Essays on competitive strategy in regulated industries: Evidence from commercial banking

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ABSTRACT

This dissertation studies heterogeneity in firm performance that arises from market failures and the regulation of market failures in the commercial banking industry.

The first essay explores the heterogeneity in firm performance that can arise from exogenously varying levels of oversight in regulated industries. We show that banks located closer to their examination field offices face lower supervision costs that are not explained by leverage. This suggests that regulatory oversight is not purely a burden, but that closer ties with supervisors bring advantages to firms. We hypothesize that these advantages accrue due to co-located banks' lower costs of information exchange. In support of this conjecture, we find that large banks do not benefit disproportionately from proximity to their supervisor, as a collusion-driven explanation would suggest.

The second essay explores whether incumbent firms enjoy a strategic advantage in reducing uncertainty about future demand in highly cyclical industries. I consider this question by studying sources of heterogeneity in financial institutions' ability to manage risk exposures for a highly cyclical, competitive line of business: construction loans. Firms with early investment experience in the construction business demonstrate superior screening capabilities relative to competitors during the building boom. Despite this advantage in identifying idiosyncratic risks across borrowers,

experienced banks do not outperform their competitors in limiting their exposure to market risk.

The third essay considers whether the the organization of regulatory enforcement agencies impacts whether regulators' intervene pro-actively in markets, and how regulators respond after a market crisis. I focus on the dramatic growth and equally dramatic collapse of construction lending in the US commercial banking industry as a case study for a highly regulated boom and bust market. I identify differences in policy implementation across firms panel data on banks' supervising agency's structure, resources, and funding incentives, as well as bank examiner turnover and compensation. Among agencies, I do not find differences in the regulation of underwriting quality or in pre-crisis construction market exposures. However, regulatory regime has a significant impact on the rate at which lending contracts after the housing market collapse. Overall, this study shows that differences in the regulatory oversight environment are not necessarily readily apparent in "boom" markets but likely to have a significant impact on performance in times of crisis.

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1. THE PERFORMANCE EFFECTS OF REGULATORY OVERSIGHT

1.1 Introduction

Oversight by government regulators can be seen as a necessary means of enforcing policy in some inudstries. Yet, the administrative demands of compliance impose significant costs on firms, and are particularly onerous for organizations which lack formal management systems, raising barriers to entry to small firms. How does engagement with regulators affect these costs? At worst, closer contact with enforcement agencies can serve as a channel through which rent-seeking bureaucrats may extract resources from firms (Djankov, et al, 2002). We might expect to see lucrative relationships form between large firms and their regulators, while small firms suffer in comparison (Stigler, 1971; Peltzman, 1973). Even so, firms that "capture" rents from the regulatory process are forced to share these rents with politicians (Shleifer and Vishny, 1993). To the extent that exogenously varying degrees of oversight exist, the rent-seeking literature would suggest that firms pay disproportionately when their supervisor has a lower cost of access or when firms' "refusal power" is lower (Ades and di Tella, 1999; Svensson, 2005). These views suggest that increasing engagement with oversight agencies is detrimental to firm performance and are disproportionately costly to small firms.

On the other hand, regualtory engagement can help overcome the information

asymmetries inherent in the regulatory relationship, as suggested by Macher et al. (2011). Closer regulatory relationships, characterized by more frequent informal contact and lower barriers to communication, may lower the cost of compliance. In addition, regulators can serve as an important resource to complement a firms' own internal systems of control, particularly for smaller firms. The sociology literature also suggests that responsive, adaptive - rather than punitive - supervision at the "street level" should facilitate the exchange of best practices, particularly for small firms operating in a complex environment, as suggested by (Lipsky, 1980; Bardach and Kagan, 1981; Kelman, 1981; Wilson, 1982; Ayres and Braithwaite, 1995; Hawkins, 2002). In this way, regulators can serve as an important resource to complement a firms' own internal systems of control, particularly for smaller firms.

Given this mix of theoretical predictions, it is an empirical question as to how regulatory oversight impacts performance in a given institutional setting. This paper focuses on how regulatory engagement affects firms' cost of doing busines in the US commercial banking industry. In the US, the performance of all but the largest banks is monitored by teams of traveling examiners who assess the "safety and soundness" of portfolio choices, control systems, and management. In order to address our research question empirically, we need a proxy for regulatory engagement that is not endogenous to financial performance. For example, a nave measure might be the number of phone calls or visits between firms and regulators, but this is likely to be driven by a firm's financial condition. Instead, we proxy for the cost of regulatory engagement by measuring the driving time between each bank and their regulatory field office.We argue that the travel distance between exam teams' field office and the bank headquarters is a proxy for the quality of the examiners' information about the bank, and consequently, for the quality of the exchange between supervisors and

bankers. Under a theory in which regulatory oversight is purely a burden, more distant banks should report lower costs associated with compliance and show improved performance as they devote fewer resources to wasteful activities. Under a "tollbooth" theory in which access allows bureaucrats to extract rents, we would expect the same result. Even if a mutually beneficial arrangement exists that is based on firms' ability to transfer resources to the regulator (including non-pecuniary ones), we should see the cost of oversight concentrated not in larger institutions but among those small banks with little to offer.

On the other hand, if proximity facilitates information exchange and knowledge transfer, then we should see the opposite. If management of knowledge and other resources is the way in which firms differentiate themselves (Conner and Prahalad, 1996; Grant, 1996; Kogut and Zander, 1996), by creating internal capabilities, then it is natural for firms close to regulators to attain competitive advantages by integrating knowledge about regulatory behavior from the public realm. This way firms can create "relational rents" (Dyer and Singh, 1998) from a "strategic network" (Gulati et al., 2000) that now extends into the public sector. Note how the mechanism here is not one that works through market power or collusion, but through the firm's cost structure. Those enjoying the largest reductions in monitoring costs should be those closest to the regulator. We find this to be the case: banks located at a smaller distance from their supervisor face lower costs levels. Further, the benefits of supervisory proximity accrue to both small and large banks. We use the overlapping jurisdictions of different commercial banking supervisors to show that these effects are not driven by local economic conditions.

We find that the positive effect of proximity is not eliminated during the uncertainty of the 2008-2010 financial crisis. However, costs at all banks rose significantly

during this period. This finding is consistent with Lipsky or Wilson's conception of public servants, not as rent-seeking agents, but as individuals who must reconcile competing aspirations of effective service to their clients with the public perception of competence. When they become more heavily scrutinized or resource-constrained, they will tend to choose equal treatment over appropriately specialized treatment (Lipsky, 1980).

To the extent that proximity proxies for closer relationships with regulators, our results have implications for the literature that seeks to characterize the value of firms' government relationships. While the literature on political connections tends to emphasize the rent-capturing potential of relationships with politicians (Fisman, 2001), particularly those with the stable tenure that characterizes bureaucracies, we argue that, at least in an environment supported by strong rule of law, a firm's positioning with respect to regulatory agencies has the potential to create value. When street-level agents have broad discretion over policy implementation and are highly trained, while their actions are confidential, or precisely our setting here, one would expect precisely this kind of impact (Lipsky, 1980).

The paper is organized as follows. Section 2 discusses the literature and institutional setting of this study. Section 3 describes the data and introduces our empirical strategy. Section 4 presents evidence on the performance effects of oversight, and links them to bank risk. In Section 5, we present extensions to study the financial crisis, capture theory, and technological evolution. Section 6 and summarizes the robustness of our results, while Section 7 concludes.

1.2 Setting

1.2.1 Commercial Banking Supervision in the United States

The focus of our empirical analysis is the relationship between commercial banks and their supervisors in the United States. The havoc that financial crises can wreak on the economy has led federal and state government to introduce an abundance of regulation to promote stability in the banking industry and ensure that managers do not take undue risks with insured depositor funding. Individual banks' adherence to regulation is monitored through periodic Safety and Soundness examinations, through the application process for changes in status, size or location, and though informal contact with bank supervisors.[1]

Safety and Soundness examinations are carried out by teams that travel to bank headquarters, though in-house examiners are assigned to large, complex institutions. Examiners prepare for exams off-site by reviewing banks' financial data (the financial data we use for our analysis), and comparing banks' performance ratios to similar institutions using computer-guided modules. During the on-site visit, which is generally scheduled to last one week, examiners meet with management and perform a loan-level analysis of a bank's portfolio. Banks are assessed on capital adequacy, asset quality, management, earnings, liquidity and sensitivity to market risk (CAMELS). Poorly-rated banks may face more frequent examinations, higher fees, or corrective action. In extreme cases, the Federal Deposit Insurance Corporation (FDIC) has the power to seize the assets of poorly performing banks. Satisfactory examination ratings are required for most bank applications (e.g. for permission to merge or move).

[1] Banks also undergo Compliance examinations ensure compliance with specific state and federal regulations, such as anti-money laundering, community lending obligations, corporate governance, or lending statutes.

The maximum frequency between examinations is determined by statute, and depends on a banks' size, past performance and age.[2] In many cases, examiners are phyiscally present at a bank 10-20/

Examiners have a great deal of discretion in evaluating management's performance and policy choices. Examiners may take issue with the way in which a bank organizes its information systems for monitoring risk and portfolio performance, or may force the bank to collateralize loans or increase capital reserves. Examiners may evaluate qualitative aspects of managements' performance – for example, by taking issue with the way that managers communicate lending policies with loan officers. Evaluations range from informal and confidential, initiated through letters of concern or meetings with the Board of Directors, to formal, public and legally enforceable. Only the most severe of their enforcement actions are observable to the public or bank investors, so banks have very little reason to take an adversarial position with respect to examiners' recommendations (Wilson, 1991). A positive by-product of this exchange may be that mangers have the potential to learn from bank exams. Examiners, who are highly trained in risk management and have extensive industry experience, may work with bank officers to improve performance. As one manager notes about the Federal Reserve examiners: "I gain something every time they come in."(*American Banker*, 9/2/2010).

Contact between examiners and bankers is not limited to these bank exams; regulators monitor banks under their supervision continuously. Examiners can contact bank managers at any time to request information. Unsurprisingly, in the light of our results, accessibility is a selling point for the supervisory agencies. For example,

[2] Statutory maximums defined by the agencies. For example, national banks undergo a compliance examination at least one every 18 months for small banks that are well capitalized, well managed and received a good rating during the last examination (12 CFR 4.6).

the Tennesee Department of Financial Institutions advertises that: "There are many benefits of becoming a Tennesee state chartered institution... Because state banks in Tennessee have closer geographical proximity to their primary regulator, communication is more direct and more effective. The Department of Financial Institutions has an "open door" policy with regard to all institutions. Representatives of any institution may call staff members or the commissioner with questions or concerns and get a personal audience quickly. We encourage officers, directors and employees of banks and other institutions to stay in close contact with us; no problem is deemed unimportant." [3] Small banks in particular are aware of the power that regulators wield over their business. One industry consultant advises: "[A] good banker should open avenues of communication with the agencies' regional and field offices, and keep them open. The best advice I have is asking 'How high?' when a regulator says 'Jump.' In other words, cooperate." (*American Banker*, 1/12/1994).

These perspectives are often mixed with the acknowledgment that compliance comes at a real cost to banks in terms of working hours, investment in expertise, and implementation of control systems to satisfy supervisors' need for documentation. Figure 1 gives an overview of how low and high levels of engagement with the supervisor allow banks to maximize the value of their relationship with regulators. If the regulator imposes an administrative burden that is unevenly distributed over firms due to resource constraints or engages in rent-seeking, an arms-length approach is valuable. When the regulator engages in collusion, or provides resources, information or learning opportunities, a more collaborative stance is in the supervisee's interest. The latter is facilitated by low interaction costs, the former by a context of costly engagement.

[3] www.tennesee.gov/tdfi/banking/charter.html)

In this study we do not measure the absolute net impact of the regulatory relationship. Rather, we investigate whether this impact varies across banks within supervisors' districts as the informal exchange of information becomes more difficult, that is, as the relationship between banks and supervisors is driven from a high-engagement collaborative one to a low-engagement arms-length one. This takes us to questions like: Do regulators pass on monitoring costs to banks as information exchange becomes more difficult? Do closer banks benefit from a better understanding of their regulatory mandate, and are they able to draw on the "free" expertise of their supervisors? Do regulators collude and share rents with supervisees, or do they extract rents from them? In the empirical analysis that follows, we use travel distances from bank headquarters to regulator field office to proxy for the cost of information exchange between supervisors and banks. Related literature provides ample evidence suggesting that geography is an important determinant of information dispersion (see, for example, Coval and Moskowitz (2001), Rajan and Petersen (2002), Malloy (2005), and Kedia and Rajgopal (2011)). Naturally, these location-driven differences can persist in equilibrium, as firms take other factors, such as the location of their customers and the cost of relocation, into account as well.

The first hypothesis we investigate is whether the differential cost of information exchange leads distant banks to devote relatively more resources to regulatory compliance. Distant banks will suffer from two different types of information disparities. First, we expect examinations of more distant banks to be carried out by an examiner who has less frequent contact with the manager, creating the need for documentation and formalization of the information exchange. For co-located banks, more frequent and informal contact builds mangers' reputation with examiners, facilitating the exchange of "soft" information about management quality (Stein 2002). Moreover, un-

less examiners invest disproportionately in acquiring information about more distant markets, the quality of their knowledge of local opportunities and threats to bank stability will deteriorate with greater distance from their home offices. If regulatory enforcement is complete, regulators will pass on these differential monitoring costs to managers, implying a higher cost of compliance for distant banks. These costs should be particularly problematic for small firms that do not have the scale to make fixed investments in internal control systems.

Second, less contact with regulators means that distant banks are less likely to correctly anticipate and pro-actively act in compliance with regulatory mandates, particularly if rulings are complex and open to interpretation. This uncertainty about regulatory behavior will lead to higher compliance costs as bankers are forced to adjust to changing expectations. In a 2005 survey on compliance costs, bankers described uncertainty about regulators' expectations as both frustrating and costly (*American Banker* 8/12/2005). An extreme example of the knowledge benefits embedded in local networks is the "revolving door" whereby exiting examiners seek employment in the private sector. To the extent that a geographically close relationship facilitates exchange between banks and examiners, compliance costs should be reduced.

In addition to lowering compliance costs, a closer supervisory relationship could facilitate knowledge transfer that allow banks to improve their performance through better use of resources and more prudent lending decisions. For many small banks, managerial expertise and sophisticated approaches to risk management are scarce resources that may not be affordable under their current scale. Risk management is not a sophisticated practice at small banks. For example, banks with less than $300 million in assets are likely to outsource their management information systems (MIS) to third-party data aggregators rather than manage them in-house. They may use pa-

per files to organize loan information rather than computers and spreadsheets, and may not differentiate lending rates based on the risk of the borrower. One supervisor we spoke with described the lack of time to work with managers during on-site examinations to improve obvious weaknesses in banks' business model as being one of the most frustrating aspects of the job. Co-located banks should benefit from a local, free source of expertise, while distant banks would have to invest disproportionately in these capabilities to achieve the same quality of internal controls (Simunic, 1980). If a closer relationship facilitates learning as well as compliance, we should see both lower costs and improved portfolio performance at co-located banks.

Two other factors deserve consideration in determining the net effect of regulatory oversight on bank performance: administrative burden and rent-seeking. To the extent that these alternative effects of oversight do not vary substantially with supervisor distance, we are unable to distinguish them from other features of banks' environment that impose costs on all firms. However, there is some reason to think that they may, which would likely bias against finding a performance benefit to close supervisory relationships.

Bank exams are designed to reduce the likelihood that managers increase leverage and make risky investments at the expense of deposit holders; oversight should reduce this moral hazard. As noted above, greater distance should increase the cost of informational exchange, increasing supervisors' monitoring costs. If supervisors are unable to pass these increased costs on to banks,[4] managers may take advantage of lax oversight to relax lending requirements or reduce systematic review of their loan portfolio. In support of this theory, DeFond, Francis and Hu (2011) find that auditors'

[4] We might think that it would be difficult for agencies to pass on costs to the banks they monitor if they have little authority to adjust monitoring technologies or examination procedures in response to information disparities across firms.

greater distance from the SEC negatively affects firms' selection of high-quality (more costly) auditors. If this were the case in our sample, we should see a decrease in management expenses with greater distance from supervisors' field office as managers shift away from investing in internal control systems, as well as increases in measures of leverage and risk-taking at distant banks.

Resource constraints may also lead regulators to impose the administrative burden of oversight more heavily on banks closer to their home office. Kedia and Rajgopal (2011) find that SEC enforcement activity is positively associated with firms' smaller distance from SEC field offices, and that the SEC's oversight of distant firms may be limited due to funding constraints. If banking regulators face a similar constraint that drives them to monitor closer banks more intensely, we should see a higher administrative burden closer to home, irrespective of its affect on banks' risk choices.

Finally, the rent-seeking literature predicts two things. First, if access to rents is facilitated by proximity to regulated firms, it will likely be more costly to do business near a corrupt regulator. Second, regulator capture and personal connections lower the costs of regulatory compliance nearby. The impact of the latter on improved outcomes is ambiguous, as non-compliance may benefit managers personally while harming firm performance, but it is likely to be larger for larger firms. We formally address this prediction in Section 5.2.

Whether these factors outweigh the potential performance benefits of closer oversight is an empirical question. If examiners' monitoring substitutes for a banks' internal monitoring costs, we would expect to see control-related expenses increase with increasing distance. If increased access to bank examiners act as a resource to the firm, we also expect to see improved portfolio performance. If either of the other

explanations dominate we should see the opposite.

1.2.2 *The Structure of Supervision in the United States*

There are nearly 6,000 commercial banks in the United States. Together, they hold over $11 trillion in assets. Banking firms can choose to be chartered under either state or federal law, and there is substantial overlap in the strategic domain of banks chartered under either regulatory regime. This key feature of the U.S. banking system makes it an ideal empirical setting in which to research banks' regulatory environment because it allows us to identify the net effect of regulation while controlling for confounding factors across geographies. Banks situated in identical business environments will face different supervisory oversight under the charter that they select.

Since the Civil War the unique "dual" character of U.S. banking law has been upheld and protected by legislations and judicial rulings under the assumption that regulatory competition supports a legal system that is both responsive and efficient (Scott, 1977; Butler and Macey, 1988; Rose, 1997). The competing legal systems are similar in their intent to govern a sound banking system, and although state and federal law governing banks differs somewhat in the scope and organization of activities that banks are permitted to engage in, legal differences among regulatory regimes have dwindled due to intense competition for charters.[5]

Within banks' chartering regime, regulatory compliance is enforced through supervisory agencies. Banks that elect a national charter are regulated and examined

[5] A number of differences between charters were eliminated by the passage of the Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991 and the Riegle-Neal Interstate Banking and Branching Efficiency Act (IBBEA) of 1994. By 2003, 48 states have adopted "wild card" statutes giving state bank supervisors the right to allow state banks to engage in any "activities" that are allowed to national banks, and national banks are allowed to engage in all activities that have been enumerated under state banking statutes (Johnson, 1995; Schooner, 1996; Schroeder, 2003). For a discussion of the evolution of charter values see Blair and Kushmeider (2006).

by the (OCC), a federal agency headquartered in Washington, DC. State-chartered banks are regulated and supervised by the state agency of the state in which they are chartered (SBA). Following the banking crises of the 1980s, state-chartered banks also came under the joint supervision of one of two federal agencies. State banks that are Federal Reserve members are also periodically examined by the Federal Reserve Bank (FRB) in the district which they are charted, and non-members are examined by the Federal Deposit Insurance Corporation (FDIC). [6] Table 1 gives an overview of these regimes.

