 2008-2011 occurred not due to contagion or systemic risk but due to credit risk in banks' local mortgage and loan portfolios. Local economic fundamentals thus still matter for banks, giving credence to the rationale that banks ought to geographically diversify to reduce their exposure to local economic shocks.

Turning to the second question, theory predicts that greater geographic diversification allows banks to mitigate potentially adverse effects from local business cycles in real estate and labor markets. Several empirical studies however raise doubts that bank stability increases with geographic diversification, suggesting instead that banks reduce capital reserves and increase credit risk as they diversify geographically, and thus becoming more likely to fail during a crisis (Demsetz and Strahan, 1997; Carlson, 2004). I therefore investigate first if U.S. banks reduced their capital reserve ratios as they diversified geographically pre-crisis, and second whether greater geographic diversification increased bank stability during the banking crisis. I find strong evidence for both cases. As the average bank increases its number of branches (or, alternatively, the number of counties it is represented in) its risk-adjusted capital ratio declines significantly. In 2006, the average unit bank had a three times higher risk-adjusted capital reserve ratio (34.8%) than the average bank that had more than 50 branches spread across more than 10 counties (11.8%). The decline in capital reserves is significant and robust to using different measures of geographic diversification and across several regression specifications using bank fixed effects and first differences while controlling for a large set of bank characteristics, state and year fixed effects.

I further find evidence on the extensive margin that greater geographic diversification (as measured by the log number of branches) prior to the banking crisis decreased the probability of bank failure and increased the probability of bank survival (i.e., neither failed nor were acquired). Furthermore, among those banks that did fail or did not survive (the intensive margin), a larger number of branches is correlated with longer survival. I find similar results for measures of earnings volatility and bank z-Scores. While those findings are consistent with previous results from the Great Depression and the Savings and Loan crisis, it is not clear whether this increase in bank stability is due to greater banking competition (which forced inefficient banks to exit earlier) or due to a portfolio diversification effect. I therefore use two exogenous sources of variation to disentangle both effects: (1) bilateral state restrictions on interstate banking between 1997 and 2005 (post Riegle-Neal;

inversely weighted by distance) to instrument for the amount of out-of-state competition a bank was exposed to in the 10 years prior to the start of the crisis, and (2) topographic variation and the availability of distinct local business cycles nearby bank headquarters that impact the potential for portfolio diversification nearby as an instrument for actual portfolio diversification. I find that both banking competition and portfolio diversification are positively related to bank stability, reducing the probability of failure (while controlling for other bank characteristics including capital reserve ratios) by 5.8% per standard deviation of portfolio diversification and by 1.6% per standard deviation increase in out-of-state banking competition. These are very large effects given an unconditional probability of failure during 2008-2011 of 5.2%. The results are confirmed with alternative bank distress measures, namely (1) the minimum capital reserve ratio a bank attained between 2008-2011 as a measure as to how close a bank came to failing, (2) the length of survival during crisis for non-surviving banks, (3) the standard deviation of return on assets as a measure of earnings volatility, and (4) the proportions of noncurrent loans relative to total assets and total loans. Per standard deviation of portfolio diversification, minimum capital reserve ratios during the crisis are on average higher by 23-71 basis points and the length of survival among non-survivors increases by 79-151 days. While pre-crisis competition does not significantly affect minimal capital reserve ratios, it does increase the length of survival of non-survivors by 33 to 57 days per standard deviation of openness to competition.

Overall, the results suggest that both portfolio diversification and banking competition were beneficial to bank stability during the recent U.S. banking crisis. Further, the contribution from portfolio diversification to bank stability seems to be at least as high, but probably significantly larger than the contribution from banking competition. With just 8.7% of U.S. banks having branch networks that cross state lines, this calls for renewed attention of banking regulators towards branching restrictions, branching decisions and portfolio diversification.

4.0 SUMMARY

The U.S. financial and banking crisis forcefully illustrated that also advanced economies with strong institutions are vulnerable to financial turmoil and the massive wealth destruction that comes with it. This dissertation contributes to the growing body of research that analyzes how new financial and banking regulation can strengthen the overall economic system.

In chapter (2) I analyze the effects from shareholder empowerment via enhanced proxy access as it was mandated by U.S. Congress in the Dodd-Frank Wall Street Reform Act and introduced by the Securities and Exchange Commission. The analysis finds that the concern that proxy access may destroy rather than create shareholder wealth was largely unfounded; on the other hand, I however also find that there were only few firms that experienced significant shareholder wealth increases. These sobering results suggest that the benefits from proxy access – at least in the form as prescribed by the SEC – are rather limited.

In chapter (3) I then analyze the degree to which geographic portfolio diversification and banking competition were beneficial to bank stability during the recent U.S. banking crisis. The crisis provides a unique environment in which a large set of banks failed or ceased to exist within a short time period thereby providing sufficient statistical variation to address these questions. The analysis makes use of exogenous cross-sectional and time-series variation in states' branching restrictions, the degree of county business cycle integration, and topographic variation due to oceans and international borders that limited the potential to diversify. I find that both banking competition and geographic portfolio diversification significantly reduced the failure probability of banks thereby providing a policy rationale to reduce the financial fragmentation of U.S. banking markets, to promote banking competition, and a greater degree of portfolio diversification.