Table 1.1: Supervisory Regimes

Institution Type	**Chartering**	**Supervision**
National Bank	OCC	OCC
State Banks (FRS Member)	SBAs	SBAs & FRB
State Banks (Non-FRS Member)	SBAs	SBAs & FDIC

Note: This table describes chartering and supervision authority over commercial banks in the United States. Banks elect to be legally chartered under either state or national law. Supervisory authority is assigned on the basis of chartering authority and Federal Reserve System membership. All state banks are co-supervised by a federal banking agency. Agency abbreviations are as follows: **OCC** is the Office of the Comptroller of the Currency, **SBAs** are State Banking Agencies, **FRS** is the Federal Reserve System Banks, **FDIC** is the Federal Deposit Insurance Corporation.

Table 2 shows the share of in-sample (see the next section for details) banks and assets governed by each regime. Between 200 and 2009, on average 28% of American commercial banks were national banks. These banks are comparatively large: they held 36% of all bank assets. State banks account for the remaining 72%; most of these, particularly the smaller ones, were not members of the Federal Reserve System.

Supervisory agencies differ with respect to organization and enforcement resources. Geographically, they differ in both number (see Table 3) and location (see

[6] In addition to co-supervising state member banks, the FRB supervises Bank Holding Companies (BHC), of which 80% of banks form a part, and the FDIC can intervene institutions with federal deposit insurance (all banks).

Table 1.2: In-Sample Distribution of Supervision, 2005

	Number	Share (#)	Total Assets ($B)	Share ($)
Total	2,848	100%	$1,138	100%
OCC	795	28%	$408	36%
SBAs	2,053	72%	$730	64%
FRS	385	13%	$155	14%
FDIC	1,668	59%	$575	51%

Note: This table shows the distribution of supervisory authority over U.S. the banks in the sample in 2005. In 2005, there were 2,848 banks in the sample, which includes U.S. commercial banks between years 2001 and 2007, with $100 million to $1 billion in assets, with geographic exclusions as described in text. Data calculated from attributes and balance sheet information on FFIEC Call Reports accessed from the FRB Chicago website. In the left-hand column, **OCC** is the Office of the Comptroller of the Currency, **SBAs** is State Banking Agencies, **FRS** is the Federal Reserve System Banks, **FDIC** is the Federal Deposit Insurance Corporation. **Number** indicates the total number of banks supervised under a given agency, and **Share (#)** indicates each agency's share of banks supervised. **Total Assets ($B)** indicates the sum of all assets supervised under a given agency (in sample, note that the largest institutions are excluded), and **Share ($)** indicates each agency's share of total assets supervised.

Figure 1, in the Appendix) of their field offices. As Table 3 shows, SBAs have an extensive national coverage of field offices, and half of all states have offices throughout the state. While every state has a state banking supervisor, OCC field offices are located in only 36 states. Although only one in three banks is nationally chartered, there are 66 OCC field offices nationally, compared to 121 total for all states. The FRS has the most sparse system of field offices, with only 24 nationwide.

Aside from their organizational differences, regulatory agencies have made a substantial effort to harmonize oversight quality to in order to avoid"charter-shopping." The OCC and the State Banking Agencies (SBAs), in conjunction with the other federal banking authorities, all set standards banks have to adhere to, and use regular examinations to enforce these standards.[7] A 2005 survey conducted by Insight Express and summarized in the *American Banker* reports that examiners tend to have

[7] Since 1979, uniform federal policy standards have been coordinated through the Federal Financial Institutions Examination Council (FFIEC). The FFIEC mandates uniform reporting forms and standard examination practices. State banking regulation choices are often coordinated loosely through the Conference of State Bank Supervisors (CSBS). In 2006, a State Liaison Committee was included in the FFIEC, but state agencies did not have a formal role before this.

Table 1.3: Geographic Dispersion of Supervisory Offices

	District Offices (HQs)	**Field Offices (FOs)**	**States Coverage**
OCC	5 - 4*	66	36
FRS	12	24	20
FDIC	6	83	42
SBAs	**Total FO**	**# with multiple FO**	**Average # of FOs**
50	121	25	3.6

Note: This data describes the administrative divisions for each regulatory agency. In the left-hand column, **OCC** is the Office of the Comptroller of the Currency, **SBAs** is State Banking Agencies, **FRS** is the Federal Reserve System Banks, **FDIC** is the Federal Deposit Insurance Corporation. Federal agencies (OCC, FRS, FDIC) are divided into regional district office headquarters and local field offices (FOs). **States Coverage** indicates the number of states where federal agency field offices are located. State agencies generally have a central office location, and occasionally have a local field office structure; **# with multiple FO** indicates the number of states that adopt a field office structure. **Average # of FO** indicates the average number of state banking agency field offices per state. Source is authors' calculations, based on agency publications. Note (*) between 2004 and 2005, the OCC consolidated from 5 to 4 administrative districts.

similar scores on flexibility, fairness, thoroughness and consistency across regulatory agencies (*American Banker* 8/12/2005).

In the empirical work that follows, we test for the supervisory effect of the two chartering authorities (the OCC and the SBAs). Agency structure may play an important role in the effect of supervision on banks (Wilson, 1991). For example, the agencies are funded differently. While the OCC and the majority of state banking agencies rely almost entirely on revenues collected from the banks they assess, the FDIC and Federal Reserve supervisors are funded independently. It is clear *ex ante* that these agencies have incentive to relax supervisory oversight of more distant banks for cost reasons. Agencies may also vary in their autonomy with respect to political or industry influence, competition for top talent, or organizational culture. Across states, there are remarkable differences in all these factors (CSBS, 2008). Consequently, we expect that differences between agencies should introduce some heterogeneity in our estimates. We pool across state banks for brevity, and leave the exploration of these mechanisms for future research.

1.3 Empirical Strategy, Data and Sample

1.3.1 Empirical Approach

The outcomes of interest that we study are non-interest expenses that are related to administrative costs. This channel measures both investments in risk management and other control mechanisms and the administrative burden of oversight, as opposed to the broader market forces that drive interest expenses and revenues. As discussed in Section 2, we surmise that the ease of information sharing, which decreases with a greater distance between bank and regulator, should lower both of these types of expenses. Other theories, be they centered around rent sharing or around scarce regulatory resources that raise administrative burden near the supervisor, would predict the opposite.

The basis of the our empirical approach is to identify the effect of regulatory oversight by comparing similarly situated banks in that are supervised under different regulatory regimes, controlling for the economic environment and observable bank characteristics. This is summarized by equation 1 below:

$$\begin{aligned} PerformanceMeasure_{i,t} = \alpha &+ Distance\ to\ Agencies_{i,t}\beta' \\ &+ Agency\ Dummies_{i,t}\gamma' \\ &+ Distance\ to\ Agencies{*}Agency\ Dummies_{i,t}\delta' \\ &+ X_{i,t}\eta' + Year_t\zeta' + Field\ Office_t\theta' \\ &+ MSA_t\phi' + \varepsilon_{i,t} \end{aligned} \tag{1.1}$$

$PerformanceMeasure_{i,t}$ varies in the analysis below, but is measured for each bank

i in year t. We use an unbalanced panel. The controls, explained below, include full sets of year ($Year_t$) and agency field office ($AgencyFO_{i,t}$), as well as $X_{i,t}$, a vector of portfolio, legal and corporate controls as well as characteristics of the competitive and economic environment that may also be important determinants of performance. The main coefficient of interest is δ, which measures the difference in returns associated with a one-minute increase in driving distance to the bank's supervisor's nearest field office.[8]

1.3.2 Data and Sample

Our initial sample is a panel of all commercial banks in the US between 2001 and 2010 and more than $100 million in assets in counties with at least 2 banks. We exclude banks that are known to have in-house examination teams, and all banks with over $10 billion in assets which are classified as members of the FDIC's Large Bank program.

We exclude banks with in-house examiners because we have no way to quantify variation in the relationship between these banks and their supervisors, and because the relationship is likely to be affected by the complexity of the regulatory relations problem at these firms. In 2005, there were 7,100 banks in the US, and only 65 of those banks had over $10 billion in assets. In our sample, which includes around 2,800 banks annually, the median bank size is around $250 million. In other words, the sample of banks that we are interested in accounts for the vast majority of all banking institutions and excludes systemically important banks. This allows us to focus on supervision dynamics that are relevant to small and entrepreneurial firms

[8] Estimation shows pooled least squares estimates with robust standard errors clustered on unique bank identifier, which asymptotically approaches the Random Effects estimate.

in other industries (energy, for example), instead of on relationships marked purely by specific characteristics of the financial services industries.

Balance sheet, portfolio composition, funding sources and income statement data for all U.S. commercial banks are based on accounting data from FFIEC Call Reports made accessible by the Federal Reserve Bank of Chicago. These come with the typical caveats associated with accounting data, but better estimates of banks' assets and liabilities are not available for such a complete sample. Data reflecting banks' legal, corporate, and regulatory regime characteristics are from the FFIEC National Information Center. Information regarding branch-level deposits comes from the FDIC Summary of Deposit database. Nominal data series are converted to real using the BEA GDP deflator. We drop banks headquartered in New Hampshire, Rhode Island, and the District of Columbia because the sample of state-charted banks in these states is too small to provide an adequate comparison. Banks in Alaska and Hawaii are dropped for travel comparability.

The key to our analysis is distance traveled between supervisors' field offices and bank locations. For all banks, we identify the address of bank headquarters using information from the FDIC. We made a substantial investment in cleaning this information to minimize loss due to poor data entry. We also identified the location of district offices and field offices for each regulatory supervisor.[9] We obtained federal field office information from public websites and historical documents, and state banking agency field office location from public websites, confirmed by email or phone survey for all states. We calculate the travel time between field offices and bank headquarters using ArcMap, the unit of measure being minutes of driving time. ArcMap takes into

[9] Policy is set and managed through district offices, and examiners often work out of field offices. Interactions between district office and bank managers are generally limited to major applications, such as M&A requests. Thus, our focus for this study is the interaction between banks and their supervising field offices.

Table 1.4: Bank Proximity to Supervisory Field Offices Varies

	Average	**Std Dev**	**Min**	**Max**
Bank average over potential FO	105	80	1	600
Bank std. dev over potential FO	96	125	0	742

Note: This table reports means, average and standard deviation for the average travel time in minutes to banks' four potential regulatory field offices (SBA, OCC, FRS and FDIC as definted in Table 1), and the standard deviation of travel time between banks' four potential regulatory field offices. All banks are assigned to the closest field office for each regulator within that regulators' jurisdiction. Columns report the Average, Standard Deviation, Minimum and Maximum within-bank averages across the sample. The sample includes 19,385 observations covering 3,708 U.S. commercial banks between years 2001 and 2007, with $100 million to $1 billion in assets, with geographic exclusions as described in text. Source is authors' calculations.

account traffic patterns and average speed limits. Field office locations are illustrated in Figure 1.

For each bank-year observation, we identify the four relevant distance measures, to the OCC, FRS, and FDIC, and SBA field offices.[10] The average distance, in minutes, is 105, with a standard deviation of 96, as shown in Table 4.

To test our hypotheses with regard to bank costs, we use items from banks' reported non-interest expenses as reported on banks' fourth quarter Call Reports. Banks' total management expenses are defined as non-interest expenses net of property and marketing expenditures. We exclude marketing and property because these two categories of expenses are not directly related to a banks' administration. We further decompose this measure into funds spent on salary and "other" control related expenses. We are unable to further decompose these "other" items into more detailed measures but this category includes: data and processing expenses; directors' fees; office supplies; legal, auditing and consulting fees; insurance assessments; telecommunications expenses; ATM interchange fees; and miscellaneous charges. For all banks, we scale expenditures by risk-based capital, defined by regulatory capital

[10] While we know which district each bank is assigned to, we do not have information about which field office examines each bank. Each bank is assigned to its minimum distance field office within the relevant district.

Table 1.5: Dependent Variables: Expense Decomposition

	Mean
ROE	11.28%
Non-interest Expense	30.71%
(-) Property	4.33 %
(-) Marketing	0.57%
Management expense	25.82%
Salary	16.34%
Other control costs	9.48%

Note: This table shows a decomposition of bank non-interest expense categories, in percentage points, scaled by total risk based capital, from the FFIEC Call Reports, accessed through the Federal Reserve Bank of Chicago. Data is averaged over all bank-year observations in sample. The sample is defined as 19,385 observations covering 3,708 U.S. commercial banks between years 2001 and 2007, with $100 million to $1 billion in assets, with geographic exclusions as described in text. "Other control costs" includes items such as legal, consulting, auditing, data, communications, and insurance.

requirements. This choice reflects our view of regulatory capital as the core of banks' liquidity.[11] In the next section, we show that this scaling does not drive our results.

We also examine banks overall performance and loss profile as a function of supervision. We measure banks overall performance as return on equity (ROE).[12]. Table 5 summarizes sample averages of these dependent variables, pooled across the sample. Payroll comprises two-thirds of management expenses. Finally, to measure banks' risk management performance we use the non-performing loan (NPL) ratio, which is the percent of all loans that a bank classifies as 90+ days past due.

We consider a broad range of firm-level characteristics, portfolio composition, and environmental factors in controlling for cost structure and firm performance. Means and standard deviations of control variables are reported in Table 6, 8 and 10 below,

[11] Total risk-based capital, defined as the sum of Tier 1 (Core) and Tier 2 (Supplementary) capital as defined by Basel Accords, represents a banks' liquid reserve capital.

[12] Net income before taxes and extraordinary items as a percentage of regulatory capital.

while Table 7, 9 and 11 show how our controls relate to outcomes of interest: the cost measures that are our main focus, and each bank's return on equity.

To control for differences in costs that arise from firms' business model, we use Call Report data to control for each bank's asset and liability positioning. On the asset side, we measure a bank's interest rate exposure with earning assets (loans, trading assets, and securities) as a percent of total assets. To further disaggregate banks' interest rate exposure, we include controls for loans as a percent of earning assets, and then decompose the banks' loan portfolio as a percent of total lending into different types of real estate, consumer, commercial, and agricultural lending. To control for leverage and also the risk of capital, we use the leverage ratio defined as total risk-based capital over risk-weighted assets (as defined by regulatory capital standards).

In order to control for firm-level differences that may explain a banks' cost structure, we control for bank age (log), SEC registration status, and indicators for whether the commercial bank is owned by a holding company (BHC) or a foreign entity. We also indicate whether a bank is the principal banking enterprise of the BHC, whether it is a nationally or state-chartered entity, and whether a bank is a member of the Federal Reserve System. Because costs certainly vary for firms involved in acquisitions, we include a count of the number of institutions acquired over the previous 12 months. Finally, we include a count for the number of branch locations operated by the bank, and an indicator for banks headquartered in rural (non-MSA) areas.

Costs and performance at banks with identical portfolios will vary with local economic conditions. Since we use variation in geographic location to proxy for regulatory intensity, it is particularly important to adequately control for aspects of banks' local environments that could vary with a banks' distance from the cities where su-

Table 1.6: Bank Portfolio Controls

Control	Mean	Standard Deviation
Assets ($Mill)	392.95	643.15
Leverage ratio	10.13	2.68
Deposit funding share	20.52	9.97
Earning assets share	93.31	2.79
Loan share	72.06	14.72
Residential mortgage share	25.84	14.98
Commercial RE share	27.20	14.00
Agricultural loan share	3.65	7.38
C & I loan share	16.70	10.60
Credit card loan share	0.45	2.11
Other cons. loan share	7.41	8.42

Note: This table reports means and standard deviations for bank balance sheet measures, reported annually on the FFIEC Call Reports accessed through the Federal Reserve Bank of Chicago. The sample includes 19,385 observations covering 3,708 U.S. commercial banks between years 2001 and 2007, with $100 million to $1 billion in assets, with geographic exclusions as described in text. All shares and ratios are measured in percentage points. **Assets** is total assets on a banks' balance sheet, measured in millions of dollars. textbfLeverage ratio is defined as regulator risk-based capital divided by total assets. **Earning assets share** is defined as all items on banks' balance sheet that earn interest (total assets excluding cash, intangibles, real estate, fixed assets, corporate investments, and risk reserves) divided by total assets. **Loan share** is gross loans divided by total assets. **Residential mortgage share** is all loans secured by 1-4 family properties, divided by gross loans. **Commerical RE loan share** is loans secured by nonfarm nonresidential properties, divided by gross loans. **Agricultural loan share** is loans to finance agricultural production and other loans to farmers, divided by gross loans. **C &I loan share** is commercial and industrial loans, divided by gross loans. **Credit card loan share** is loans to individuals for household, family, and other personal expenditures made in the form of credit cards, divided by gross loans. **Other cons. loan share** is all other loans to individuals, divided by gross loans.

Table 1.7: Portfolio Choices and Bank Costs

	Management Expense	**Salary**	**Other Control Costs**	**ROE**
Assets	-0.0027***	-0.0016***	-0.0011***	0.0047***
	-4.16	-3.91	-3.36	11.09
Assets squared	0.2310***	0.1157**	0.1153***	-0.4637***
	3.19	2.48	2.79	-7.22
Leverage ratio	-1.6438***	-0.9829***	-0.6609***	-0.4262***
	-20.72	-22.73	-12.10	-9.66
Deposit Funding	0.0297	0.0372	-0.0075	0.0821***
Share	0.66	1.47	-0.33	5.19
Earning assets share	-1.6253***	-0.8210***	-0.8043***	0.4074***
	-5.48	-5.01	-5.55	3.85
Loan share	0.0320	0.0400***	-0.0080	0.0676***
	1.50	3.39	-0.58	7.18
Resi Mortgage loan	0.0501*	0.0512***	-0.0011	0.0054
share	1.94	2.95	-0.08	0.36
Commercial RE loan	-0.0357	-0.0258*	-0.0099	0.0161
share	-1.48	-1.74	-0.71	1.11
Agricultural loan	-0.0366	-0.0040	-0.0327**	-0.0409*
share	-1.24	-0.21	-1.99	-1.70
C & I loan share	0.0170	0.0139	0.0031	-0.1057***
	0.64	0.86	0.23	-6.48
Credit card loan	0.6505***	0.2450***	0.4055**	-0.1370
share	2.78	3.23	2.12	-1.11
Other consumer loans	0.3559***	0.1587**	0.1972***	0.0371
share	2.97	2.38	3.34	1.61
MSA weights	Yes	Yes	Yes	Yes
State, FO FE	Yes	Yes	Yes	Yes
Adj R-sq	0.441	0.397	0.365	0.201
Observations	19385	19385	19385	19385

Note: This table reports OLS regressions of banks' balance sheet measures on costs. The sample is defined as 3,708 U.S. commercial banks between years 2001 and 2007, with $100 million to $1 billion in assets, with geographic exclusions as described in text. All dependent variables are derived from expense items from the FFIEC Call Reports, scaled by total risk based capital and measured in percentage points. The dependent variables are as follows: (Column 1) **Management Expense** is defined as non-interest expense less marketing and real estate costs; (Column 2) **Salary**, defined as salary expense; (Column 3) **Other Control Costs** is all Management Expense excluding Salary, which includes items such as legal, consulting, auditing, data, communications, and insurance; (Column 4) **ROE** is net income less taxes and extraordinary items. Independent variables are defined as described in Table 6. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. **FO fixed effecs** indicate the field office of a banks supervising regulator, at both state and federal levels, as described in Table 1. All banks are assigned to the closest field office within their supervisors' jurisdiction. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors clustered on bank identifier.

Table 1.8: Firm Controls

Control	Mean	Standard Deviation
Age (log)	3.40	0.96
Branches	7.29	10.99
Past year mergers	0.06	0.32
		Percent
State Charter		72.46
FRS member		41.06
SEC registration (0-1)		20.68
BHC owned (0-1)		86.98
Foreign owned (0-1)		0.96
Main BHC enterprise (0-1)		76.58
Rural HQ		20.89

Note: This table reports means and standard deviations for bank characteristics, measured annually. For binary indicators, the sample average of values equal to 1 is reported. The sample includes 19,385 observations covering 3,708 U.S. commercial banks between years 2001 and 2007, with $100 million to $1 billion in assets, with geographic exclusions as described in text. Unless otherwise noted, attributes are based on series from the FFIEC National Information Center (NIC) database. **Age (log)** is the natural log of years since the original charter that a bank operates under was founded. **Branches** is the number of branches with non-zero deposits operated by each entity, derived from FDIC Summary of Deposits data. **Past year mergers** indicate the number of institutions acquired by the entity in the previous 12 months. **State Charter** and **FRS member** indicate a firms' charter type. **SEC registration** indicates whether a bank is registered with the Securities and Exchange Commission (=1). **BHC owned** indicates a bank entity is owned by a bank holding company (=1), as defined by the BHC Act of 1956, and **Foreign owner** indicates a ban entity is owned by a foreign corporation (=1). **Main BHC Enterprise** indicates whether the entity is the principal commercial banking enterprise of the BHC owner (=1). **Rural HQ** indicates whether a banks' headquarters are located outside a Census-defined Metropolitan Statistical Area (MSA) (=1).

Table 1.9: Firm Characteristics and Bank Costs

	Management Expense	**Salary**	**Other Control Costs**	**ROE**
Bank age (log)	0.3757	0.1754	0.2003	1.8704***
	1.22	0.92	1.30	11.32
Bank branches	0.1544**	0.0951**	0.0594**	0.0793***
	2.14	2.01	2.01	5.55
Institutions	-2.1999***	-1.5505***	-0.6494**	-0.5269**
acquired, past year	-4.52	-5.29	-2.36	-2.02
SEC registration	-0.0163*	-0.0131**	-0.0033	0.0069**
status (0-1)	-1.90	-2.55	-0.83	2.11
Bank owned by BHC	0.0625***	0.0247**	0.0378***	0.0323***
(0-1)	3.50	2.52	4.27	7.21
Foreign owned bank	-0.0500	-0.0421**	-0.0078	0.0095
(0/1)	-1.53	-2.35	-0.49	0.53
Bank main enterpr of	-0.0203*	0.0034	-0.0237***	-0.0163***
HC (0/1)	-1.71	0.54	-3.77	-4.74
Rural bank	-0.0328***	-0.0205***	-0.0123***	0.0006
	-5.23	-5.17	-4.05	0.17
MSA weights	Yes	Yes	Yes	Yes
State, FO FE	Yes	Yes	Yes	Yes
Adj R-sq	0.243	0.207	0.246	0.170
Observations	19379	19379	19379	19379

Note: This table reports OLS regressions of bank characteristics on bank-level costs. The sample is defined as 3,708 U.S. commercial banks between years 2001 and 2007, with $100 million to $1 billion in assets, with geographic exclusions as described in text. All dependent variables are derived from expense items from the FFIEC Call Reports, scaled by total risk based capital and measured in percentage points. The dependent variables are as follows: (Column 1) **Management Expense** is defined as non-interest expense less marketing and real estate costs; (Column 2) **Salary**, defined as salary expense; (Column 3) **Other Control Costs** is all Management Expense excluding Salary, which includes items such as legal, consulting, auditing, data, communications, and insurance; (Column 4) **ROE** is net income less taxes and extraordinary items. Independent variables are defined as described in Table 8. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. **FO fixed effecs** indicate the field office of a banks supervising regulator, at both state and federal levels, as described in Table 1. All banks are assigned to the closest field office within their supervisors' jurisdiction. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors clustered on bank identifier.

Table 1.10: Market Environment Controls

Control	Mean	Standard Deviation
Deposit market share	11.79	13.93
Large bank share	53.69	27.45
Market Herfindahl	1862.42	909.29
Small bank Herfindahl	2073.47	1555.77
Local unemployment	5.11	1.33
Local unemployment growth	0.09	0.71
State GDP	427.62	384.74

Note: This table reports means and standard deviations for local economic conditions at banks, measured annually. The sample includes 19,385 observations covering 3,708 U.S. commercial banks between years 2001 and 2007, with $100 million to $1 billion in assets, with geographic exclusions as described in text. All nominal dollar series are adjusted to 2005 prices using the BEA GDP deflator unless otherwise noted. Where banks operate in multiple markets, banks' market measures are averaged over values in the local areas where banks operate branches, weighted by banks' deposits in each MSA (called "deposit-weighted" here). "Local areas" are defined as Metropolitan Statistical Areas (MSAs) for urban areas and counties for rural areas. Deposit weights derived from FDIC Summary of Deposits data. **Deposit market share** is defined as a banks' weighted average market share in all markets in which banks operate branches. Shares are calculated as the total value of bank deposits in local branches divided by the sum of all deposits in the local area, measured in percentage points. **Large bank share** is a measure of local market share comprised by banks with more than 20 total branches. Shares are calculated as the total value of "large" banks' deposits in local area branches, divided by the sum of deposits in the local area, for each bank-year observation are wedighted by a banks' deposit expsoure to the local area. **Market Herfindahl**, a measure of market concentration, is calculated for each bank-year observation as the deposit-weighted average MSA-level Herfindahl Index (HHI). HHI is defined as the sum of squared deposit market shares (measured in percentage points) for each MSA-year over the sample of all commercial bank branches in the MSA. **Small bank Herfindahl**, is the same measure calculated over the set of banks with less than 20 total branches in each local area. **Local unemployment** is derived from the series reported at the county level by the Bureau of Labor Statistics, and is calculated for each bank-year as the deposit-weighted average unemployment rate, measured in percentage points. **Local unemployment growth** is the year-over-year change in this measure. **State GDP** is derived from the series reported at the state level by the US Bureau of Economic Analysis.

pervisory field offices are located. The most important control in this respect is our set of distance indicators, which measure a banks' distance from each supervisory field office. As explained above, the overlapping pattern of jurisdictions allows us to control for confounding effects of distance by separately identifying the distance to a banks' *own* regulatory field office.

Since concerns of unobserved heterogeneity in banks markets may remain (if, for example, the supervisory distance within regime is correlated with market costs), we include MSA fixed effects for the bank headquarters. To control for costs arising across a banks' various geographic exposures, we use deposit-weighted fixed effects

for bank states.[13] To address time-varying aspects of banks' environment we aggregate banks' local branch-level exposure (deposit-size weighted) to the institution level for a number of MSA, state and county-level market conditions at the bank-year level. "Local" areas defined here are MSA boundaries for urban areas or county boundaries for rural areas. Using local area data, we control for banks' average local unemployment rate and the year-over-year change in unemployment rate. We also control for banks' competitive environment as measured by the Herfindahl index (HHI) and a bank's market pricing power as measured by its deposit share, both calculated locally and aggregated to the bank level. Since local competition will vary across market segments dominated by national and community banks, we include an additional variable measuring the percentage of local deposit market share by large institutions (those with more than 20 branches), and a separate Herfhindal measuring competition among smaller banks.[14] We control for overall economic opportunity at the state level using Gross State Product.[15]

Finally, to control for structural differences among agencies and field offices, including differences in labor market conditions and enforcement resources, we include field office fixed effects for banks' chartering agency (OCC or SBA) and banks' federal co-supervisor for state banks (FDIC and FRS).[16] Although we observe banks in

[13] For example, a bank with 85% deposits located in Kansas and 15% deposits located in Nebraska would have an indicator for presence in these two states multiplied by their deposit exposure, and a 0 for all other states. Regression results are similar using this weighted indicator and a 0/1 indicator for a bank's primary state of business.

[14] Both Herfindahl measures include rely on the full set of commercial banks in the United States, including institutions excluded from the sample, such as those with more than $10 billion in assets.

[15] Gross State Products and components come from the BEA Regional Economic Accounts, county-level unemployment and labor force figures from the Bureau of Labor Statistics.

[16] We match banks to field offices within district designations based on the minimum distance between field offices and headquarters.

multiple years, we do not include firm-level fixed effects, due to the fact that identification gained off changes in agency location is likely to be driven by confounding explanations for performance differences (mergers and restructuring).

1.4 Basic Results

1.4.1 Management Expenses and Supervision

Table 12 presents our basic regression results. They show that management expenses increases across the board with greater distance to the federal supervisor's field office for national banks as well as with greater distance to the federal co-supervisors' field offices for state banks. These increases derive mainly from higher non-payroll expenses. This result confirms our central hypothesis: easy information sharing with regulators helps banks manage their internal control function and/or reduces the administrative burden of supervision. The impact on bank expense levels is sizable in economic terms: being 2 hours farther away from the federal regulator increases management expenses as a fraction of risk-based capital by one to two percentage points. Note that we control for distance to all possible supervisors, and that only banks' own supervisors matter, just as one would expect if it is the supervisory relationship, not local economics that drives these results. Unsurprisingly, the results are strongest for the OCC, which is the sole supervisor for national banks, and less so for the more heterogeneous state banking agencies or their federal co-supervisors. This is strongly reminiscent of the results found in Agarwal et al. (2011) regarding regional heterogeneity in regulator leniency.

Table 1.11: Market Environment and Bank Costs

	Management Expense	**Salary**	**Other Control Costs**	**ROE**
Local unemployment	0.6286***	0.2775**	0.3511***	-0.3839***
	3.25	2.38	3.33	-2.95
Local unemployment growth	-0.2733*	-0.0772	-0.1961*	0.1509
	-1.73	-0.92	-1.84	1.30
State GDP	-0.0114***	-0.0073***	-0.0041**	0.0033
	-3.12	-3.29	-2.14	1.07
Market Herfindahl	0.0009***	0.0006***	0.0003	-0.0008***
	2.59	3.43	1.27	-3.79
Small bank Herfindahl	0.0008***	0.0003**	0.0004***	0.0003
	3.04	2.36	2.92	1.49
Large bank share	0.0324**	0.0158*	0.0166*	0.0421***
	2.18	1.86	1.92	4.13
Deposit market share	-0.2090***	-0.1194***	-0.0896***	0.0993***
	-8.65	-8.84	-5.81	6.46
MSA weights	Yes	Yes	Yes	Yes
State, FO FE	Yes	Yes	Yes	Yes
Adj R-sq	0.226	0.182	0.235	0.131
Observations	19366	19366	19366	19366

Note: This table reports OLS regressions of banks' market environment on bank-level costs. The sample is defined as 3,708 U.S. commercial banks between years 2001 and 2007, with $100 million to $1 billion in assets, with geographic exclusions as described in text. All dependent variables are derived from expense items from the FFIEC Call Reports, scaled by total risk based capital and measured in percentage points. The dependent variables are as follows: (Column 1) **Management Expense** is defined as non-interest expense less marketing and real estate costs; (Column 2) **Salary**, defined as salary expense; (Column 3) **Other Control Costs** is all Management Expense excluding Salary, which includes items such as legal, consulting, auditing, data, communications, and insurance; (Column 4) **ROE** is net income less taxes and extraordinary items. Independent variables are defined as described in Table 10. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. **FO fixed effecs** indicate the field office of a banks supervising regulator, at both state and federal levels, as described in Table 1. All banks are assigned to the closest field office within their supervisors' jurisdiction. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors clustered on bank identifier.

Table 1.12: Supervisor Distance and Monitoring Costs

	Management Expense	Salary	Other Control Costs
State Charter	11.7492	6.5655	5.1837
	1.00	0.87	0.92
FRS member	2.2805	0.3329	1.9476
	0.55	0.11	1.36
Supervision Effect			
Distance to SBA x SB	0.5090	-0.1311	0.6401*
	0.95	-0.46	1.75
Distance to OCC x NB	1.2786**	0.2990	0.9796**
	2.25	1.04	2.36
Distance to FRB x SMB	0.0513	0.0223	0.0290
	0.19	0.12	0.20
Distance to FDIC x NMB	0.6615*	0.2969	0.3647*
	1.77	1.22	1.73
Distance Controls			
Distance to SBA	-0.5369	-0.0305	-0.5064
	-1.04	-0.11	-1.43
Distance to OCC	-0.4119*	-0.0244	-0.3876***
	-1.67	-0.16	-2.59
Distance to FRB	0.0772	0.0651	0.0122
	0.42	0.54	0.13
Distance to FDIC	-0.5984	-0.1632	-0.4353*
	-1.63	-0.77	-1.75
Portfolio, firm, market controls	Yes	Yes	Yes
MSA weights	Yes	Yes	Yes
State, FO FE	Yes	Yes	Yes
Adj R-sq	0.458	0.426	0.371
Observations	19468	19468	19468

Note: This table reports OLS regressions of supervisor distance measures on costs. The sample is defined as U.S. commercial banks between years 2001 and 2007, with $100 million to $1 billion in assets, with geographic exclusions as described in text. All dependent variables are derived from expense items from the FFIEC Call Reports, scaled by total risk based capital and measured in percentage points. The dependent variables are as follows: (Column 1) **Management Expense** is defined as non-interest expense less marketing and real estate costs; (Column 2) **Salary**, defined as salary expense; (Column 3) **Other Control Costs** is all Management Expense excluding Salary, which includes items such as legal, consulting, auditing, data, communications, and insurance. **State charter** indicates whether a bank is chartered under state law (=1) or national. **FRS member** indicates whether a bank is a member of the FRS system. The **Distance Controls** are **Distance to SBA, OCC, FRB** and **FDIC**, indicating the travel time in minutes between a banks' headquarters and the respective supervisory field office for each bank. The **Supervision Effect** is each of these distance controls interacted with an indicator for a banks' regulating supervisor or co-supervisor: **SB** for State Banking Agency-supervised state-chartered banks (state charter=1), **NB** for OCC-supervised national banks (state charter = 0), **SMB** for Federal Reserve-supervised state-chartered member banks (state charter=1, FRS member=1), and **NMB** for FDIC-supervised state-chartered non-member banks (state charter=1, FRS member=0). **Portfolio controls** include total assets, assets squared, leverage ratio, earning asset share, loan share, real estate loan share, agricultural loan share, C & I loan share, and credit card loan share. **Firm controls** include a banks' age (log), number of branches, number of recent acquisitions, and indicators for a firms' SEC registration status, holding company ownership, foreign ownership, whether the firm is the owners' principal enterprise, and whether the bank headquarters are located in a rural area, as described in Table 7. **Market controls** include unemployment rates, unemployment growth, state GDP, market concentration (Herfhindal index), and deposit market share, as described in Table 5. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. **FO fixed effecs** indicate the field office of a banks supervising regulator, at both state and federal levels, as described in Table 1. All banks are assigned to the closest field office within their supervisors' jurisdiction. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors clustered on bank identifier.

1.4.2 *Endogenous Location Choice*

There are two more types of endogeneity that might be a concern. The first is banks' original location choice. In an industry with a single regulator we may believe that firms' location choice is correlated with some features of the environment that drive performance and are not captured in our local economic controls. However, in this setting of regulatory choice and disperse field office locations, it is reasonable to assume that controlling for the endogeneity of supervisor choice is sufficient to address endogeneity relating to the banks' location decision.

The second area of concern is regulators' location choices. Regulators may locate their field offices closer to better performing banks, or performance differences may reflect other unobserved market characteristics of field office locations. If this is the case, the results above could simply reflect systematically different costs of doing business in different environments where supervisors and banks tend to co-locate; for instance, a more competitive business environment. We think that this concern is not very serious for several reasons. The first is that there are very few changes in field office locations during our sample period.[17] To confirm field office locations, we contacted every state banking agency with a questionnaire about office locations and changes in location. Differences in location characteristics that do not change over time are controlled for with MSA and Field Office fixed effects. Second, beyond the largest metropolitan areas, there is a wide variation in the location patterns among supervisors – and thus in banks' choice set – reflecting differences in their district structuring and the geographic scope of bank locations. For example, the state of Pennsylvania has a field office located in Harrisburg, not a regional banking center,

[17] There have been changes in district office organization. Although older documents from the OCC indicate that several field office locations existed in the past that do not exist today, after FOIA requests and conversations with the OCC librarian, we were unable to identify their exact location

but a city with a geographic centrality that facilitates travel throughout the state. Table 4 showed the mean distance and standard deviation of banks' choice set among their supervisors. The mean of distances from the OCC, State, FRS and FDIC for banks in our sample is 105 minutes of driving time, with a standard deviation of 96 minutes. If all field offices and banks were co-located, both the mean and standard deviation of the choice set would be close to zero.

1.4.3 Oversight, Compliance and Leverage

Are the differences in banks' cost structure that we observe across supervisory districts due to differences in compliance or leverage? One of the main justifications for bank supervision is that deposit insurance gives managers the incentive to make riskier investments and increase leverage at the expense of deposit holders. Solvency, rather than profitability, is supervisors' main concern in examining banks. If agencies do not monitor leverage and other indicators of risky behavior perfectly within their districts, we might also expect to see leverage vary systematically with distance to supervisory field offices. Our income and cost measures are scaled by bank capital, so lower cost ratios at close banks represent increased regulatory scrutiny of capital levels at these institutions. Table 13 shows that, controlling for portfolio composition, performance differentials are not driven by notably risky behavior at more distant banks[18]. The effect of supervisor distance on delinquency levels at banks (NPL ratio) is small and not significant. Coverage ratio, defined as loan loss reserves over non-performing loans, is a measure of banks' ability to cover future losses. This measure also does not vary significantly with supervisor distance. We also test whether su-

[18] Note that here, for clarity, primary supervisors (OCC and SBA) and federal co-supervisors (FRS and FDIC) have been treated as two, not four, distinct categories. The same is true for all remaining tables.

pervisor distance is related to higher income volatility, controlling for portfolio composition. This dependent variable is defined as the standard deviation of banks' total ROE over the previous 5 years, measured annually. Finally, we test whether distantly supervised banks have higher interest margins, which could be the result of a riskier portfolio. Neither of these measure vary significantly with supervisor distance. Finally, Table 14 shows that supervisor distance is not associated with differences in leverage.

The fact none of these measures of risk or solvency vary with supervision is somewhat surprising. We interpret this finding as support for our hypothesis that differences in supervision, at least within a given regulatory regime, are not driven by differences in formal enforcement due to shirking or corrupt agents. Rather, they are driven by differences in the nature of information exchange among banks issues matters involving a high degree of discretion, such as management practices and internal controls. In contrast, risk-based capital levels are strictly measured and transparently reported quarterly, leading to parity across institutions.

1.5 Extensions

The financial crisis of 2008-2009 provides an interesting opportunity estimate the effect of an adverse event on regulatory behavior. It is not clear whether the increasing uncertainty in the environment would reduce differences among institutions, or increase them. The overwhelming sentiment from the industry and conversations with supervisors is that the crisis has provoked a more proactive and punitive approach by regulators.[19] If instead the crisis only only affects banks' loss probability,

[19] "[E]xaminers (..) have crossed he line and become too cautious. 'That over-cautiousness is really slowing down our ability to make loans. (..) If we want to get this economy moving, we've got to let banks do what banks do best, which is underwrite credit.'" *American Banker*, 9/2/2010

Table 1.13: Supervisor Distance and Compliance Behavior

	NPL Ratio	Coverage Ratio	Income Volatility	NIM
Distance to	0.0252	2.7740	-0.0569	0.1888
supervisor	0.66	0.89	-0.28	0.69
Distance to	0.0286	0.2255	0.1448	-0.1533
co-supervisor	1.11	0.14	1.11	-0.92
Distance controls	Yes	Yes	Yes	Yes
Portfolio, firm, mkt controls	Yes	Yes	Yes	Yes
MSA weights	Yes	Yes	Yes	Yes
State, FO FE	Yes	Yes	Yes	Yes
Adj R-sq	0.145	0.043	0.230	0.543
Observations	19360	18163	17989	19360

Note: This table reports OLS regressions of supervisor distance measures on risk-taking behavior at banks. The sample is defined as U.S. commercial banks between years 2001 and 2010, with $100 million to $1 billion in assets, with geographic exclusions as described in text. All dependent variables are derived from expense items from the FFIEC Call Reports, scaled by total risk based capital and measured in percentage points. The dependent variables are as follows: (Column 1) **NPL Ratio** is a measure of loan delinquencies, defined as all loans with payments over 90 days past due, scaled by total loans, a measure of banks' ability to screen borrowers and manage risk; (Column 2) **Coverage Ratio**, defined as loan loss reserves over non-performing loans, is a measure of the adequacy of bank reserves to cover loses; (Column 3) **Income Volatility** is the standard deviation of bank ROE over the previous 5 years; (Column 4) **NIM** is the net interest margin, the difference between interest income and interest expense, as a share of capital measured in percentage points. The **Distance to supervisor** is each of banks' travel time in minutes to their chartering agency, and **Distance to co-supervisor** is state banks' travel time in minutes to their federal co-supervisor (either the FRS for member banks or FDIC for non-member banks), and is 0 for OCC-supervised banks. The **Distance controls** are four variables indicating each banks' distance to the closest SBA, OCC, FRB and FDIC field offices. **Portfolio controls** include total assets, assets squared, leverage ratio, earning asset share, loan share, and loan portfolio shares for mortgage loans, CRE loans, agricultural loans, C & I loans, credit card loans, and other consumer loans, as described in Table 6. **Firm controls** include a banks' age (log), number of branches, number of recent acquisitions, and indicators for a firms' SEC registration status, holding company ownership, foreign ownership, whether the firm is the owners' principal enterprise, and whether the bank headquarters are located in a rural area, as described in Table 8. **Market controls** include unemployment rates, unemployment growth, state GDP, large bank market share, market concentration (Herfindahl index), small bank market concentration and deposit market share, as described in Table 10. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. **FO fixed effecs** indicate the field office of a banks supervising regulator, at both state and federal levels, as described in Table 1. All banks are assigned to the closest field office within their supervisors' jurisdiction. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors clustered on bank identifier.