APPENDIX A

LIST OF SPECIAL-INTEREST INVESTORS

ALASKA RETIREMENT MANAGEMENT BOARD
ALLSTATE PENSION PLAN
ALLSTATE RETIREMENT PLAN
AMERICAN FINANCIAL GROUP INC RETIREMENT & SAVINGS PLAN
AMICA PENSION FUND BOARD OF TRUSTEES
APG ALL PENSIONS GROUP
BEDRIJFSTAKPENSIOENFONDS VOOR DE MEDIA PNO
BRITISH COLUMBIA INVESTMENT MANAGEMENT CORP
CAISSE DE DEPOT ET PLACEMENT DU QUEBEC
CALIFORNIA PUBLIC EMPLOYEES RETIREMENT SYSTEM
CALIFORNIA STATE TEACHERS RETIREMENT SYSTEM
CANADA PENSION PLAN INVESTMENT BOARD
COMMONWEALTH OF PENNSYLVANIA PUBLIC SCHOOL EMPLS RETRMT SYS
COORDINATING INVESTMENT FIDUCIARY OF RAYTHEON CO EMPLOYEE BE
ELCA BOARD OF PENSIONS
EMPLOYEES RETIREMENT SYSTEM OF TEXAS
HER MAJESTY THE QUEEN IN RIGHT OF THE PROVINCE OF ALBERTA
IBM RETIREMENT FUND
NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION
NEW JERSEY BETTER EDUCATIONAL SAVINGS TRUST
NEW MEXICO EDUCATIONAL RETIREMENT BOARD
NEW YORK STATE COMMON RETIREMENT FUND
NEW YORK STATE TEACHERS RETIREMENT SYSTEM
NJ STATE EMPLOYEES DEFERRED COMPENSATION PLAN
ONTARIO TEACHERS PENSION PLAN BOARD
OREGON PUBLIC EMPLOYEES RETIREMENT FUND
PENSIONFUND DSM NETHERLANDS
PUBLIC EMPLOYEES RETIREMENT ASSOCIATION OF COLORADO
PUBLIC EMPLOYEES RETIREMENT SYSTEM OF OHIO
SAVINGS PLAN & PUBLIC SECTOR PENSION INV.BOARD
SHELTER INS PROFIT SHARING
SHELTER INS RETIREMENT PLAN
STATE BOARD OF ADMINISTRATION OF FLORIDA RETIREMENT SYSTEM
STATE OF NEW JERSEY COMMON PENSION FUND A
STATE OF NEW JERSEY COMMON PENSION FUND B
STATE OF NEW JERSEY COMMON PENSION FUND D
STATE OF NEW JERSEY COMMON PENSION FUND E
STATE OF WISCONSIN INVESTMENT BOARD
STATE TREASURER STATE OF MICHIGAN
STATE TEACHERS RETIREMENT SYSTEM OHIO
TEACHER RETIREMENT SYSTEM OF TEXAS
TEACHERS ADVISORS INC
TEACHERS INSURANCE & ANNUITY ASSOCIATION OF AMERICA
TEACHERS RETIREMENT SYSTEM OF THE STATE OF KENTUCKY
TEXAS PERMANENT SCHOOL FUND
TIAA CREF INVESTMENT MANAGEMENT LLC
TIAA CREF TRUST CO FSB/MO
UNITED SERVICES AUTOMOBILE ASSOCIATION
UNITED STATES STEEL & CARNEGIE PENSION FD
UNITRIN, INC. MASTER RETIREMENT TRUST
VIRGINIA RETIREMENT SYSTEMS ET AL
WASHINGTON STATE INVESTMENT BOARD

APPENDIX B

INTERSTATE BRANCHING AND STATE RESTRICTIONS

State-level interstate branching/banking restrictions pre and post the 1994 Riegle-Neal Interstate Banking and Branching Efficiency Act (effective 1997).† indicates that reciprocity is required to have more lenient regulations apply. Interstate banking pre-1997 (column 1) indicates the first year in which a state entered an agreement with another state to allowed out-of-state banks to acquire in-state banks (the acquiring bank could however not consolidate banking operations but had to run the target as an independent institution). More information on the data in section 4.1.5 and on the construction of competition-related measures in 5.4. Data sources: Johnson and Rice (2008) and Kroszner and Strahan (1999).

Table B1: State Interstate Branching and Banking Restrictions

	Pre-1997	1997-2005				
State	Interstate Banking Permitted (1)	Date for Effectiveness (2)	*de novo* branching (3)	Minimum Age to be acquirable (4)	Part-acquisition permitted (5)	Deposit cap for acquisitions (6)
AK	1982	1/1/1994	No	3	Yes	50
AL	1987	5/31/1997	No	5	No	30
AR	1989	6/1/1997	No	5	No	25
AZ	1986	8/31/2001	No	5†	Yes†	30
CA	1987	9/28/1995	No	5	No	30
CO	1988	6/1/1997	No	5	No	25
CT	1983	6/27/1995	Yes†	5	Yes†	30
DC	1985	6/13/1996	Yes	0	Yes	30
DE	1988	9/29/1995	No	5	No	30
FL	1985	6/1/1997	No	3	No	30
GA	1985	5/10/2002	No	3	No	30
HI	-	1/1/2001	Yes	0	Yes	30
IA	1991	4/4/1996	No	5	No	15
ID	1985	9/29/1995	No†	5†	No†	100†
IL	1986	8/20/2004	Yes†	5†	Yes†	30†
IN	1986	7/1/1998	Yes	5	Yes	30
KS	1992	9/29/1995	No	5	No	15
KY	1984	3/22/2004	No	0	No	15
LA	1987	6/1/1997	No	5	No	30
MA	1983	8/2/1996	Yes†	3†	Yes†	30
MD	1985	9/29/1995	Yes	0	Yes	30
ME	1978	1/1/1997	Yes†	0	Yes†	30
MI	1986	11/29/1995	Yes†	0	Yes†	100
MN	1986	6/1/1997	No	5	No	30
MO	1986	9/29/1995	No	5	No	13