Table 1.14: Supervisor Distance and Leverage

	Other Control Costs	**Leverage**	**Other Control Costs / Assets**
State Charter	5.3693	6.7830**	0.6757
	0.95	2.04	1.07
FRS member	1.1011	-0.6067	0.1006
	0.80	-0.96	0.81
Distance to supervisor	0.9027**	0.0449	0.0840***
	2.40	0.45	3.06
Distance to co-supervisor	0.0979	-0.0620	0.0044
	0.61	-0.87	0.32
Distance controls	Yes	Yes	Yes
Portfolio, firm, market controls	Yes	Yes	Yes
MSA weights	Yes	Yes	Yes
State, FO FE	Yes	Yes	Yes
Adj R-sq	0.372	0.262	0.283
Observations	19360	19360	19360

Note: This table reports OLS regressions of supervisor distance measures on costs, scaled alternatively by capital and by assets, and shows that leverage does not drive our results. The sample is defined as U.S. commercial banks between years 2001 and 2007, with $100 million to $1 billion in assets, with geographic exclusions as described in text. All dependent variables are derived from expense items from the FFIEC Call Reports, and measured in percentage points. The dependent variables are as follows: (Column 1) **Other Control Costs** is all Management Expense excluding Salary, scaled by regulatory capital; (Column 2) **Leverage**, defined as regulatory capital over assets; (Column 3) **Other Control Costs / Assets** is Control Costs divided by total assets rather than risk-based capital. **State charter** indicates whether a bank is chartered under state law (=1) or national. **FRS member** indicates whether a bank is a member of the FRS system. The **Distance to supervisor** is each of banks' travel time in minutes to their chartering agency, and **Distance to co-supervisor** is state banks' travel time in minutes to their federal co-supervisor (either the FRS for member banks or FDIC for non-member banks). **Distance controls** are four variables indicating each banks' travel time in minutes to the closest SBA, OCC, FRB and FDIC field offices. **Portfolio controls** include total assets, assets squared, leverage ratio, earning asset share, loan share, and loan portfolio shares for mortgage loans, CRE loans, agricultural loans, C & I loans, credit card loans, and other consumer loans, as described in Table 6. **Firm controls** include a banks' age (log), number of branches, number of recent acquisitions, and indicators for a firms' SEC registration status, holding company ownership, foreign ownership, whether the firm is the owners' principal enterprise, and whether the bank headquarters are located in a rural area, as described in Table 8. **Market controls** include unemployment rates, unemployment growth, state GDP, large bank market share, market concentration (Herfindahl index), small bank market concentration and deposit market share, as described in Table 10. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. **FO fixed effecs** indicate the field office of a banks supervising regulator, at both state and federal levels, as described in Table 1. All banks are assigned to the closest field office within their supervisors' jurisdiction. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors clustered on bank identifier.

not regulator behavior, we would expect to see a relative increase in costs for the more poor-performing (distant) banks.

James Q. Wilson (1991) argues that bureaucratic agencies' ability to act as a resource to industry though cooperative information exchange and supervisor discretion depends heavily on the level of risk that agents bear for exercising that discretion, which is largely determined by the political environment. Decentralization of authority facilitates the exchange between banks and regulators. Both the FDIC and OCC delegated increased authority to field offices during this study (2002 and 2004, respectively), which may account for the stronger relationship between distance and performance at these agencies. In contrast, a highly litigious or adversarial environment discourages a "helpful" regulator. A negative response by politicians and the public to a major crisis should shift regulatory agencies' positioning toward industry. During the financial crisis of 2008-2009, we would expect examiners to face both higher uncertainty about bank performance, and to face higher risk in exercising discretion. Examiners may be more reluctant to advise banks, and more likely to increase the compliance burden to avoid blame for banks' choices. These effects of the crisis may dissipate the value of close relationships.

Industry sources suggest this might be the case. As noted by the *American Banker*, bankers perceived a negative shift during the financial crisis: "Field examiners feel threatened. They feel like their jobs are in jeopardy if they vary from anything that Washington says to do." (*American Banker* 2/10/2011); "Many community bankers said their examiner, once a trusted adviser who helped the bank improve its operations, is now more concerned with defending his or her performance to superiors in Washington." *American Banker*, 1/26/2011; "Regulators have stifled lending to a great degree because bankers are afraid to make loans...Our exam last year was so

very different than any other exam. They came in, they didn't smile, they had their marching orders from headquarters. It was a totally different experience." *American Banker*, 9/2/2010. These views were confirmed by conversations with supervisors.

Table 15 shows that the proximity benefit for both state and national banks does not vary in times of crisis. At the same time, overall control costs to these banks rise by 3%. These results imply a shift in agency behavior which results in increased compliance costs for all banks, although closer relationships mitigate this effect somewhat. These results lend credence to the idea that cooperative regulatory relationships can insulate firms from major industry crises.

1.5.1 Capture Theory

A benefit to local relationships could be that regulators and banks are better able to establish a reputational equilibrium in which frequency of interaction and personal relationships facilitate the transfer of rents between examiners and management (Kroszner and Strattman, 1999). These exchanges be monetary, or could be referrals, future employment, etc., in exchange for a less costly examination. The key differences between this explanation and the one that we offer are, first, that examinations would not necessarily enhance banks' financial performance, and second, that we would expect to see the most lucrative relationships between large banks and their regulators rather than between small banks and their regulators.

In the previous section we showed that banks that are co-located with their examiners have both lower costs and more prudently managed portfolios, a first indication that capture theory does not explain the differences we observe. We also see in Table 16 below that the benefit to a close supervisory relationship does not increase with

Table 1.15: Extension: Financial Crisis, 2008-2010

	Management Expense	**Salary**	**Other Control Costs**
Distance to supervisor	1.0901**	0.1987	0.8913**
	2.22	0.84	2.42
Distance to co-supervisor	-0.0283	-0.0758	0.0475
	-0.12	-0.55	0.32
Crisis	3.2332***	0.1865	3.0467***
	2.71	0.28	3.97
Crisis x Distance to supervisor	-0.1897	0.0567	-0.2465
	-0.76	0.50	-1.34
Crisis x Distance to co-supervisor	0.1529	0.0419	0.1110
	0.68	0.45	0.60
Distance, charter controls	Yes	Yes	Yes
Portfolio, firm, market controls	Yes	Yes	Yes
MSA weights	Yes	Yes	Yes
State, FO FE	Yes	Yes	Yes
Adj R-sq	0.430	0.405	0.345
Observations	27953	27953	27953

Note: This table reports OLS regressions of supervisor distance measures on costs for a time period that includes the US banking crisis (2008-2010) in order to identify separate effects of supervision on costs during crisis response. The sample is defined as U.S. commercial banks between years 2001 and 2010, with $100 million to $1 billion in assets, with geographic exclusions as described in text. All dependent variables are derived from expense items from the FFIEC Call Reports, scaled by total risk based capital and measured in percentage points. The dependent variables are as follows: (Column 1) **Management Expense** is defined as non-interest expense less marketing and real estate costs; (Column 2) **Salary**, defined as salary expense; (Column 3) **Other Control Costs** is all Management Expense excluding Salary, which includes items such as legal, consulting, auditing, data, communications, and insurance. **Crisis** indicates years 2008-2010, the US banking crisis. The **Distance to supervisor** is each of banks' travel time in minutes to their chartering agency, and **Distance to co-supervisor** is state banks' travel time in minutes to their federal co-supervisor (either the FRS for member banks or FDIC for non-member banks). Each of these terms is interacted with "Crisis". The **Distance controls** are four variables indicating each banks' travel time in minutes to the closest SBA, OCC, FRB and FDIC field offices, as well as interactions with each of these terms and "Crisis". **Charter controls** state charter and FRS Membership indicator are included by not reported, as well as their interactions with "Crisis", coefficients are not statistically significant. **Portfolio controls** include total assets, assets squared, leverage ratio, earning asset share, loan share, and loan portfolio shares for mortgage loans, CRE loans, agricultural loans, C & I loans, credit card loans, and other consumer loans, as described in Table 6. **Firm controls** include a banks' age (log), number of branches, number of recent acquisitions, and indicators for a firms' SEC registration status, holding company ownership, foreign ownership, whether the firm is the owners' principal enterprise, and whether the bank headquarters are located in a rural area, as described in Table 8. **Market controls** include unemployment rates, unemployment growth, state GDP, large bank market share, market concentration (Herfindahl index), small bank market concentration and deposit market share, as described in Table 10. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. **FO fixed effecs** indicate the field office of a banks supervising regulator, at both state and federal levels, as described in Table 1. All banks are assigned to the closest field office within their supervisors' jurisdiction. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors clustered on bank identifier.

size.[20] The insignificant coefficient on the interaction term of supervisor distance and size indicates that as a bank grows larger the relative benefit of a close supervisory relationship (or cost of a very distant one) does not grow. This finding provides evidence against the capture theory-based explanation for our central result.

1.5.2 Evidence on technology adoption

Has the improved use of information technology in recent years reduced the information disparity between distant banks and those closer to home? Indeed, research on technology adoption in banks has indicated that information technology has widened the scope of banks' ability to lend on "soft information" (Petersen and Rajan, 2002). On the other hand, if supervisory relationships rely on examiners' local knowledge and personal relationships, there is little reason to think the effect will decrease over time. In our sample, which includes the pre-crisis years of 2001-2007, there is little evidence that the importance of proximity decreases over time, as Table 17 shows.

The fact that we do not see a linear trend in reducing the benefit could be due to any number of confounding factors. Our sample is limited to 7 years of data, and it is not clear when changes were made at each of the agency field offices during this time period. Additionally, the effects of changes in examination practices are likely not linear. The reorganizations of the FDIC and OCC field office structures over this period (toward more decentralized authority) may have had the effect of increasing

[20] A general point seems worth making here. Our setting, which relies on the activities of multiple agencies, demonstrates heterogeneity in the way that oversight affects firms. Firms that are supervised by the federal agencies, which are commonly known as the "toughest" supervisors, exhibit the most financial benefit from close supervision, while the pooled effect of the relatively resource-constrained state bank supervision is less precisely estimated. These results suggest that the net impact of supervisory oversight depends very much on institutional factors guiding agency behavior, an interesting avenue for future research.

Table 1.16: Extension: Bank Size Interaction

	Management Expense	**Salary**	**Other Control Costs**
Distance to supervisor	0.8495*	0.0590	0.7905*
	1.68	0.26	1.95
Distance to co-supervisor	0.0007	0.0003	0.0004
	1.54	1.33	1.20
Assets x Distance to supervisor	0.0877	-0.0398	0.1275
	0.32	-0.25	0.79
Assets x Distance to co-supervisor	0.0004	0.0003	0.0001
	1.03	1.10	0.63
Distance, charter controls	Yes	Yes	Yes
Portfolio, firm, market controls	Yes	Yes	Yes
MSA weights	Yes	Yes	Yes
State, FO FE	Yes	Yes	Yes
Adj R-sq	0.460	0.433	0.372
Observations	19360	19360	19360

Note: This table reports OLS regressions of supervisor distance measures on costs with interaction terms to identify scale effects for supervision on costs. The sample is defined as U.S. commercial banks between years 2001 and 2007, with $100 million to $1 billion in assets, with geographic exclusions as described in text. All dependent variables are derived from expense items from the FFIEC Call Reports, scaled by total risk based capital and measured in percentage points. The dependent variables are as follows: (Column 1) **Management Expense** is defined as non-interest expense less marketing and real estate costs; (Column 2) **Salary**, defined as salary expense; (Column 3) **Other Control Costs** is all Management Expense excluding Salary, which includes items such as legal, consulting, auditing, data, communications, and insurance. The **Distance to supervisor** is each of banks' travel time in minutes to their chartering agency, and **Distance to co-supervisor** is state banks' travel time in minutes to their federal co-supervisor (either the FRS for member banks or FDIC for non-member banks). Each of these terms is interacted with total **Assets** as reported on bank balance sheets. The **Distance controls** are four variables indicating each banks' travel time in minutes to the closest SBA, OCC, FRB and FDIC field offices, as well as interactions with each of these terms and Assets. **Charter controls** state charter and FRS Membership indicator are included by not reported, as well as their interactions with Assets, coefficients are not statistically significant. **Portfolio controls** include total assets, assets squared, leverage ratio, earning asset share, loan share, and loan portfolio shares for mortgage loans, CRE loans, agricultural loans, C & I loans, credit card loans, and other consumer loans, as described in Table 6. **Firm controls** include a banks' age (log), number of branches, number of recent acquisitions, and indicators for a firms' SEC registration status, holding company ownership, foreign ownership, whether the firm is the owners' principal enterprise, and whether the bank headquarters are located in a rural area, as described in Table 8. **Market controls** include unemployment rates, unemployment growth, state GDP, large bank market share, market concentration (Herfindahl index), small bank market concentration and deposit market share, as described in Table 10. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. **FO fixed effecs** indicate the field office of a banks supervising regulator, at both state and federal levels, as described in Table 1. All banks are assigned to the closest field office within their supervisors' jurisdiction. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors clustered on bank identifier.

Table 1.17: Extension: Time Trend

	Management Expense	Salary	Other Control Costs
Distance to supervisor	0.6506	-0.1379	0.7884*
	1.19	-0.54	1.88
Distance to co-supervisor	0.0591	-0.0243	0.0834
	0.19	-0.14	0.45
Trend	0.3846	0.1200	0.2646*
	1.50	0.81	1.72
Trend x State Charter	-0.1424	-0.0662	-0.0763
	-0.66	-0.51	-0.58
Trend x FRS member	-0.2186*	-0.0892	-0.1294**
	-1.80	-1.14	-2.04
Trend x Distance to supervisor	0.0922	0.0661*	0.0261
	1.46	1.89	0.64
Trend x Distance to co-supervisor	0.0076	-0.0036	0.0112
	0.13	-0.12	0.29
Distance, charter controls	Yes	Yes	Yes
Portfolio, firm, market controls	Yes	Yes	Yes
MSA weights	Yes	Yes	Yes
State, FO FE	Yes	Yes	Yes
Adj R-sq	0.457	0.424	0.372
Observations	19360	19360	19360

Note: This table reports OLS regressions of supervisor distance measures on costs with interaction terms to identify a time trend in this effect over the 7-year sample period. The sample is defined as U.S. commercial banks between years 2001 and 2007, with $100 million to $1 billion in assets, with geographic exclusions as described in text. All dependent variables are derived from expense items from the FFIEC Call Reports, scaled by total risk based capital and measured in percentage points. The dependent variables are as follows: (Column 1) **Management Expense** is defined as non-interest expense less marketing and real estate costs; (Column 2) **Salary**, defined as salary expense; (Column 3) **Other Control Costs** is all Management Expense excluding Salary, which includes items such as legal, consulting, auditing, data, communications, and insurance. **Trend** is a time trend, with 2001 set to 0 and each year increasing. The **Distance to supervisor** is each of banks' travel time in minutes to their chartering agency, and **Distance to co-supervisor** is state banks' travel time in minutes to their federal co-supervisor (either the FRS for member banks or FDIC for non-member banks). Each of these terms is interacted with total **Trend** as reported on bank balance sheets. The **Distance controls** are four variables indicating each banks' travel time in minutes to the closest SBA, OCC, FRB and FDIC field offices, as well as interactions with each of these terms and Assets. **Charter controls** state charter and FRS Membership indicator are included by not reported. Each of these variables interaction with "Trend" is reported. **Portfolio controls** include total assets, assets squared, leverage ratio, earning asset share, loan share, and loan portfolio shares for mortgage loans, CRE loans, agricultural loans, C & I loans, credit card loans, and other consumer loans, as described in Table 6. **Firm controls** include a banks' age (log), number of branches, number of recent acquisitions, and indicators for a firms' SEC registration status, holding company ownership, foreign ownership, whether the firm is the owners' principal enterprise, and whether the bank headquarters are located in a rural area, as described in Table 8. **Market controls** include unemployment rates, unemployment growth, state GDP, large bank market share, market concentration (Herfindahl index), small bank market concentration and deposit market share, as described in Table 10. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. **FO fixed effecs** indicate the field office of a banks supervising regulator, at both state and federal levels, as described in Table 1. All banks are assigned to the closest field office within their supervisors' jurisdiction. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors clustered on bank identifier.

the importance of distance, and the introduction of new examination priorities like "risk-based" supervision, may also confound our estimates.

1.6 Robustness Checks

In this section we study the robustness of the results established in the Section 3 by considering alternative sample selection and functional form choices.

1.6.1 Sample Selection

Table 18 uses our specification from Table 11 to regress Management Expenses on supervision under various sample restrictions, removing parts of our data set that may spuriously drive our results. The sub-sample in Column 1 excludes banks headquartered in the northeastern United States, defined as all those reporting to the first or second Federal Reserve District. This includes all of New England, New York, and New Jersey. In much of this area, driving times are much lower and there may be inadequate state banking institutions to provide a robust comparison group (with the exception of New York.) We have also been asked on occasion whether urban density in financial centers like the New York City metropolitan region drives our results. The sub-sample in Column 2 excludes "hot" banking markets between 2001 and 2007, dropping Florida, Georgia, and Nevada. These states have received attention as a locus of many of the small bank failures during the financial crisis, and both have a highly active state banking system that has competed actively for regional deposits. Removing these states should ensure that it is not the housing bubble or its fallout that drives our results. The sub-sample in Column 3 includes only those banks that exist in all years 2001 - 2007 and makes our panel balanced. This sample restriction tests whether our results are driven by banks that enter or leave or sample

during the period. Finally, the sub-sample in Column 4 excludes rural banks, which may face a qualitatively different competitive environment. None of these changes to our sample affect our central result in qualitatively important ways.

1.6.2 Functional Form

The prior literature on information diffusion and geographic networks indicates that we should not find that the benefits of close supervision are linear in distance. Coval and Moskowitz (2001), who study the effect of proximity on information rents in the investment industry, report that information transfers occur when agents are located within 100km (60 miles) of each other, and beyond that there is no effect. In Table 19, we include three non-linear specifications. Column (1) includes a squared distance measure, whereas Column (2) includes a dummy variable indicating if a bank is in the same MSA as its supervisor, and Column (3) includes a dummy variable indicating if a bank is farther than one hour's driving distance from the supervisors' field office. Together, these results suggest that it really is distance, not Coval and Moskowitz' colocation notion, that drives our results.