(Appendix 3 continued)

State	Pre-1997 Interstate Banking Permitted (1)	1997-2005 Date for Effectiveness (2)	*de novo* branching (3)	Minimum Age to be acquirable (4)	Part-acquisition permitted (5)	Deposit cap for acquisitions (6)
MS	1988	6/1/1997	No	5	No	25
MT	1993	3/13/2001	No	5	No	22
NC	1985	7/1/1995	Yes	$0^{\dagger}$	Yes†	30
ND	1991	8/1/2003	Yes	$0^{\dagger}$	Yes†	25
NE	1990	5/31/1997	No	5	No	14
NH	1987	1/1/2002	Yes	$0^{\dagger}$	Yes†	30
NJ	1986	4/17/1996	No	0	Yes	30
NM	1989	6/1/1996	No	5	No	40
NV	1985	9/29/1995	No	5	No	30
NY	1982	6/1/1997	No	5	Yes	30
OH	1985	5/21/1997	Yes	0	Yes	30
OK	1987	5/17/2000	Yes	$0^{\dagger}$	Yes†	20
OR	1986	7/1/1997	No	3	No	30
PA	1986	7/6/1995	Yes	$0^{\dagger}$	Yes†	30
RI	1984	6/20/1995	Yes	$0^{\dagger}$	Yes†	30
SC	1986	7/1/1996	No	5	No	30
SD	1988	3/9/1996	No	5	No	30
TN	1985	3/17/2003	Yes†	3	Yes†	30
TX	1987	9/1/1999	Yes†	0	Yes†	20
UT	1984	4/30/2001	Yes†	5	Yes	30
VA	1985	9/29/1995	Yes†	0	Yes	30
VT	1988	1/1/2001	Yes†	0	Yes	30
WA	1987	5/9/2005	Yes†	5	Yes†	30
WI	1987	5/1/1996	No	5	No	30
WV	1988	5/31/1997	Yes†	0	Yes†	25
WY	1987	5/31/1997	No	3	No	30

APPENDIX C

GEOGRAPHIC CLUSTERING OF BANK FAILURES

The goal is to compute a statistic that represents the degree to which geographic clustering occurs in a network of geographic points (here, the bank network of 453 banks that failed between January 2008 and July 2012). Once such a sample statistic is obtained, its statistical significance is needed.

Step 1: For each of the 453 points in the failed bank network, I count the number of failed banks in the network within a 200 miles radius and divide that number by 452. Thus, for *each* failed bank, I obtain the probability that another *randomly chosen* bank from the failed bank network is within 200 miles.[1] If geographic clustering in the network was high, we would expect to get high probabilities; if however failed banks were thinly spread out across the U.S., we would expect to get low probabilities. I then take the average of the 453 probabilities to arrive at the average probability that a randomly chosen bank in the network is within 200 miles. I find for the failed bank network an average probability of 10.005%. Hence, for the average bank in the failed bank network, there is a 10.005% chance that another randomly chosen failed bank is within 200 miles distance.

[1] Distances are calculated between bank headquarters' GPS locations as obtained by the FDIC. The results are robust to alternative distances such as 50 or 100 miles.

Step 2: At this point, it is not yet clear whether a probability of 10.005% indeed indicates clustering relative to the population of all banks. After all, the population of all 8,588 U.S. banks that existed as of Jan 1st, 2007 could be themselves geographically clustered. For that reason, I draw 1,000 random samples of size 453 from the population of all banks and repeat step 1 for each randomly drawn bank network. The procedure provides the empirical sampling distribution of the clustering statistic, which has a mean of 6.384% and a standard deviation of 0.3708% (Chart A.1).