1.7 Conclusions

This paper shows that firms can effectively gain a competitive advantage by extracting relational rents from their regulatory environment. We observe this through the lower costs at banks near supervisors, and interpret our findings as support for the idea that proximity to regulators facilitates informal contact which can be the basis of cost-reducing information exchange and performance-enhancing knowledge transfer.

Our results come with several caveats. The first is that our study focuses on the

Table 1.18: Robustness: Sample Restrictions

	DV: Other Control Costs			
	(1)	(2)	(3)	(4)
Distance to	0.8719**	0.9719**	1.2357**	1.2447*
supervisor	2.25	2.34	2.32	1.75
Distance to	0.0978	0.0858	0.2884	0.3763
co-supervisor	0.63	0.52	1.22	1.23
Distance, charter controls	Yes	Yes	Yes	Yes
Portfolio, firm, mkt controls	Yes	Yes	Yes	Yes
MSA weights	Yes	Yes	Yes	Yes
State, FO FE	Yes	Yes	Yes	Yes
Adj R-sq	0.378	0.376	0.441	0.388
Observations	18433	17484	12899	14743

Note: This table reports OLS regressions of supervisor distance measures on costs using limited subsets of the data. The original sample is defined as U.S. commercial banks between years 2001 and 2007, with $100 million to $1 billion in assets, with geographic exclusions as described in text. The sub-sample in **Column 1** excludes Northeastern states, which may have different economic density (drops Federal Reserve Districts 1 and 2). The sub-sample in **Column 2** excludes "hot" banking markets, dropping Florida, Georgia, and Nevada. The sub-sample in **Column 3** is a balanced panel. The sub-sample in **Column 4** excludes all rural banks and those banks that operate outside of MSAs according to branch deposit data. All dependent variables are derived from expense items from the FFIEC Call Reports, scaled by total risk based capital and measured in percentage points. The dependent variables for all results is **Other Control Costs**, or non-interest expense less real esate, marketing and salary, which includes items such as legal, consulting, auditing, data, communications, and insurance. The **Distance to supervisor** is each of banks' travel time in minutes to their chartering agency, and **Distance to co-supervisor** is state banks' travel time in minutes to their federal co-supervisor (either the FRS for member banks or FDIC for non-member banks). The **Distance controls** are four variables indicating each banks' travel time in minutes to the closest SBA, OCC, FRB and FDIC field offices, as well as interactions with each of these terms and Assets. **Charter controls** state charter and FRS Membership indicator are included by not reported. **Portfolio controls** include total assets, assets squared, leverage ratio, earning asset share, loan share, and loan portfolio shares for mortgage loans, CRE loans, agricultural loans, C & I loans, credit card loans, and other consumer loans, as described in Table 6. **Firm controls** include a banks' age (log), number of branches, number of recent acquisitions, and indicators for a firms' SEC registration status, holding company ownership, foreign ownership, whether the firm is the owners' principal enterprise, and whether the bank headquarters are located in a rural area, as described in Table 8. **Market controls** include unemployment rates, unemployment growth, state GDP, large bank market share, market concentration (Herfindahl index), small bank market concentration and deposit market share, as described in Table 10. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. **FO fixed effecs** indicate the field office of a banks supervising regulator, at both state and federal levels, as described in Table 1. All banks are assigned to the closest field office within their supervisors' jurisdiction. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors clustered on bank identifier.

Table 1.19: Robustness: Functional Form

	DV: Other Control Costs		
	(1)	(2)	(3)
Distance to supervisor	0.8601*		
	1.95		
Distance to co-supervisor	0.3813		
	1.24		
Distance to supervisor, squared	0.0227		
	0.42		
Distance to co-supervisor, squared	-0.0351		
	-1.29		
Co-location with supervisor		0.6894	
		0.87	
Co-location with co-supervisor		-0.2919	
		-0.55	
Distance to sup over 60 min			0.1906
			0.43
Distance to co-sup over 60 min			0.2598
			0.60
Distance, charter controls	Yes	Yes	Yes
Portfolio, firm, market controls	Yes	Yes	Yes
MSA weights	Yes	Yes	Yes
State, FO FE	Yes	Yes	Yes
Adj R-sq	0.372	0.371	0.371
Observations	19360	19360	19360

Note: This table reports OLS regressions of supervisor distance measures on costs with alternative measures of supervisory distance. The sample is defined as U.S. commercial banks between years 2001 and 2007, with $100 million to $1 billion in assets, with geographic exclusions as described in text. All dependent variables are derived from expense items from the FFIEC Call Reports, scaled by total risk based capital and measured in percentage points. The dependent variables for all results is **Other Control Costs**, or non-interest expense less real esate, marketing and salary, which includes items such as legal, consulting, auditing, data, communications, and insurance. The **Distance to supervisor** is each of banks' distance to their chartering agency, and **Distance to co-supervisor** is state banks' travel time in minutes to their federal co-supervisor (either the FRS for member banks or FDIC for non-member banks). **Co-location with supervisor** (or co-supervisor) indicates that the bank HQ are located in the same city as the regulating agency field office. **Distance to sup over 60 min** indicates that bank headquarters are over 60 minutes from their own regulating field office. The **Distance controls** are four variables indicating each banks' distance to the closest SBA, OCC, FRB and FDIC field offices, as well as interactions with each of these terms and Assets. **Charter controls** state charter and FRS Membership indicator are included by not reported. **Portfolio controls** include total assets, assets squared, leverage ratio, earning asset share, loan share, real estate loan share, agricultural loan share, C & I loan share, and credit card loan share. **Firm controls** include a banks' age (log), number of branches, number of recent acquisitions, and indicators for a firms' SEC registration status, holding company ownership, foreign ownership, whether the firm is the owners' principal enterprise, and whether the bank headquarters are located in a rural area, as described in Table 7. **Market controls** include unemployment rates, unemployment growth, state GDP, market concentration (Herfhindal index), and deposit market share, as described in Table 5. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. **FO fixed effecs** indicate the field office of a banks supervising regulator, at both state and federal levels, as described in Table 1. All banks are assigned to the closest field office within their supervisors' jurisdiction. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors clustered on bank identifier.

marginal effects of distance within a regulatory regime, not on the total costs or benefits associated with a given level of oversight, nor on the relationship of the total with the marginal effect. For example, it could be that the benefit of geographic proximity is greatest when administrative rules are highly complex and costly. It could also, admittedly, be the case that in other regulatory environments the advantages of proximity to regulators do not outweigh the drawbacks. Even if they do not, the source of the benefit may be increased rents instead of decreased costs. The finding that the financial crisis dissipates the effect of proximity but increases overall costs suggests that there are complex dynamics underlying the relationships firms' compliance environment that are worthy of study.

We also do not distinguish the drivers of agency behavior that are likely to underly the value in regulatory relationships. For example, we find mixed evidence of the existence of performance differences for banks under different supervisory regimes. The FRS oversight system, which is operated out of a sparse network of field offices with strong district-level control, seems to confer more limited relationship advantages than the relatively more disperse and decentralized FDIC. We view these caveats as launching points for a research agenda that explores these issues in more depth.

Banks certainly benefit from the fact that the supervisors' endeavor to promote a strong, stable banking system is well-aligned with bank managers' objectives for firm performance. The potential for beneficial exchange arises out of these shared objectives. It is worth considering whether the potential for shared value exists in other regulated industries. Could firms facing environmental compliance inspections benefit from an improved understanding of their regulator? Do manufacturing firms have the potential to learn from safety inspectors? We leave the answer to future research,

and it will vary from industry to industry, but we do believe that firms across regulated industries should investigate the potential sources of value in engaging with their supervisors.

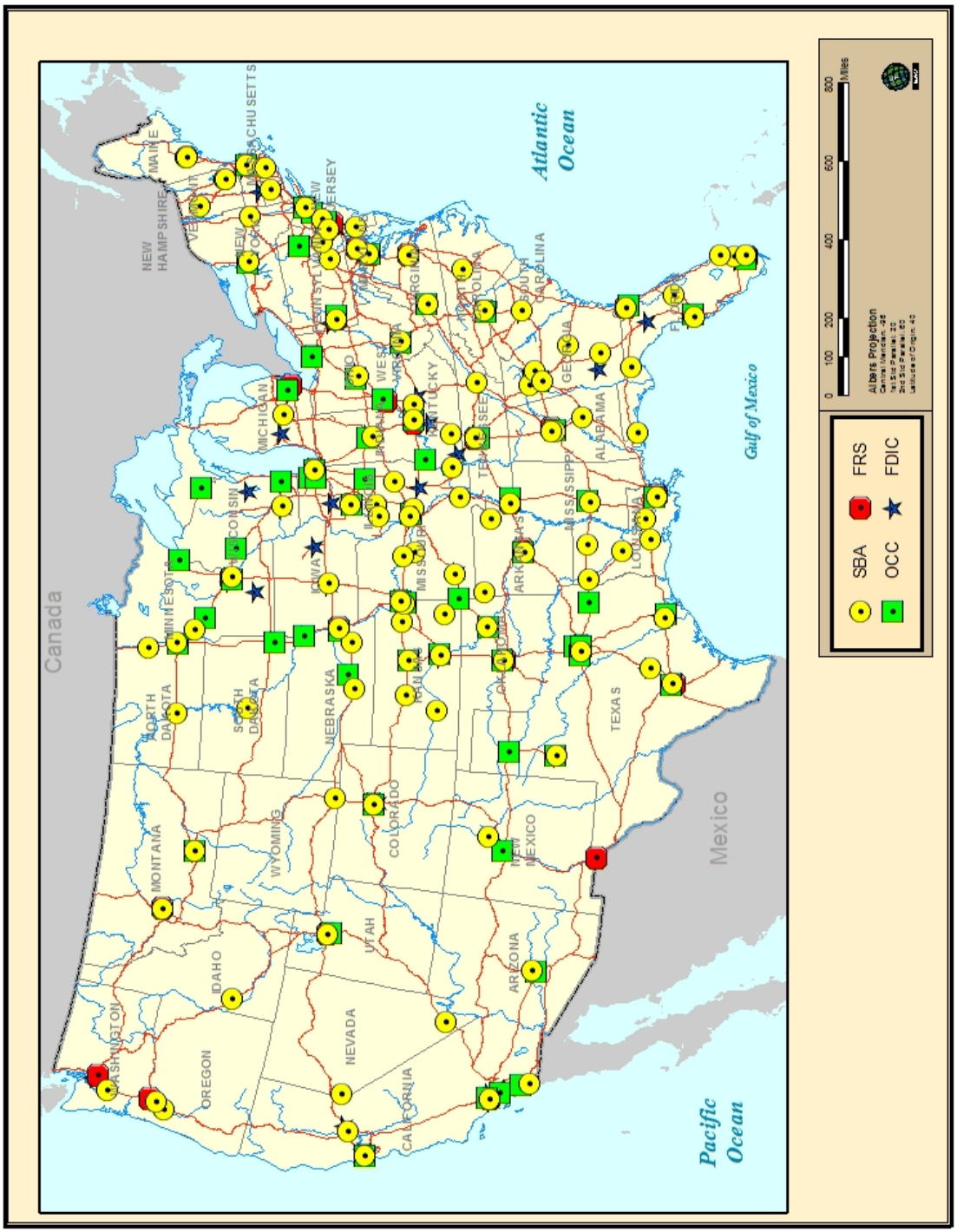

Figure 1.1: Field Offices

2. MANAGING IN BOOM AND BUST MARKETS : THE ROLE OF MARKET EXPERIENCE

2.1 Introduction

Does the knowledge acquired through market experience contribute to a strategic advantage in managing exposure to risk? I consider this question by studying differences in the quality of banks' investment decisions in a highly cyclical, competitive line of business: construction and development lending. Over the last decade, a surge in demand for new construction projects drove widespread growth in construction lending at community banks.[1] Between 2001 and 2007 community banks more than tripled their volume of these loans, doubling the share of all business done at these banks. This surge in demand increased the number of banks that engaged heavily in this line of business; while only 1 in 5 banks relied on construction for over 10% of total assets in 2001, 1 in 2 did in 2007. Yet, following the 2008 financial crisis, bank's construction lending assets collapsed to half of their 2007 volume, with 10%[2] of all loans reported delinquent, and over 300 bank failures due primarily due to exposures in this area. In this paper, I use the 2008 real estate demand shock to test whether banks with higher investment levels before the market boom demonstrate advantages

[1] The characteristics defining this industry subgroup are discussed in Section 2.

[2] During the period 2001 to 2007, this rate averaged less than 1% of loans.

in managing exposure to project-level idiosyncratic risk and to market-level systemic risk in construction lending.

Credit markets are characterized by asymmetric information about borrowers' creditworthiness and uncertainty about future market conditions. In competitive markets, banks offer borrowers loan terms that reflect the risks associated with financing the project, while borrowers select the best terms available. Thus, in the long-run, superior performance in credit markets is driven by banks' ability to correctly predict and manage these risks. This paper considers the origins of these risk management capabilities, and proposes that banks' capacity to construct high-quality loan portfolios is a resource that must be acquired within organizations over time. If this is the case, banks with more lending experience should acquire projects with lower default probabilities than their competitors. If rapid market expansion allows lower quality, less experienced lenders enter the market, more savvy banks' overall exposure to the market should decrease.

In the empirical analysis, I use evidence from the timing of banks' entry into construction lending to show that market experience is associated with relatively lower loan delinquency rates for construction loans after the market collapse of 2008, which suggests that firms with market experience have an advantage in identifying high-quality construction projects, despite rapidly changing market conditions. While incumbent firms outperform their competitors in acquiring low-risk projects, there is no evidence that these banks are crowded out of the market or act preemptively to limit exposure to aggregate demand shocks. After initially losing market share to new entrants, incumbents dramatically increase their exposure to construction lending in the years immediately preceding the market collapse. These facts suggest a tension between the prudent management of overall exposure to construction lend-

ing markets and the pressure to maintain market position for these heavily invested firms.

The analysis in this paper contributes to our understanding of sources of dynamic competitive advantage. One of the most important questions in strategic management is how the capabilities underlying firms' success are sustained and evolve in changing market conditions (Barney, 1991; Teece et al, 1997; Winter, 2003; Helfat, 2007). However, this literature has focused primarily on innovative capabilities, while this paper considers dynamic sources of advantage associated with managing uncertainty in a completely undifferentiated, competitive market. In doing so, I show that the ability to reduce uncertainty itself is a source of advantage.

At first glance, these capabilities may seem to be a source of advantage to only financial services firms, which that trade directly in products that are priced according to risk. However, there are a number of ways that these capabilities connect to traditional frameworks with which strategy scholars think about the development of competitive advantage. For example, the early "learning by doing" literature focused on how market experience affects firm performance by changing manufacturing firms' cost structure (Arrow, 1962; Yelle, 1979). More recently this literature has expanded to show how learning-by-doing impacts performance for service (Dar, Argote and Epple, 1995), innovation (Cohen and Levinthal, 1990; Hatch, 1990) and internationalization (Clerides et al. 1998). These diverse settings are united by the fact that mangers must make financial or strategic commitments under uncertainty, and over time organizations develop internal processes by which to reduce this uncertainty. This paper considers a complementary source of advantage that firms may develop internally by "doing" – the ability to reduce errors in judgment when entering into long term relationships with customers. In this case, I study how organizational

learning could contribute to – or fail to contribute to – institutions' ability to survive dramatic changes in market conditions.

Finally, the empirical results contributes to two contrasting streams in the financial economics literature – one that emphasizes herding behavior and the other that investigates heterogeneity in investor skill (Rajan, 1994; Devenow and Welch, 1996; Zheng, 1999). The result that banks' credit standards for individual borrowers are not subject to herding, but that banks fail to limit correlated exposures is not consistent with the existing theoretical literature on herding in which the mechanism by which credit expands is through competition on loan quality. At the same time, while there is empirical evidence that individual investors with higher quality information are able to profitably re-deploy resources ahead of the herd in financial markets, the results in this paper suggest that organizations often face internal rigidities that make agility difficult despite an ostensible knowledge advantage.

Section 2 describes the institutional context and provides some detail on the construction lending market and competitive dynamics in commercial banking over the time period. Section 3 describes the data used in the empirical analysis. Section 4 analyzes the dynamics of the boom and bust cycle in construction lending, and Section 5 concludes and indicates directions for future work.

2.2 *Setting and Hypothesis Development*

The research setting, a study of construction lending at community banks[3] in the United States provides an excellent setting in which to study the role of acquired market knowledge on investment decisions. For reasons explained below, construc-

[3] Community banks, or locally-funded institutions with less than $1 billion in assets, make up over 90% of the nearly 7,000 commercial banks in the country.

tion loans have become an increasingly important line of business for small banks in the US, increasing the number of banks with significant investments in this area. Yet, with little ability to differentiate their product, banks that are successful in this line of business are those that develop the ability to accurately predict borrowers' repayment prospects. In addition, construction lending volume relies heavily on speculation about future real estate prices and is subject to local market externalities, so banks' ability to manage exposure to aggregate demand volatility a core capability for firms engaging in this line of business. In this competitive setting, we can attribute differences in portfolio quality to differences in firms ability to screen customers and manage risk. Below I provide background on community banks' investment in construction loans, and develop hypotheses about how market experience may affect banks' investment decisions in this line of business.

2.2.1 *Construction Lending at Community Banks*

Community banks are increasingly reliant on construction loans as a core business line. Traditionally, community banks have provided credit to consumers and small businesses, relying on local relationships to create advantage in specialized knowledge of customers and lending market conditions (Berger and Udell, 2002). Over the past 15 years, however, advances in information technologies and credit scoring have allowed larger retail banks to expand into these markets (DeYoung, 2008). This development of high-cost screening techniques has led to industry consolidation – so much so that the number of commercial banking institutions in the United States has decreased nearly 25% in the last ten years.

These advances in the scope of larger banks' ability to lend at arms-length have resulted in a convergence in community banks' portfolios toward the remaining loan

products that thrive under relationship lending, such as construction and development lending. While consumer lending accounted for 16% of community bank loans in 1996, they accounted for only 5% by 2010. Similarly, small business lending declined by 5% as a share of banks' portfolios over this period, and community banks have lost about 20% of market share to large national institutions. Meanwhile, real estate transactions, particularly construction and commercial real estate, tend to be highly idiosyncratic and require local market expertise and relationships. Successful project financing requires acute understanding of borrower potential and emerging conditions in local areas. Unlike mortgage loans, these loans are not widely commoditized as securities and sold.

However, this shift toward construction lending has also represented an increasing exposure to a highly cyclical real estate market demand. Construction loans are the most volatile class of real estate loans. Not only do they rely on the borrowers' ability to manage construction projects in a way that improves the value of the underlying collateral, but they also rely on speculation about future real estate demand, which tends to be highly correlated across projects in a given area. During the construction boom, a long history of increasing real estate prices led banks to speculate heavily. Between 2000 and 2007, home sales prices rose 56% on average across all US states, and by as much as 245%. Over the same period, construction lending in the US grew almost 250% with the increase in real estate values, from a total volume $172 to $419 billion. On average, community banks more than tripled their volume of construction loans, doubling the share of all business done at these banks. While only 1 in 5 community banks relied on this line of business for over 10% of total assets in 2001, 1 in 2 did in 2007.

This boom in construction was followed by a rapid collapse when real estate prices

started to decline nationally in 2008. This decline led to a profound negative shock to demand for construction loans at banks across the country. As demand for new loans contracted, banks were forced to reckon with a collapse in the value of collateral and pressure to contract to remain capitalized. Moreover, developers were unable to complete and refinance construction projects – banks' average balance of non-performing construction loans, or loans with payments over 90 days past due, increased over the period from an average of 1% to an astronomical 10% for all banks. This collapse in asset value and high delinquency rates threatened the solvency of small banks, who maintain average capital around 9% of assets. According to an analysis by SNL Financial for USA Today, the 10% of banks that had the highest concentration of construction loans at the end of 2007 represent more than half of the bank failures between 2007-2010.[4].