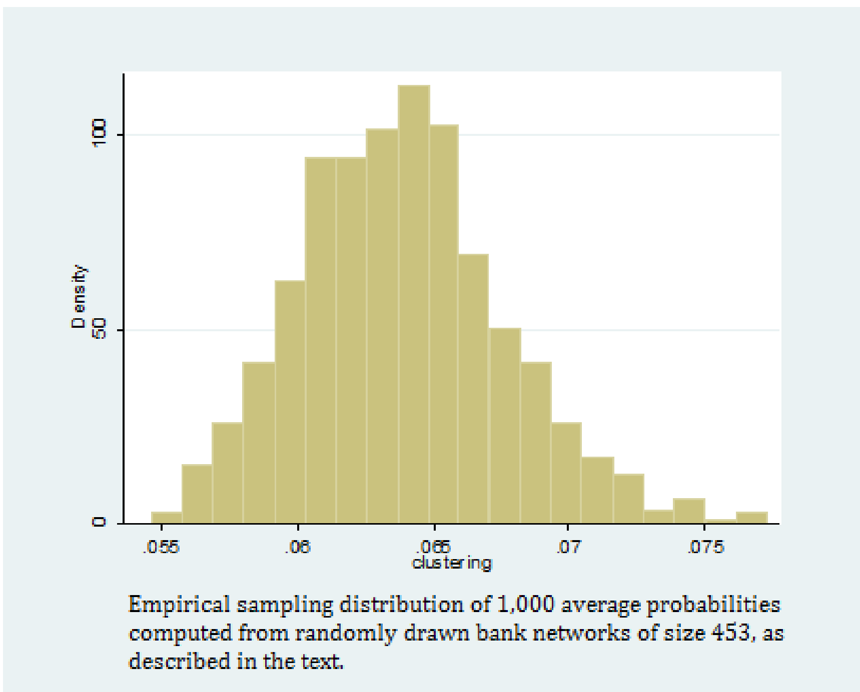

Figure C1: Empirical Sampling Distribution of Geographic Clustering Statistic

The clustering statistic of the failed bank network (10.005%) lies 9.77 standard deviations to the right of the mean and is located in the top percentile of the empirical sampling distribution. I therefore conclude that the geographic clustering in the failed bank network is significantly higher than the average clustering in the general bank population.

APPENDIX D

POTENTIAL PORTFOLIO DIVERSIFICATION

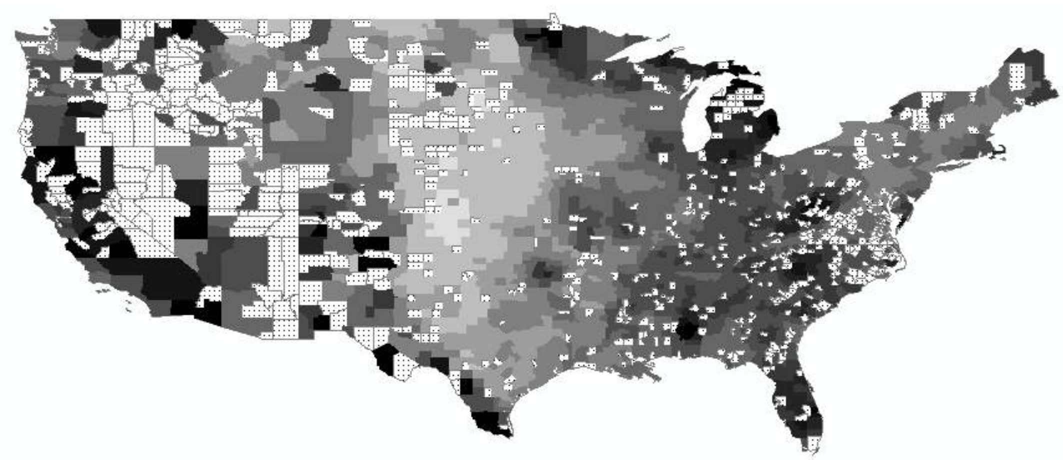

Figure D1: Potential Average Portfolio Risk of Banks (50 miles), by U.S. County

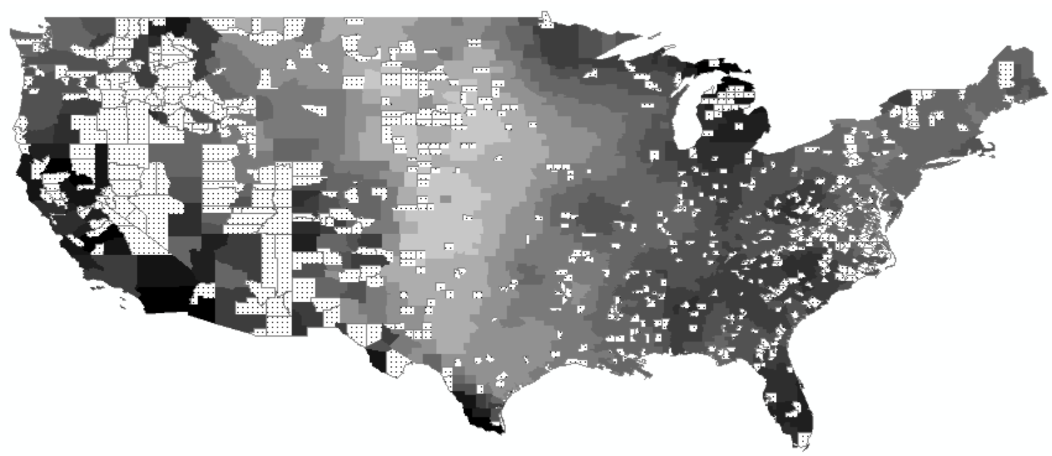

Figure D2: Potential Average Portfolio Risk of Banks (100 miles), by U.S. County

BIBLIOGRAPHY

Acharya, V., D. Gromb, and T. Yorulmazer, "Imperfect Competition in the Inter-Bank Market for Liquidity as a Rationale for Central Banking," *American Economic Journal: Macroeconomics*, 2012, *4*, 184–217.

Akyol, A.C., W.F. Lim, and P. Verwijmeren, "Shareholders in the Boardroom: Wealth Effects of the SEC's Rule to Facilitate Director Nominations," *Journal of Financial and Quantitative Analysis*, 2011, *forthcoming.*

Alchian, Armen, "Uncertainty, Evoluation and Economic Theory," *Journal of Political Economy*, 1950, *58*, 211–221.

___ **and Harold Demsetz**, "Production, Information Costs and Economic Organization," *American Economic Review*, 1972, *62*, 777–795.

Allen, Franklin and Douglas Gale, "Competition and Financial Stability," *Journal of Money, Credit and Banking*, 2004, *36*, 433–480.