Table 1 illustrates the boom and bust cycle in construction lending at small banks over this period. The total volume of construction loans at all small banks grew from $45 billion in 2001 to $115 billion in 2007, followed by a collapse to $61 billion in 2010. The average size of an individual banks' lending portfolio tripled from $10 to $30 million, increasing to almost a quarter of all real estate lending and 12% of banking assets.

Table 2 illustrates the the portfolio composition of the average community bank in 2001 and 2007, showing an increasing reliance on real estate, from 65% to 75% of all business in just six years. Most of the increase in this share can be attributed to an increasing portion of banks' lending portfolio dedicated to construction and development loans, a jump from under 9% to 17% in just 6 years.

[4] ibid. USAToday

Table 2.1: Construction Lending Growth and Performance, 2001-2010

	Industry	Community Bank Average			
	Loan Volume	**Loan Volume**	**RE loan share**	**Constr loan share**	**NPL ratio**
2001	45,210	10.94	13.41	5.87	0.93
2002	51,221	13.11	13.37	6.22	0.98
2003	57,255	14.92	14.09	6.78	0.95
2004	66,079	17.57	15.54	7.98	0.82
2005	86,420	23.32	17.74	9.64	0.56
2006	104,159	28.54	20.49	11.44	0.61
2007	115,195	30.76	22.18	12.38	1.37
2008	110,677	29.76	20.61	11.80	4.17
2009	88,495	24.22	16.29	9.08	8.20
2010	61,512	17.36	12.22	6.46	9.81

Note: Figures in the first column **Industry Loan Volume** represent the sum of all construction and development loans reported at US commercial banks in each year, measured in millions of 2005 dollars, adjusted with the BEA GDP deflator. Figures in columns 2 through 6 represent averages calculated over community banks in the sample by year. **$ Volume** is the average level of construction and development loans at community banks in the sample, in millions. **RE loan share** is the average level of construction and development loans as a share of bank's total real estate loan portfolio, measured in percentage points. **Constr loan share** is the average level of construction and development loans as a share of bank's total assets, measured in percentage points. **NPL ratio** is the total construction and land development loans that are more than 90 days past due on payments or in non-accrual status, scaled by total loans in this category, measured in percentage points. Sample represents 18,843 bank-year observations from a sample of 2,613 community banks 35 U.S. states between 2001 and 2010. Community banks are defined as institutions with less than $1 billion in total assets with headquarters in a US Census Bureau defined Metropolitan Statistical Area (MSA), and more than 50% of deposits located in the MSA in which the bank is headquartered. "Share of Total Assets" is defined as a bank's total construction loans and land development loans scaled by total assets, measured in percentage points. "Non-Performing Loan Ratio" is defined as total construction and land development loans that are more than 90 days past due on payments or in non-accrual status, scaled by total loans in this category, measured in percentage points. All data series are derived from FFIEC Call Reports accessed from the Federal Reserve Bank of Chicago.

2.2.2 *Market Experience and Risk Management Capabilities*

This paper tests the hypothesis that market experience allows firms to develop knowledge, skills and monitoring expertise that create an advantage in managing demand volatility. One thing that makes comparisons across banks is that the product being exchanged – money – is an undifferentiated product to customer. In this setting, banks' customers (developers) tend to shop their project across multiple lenders and obtain comparable "term sheets" by which to compare lenders'. According to developers interviewed for this project, selection is based on the loan financing terms obtained from potential lenders rather than on any perceived qualitative differences

Table 2.2: Portfolio Composition at Community Banks, 2001 and 2007

	2001	**2007**
Real Estate	65.75	75.11
... Residential Mortgages	28.19	23.91
... Commercial RE	24.32	28.90
... Construction	8.84	17.00
Small Business	16.87	12.23
Consumer Loans (non-CC)	9.95	4.95
Other Loans	7.43	7.71

Note: Figures represent the dollar value of each loan category as a percentage of total loans, averaged over the sample of community banks in 2001 and 2007. Community banks are defined as institutions with less than $1 billion in total assets with headquarters in a US Census Bureau defined Metropolitan Statistical Area (MSA), and more than 50% of deposits located in the MSA in which the bank is headquartered. All data series are derived from FFIEC Call Reports accessed from the Federal Reserve Bank of Chicago.

in brands.[5] If banks competitively bid on each project and "win" only with the highest bid, we can surmise that lenders' core advantage relies on their ability to accurately identify and manage the risks associated with each loan project. A pertinent question for managers in this business is what factors lead to differences in firms' ability to project the value of individual projects. I consider whether banks that were relatively more "experience" in the construction lending business were better able to manage the boom-and-bust cycle in real estate prices than others by identifying high-quality projects and actively limiting their construction market exposures as the market reached its peak. If so, the "bust" in 2008 that caused so many failures might be seen as a natural correction to excessive entry by poorly informed competitors.

When financing a construction lending project, loan officers consider the underlying value of the real estate collateral and the expected value added due to the development project. For a given construction project, lenders are exposed to risks related to borrowers' ability to execute and complete the project and also to credit

[5] According to one source, "Cash is cash. We are doing business here."

risks associated with changes in market conditions that affect both the value of the real estate project and the underlying value of the land. Loan officers set the rate and terms at which they lend to borrowers according to these risks.

How could experience contribute to an advantage in lenders' ability to limit risk? Loan officers with experience financing construction projects may require developers to present detailed financial projections for re-sale of the property under a number of probable contingencies; over time loan officers at the lending institutions develop the judgment to realistically evaluate these projections. The capability to structure, evaluate and correctly quantify the risks associated with these projections is not likely to be generic across loan types – for example, a lender with strong capabilities in evaluating entrepreneur's business plans does not necessarily possess the skills to appraise the re-sale value of a commercial property, nor is a lender with knowledge of mortgage borrowers' creditworthiness likely to understand whether a certain borrower is likely to over-run cost or complete a project in a particular time frame.

In short, experience in construction lending should narrow the error with which lenders predict a projects' repayment probability, such that more experienced lenders are least likely to over or under-estimate the value of a project. If we also assume that borrowers seek multiple bids for each development project, as anecdotal evidence suggests, we should see novice lenders are more likely to acquire projects in which they under-estimate repayment risk.

Hypothesis 1. Project risk: *Lenders with market experience on average acquire loans with higher repayment probability.*

In the empirical analysis, I test whether market experience leads to differences in banks' management of exposure to repayment risk across construction lending projects. If there is heterogeneity in banks' ability to reduce information asymmetries

due to the development of internal capabilities that provide an information advantage in this market, then we should see these banks make higher-quality loans on average.

There are several reasons why this might not be the case – if the influx of new borrowers throughout the market boom erodes lenders' relationship advantages, we should see that banks with market experience are no better than their competitors in selecting high quality projects. Rapid entry by firms with poor information may decrease transparency between lenders and borrowers (Broecker, 1990) and competition with low-quality lenders may crowd banks with high-quality information out of the market (Riordan, 1993). If banks endogenously invest in screening, incumbent banks may reduce monitoring as rents are dissipated through increasing competition (Gehrig, 1998). Likewise, agency problems at firms could lead banks to lower credit quality collectively (Rajan, 1994). Thus, during rapid market expansions it is an empirical question – one with considerable interest to managers – whether early entrants make better project choices despite evolving market conditions.

We may also consider whether these capabilities to evaluate individual borrowers extend to banks' ability to make better decisions with respect to aggregated market-level risks. This would be the case if, at a strategic level, banking organizations were able to internal control systems to develop to screen and manage risk, rather than rely on individual loan officers' expertise. Looking at the portfolio as a whole, banks' willingness to extend credit to borrowers should depend on the total variance of the portfolio – managers should be more prudent in areas where banks expect correlated shocks across borrowers, In this case, we can see that by 2007 (Table 2), more than 75% of banks' portfolios were exposed to changes in real estate demand. A significant exposure to construction lending as a share of assets is particularly problematic. Construction loans are generally short-term, so existing cash flows and new demand

can deteriorate rapidly with a change in local real estate conditions, putting bank capital at considerable risk. Market shocks can be exacerbated by negative competitive externalities; in markets where demand slows, an increasing volume of distressed properties can depress the value of other properties on the market and cause a spiral of declining prices. These cyclical risks are well-known within the banking industry – the 2008 collapse in construction lending mirrored similar shocks to this market in the early 1980s and early-1990s.

Because they already face higher market risk for each new construction loan added to their portfolio, it is relatively more costly for incumbent banks to finance construction loans. During a period of market expansion, we should see a convergence in banks' exposure to construction lending relative to their asset base as entrants face less market risk per dollar added to their portfolio.

Hypothesis 2a. Market risk: *Over a credit boom, lenders with market experience demonstrate a slower growth in construction lending relative to competitors.*

If the difference in these experienced banks ability to predict demand shocks is superior to their competitors, as tested in Hypothesis 1, we should also see their exposure to construction lending decrease in *absolute* terms during "boom" times. First, with lower prediction error, they are less likely to finance individual projects, so may lose market share. Further, the fact that competitors finance high-risk projects increase each banks' exposure to demand externalities. For both of these reasons, we would expect to see that banks with market experience to anticipate aggregate changes in the market by limiting credit exposures earlier than other lenders.

Hypothesis 2b. Market risk: *Over a credit boom, lenders with market experience decrease their construction market exposure.*

On the other hand, there are a number of reasons why we might expect that firms' ability to limit exposure to a core line of business might be difficult during a boom market, even if that firm displays advantages in selecting individual projects. Boundedly rational managers may not be able to identify these complex, higher-order risk factors (Levinthal and March, 1993), and internal rigidities may limit organizations ability to change strategic orientation, particularly when this change involves abandoning prior sources of advantage (Leonard-Barton, 1992). Even if individual loan officers are able to identify increasing exposure to market-level risks, there may be little incentive for these individuals to limit banks' exposure without organizational support (Sharfstein and Stein, 1990).

In the empirical analysis in Section 4, I explore differences banks' ability to manage risk by examining the determinants and consequences of banks' growing exposure to construction lending as a share of assets. I use the 2008 decline in home prices to identify whether the timing of banks' growth in this market is associated with differences in the quality of banks' investments, as revealed by delinquency levels.

2.3 Methodology, Sample and Data

This section discusses the methodology used to test for differences in project- and market-level risk across banks, the sample of commercial banks used in the empirical analysis, and data sources.

2.3.1 Key measures

Information related to banks' construction lending activities are gathered from the volume of construction loans on banks' balance sheet. Construction loans are divided by total assets, to normalize this measure across banks. Growth in a banks'

construction share of assets represents an shift toward construction lending relative to other loan categories at banks. The balance sheet measure of construction lending available from the FFIEC Call Reports is "Construction, land development, and other land loans" referred to simply as construction loans going forward.[6] These loans are secured by real estate and have a term of less than 5 years.[7] Further information relating to the type of projects (commercial or residential) that these loans finance is not publicly available. However, in the sample of community banks these loans are strongly correlated with banks' investment in multifamily property developments, suggesting that most of these short-term loans are precursors to longer-term mortgages on multifamily residential properties.

Independent variable: Experience. To test whether early market experience plays an important role in determining risk exposures at the height of the market before collapse (2007), I decompose banks' investment level into those components that banks acquired early in the credit cycle (2001) to those acquired during the boom (2001-2007):

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[6] Item RCON1415 from Schedule RC-C on FFIEC 031. The definition of this item from the Microdata Reference Manual (MDRM) is as follows: *Includes loans secured primarily by real estate and with maturities of not over 60 months (for member banks) made to finance land development and the construction of industrial, commercial, residential, or farm buildings. Includes not only the construction of new structures but also additions or alterations to existing structures; the demolition of existing structures to make way for new structures; and loans secured primarily by real estate where the proceeds thereof are to be used to acquire and improve developed property (land development is the process of improving land (i.e., laying sewers, water pipes, etc.) preparatory to the erection of new structures); and loans made under Title I of the National Housing Act that conform to the definition of construction, as stated above, and that are secured primarily by real estate. Excludes loans secured primarily by real estate that have maturities greater than 60 months (for member banks) and loans to finance construction and land development that are not secured primarily by real estate. Also excludes loans to acquire vacant land.*

[7] The MDRM leaves some ambiguity as to whether the subset non-member community banks report any loans that have maturity over 60 months.

$$\text{cshare}_{i,2007} = \text{cshare}_{i,2001} + dcshare_{i,2001-04} + dcshare_{i,2004-07} \tag{2.1}$$

Where $\text{cshare}_{i,t}$ repreasent a banks' level of construction lending investment, scaled by assets, in the year indicated in subscripts, and $dcshare_{i,t1-t2}$ represents the growth in this measure over the period indicated in subscripts. I use the three periods (2001-2004), (2004-2007) and (2007-2010) because this 3 x 3 year decomposition allows for a parsimonious interpretation of the dynamics over the beginning of the lending boom, the "height" of the boom when warnings about excessive exposures began to circulate in trade publication and among regulators, and the "bust" period.

Since the 2001 volume of construction loan assets on banks' represents a bank's total investment stock, rather than a flow of new loans, it is a reasonable proxy for loans acquired over the previous 5 years. In addition, it is helpful to note that by the year 2008, construction loans made by banks in 2001 will have matured, so portfolio investment levels reflect loans that are either new or refinanced since 2003. The empirical analysis tests whether banks' 2001 construction lending exposure level affects investment decisions, market exposure and portfolio quality on new loans made after 2001.

This continuous measure of incumbency may be an imperfect measure of banks' capabilities at a point of time. There are certainly unobserved differences among banks with the same "level" of experience in 2001, and there are potentially non-linearities in the effect of experience with continued exposure to a line of business. However, this stock measures provides much more granular information than binary measures of entry and draws from the "learning curve" methodology, where cumu-

lative quality determines learning. It also reflects the assumption that banks with higher exposure to this market devote relatively more organizational resources to originating and monitoring these loans. Table 3 shows summary statistics on banks' average portfolio composition between 2001 and 2010; construction lending as a share of assets at the average community bank increases from around 6% in 2001 to 12% in 2007, and back to 6% by 2010.

Table 2.3: Construction Lending Growth and Performance, 2001-2010

	Construction Share of Assets				**Non-performing Loan Ratio**			
	Mean	**Change**	**St Dev**	**Max**	**Mean**	**Change**	**St Dev**	**Max**
2001	5.89	.	6.57	59.08	0.93	.	4.34	87.50
2002	6.24	0.33	6.85	56.42	0.98	0.09	5.32	100.00
2003	6.82	0.58	7.26	53.62	0.95	-0.02	4.61	100.00
2004	8.02	1.18	8.27	60.71	0.82	-0.05	5.09	100.00
2005	9.66	1.62	9.63	66.60	0.56	-0.25	3.27	90.34
2006	11.43	1.83	11.06	77.36	0.61	0.16	2.85	72.50
2007	12.36	1.05	11.46	76.80	1.37	0.84	4.85	93.76
2008	11.79	-0.34	10.26	73.00	4.17	2.92	8.65	100.00
2009	9.06	-2.16	7.51	45.03	8.20	4.53	14.89	100.00
2010	6.43	-2.00	5.32	36.91	9.81	2.49	15.07	100.00

Note: This table reports mean, standard deviations, maximum values, and year-over-year changes calculated over all banks in the sample by year. **Construction Share of Assets** is defined as a bank's total construction loans and land development loans scaled by total assets, measured in percentage points. **Non-Performing Loan Ratio** is defined as total construction and land development loans that are more than 90 days past due on payments or in non-accrual status, scaled by total loans in this category, measured in percentage points. Both variables are derived from FFIEC Call Reports accessed from the Federal Reserve Bank of Chicago. Sample represents 18,843 bank-year observations from a sample of 2,613 community banks 35 U.S. states between 2001 and 2010. Community banks are defined as institutions with less than $1 billion in total assets with headquarters in a US Census Bureau defined Metropolitan Statistical Area (MSA), and more than 50% of deposits located in the MSA in which the bank is headquartered.

Dependent variable: Project exposure. The 2008 financial crisis provides an shock to the value of banks' construction lending portfolio that allows me to identify systematic differences in banks' portfolio quality (borrowers' probability of default) and banks' exposure levels at the height of the boom. In the case of portfolio quality, default risk is measured as banks' balance of non-performing construction loans (NPL) after 2008, or the amount of loans classified as over 90 days past due or in non-accrual status, as a share of total construction loans. Table 3 shows that the percentage of

loans over 90 days past due reached almost 10% at the average bank by 2010, with a standard deviation of 15% across banks. Within a particular market, differences in banks' delinquency levels reveal differences in the quality of a banks' loan portfolio. These differences in quality could be due to differences in risk profile borrowers, development projects, or the appraised value of the land, but all relate to either poor information or higher risk tolerance reflected in banks' underwriting standards, monitoring, or payment structure.

Banks' NPL are only publicly available from 2001. One potential difficulty with this measure is that differences among banks may arise due to differences in accounting for potential losses. More aggressive charge-offs, an income statement measure of the value of loans banks do not expect to recover, may result in lower NPL ratios over time. Although I do not expect this to be the main source of differences among banks, I as a robustness check I test to all tests on NPL I test for differences among banks' net charge-off ratio (NXO) as a percent of construction loans.

Dependent variable: Market exposure. To measure market risk exposure levels, I look at both the exposure to construction lending as a share of total assets in 2008, and the rate at which banks acquired this investment share between 2001 and 2008.

2.3.2 *Econometric Specification*

To test Hypothesis 1, that early market experience contributes to lower default probabilities on loans in a banks' investment portfolio, I use the following specification, using the same variable definitions as above, in years 2008-2010:

$$
\begin{aligned}
NPL_{i,t} = \alpha &+ \beta_0 \text{cshare}_{i,2001} + \beta_1 dcshare_{i,2001-04} + \beta_2 dcshare_{i,2004-07} \\
&+ \beta_3 \text{cshare}_{i,2001} * dcshare_{i,2001-04} + \beta_4 \text{cshare}_{i,2001} * dcshare_{i,2004-07} \\
&+ \beta_5 \text{construction loans}_{i,t} + \beta_6 \text{cshare}^2_{i,2007} \\
&+ FIRM_{i,t}\eta' + MKT_{i,t}\theta' + MSA_{i,t}\phi' + Year_t\zeta' + \varepsilon_{i,t}
\end{aligned}
\tag{2.2}
$$

The coefficients of interest are β_3 and β_4, which measure the extent to which firms with a high level of market experience in 2001 make loans with relatively higher (or lower) default probabilities. A negative sign on these would support the hypothesis that firms with investment experience make higher quality loans in a market boom. I control for portfolio diversification effects by including the level of construction loans (making "cshare" a true interaction term), and the squared share in 2007 to control for non-linearities in the effect of absolute concentration on delinquency levels. Firm and market-level controls as well as market and year fixed effects, are included. The construction of these variables is discussed below in Section 3.4.

To test Hypothesis 2a and 2b, that early market experience contributes to slower or negative growth in construction lending as a share of assets during the market boom, I use the following specification for portfolio turnover during the period 2001 and 2004:

$$dcshare_{i,2001-04} = \alpha + \beta_0 \text{cshare}_{i,2001} + FIRM_{i,2004}\eta' + MKT_{i,2004}\theta' + MSA_i\phi' + \varepsilon_{i,t} \tag{2.3}$$

And similarly, for the period between 2004 and 2007:

$$dcshare_{i,2004-07} = \alpha + \beta_0 \text{cshare}_{i,2001} + \beta_1 dcshare_{i,2001-04} + \beta_2 dcshare_{i,2004-07} + FIRM_{i,t}\eta' + MKT_{i,t}\theta' + MSA_{i,t}\phi' + \varepsilon_{i,t} \tag{2.4}$$

In these regressions, I hypothesize that coefficient β_0 should be negative. I also test whether differences in the timing of investment contribute to differences in the the severity of exposure to the construction lending collapse after 2007, using the following specification.

$$dcshare_{i,2004-07} = \alpha + \beta_0 \text{cshare}_{i,2001} + \beta_1 dcshare_{i,2001-04} + FIRM_{i,t}\eta' + MKT_{i,t}\theta' + MSA_{i,t}\phi' + \varepsilon_{i,t} \tag{2.5}$$

All estimates reported in the next section are OLS estimates. Given the restrictions on functional form implied by scaling the dependent variable as a proportion, particularly for the skewed NPL distribution, I repeat these estimates using a logit-linked GLM with bootstrapped standard errors (Papke and Wooldridge, 1996).