Bagehot, Walter, "Lombard Street: A Description of the Money Market," *Paul Publishers*, 1873.

Bainbridge, S., "Proxy Access Invalidated on APA Grounds," *ProfessorBainbridge.com*, 2011. http://www.professorbainbridge.com/professorbainbridgecom/2011/07/proxy-access-invalidated-on-apa-grounds.html.

Balsam, Steven, John Puthenpurackal, and Arun Upadhyay, "The Determinants and Performance Impact of Outside Board Leadership," *working paper*, 2011.

Barth, James R., Gerard Caprio Jr., and Ross Levine, "Bank Regulation and Supervision: What Works Best?," *Journal of Financial Intermediation*, 2004, *13*, 205–248.

Bazzi, Samuel and Michael A. Clemens, "Blunt Instruments: Avoiding Common Pitfalls in Identifying the Causes of Economic Growth," *American Economic Journal: Macroeconomics*, 2013, *5*, 152–186.

Bebchuk, L., "The Myth of the Shareholder Franchise," *Virginia Law Review*, 2007.

___ , A. Cohen, and A. Ferrell, "What Matters in Corporate Governance?," *The Review of Financial Studies*, 2009, *22*, 783–827.

___ and ___ , "The Costs of Entrenched Boards," *Journal of Financial Economics*, 2005, *78*, 409–433.

Beck, T., "Bank Competition and Financial Stability: Friends or Foes?," *World Bank Policy Research Working Paper 4656*, 2009.

___ , A. Demirgüç-Kunt, and R. Levine, "Bank Concentration, Competition and Crises: First Results," *Journal of Banking and Finance*, 2006, *30*, 1581–1603.

Beck, Thorsten, Diane Coyle, Mathias Dewatripont, Xavier Freixas, and Paul Seabright, "Bailing out the Banks: Reconciling Stability and Competition," *Centre for Economic Policy and Research*, 2010.

Becker, B., D. Bergstresser, and G. Subramanian, "Does Shareholder Proxy Access Improve Firm Value? Evidence from the Business Roundtable Challenge," *Harvard Business School Finance Working Paper No. 11-052*, 2010.

Berger, Allen N., "The Profit-Structure Relationship in Banking – Tests of Market-Power and Efficient-Structure Hypotheses," *Journal of Money, Credit, and Banking*, 1995, *27*, 404–431.

___ , Asli Demirgüç-Kunt, Ross Levine, and Joseph G. Haubrich, "Bank Concentration and Competition: An Evolution in the Making," *Journal of Money, Credit and Banking*, 2004, *36*, 433–451.

Berle, Adolf and Gardiner Means, *The Modern Corporation and Private Property*, Macmillan, 1932.

Bertrand, Marianne and Sendhil Mullainathan, "Enjoying the Quiet Life? Corporate Governance and Managerial Preferences," *Journal of Political Economy*, 2003, *111*, 1043–1075.

Bharath, S., S. Jayaraman, and V. Nagar, "Exit as Governance: An Empirical Analysis," *Working Paper*, 2010.

Bikker, J. A. and L. Spierdijk, "Measuring and Explaining Competition in the Financial Sector," *Journal of Applied Business and Economics*, 2010, *11*, 11–42.

Bikker, Jacob A. and Katharina Haaf, "Measures of Competition and Concentration in the Banking Industry: a Review of the Literature," *Economic and Financial Modelling*, 2002.

Bloomberg, "SEC Rule on Ousting Directors is Rejected," *Bloomberg News: July 22, 2011*, 2011. http://www.bloomberg.com/news/2011-07-22/appeals-court-rejects-sec-proxy-access-rules-chamber-of-commerce-opposed.html.

Bosch, Tim and Jim Fuchs, "Why Are Banks Failing?," *Central Banker*, 2009, pp. 4–5.

Boyd, J. and G. De Nicoló, "The Theory of Bank Risk-Taking and Competition Revisited," *Journal of Finance*, 2005, *60*, 1329–1343.

Brav, A., W. Jiang, F. Partnoy, and R. Thomas, "Hedge Fund Activism, Corporate Governance, and Firm Performance," *Journal of Finance*, 2008, *63*, 1729–1775.

Brevoort, Kenneth and John D. Wolken, "Does Distance Matter in Banking?," in Pietro Alessandrini, Michele Fratianni, and Alberto Zazzaro, eds., *The Changing Geography of Banking and Finance*, Springer Publishing Company, 2009.

Brown, R. J. Jr., "Shareholder Access and Uneconomic Economic Analysis: Business Roundtable vs. SEC," *Legal Research Series, Working Paper No. 11-14*, 2011.

Cai, J., J. L. Garner, and R.A. Walkling, "Election Directors," *Journal of Finance*, 2009, *64*, 2389–2421.

Calomiris, Charles, *U.S. Banking Regulation in Historical Perspective*, The Cambridge University Press, 2000.

Calomiris, Charles W. and Joseph R. Mason, "Causes of U.S. Bank Distress during the Depression," *Proceedings: Federal Reserve Bank of Chicago*, 2001, pp. 530–554.

___ **and** ___ , "Consequences of Bank Distress During the Great Depression," *The American Economic Review*, 2003, *93*, 937–947.

Carletti, Elena and Philipp Hartmann, "Competition and Stability: What's Special about Banking?," in P. Mizen, ed., *Monetary History, Exchange Rates and Financial Markets: Essays in Honor of Charles Goodhart*, Edward Elgar, 2003.