2.3.3 *Sample*

My initial sample is a panel of all commercial banks in the US between 2001 and 2010 with less than $1 billion in assets, defined by the FDIC Statistics division as "community banks."[8] Although data on the borrowers' location is not available, I select firms that are concentrated in a single metropolitan area, allowing me to approximate the location of banks' lending activity. I exclude from the sample banks with headquarters outside of Census-defined Metropolitan Statistical Areas (MSAs) due to concerns that these differ systematically from those in metropolitan environments in ways that I would be unable to control for with local area fixed effects due to low geographic density. For the same reason, I also drop banks that have over 50% of deposits originating from outside of their home MSA.

The median size of banks in the sample is only $145 million in assets, with 3 branches and 42 employees (Table 4). Information about the financial position and balance sheet composition of U.S. commercial banks is based on accounting data from FFIEC Call Reports made accessible by the Federal Reserve Bank of Chicago. These come with the typical caveats associated with accounting data, but better estimates of banks' assets and liabilities are not available for such a complete sample. Information regarding the geographic location of banks' branch-level deposits comes from the FDIC Summary of Deposit database. Nominal data series are converted to real using the BEA GDP deflator. I drop banks headquartered in states and MSAs with too few observations for sufficient comparison. The 35 states included in the sample are listed in Appendix A. There are 155 MSAs included in the sample.

[8] Including banks up to $10 billion, the threshold that most agencies use to assign in-house examiners, includes another 400 institutions but does not substantially affect the results that follow.

Table 2.4: Sample Distribution of Bank Size

	Assets	**Branches**	**FTE**
5th Percentile	$29 million	1	10
25th Percentile	$75 million	1	23
50th Percentile	$145 million	3	42
75th Percentile	$280 million	5	79
95th Percentile	$650 billion	12	190

Note: This table reports sample distribution for 18,843 bank-year observations from a sample of 2,613 community banks 35 U.S. states between 2001 and 2010. Community banks are defined as institutions with less than $1 billion in total assets with headquarters in a US Census Bureau defined Metropolitan Statistical Area (MSA), and more than 50% of deposits located in the MSA in which the bank is headquartered. All nominal dollar series are adjusted to 2005 prices using the BEA GDP deflator unless otherwise noted. All measures vary by year. **Assets** is total assets reported on banks' FFIEC Call Report, accessed from the Federal Reserve Bank of Chicago. **Branches** is total number of deposit-holding branch locations indicated by the FDIC Summary of Deposits database. **FTE** is number of Full-time equivalent employees at banks as reported on banks' FFIEC Call Report.

2.3.4 Controls

On a practical level, community banks are an attractive research setting in which to study heterogeneity in risk management capabilities because the industry structure and data availability allow for relatively clean identification of firm-level characteristics on investment choices. Community banks primarily compete for construction business locally, allowing us to examine firms' behavior across a number of urban markets and attribute differences across firms within markets to firm-level characteristics. A large volume of publicly available data on economic conditions across metropolitan areas also allows researchers to control for differences among firms that arise from differences in demand and other local market conditions that are time varying. In addition, due to regulatory filing requirements, commercial banks file detailed information about investments, legal organization and ownership quarterly. This allows me to control for firm-level effects that may confound my measure of market experience.

I consider a range of firm-level and environmental factors that may drive these

measures. Means and standard deviations of control variables are reported in Table 5. To control for the differences in local demand for construction lending, I consider market size, home prices, unemployment rates, population growth and income levels in the local areas in which banks do business.[9] Because banks are required to report the location and volume of deposits, I use banks' annual branch deposit volume as a measure of their geographic exposure to a given MSA and weight all MSA-level measures by banks' exposure to that area. The first control, market size, is the sum of all construction loans outstanding for community banks in a given MSA within a given year. Opportunities in residential real estate investment are measured using the state-level Home Price Index (HPI) from the Federal Housing Finance Agency (FHFA). This index has some shortcomings – it represents the value of sales, and thus might lag the true value of homes in a downturn if prices decline; it does not incorporate changes in the value of commercial real estate; and it is not available at the MSA level for the full sample. Still, more accurate data were not available. Levels and changes are included in the model. I measure opportunities in the commercial and industrial development markets using county-level unemployment rates, gross state product per capita, and state-level population growth. Since "excessive competition" is often cited as a determinant of deteriorating loan standards, I include a deposit-weighted Herfhindal (HHI) index for local concentration. To address other unobserved heterogeneity in local markets, I include a dummy variable "weight" for banks' deposit exposure to each MSA (weighted fixed effects), and allow these effects to vary between the time periods in the sample. State-level fixed effects are also included, as are year fixed effects for models with annual variation.

Differences in managerial experience or risk tolerance should be important factors

[9] Factors influencing construction lending markets are discussed in the *Comptroller's Handbook on Commercial Real Estate and Construction Lending*.

determining banks' investment decisions and relative performance. To capture this, I control for bank age (log) as a measure of firm experience. I also control for volatility in firms' return on equity (ROE) over the previous five years. Differences in asset base, financing, retail orientation, and liquidity are also controlled for using banks' total asset size (in millions of inflation-adjusted dollars), the percent of interest-earning assets on banks' balance sheet, the percentage of bank funding that originates from retail depositor funding, and banks' regulatory total capital, all scaled by total assets. Since banks owned by a holding company parent may have access to internal capital markets and internal managerial resources, I control for parent company ownership. All these measures are derived from Call Report data. Banks' market position is measured in terms of market share and relative profitability. As a determinant of construction lending growth, banks' construction loan market share proxies for banks' ability to favorably dictate the terms of loan contracts. Relative profitability is coded as a binary variable, with "Low Performer" indicating that banks' average ROE over the previous 5 years was below the median in the market in which a bank is headquartered. I also control for market power using banks' market share in construction lending. This metric is defined as the volume of construction loans at a given institution scaled by the sum of all construction loans outstanding at other community banks headquartered in the same MSA.[10]

I also control for differences in banks' regulatory environment. Banks are regulated and supervised under state or national banking laws, so regulatory oversight within states may vary across regulatory regimes. State-chartered banks that are Federal Reserve members are also supervised by either their area Federal Reserve Bank, while non-members are jointly supervised by the Federal Deposit Insurance Corpo-

[10] This variable suffers from some measurement error when banks operate in multiple MSAs but this error is limited by the fact that all banks have at least 50% of deposits in the headquartering MSA.

ration. I control for average differences across chartering authorities and Federal Reserve membership status using identifiers coded in banks' Call Reports, combined with state-level fixed effects.

2.4 *Empirical Analysis and Discussion*

This section presents results from the econometric analysis of two banks' exposure to loan delinquencies (project risk) and to changes in the demand for construction loans (market risk). The first two sections establish the basic relationship between local economic market conditions, bank characteristics, and firm-level construction investment patterns. The most compelling result from these sections is an observable pattern of low-performing firms that increase exposure to construction lending as a share of assets as the boom reaches its peak. The third section tests Hypothesis 1, that banks with early experience in the construction market acquire loans with lower default probabilities than their competitors over the market boom. This hypothesis is supported by the data. The fourth section tests Hypothesis 2 that these banks withdraw or are crowded out of the market, and the data does not support this hypothesis. I then present evidence that "experience" is more important in fast-growing markets, which is consistent with theory that market entry allows for differences in capabilities to arise. Finally, I show that experienced banks do not demonstrate lower failure rates than their counterparts – evidence that exposure to the demand shock was the most important shock determining failure rates.

2.4.1 *Market conditions*

Market conditions may be a key factor in explaining banks' investment patterns in construction lending, and may also explain average differences in loan delinquency

levels after the crisis. Table 6 regresses construction lending growth as a share of assets and loan delinquency levels on the set of market-level controls described in Section 3. In Columns 1 and 2, the dependent variable is year-over-year changes in construction lending as a share of assets, measured in percentage points. In Column 3 the dependent variable is banks' construction NPL ratio, also scaled in percentage points. Average NPL levels across markets reflect banks' exposure to market-level risk. A higher NPL ratio means a larger portion of banks' loan portfolio is delinquent. Independent variables are scaled as in Table 5. All regressions include state fixed effect and MSA weights. These conventions are adopted in all following tables

Increasing real estate prices, lower unemployment and higher population growth all drove increased demand for construction loans and increased the attractiveness of construction lending investment as one would expect. Over the 2001 to 2007 period, banks' average concentration in construction lending grew more in larger markets. Deposit market competition did not affect banks' construction lending portfolios. While market factors only explained 6% of the variation before the crisis, they explained 35% after 2008. After 2008, banks sustained higher levels of construction lending in high income states. Column 3 shows the market drivers of NPL ratios at banks during the banking crisis.[11] Over 2008 to 2010, the average bank NPL ratio increased from 4% to nearly 10%. Highly concentrated markets have lower NPL levels, indicating that competition may be an important factor driving loan quality levels.

[11] Recognizing that NPL levels are scaled as a proportion of total loans and bounded between 0 and 100, I estimate all models on delinquency rates with a GLM logit link model and find that the substantive results are not dependent on the estimation method.

2.4.2 *Bank characteristics*

Table 7 introduces firm characteristics to the model of construction lending risk exposures, and decomposes banks' growth in construction lending exposure by time period. This decomposition allows me to identify whether firm characteristics associated with growing exposure to construction lending vary over the course of the lending cycle in order to provide a more insightful explanation of the dynamics behind the expansion and collapse of this line of business within banks. The dependent variable in Column 1 is banks' initial share of construction lending in 2001, while in Columns 2 through 4 the dependent variable is a banks' total 3-year growth in construction share over the time periods (2001-2004), (2004-2007) and (2007-2010), with independent variables observed at the beginning of the period.

Column 1 shows that banks heavily involved in construction lending in 2001 tended to be, on average, younger banks[12] with a high market share and a low reliance on the retail deposit market for funding. They tended to be stand-alone operations without a BHC parent. They tend to hold less capital than other banks but their earnings are not more or less volatile than their peers. Finally, these banks tended to be above average profitability in their MSA over the last 5 years. Between Columns 1 and 3 we see that factors that explain banks' early exposure do not explain their growth. Banks that grow the most between 2004-2007 are smaller (and thus with less potential diversification across borrowers), have more volatile earnings, and more highly funded by retail depositors. Over this period, the share of banks' earning assets share was positively associated with growth, meaning greater

[12] In this sample, the average bank is over 20 years old with a standard deviation of 3 years, so there is not a large qualitative difference in age. However, this coefficeint suggests that further an investigation into banks which were not present for the 1991-92 credit crisis might be an interesting avenue for future research.

portfolio diversification and lower liquid balances. A comparison of Column 1 with Column 3 shows that between 2001 and the end of 2007, a growth in construction lending is decoupled from market share, implying more competitive conditions that could drive underwriting quality down. Finally, banks that rank below the median ROE within their MSA and with higher income volatility are more likely to grow in this business between 2004 and 2007 than were in 2001. These results, combined with the fact that there is very little time variation in these firm-level covariates, imply that market structure of the construction lending business evolved during the credit expansion. In a sense, construction as a line of business was "democratized" across other sub-groups of community banks, and growth was primarily driven by entry by banks with higher risk profiles. Of the 731 banks who that ranked in the top quartile of their MSA in construction lending concentration in 2001, only 40% remained in the top quartile in 2007. For banks involved in the construction lending market in the early part of the lending boom, entry by these competitors, especially "low quality" competitors, increases exposure to market externalities. The next section explores how banks with a relatively high investment levels in construction lending in 2001 perform relative to other firms entering the line of business.

Column 4 decomposes the factors behind the changes in banks' construction lending share between 2007 and 2010, a period over which banks' average concentration in construction lending dropped more than 4% as a share of assets. A positive coefficient represents a reduced contraction in this period. Strikingly, few of the firm characteristics that explained growth explain differences in firms' ability to maintain loan levels during the collapse, except banks' age (negatively) and market share (positively). The fact that firms' market share in 2007 share is correlated with lower levels of contraction over the subsequent three years is particularly interesting and is

discussed below.

Column 5 provides an ex-post accounting of the firm characteristics associated with higher quality loan portfolios. The dependent variable in this column is the non-performing loan ratio, and controls for the level of construction lending are included but not reported. Regression results show that, high earnings volatility predicts higher NPL levels, as do relatively low ROE levels relative to other firms in the market, suggesting these are valid proxies for firm quality. Firms with a holding company parent demonstrate lower NPL, as do firms with more bank branches. These two results are at odds with an agency theory-based argument that managers in disperse branch locations or separated from corporate ownership parents are more likely to make risky loans in favor of short-term gains. In fact, access to corporate resources and availability of close, neighborhood-level loan monitoring improve banks' asset quality. Finally, older banks (not those likely to be invested in 2001) were more likely to report high delinquency levels after 2007.

Overall, the evidence from Table 7 suggests that banks vary in their choices to increase their exposure to construction lending at various times during the lending boom, and that firm-level characteristics determine the rate of contraction of lending activities after the bust. Most importantly, firms that choose to expand construction lending portfolios are those that are "Low Performers" and with more volatile earnings relative to their peers.

2.4.3 Project exposure

Banks with poor risk management capabilities may extend credit to lower quality borrowers, or may lack the ability to structure and manage the underwriting process in a way that minimizes their exposure to default risk. This section tests the hypoth-

esis that banks with less market experience are more exposed to default risk than their market incumbents. I use the 2008 shock to test whether there are differences in banks' exposure to default risk, as measured by loan delinquency rates. I controlling for bank risk tolerance using capital levels and earnings volatility, I test whether similar banks show systematic differences in loan quality by comparing delinquency levels after 2008.

Table 8 presents regressions on average construction NPL between 2008-2010 as a function of firm-level characteristics and the timing of entry.[13] In each column, a control for the total volume of construction loans is included but not reported. Across all models, bank portfolio controls do not have a strong correlation with NPL levels, although older banks and those with more diversified credit portfolios, report higher NPL levels. A positive coefficient on construction loan share shows that banks with the highest concentration in construction lending as a share of assets are also those that also have the poorest quality portfolios. One way to interpret a positive coefficient on construction loan share is that banks who invested heavily in this business did so at the expense of loan quality standards.

Table 8 shows heterogeneity in construction asset quality levels based on the timing at which banks grew their construction lending business, although all banks with high construction lending concentrations have the worst quality portfolios on average. Column 2 shows that entry between 2001 and 2004 results in 25% higher delinquency levels than growth before 2001.[14]

In Column 3, I include an interaction term for banks' 2001 share interacted with growth over the subsequent two periods in order to compare similar loans made at

[13] Regressions on banks' net charge-off ratio have similar results and are not reported for brevity.

[14] Test on the difference between the two coefficients fails to reject null of equivalence at 0.03 level.

the same point in time. This is an important adjustment because the overall quality of loans within the market at a given point in time may vary for a number of reasons – competition on quality, increasing market opacity, or reduced incentive to monitor loan projects. A negative coefficient on this interaction term shows that expansion at firms with a high share in 2001 is associated with lower levels of NPL than relatively less experienced firms lending during this period Column 2 shows a large, significant negative coefficient on the interaction between banks' 2001 share and growth between 2004 and 2007. A bank that has 10% of assets in construction lending in 2001 and increases that share to 20% in the subsequent 6 years reports over 2% lower non-performing loan levels than firms without any lending activity in 2001. This result is key to the argument that early entrants enjoyed an advantage in selecting high-quality projects. Early entrants seem to maintain higher quality levels during their expansion between 2004 and 2007 than their competitors. However, this result also shows that early entrants that failed to "renew" their capabilities in construction lending by continuing to compete throughout the boom do not report lower delinquency levels than their competitors. Further, relatively higher quality loans did not mitigate the market risk that resulted in a significant shock to bank capital.

2.4.4 Market exposure

Table 9 reports these regressions on how firms' initial investment in construction lending contributes to expansion during the 2001-2007 market boom and the 2007-2010 bust. Earlier, I hypothesized that the coefficients on banks' initial share should be negative, and perhaps so negative as to contribute to divestiture on average. However, The coefficients on banks' 2001 construction lending share of assets in Column 1 and Column 2 shows that banks with high initial investments in construction lending

were less likely to grow in the early part of the boom, but grew their portfolios at an equal pace with competitors in the three years preceding the collapse. There is no evidence that these banks act to reduce correlated risk within their portfolios or across the market.

The last three rows of Column 3 demonstrate the systemic nature of the construction market crisis – lending was reduced nearly equally, by around 0.5 cents of every dollar, regardless of the timing in which banks invested in the construction market.[15] This collapse in portfolio value, after controlling for market-level conditions and MSA effects, reflects a shift to a more conservative exposure level, regardless of market entry timing.

2.4.5 Extensions

A relevant question is whether these results vary with the magnitude of growth in local construction lending volume. While I have assumed a national construction lending boom trend, there may be substantial variation across local markets. The importance of market experience is likely to be more salient in markets where there is substantial entry. In fact, between 2001 and 2007, the MSAs in our sample vary substantially in their aggregate growth, and on average increase in size slightly over 250%. In Table 10, I present evidence on loan delinquencies in markets in the lowest quartile of growth in aggregate construction lending volume by community banks (less than 1.75x growth) and those in the top quartile (greater than 3.5x growth). Columns 2 and 4 shows that in markets where early entrants face relatively more competition by new entrants, they vastly outperform their competitors.

I also test whether aggregate exposures to construction lending in 2008 predict a

[15] T-tests on these coefficients fail to reject the null hypothesis that they are equal in magnitude.

higher probability of failure. This test addresses the possibility that experience allows banks vary in their strategies for hedging risk associated with demand shocks. Table 11 reports a probit regression of the probability of failure on bank-level characteristics. The sample includes 41 failures in 11 states for this subset of institutions. Among firm-level predictors, capital and construction lending share of assets are the only predictors of bank failure (coefficients for other bank-level covariates not reported, but are statistically insignificant). Other things equal, a 10% construction share of assets increases banks' probability of failure by 40%. For banks that acquired this business between 2001 and 2007, this probability would be above 80%, while banks that had this share in 2001 and did not increase investment levels are only 30%.[16]

[16] These point estimates on extreme values of the distribution should be taken with several grains of salt.