Carlson, Mark, "Are Branch Banks Better Survivor? Evidence from the Depression Era," *Economic Inquiry*, 2004, *42*, 111–126.

——— **and Kris J. Mitchener**, "Branch Banking, Bank Competition, and Financial Stability," *Journal of Money, Credit and Banking*, 2006, *38*, 1293–1328.

Chandra, R. and B.V. Balachandran, "A Synthesis of Alternative Testing Procedures for Event Studies," *Contemporary Accounting Research*, 1990, *6*, 611–640.

Chernozhukov, Victor and Christian Hansen, "The Reduced Form: A simple Approach to Inference with Weak Instruments," *Economic Letters*, 2008, *100*, 68–71.

Claessens, Stijn and Luc Laeven, "What drives Bank Competition? Some International Evidence," *Journal of Money, Credit and Banking*, 2004, *36*, 563–583.

——— **, Asli Demirguc-Kunt, and Harry Huizinga**, "How does Foreign Entry Affect Domestic Banking Markets?," *Journal of Banking and Finance*, 2001, *25*, 891–911.

Coase, Ronald, "The Problem of Social Cost," *Journal of Law and Economics*, 1960, *3*, 1–44.

Coates, J. C., "Testimony on July 29, 2009 before the Subcommittee on Securities, Insurance, and Investment of the Committee on Banking, Housing, and Urban Affairs, U.S. Senate," 2009. http://banking.senate.gov/public/index.cfm?Fuseaction=Hearings.Hearing&Hearing_ID=c754606c-0b95-4139-a38a-63e63b4b3fa9.

Cohn, J., S. Gillan, and J.C. Hartzell, "On Enhancing Shareholder Control: A (Dodd-) Frank Assessment of Proxy Access," *Working paper*, 2011.

Council of Institutional Investors, "CII Applauds Historic SEC Action on Corporate Board Nominations," *Press Release*, 2010. http://www.cii.org/UserFiles/file/news/08-25-2010ProxyAccessPressRelease.pdf.

Cremers, Martijn and Vinay B. Nair, "Governance Mechanisms and Equity Prices," *Journal of Finance*, 2005, *60*, 2859–2894.

D.C. Circuit Court of Appeals, "On Petition for Review of an Order of the Securities & Exchange Commission," *USCA Case No. 10-1305, July 22, 2011*, 2011. http://online.wsj.com/public/resources/documents/ProxyAccessDecision07222011.pdf.

——— , "Rules of the District of Columbia Court of Appeals." http://www.dcappeals.gov/dccourts/docs/DCCA_Rules-1-01-11.pdf.

de Bandt, Oliver and Philipp Hartmann, "Systemic Risk: A Survey," in Charles Goodhart and Gerhard Illing, eds., *Financial Crisis, Contagion and the Lender of Last Resort: A Book of Readings*, Oxford University Press, 2002, pp. 249–298.

DeAngelo, Harry and Edward M. Rice, "Antitakeover Charter Amendments and Stockholder Wealth," *Journal of Financial Economics*, 1983, *11*, 329–359.

Delaware General Assembly, "An Act to Amend Title 8 of the Delaware Code Relating to the General Corporation Law," *The State of Delaware*, 2009. http://legis.delaware.gov/LIS/lis145.nsf/vwLegislation/HB+19?Opendocument.

Demsetz, Harold and Kenneth Lehn, "The Structure of Corporate Ownership: Causes and Consequences," *Journal of Political Economy*, 1985, *93*, 1155–1177.

Demsetz, Rebecca S. and Philip E. Strahan, "Diversification, Size, and Risk at Bank Holding Companies," *Journal of Money, Credit and Banking*, 1997, *29*, 300–313.

Denis, David J., Diane K. Denis, and Atulya Sarin, "Agency Problems, Equity Ownership and Corporate Diversification," *Journal of Finance*, 1997, *52*, 135–160.

Dittmar, Amy and Jan Mahrt-Smith, "Corporate Governance and the Value of Cash Holdings," *Journal of Financial Economics*, 2007, *83*, 599–634.

Dodd Frank Act, "Dodd-Frank Wall Street Reform and Consumer Protection Act," *Public Law 111-023, July 21, 2010*, 2010. http://www.gpo.gov/fdsys/pkg/PLAW-111publ203/pdf/PLAW-111publ203.pdf.

Faleye, Olubunmi, "Does One Hat Fit All? The Case of Corporate Leadership Structure," *Journal of Management and Governance*, 2007, *11*, 239–259.

Fama, Eugene F., "The Behavior of Stock-Market Prices," *Journal of Business*, 1965, *38*, 34–105.

___ **and Michael C. Jensen**, "Separation of Ownership and Control," *Journal of Law and Economics*, 1983, *26*, 301–325.

Federal Reserve St. Louis, "Flow of Funds Account of the United States," *Board of Governors of the Federal Reserve System*, 2013.

Fisch, J., "The Destructive Ambiguity of Federal Proxy Access," *Emory Law Journal*, 2011. forthcoming.

Fos, V., "The Disciplinary Effects of Proxy Contests," *Dissertation*, 2011.

Friedman, Milton and Anna Schwartz, *A Monetary History of the United States, 1867-1960*, Princeton University Press, 1963.

Fuchs, Jim and Timothy A. Bosch, "Why are Banks Failing?," *Central Banker*, 2009.

Ganor, M., "Why do Managers Dismantle Staggered Boards?," *Delaware Journal of Corporate Law*, 2008, *33.*

Gart, Alan, *Regulation, Deregulation, Reregulation*, John Wiley and Sons Inc., 1994.

Georgeson, "Annual Corporate Governance Review: Annual Meetings, Shareholder Initiatives and Proxy Contests, note=http://www.georgeson.com/usa/download/acgr/acgr2010.pdf," 2010.

Ghallager, D., P. Gardner, and P.L. Swan, "Governance through Trading: Institutional Swing Trades and Subsequent Firm Performance," *Working paper.*

Gompers, P., J. Ishii, and A. Metrick, "Corporate Governance and Equity Prices," *The Quarterly Journal of Economics*, 2003, *118*, 107–155.

Grossman, Richard, "The Shoe That Didn't Drop: Explaining Bank Stability in the Great Depression," *Journal of Economic History*, 1994, *54*, 654–682.

Guercio, D. Del, L. Seery, and T. Woidtke, "Do Boards Pay Attention when Institutional Investor Activists "just vote no"?," *Journal of Financial Economics*, 2008, *90*, 84–103.

Guercio, Diane Del and Tracie Woidtke, "Do the Interests of Public Pension Fund and Labor Union Activists Align with other Shareholders'? Evidence from the Market for Directors."

Harford, Jarrad, Sattar A. Mansi, and William F. Maxwell, "Corporate Governance and Firm Cash Holdings in the U.S.," *Journal of Financial Economics*, 2008, *87*, 535–555.

Hellman, T., K. Murdock, and J. Stiglitz, "Liberalization, Moral Hazard in Banking, and Prudential Regulation: Are Capital Requirements Enough?," *American Economic Review*, 2000, *90*, 147–165.

Hicks, John, "A Theory of Economic History," *Oxford: Clarendon Press*, 1969.

Hurd, Michael D. and Susann Rohwedder, "Effects of the Financial Crisis and Great Recession on American Households," *NBER Working Papers 16407*, 2010.

Jayaratne, Jith and John Wolken, "How Important Are Small Banks to Small Business Lending? New Evidence from a Survey of Small Firms," *Journal of Banking and Finance*, 1999, *23*, 427–458.

Jiménez, G., J. Lopez, and J. Saurina, "How does Competition Impact Bank Risk-Taking?," *Federal Reserve Bank of San Francisco Working Paper Series 2007-23*, 2007.

Johnson, Christian A. and Tara Rice, "Assessing a Decade of Interstate Bank Branching," *The Washington and Lee Law Review*, 2008, *65*, 73–127.

Kahan, M. and E. Rock, "The Insignificance of Proxy Access," *Virginia Law Review*, 2011, *97.*

Keeley, M., "Deposit Insurance, Risk and Market Power in Banking," *American Economic Review*, 1990, *80*, 1183–1200.

Keller, S., "What Now for Proxy Access? The Harvard Law School Forum on Corporate Governance and Financial Regulation," *The Harvard Law School Forum on Corporate Governance and Financial Regulation*, 2011. http://blogs.law.harvard.edu/corpgov/2011/08/18/what-now-for-proxy-access/.

King, Robert and Ross Levine, "Finance and Growth: Schumpeter Might be Right," *Quarterly Journal of Economics*, 1993, pp. 717–737.

Klein, A. and E. Zur, "Entrepreneurial Shareholder Activism: Hedge Fund and other Private Investors," *Journal of Finance*, 2009, *64*, 187–229.

Kolari, J. W. and S. Pynnönen, "Event Study Testing with Cross-sectional Correlation of Abnormal Returns," *Review of Financial Studies*, 2010, *23*, 3996–4025.

Kroszner, Randall and Philip E. Strahan, "What Drives Regulation? Economics and Politics of the Relaxation of Bank Branching Restrictions," *The Quarterly Journal of Economics*, 1999, *114*, 1437–1467.

Laeven, Luc and Fabián Valencia, "Systemic Banking Crises Database: An Update," *IMF Working Paper*, 2012, *WP/12/163.*

Larcker, D.F., G. Ormazabal, and D.J. Taylor, "The Market Reaction to Corporate Governance Regulation," *Journal of Financial Economics*, 2011, *101*, 431–448.

Lehn, K., S. Patro, and M.Zhao, "Governance Indices and Valuation Multiples: Which Causes Which?," *Journal of Corporate Finance*, 2007, *13*, 907–928.

Levine, Ross and Sara Zervos, "Stock Markets, Banks, and Long-Run Economic Growth," *American Economic Review*, *88*, 537–558.

Mandelbrot, Benoit, "The Variation of Certain Speculative Prices," *Journal of Business*, 1963, *36*, 394–419.

Masulis, Ronald W., Cong Wang, and Fei Xie, "Corporate Governance and Acquirer Returns," *Journal of Finance*, 2007, *62.*

McDonnell, B., "Shareholder Bylaws, Shareholder Nominations, and Poison Pills," *Berkeley Business Law Journal*, 2005, *205.*

Mian, Atif and Amir Sufi, "House Prices, Home Equity-Based Borrowing, and the US Household Leverage Crisis," *American Economic Review*, 2011, *101*, 2132–2156.

Murray, Michael P., "Avoiding Invalid Instruments and Coping with Weak Instruments," *Journal of Economic Perspectives*, 2006, *20*, 111–132.

OECD, "Roundtable on Competition, Concentration and Stability in the Banking Sector," *Directorate for Financial and Enterprise Affairs - Competition Committee*, 2010.

Office of the Special Inspector General for the Troubled Asset Relief Program, "Quarterly Report to Congress," 2010, pp. 173–198.

___ , "Quarterly Report to Congress," 2012, pp. 239–256.

Petersen, Mitchell A. and Raghuram G. Rajan, "Does Distance Still Matter? The Information Revolution in Small Business Lending," *Journal of Finance*, 2002, *57*, 2533–2570.

Porta, Rafael La, Florencio Lopez de Silanes, Andrei Shleifer, and Robert Vishny, "Legal Determinants of External Finance," *Journal of Finance*, 1997, pp. 1131–1150.

___ , ___ , ___ , and ___ , "Law and Finance," *Journal of Political Economy*, 1998, *106*, 1113–1155.

Rajan, Raghuram and Luigi Zingales, "What Do We Know about Capital Structure? Some Evidence from International Data," *Journal of Finance*, *50*, 1421–1460.

Renneboog, Luc and Peter G. Szilagyi, "The Role of Shareholder Proposals in Corporate Governance," *Journal of Corporate Finance*, 2010, *17*, 167–188.

Rice, Tara and Philip E. Strahan, "Does Credit Competition Affect Small-Firm Finance?," *Journal of Finance*, 2010, *65*, 861–889.

Romano, Roberta, "Public Pension Fund Activism in Corporate Governance Reconsidered," *Columbia Law Review*, 1993, *93*, 795–853.

Saiz, Albert, "The Geographic Determinants of Housing Supply," *Quarterly Journal of Economics*, *125*, 1253–1296.

Scannell, K., "Proxy Plan Roils Talks on Finance Rules," *Wall Street Journal at A2, Mar 17, 2010*, 2010.

Schaeck, K., M. Cihak, and S. Wolfe, "Are Competitive Banking Systems more Stable?," *Journal of Money, Credit and Banking*, 2009, *41*, 713–734.

Schipper, K. and R. Thompson, "The Impact of Merger-related Regulations on the Shareholders of Acquiring Firms," *Journal of Accounting Research*, 1983, *21*, 184–221.

Schumpeter, Joseph, "The Theory of Economic Development," *Leipzig: Dunker & Humboldt*, 1912.

Schuster, R.T., "Rule 14a-11 and the Administrative Procedure Act: It's Better to Have Had and Waived, than Never to Have Had at All," *Minnesota Law Review*, 2010, *95.*

SEC, "Summary of Comments: In Response to the Commission's Proposed Rules Relating to Security Holder Director Nominations," *Exchange Act Release No. 34-48626, Mar. 5, 2004*, 2004. http://www.sec.gov/rules/extra/s71903summary.htm.

——, "Facilitating Shareholder Director Nominations," *Final Rule, Release-No. 34-62764, IC-29384, August 25, 2010*, 2010. http://www.sec.gov/rules/final/2010/33-9136.pdf.

——, "Letter by Mary Schapiro, Chairman SEC, to the Honorable Scott Garrett," *U.S. House of Representatives, Committee on Financial Services*, 2011. http://financialservices.house.gov/UploadedFiles/02-24-11_Bachus-Hensarling-Neugebauer-Garrett_ltr_to_Schapiro.pdf.

SharkRepellent, "2007 Year End Review," *SharkRepellent.net Archive*, 2008. https://www.sharkrepellent.net/request?an=dt.getPage&st=1&pg=/pub/rs_20080107.html.

Shiers, Alden F., "Branch Banking, Economic Diversity and Bank Risk," *The Quarterly Review of Economics and Finance*, 2002, *42*, 587–587.

Shivdasani, A. and D. Yermack, "CEO Involvement in the Selection of New Board Members: An Empirical Analysis," *Journal of Finance*, 1999, *54*, 1829–1853.

Sprague, O.M.W., "Bank Branching in the United States," *The Quarterly Journal of Economics*, 1903, *17*, 242–260.

Stigler, George, "The Economies of Scale," *Journal of Law and Economics*, 1958, *1*, 54=71.

Stock, James H. and Motohiro Yogo, "Testing for Weak Instruments in IV Regression," in Donald W. K. Andrews and James H. Stock, eds., *Identification and Inference for Econometric Models: A Festschrift in Honor of Thomas Rothenberg*, Cambridge University Press, 2005, pp. 80–108.

——, **Jonathan H. Wright, and Motohiro Yogo**, "A Survey of Weak Instruments and Weak Identification in Generalized Method of Moments," *Journal of Business and Economic Statistics*, 2002, *20*, 518–529.

Strahan, Philip E. and Tara Rice, "Does Credit Competition Affect Small-Firm Finance?," *Journal of Finance*, 2010, *65.*

U.S. Chamber of Commerce, "Petition for Review," *U.S. Courts of Appeal for the District of Columbia Circuit*, 2010. http://www.uschamber.com/sites/default/files/files/1009uscc_sec.pdf.

Wheelock, David, "Regulation, Market Structure, and the Bank Failures of the Great Depression," *Federal Reserve Bank of St. Louis Review*, 1995, *77*, 27–38.

Woidtke, Tracie, "Agents watching Agents? Evidence from Pension Fund Ownership and Firm Value," *Journal of Financial Economics*, 2002, *63*, 99–131.

WSJ, "Fight Brews as Proxy Access Nears," *The Wall Street Journal, August 26, 2009*, 2010.