Table 2.5: Control Variables

Control	Mean	Std Dev
Market Controls		
Construction market size	0.72	1.16
Local HHI	1499.69	747.80
Home price index	133.88	26.79
Change in HPI	3.56	6.94
Unemployment rate	5.73	2.09
Real state GDP per captia	40.95	5.32
Population growth	0.91	0.77
Bank Controls		
Age (log)	3.03	1.19
Assets	212.81	195.53
% Earning assets	93.06	2.80
% Deposit funding	20.94	10.95
Capital ratio	11.01	4.39
Average ROE	13.12	8.47
Earnings volatility	4.78	4.93
Market share	10.16	17.36
		Share
Holding Company Parent (0-1)		79.69%
State Bank (0-1)		77.47%

Note: This table reports means and standard deviations for 18,843 observations from a sample of 2,613 community banks 35 U.S. states between 2001 and 2010. Community banks are defined as banks with less than $1 billion in total assets with headquarters in a US Census defined Metropolitan Statistical Area (MSA), and more than 50% of deposits located in the MSA in which the bank is headquartered. All nominal dollar series are adjusted to 2005 prices using the BEA GDP deflator unless otherwise noted. Values reported for **Market Controls** are averaged over observations in the sample. Banks' market level measures arve are averaged over values in the MSA's where banks operate branches, weighted by banks' deposits in each MSA (called "deposit-weighted" here). Deposit weights derived from FDIC Summary of Deposits data. **Construction market size** is defined as billions of dollars in construction loans made by all community banks within the MSA in which a bank is headquartered. **Local HHI**, a measure of market concentration, is calculated for each bank-year observation as the deposit-weighted average MSA-level Herfhindal Index (HHI). HHI is defined as the sum of squared deposit market shares (measured in percentage points) for each MSA-year over the sample of all commercial bank branches in the MSA. **Home price index** is the Federal Housing Finance Agency's (FHFA) annual state-level index of home prices estimated using seasonally adjusted sales price data, calculated in state where the bank is headquartered, scaled to 2000=100 for all states. **Change in HPI** is the year-over-year change in this index. **Unemployment Rate** is derived from the series reported at the county level by the Bureau of Labor Statistics, and is calculated for each bank-year as the deposit-weighted average unemployment rate, measured in percentage points. **Real state GDP per capita** is derived from the series reported at the state level by the US Bureau of Economic Analysis and scaled by annual state population estimates from the US Census. Population growth is the year-over-year change in the US Census bureau population estimates by state, measured in percentage points. **Bank Controls** are based on data series derived from the FFIEC Call Reports, accessed through the Federal Reserve Bank of Chicago website, and the FFIEC National Information Center (NIC). All are reported at the bank-year. **Age (log)** is the natural log of years since the original charter that a bank operates under was founded. **Assets** is total assets as reported in the Call Reports, measured in millions of dollars. **% Earning Assets** is defined as all items on banks' balance sheet that earn interest (Total Assets excluding Cash, Intangibles, Real Estate, Fixed Assets, Corporate Investments, and Risk Reserves), measured in percentage points. **% Deposit funding** is the banks' total domestic demand deposits scaled by assets, measured in percentage points. **Capital ratio** is banks total risk-based capital scaled by risk-weighted assets, as defined by regulatory capital requirements, measured in percentage points. **Average ROE** is banks' total net income excluding taxes and extraordinary items scaled by bank equity capital, averaged over the 5 years prior to the current period, measured in percentage points. In the regression analysis, this variable is coded as **Low Performer (0-1)** which indicates whether Average ROE is above (=1) the median for the MSA in which a bank is headquartered. **Market share** is bank's total construction and land development loans scaled by Construction Market Size in the MSA in which banks are headquartered, measured in percentage points. **Holding Company Parent** indicates whether the commercial bank is owned by a Bank Holding Company (=1). **State Bank** indicates banks' chartering and regulatory authority.

Table 2.6: Market Determinants of Construction Loan Exposure and Delinquencies

	Construction Share Growth		NPL Ratio
	2001-2007	2008-2010	2008-2010
	(1)	(2)	(3)
Market size (log)	0.4162***	0.2020	-0.1280
	4.57	0.97	-0.14
Market growth	1.3017***	1.5606***	-1.7913*
	9.02	5.33	-1.78
Local market HHI	-0.6110	1.0054	-4.5029
	-0.69	0.58	-1.02
Home Price Index	0.8265***	6.4702***	-13.0920***
	2.71	4.04	-2.99
Change in Home Price	4.9671***	5.6388***	0.7355
Index	3.50	2.97	0.09
Unemployment rate	-0.0584	-0.0343	0.3335
	-1.39	-0.72	1.32
State population	0.2180**	0.1913	-0.9713**
growth	2.04	1.63	-2.21
Real GSP per capita	-0.0141	0.0463	0.0388
	-0.28	1.34	0.43
Real GSP per capita	1.4746	1.1115	-22.9303**
growth	0.61	0.27	-2.04
MSA weights	Yes	Yes	Yes
State, Year fixed effects	Yes	Yes	Yes
Adj. R-squared	0.07	0.37	0.15
Observations	12887	4853	4853

Note: This table reports OLS regressions of banks' market environment on the growth of bank-level exposure to construction lending, by time period, and the quality bank loan portfolios after 2008. Sample of community banks and independent variables defined as in Table 5. The dependent variable in Columns 1 and 2, **Construction Share Growth**, is year-over-year changes in bank construction and development loan as a share of total assets, measured in percentage points. The dependent variable in Column 2, **NPL Ratio**, or non-performing loan ratio, is the percentage of all construction loans that have been classified as over 90 days past due or in non-accrual status, measured in percentage points. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors clustered on bank identifier.

Table 2.7: Bank Characteristics and Construction Loan Exposure and Delinquencies

	Constr. Share of assets, 2001	**Constr. Share of Assets, Growth**			**NPL Ratio**
		2001-2004	**2004-2007**	**2007-2010**	**2007-2010**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
State Bank	0.4310	0.0893	-0.3246	0.7229*	-1.0175**
	1.58	0.34	-0.93	1.89	-2.22
Age (log)	-0.3930*	-0.1438	-0.1673	0.2363	1.0121***
	-1.92	-0.68	-0.65	0.99	3.95
Assets	-2.8196	-2.3295	10.1294***	3.1004	8.1646**
	-1.11	-0.96	3.46	0.85	2.12
Assets squared	1.7337	-0.2935	-9.1394***	0.0827	-6.5822*
	0.61	-0.12	-3.27	0.02	-1.88
Earning assets	-0.0145	0.0686	0.1369**	0.0171	-0.4066***
	-0.25	1.16	2.06	0.25	-5.70
Bank branches	-0.1017**	0.0507	-0.0459	-0.0109	-0.1271**
	-2.33	1.03	-0.79	-0.17	-1.97
Deposit funding	-0.0125	0.0006	0.0336*	0.0343*	-0.0217
	-0.77	0.04	1.92	1.71	-0.88
Capital ratio	-0.2682***	-0.1322***	-0.0941**	0.1556***	-0.0625
	-9.31	-4.71	-2.38	3.66	-1.06
Holding company	-0.7328**	-0.0872	-0.3451	1.5802**	-1.1717*
parent (0-1)	-2.07	-0.22	-0.82	2.44	-1.90
Market share	0.1685***	0.0411***	0.0323**	-0.0998***	0.0172
	12.37	3.40	2.41	-6.45	1.16
Earnings volatility	0.0118	-0.0012	0.1705***	-0.0359	0.4203***
	0.37	-0.05	3.70	-0.65	7.28
Low Performer	-0.8365***	0.1526	0.6695**	0.7422**	0.8493**
	-3.32	0.60	2.05	2.22	2.37
Market controls	Yes	Yes	Yes	Yes	Yes
MSA weights	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.44	0.06	0.19	0.18	0.25
Observations	1658	1659	1645	1504	5708

Note: This table reports OLS regressions of bank-level characteristics on the level and changes in banks **Construction share of assets**, defined as bank construction and development loan assets as a share of total assets, measured in percentage points. Sample of community banks and independent variables defined as in Table 5. The dependent variable in Column 1 is the **Initial Share** level of bank Construction Lending Share in 2001. The dependent variables in Columns 2, 3, and 4 is **Construction share of assets, growth (...)**, the sum of year-over-year changes in Construction Lending share over the 3 year period. Bank-level independent variables are measured in 2001 in Column 1 and at the beginning of the period for Columns 2, 3, and 4. The dependent variable in Column 5 is the annual construction **NPL Ratio**, or non-performing loan ratio, the percentage of all construction loans that have been classified as over 90 days past due or in non-accrual status. **Market Controls** included but not reported are Market Size, Local HHI, Home Price Index, Change in HPI (3-year change), Local unemployment, Population growth (3-year change), Real GSP per capita, as defined in Table 5. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors.

Table 2.8: Experience and Construction Loan Delinquencies, 2008-2010

	NPL Ratio, Annual Level		
	(1)	**(2)**	**(3)**
Constr. share of	0.2013***		
assets, 2007	2.74		
Constr. share of		0.2092**	0.1591*
assets, 2001		2.32	1.67
Construction share		0.2460**	0.2256*
growth (2001-2004)		2.41	1.87
Construction share		0.1835**	0.1871*
growth (2004-2007)		1.97	1.89
Constr. share of			-0.0137*
assets, 2001 x growth (2001-2004)			-1.89
Constr. share of			-0.0199**
assets, 2001 x growth (2004-2007)			-2.20
Construction loans	-0.0310***	-0.0299***	-0.0303***
	-3.47	-3.08	-3.04
Constr. share of	-0.0007	-0.0004	0.0038
assets, 2007, squared	-0.54	-0.25	1.47
Bank controls	Yes	Yes	Yes
Market controls	Yes	Yes	Yes
MSA weights	Yes	Yes	Yes
State, Year fixed effects	Yes	Yes	Yes
Adj. R-squared	0.24	0.23	0.23
Observations	4167	3549	3549

Note: This table reports OLS regressions of bank-level characteristics on a quality measure of banks' construction lending portfolio during the downturn of 2008-2010. **NPL Ratio**, or non-performing loan ratio, is the percentage of all construction loans that have been classified as over 90 days past due or in non-accrual status. Sample of community banks and independent variables defined as in Table 5. Banks with no construction loans in 2007, 82 observations, are excluded from the sample. The independent variable **Construction share of assets, 2001** is Construction Lending Share in 2001, defined as bank construction and development loan assets as a share of total assets in 2001, measured in percentage points. Similarly, the independent variables **Constr. share of assets, growth (...)** are the 3-year growth in bank Construction Lending Share over the period defined in parentheses, in percentage points. A control for the 2007 construction share of assets is included but not reported (not significant). **Bank controls** included but not reported are Age (log), Assets, Assets squared, Deposit funding, Capital Ratio, Holding company parent, Market share, Capital Ratio, Earnings Volatility, and Low Performer. **Market Controls** included but not reported are Market Size, Local HHI, Home Price Index, Change in HPI (3-year change), Local unemployment, Population growth (3-year change), Real GSP per capita, as defined in Table 5. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors, clustered on bank identifier.

Table 2.9: Experience and Construction Market Exposure

	Construction Share of Assets, Growth			
	2001-2004	**2004-2007**	**2007-2010**	**2007-2010**
	(1)	**(2)**	**(3)**	**(4)**
Constr. share of	-0.3149***	-0.0836	-0.5315***	-0.7113***
assets, 2001	-4.79	-1.61	-10.69	-11.02
Construction share		-0.3033***	-0.5170***	-0.7623***
growth (2001-2004)		-4.06	-10.23	-9.91
Construction share			-0.5096***	-0.6325***
growth (2004-2007)			-10.11	-10.80
Constr. share of				-0.0002
assets, 2001 x growth (2001-2004)				-0.03
Constr. share of				-0.0113
assets, 2001 x growth (2004-2007)				-1.48
Constr. share of				0.0061***
assets, 2007, squared				3.11
AdjR-sq	0.13	0.23	0.53	0.55
Observations	1643	1576	1301	1301
Bank controls	Yes	Yes	Yes	Yes
Market controls	Yes	Yes	Yes	Yes
MSA weights	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	
Adj. R-squared	0.13	0.23	0.53	0.55
Observations	1643	1576	1301	1301

Note: This table reports OLS regressions of growth in construction lending investment as a share of assets, **Construction share of assets**, as a function of earlier investment levels. Sample of community banks and independent variables defined as in Table 5. The dependent variables are **Construction share of assets, growth (...)**, the sum of year-over-year changes in Construction lending share of assets over the 3 year period. The independent variable **Construction share of assets, 2001** is Construction Lending Share in 2001. The independent variables **Construction share of assets, growth (...)** are the 3-year growth in bank construction loan share over the period defined in parentheses, and the same values used as dependent variables in Columns 1 and 2. **Bank controls** included but not reported are Age (log), Total assets, Earning Asset share, Assets squared, Deposit funding share, Capital ratio, Holding Company Parent, Market share, Earnings Volatility, and Low Performer. Including 3-year changes of these variables does not significantly affect estimates. Bank-level independent variables are measured at the beginning of each the period. **Market Controls** included but not reported are Market Size, Local HHI, Home Price Index, Change in HPI (3-year change), Local unemployment, Population growth (3-year change), Real GSP per capita, as defined in Table 5. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors.

Table 2.10: Delinquency Rates by Construction Market Growth

	NPL Ratio, Annual Level, 2008-2010			
	Bottom Quartile (1)	**Top Quartile (2)**	**Bottom Quartile (3)**	**Top Quartile (4)**
Constr. share of	0.2548**	-0.1106	0.2265*	-0.2251
assets, 2001	2.18	-0.74	1.90	-1.41
Construction share	0.2205*	0.0016	0.1854	-0.0449
growth (2001-2004)	1.84	0.01	1.46	-0.27
Construction share	0.0681	0.0237	0.1239	-0.1094
growth (2004-2007)	0.62	0.18	1.08	-0.72
Constr. share of			-0.0060	-0.0247***
assets, 2001 x growth (2001-2004)			-0.51	-2.79
Constr. share of			-0.0164	-0.0224**
assets, 2001 x growth (2004-2007)			-1.03	-2.36
Constr. share of	-0.0028	0.0026	0.0000	0.0092***
assets, 2007, squared	-1.15	1.33	0.00	2.70
Construction loans	-0.0083	-0.0193*	-0.0087	-0.0148
	-0.61	-1.78	-0.64	-1.32
Bank controls	Yes	Yes	Yes	Yes
Market controls	Yes	Yes	Yes	Yes
MSA weights	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	
Adj. R-squared	0.207	0.311	0.207	0.313
Observations	1342	1302	1342	1302

Note: This table reports OLS regressions of bank-level characteristics on a quality measure of banks' construction lending portfolio during the downturn of 2008-2010, for markets (MSAs) with high and low growth rates in aggregate construction lending volume. **Bottom Quartile** represents markets that grow less than 1.75 times their construction lending volume between 2001 and 2007, and **Top Quartile** represents markets that grow more than 3.5 times size between 2001 and 2007. **NPL Ratio**, or non-performing loan ratio, is the percentage of all construction loans that have been classified as over 90 days past due or in non-accrual status. Sample of community banks and independent variables defined as in Table 5. Banks with no construction loans in 2007, 82 observations, are excluded from the sample. The independent variable **Construction share of assets, 2001** is Construction Lending Share in 2001, defined as bank construction and development loan assets as a share of total assets in 2001, measured in percentage points. Similarly, the independent variables **Constr. share of assets, growth (...)** are the 3-year growth in bank Construction Lending Share over the period defined in parentheses, in percentage points. A control for the 2007 construction share of assets is included but not reported (not significant). **Bank controls** included but not reported are Age (log), Assets, Assets squared, Deposit funding, Capital Ratio, Holding company parent, Market share, Capital Ratio, Earnings Volatility, and Low Performer. **Market Controls** included but not reported are Market Size, Local HHI, Home Price Index, Change in HPI (3-year change), Local unemployment, Population growth (3-year change), Real GSP per capita, as defined in Table 5. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors, clustered on bank identifier.

Table 2.11: Probability of Failure, 2008-2010

	Probability of Failure		
	(1)	**(2)**	**(3)**
Capital ratio	-0.1184	-0.1398*	-0.1253
	-1.61	-1.66	-1.49
Constr. share of	0.0536***		
assets, 2007	3.72		
Constr. share of		0.0471**	0.0997**
assets, 2001		2.26	2.12
Construction share		0.1119***	0.1720***
growth (2001-2004)		4.41	3.25
Construction share		0.0724***	0.1099**
growth (2004-2007)		3.36	2.51
Constr. share of			-0.0008
assets, 2001 x growth (2001-2004)			-0.40
Constr. share of			0.0008
assets, 2001 x growth (2004-2007)			0.36
Market controls	Yes	Yes	Yes
MSA weights	No	No	No
State fixed effects	Yes	Yes	Yes
Pseudo R-squared	0.389	0.402	0.408
Observations	806	726	726

Note: This table reports probit regressions of bank-level characteristics in June 2007 on the probability of bank failure in the subsequent three years. The dependent variable is equal to 1 if the bank failed at any point between June 30, 2007 and December, 2009. Marginal effects reported, scaled as marginal probabilities between 0 and 1. Sample of community banks and independent variables defined as in Table 5. The independent variable **Construction share of assets, 2007** defined as bank construction and development loan assets as a share of total assets in 2007, measured in percentage points. Controls for **Age, Assets, Assets squared, Earning asset ratio, Deposit funding, Holding company parent, Low Performer, Earnings Volatility and Market share** and are included but not reported – all coefficeints are statistically insignificant. **Market Controls** included but not reported are Market Size, Local HHI, Home Price Index, Change in HPI (3-year change), Local unemployment, Population growth (3-year change), Real GSP per capita, as defined in Table 5. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors, clustered on bank identifier.

2.4.6 *Discussion*

To summarize, the results in this section shows that market booms and busts do not affect all firms equally, and that in this setting banks vary in their response to the surge and collapse in demand. From the analysis of firm characteristics and growth in construction market exposure on banks' portfolios, we see that rapid expansion of construction loans as a line of business at community banks was driven by banks for whom this product was outside their core line of business. Initial entrants enjoyed significant market share, were strong, stable performers, and were relatively isolated from retail markets. Between 2001 and 2007 the boom in construction lending was driven primarily by relatively low-performing banks, with high earnings volatility, low market share, high deposit exposures (risking depositor funding), and smaller asset base. These firms rapidly gained market share as the market expanded.

The analysis of the timing of growth shows that market "experience" does not affect firms' choices in the way that we would expect, particularly given evidence on screening capabilities. Firms with existing construction lending business were initially reluctant to expose their portfolios to increased market risk by expanding their level of exposure, but, faced with deteriorating market share, took an aggressive stance in expanding lending levels to maintain their market position. In the market collapse after 2008, both initial entrants and late entrants construction loan portfolios contracted to about 50% of their size in 2007.

On the other hand, market experience allows early entrants to select high-quality borrowers, and in the aftermath of the real estate crisis experienced banks have lower loan delinquencies on a loan-per-loan basis. However, banks with the highest concentration in construction lending make the worst loans, suggesting that entry and competition for market share in this line of business may have resulted in some de-

terioration of quality standards. Together, these facts suggest that while banks' acquired capabilities in screening individual projects may contribute to a competitive advantage in a static setting, it is not associated with a superior ability to identify and respond to market-level risks when firms face competitive pressure from new entrants. In fact, the analysis shows the opposite – these firms must expand and compete in order to maintain their quality advantage.

What could explain this behavior? One narrative that is consistent with the data is that bank managers were initial hesitation to increase their investment levels given their high exposure, but were ultimately tempted to compete in order to maintain market share. This interpretation is supported by the graphs in Figure 1 and Figure 2, which show banks' level of construction lending exposure over time, based on initial 2001 exposure levels. In these figures, firms are divided into equal quartiles by their share of construction lending in 2001. The lines represent median lending levels within a quartile at four different points in time: 2001, 2004, 2007, and 2010. Figure 1 shows that firms with the highest initial investment in this industry do not significantly increase their investment levels as a share of assets between 2001 and 2004, but competitors do.[17] The second, right-hand axis in Figure 2 is firms' average market share within their local market, as calculated and summarized in Table 5. Figure 2 shows that firms for whom construction lending is a core business face a rapidly declining market share over this period as competitors captured the majority of market growth. However, between 2004 and 2007, early entrants dramatically expanded their business as a share of assets (Figure 1) but newer entrants still gain market share over this period (Figure 2). Overall, there is no evidence that early entrants reduced their lending exposures in response to increasing market risk. In

[17] Note that these figures are sample values, and do not condition on firm and market characteristics.

fact, we see the opposite; these firms increase their exposure prior to the crisis to maintain market share, despite the high level of risk to their portfolios.

Figure 2.1: Change in Construction Market Exposure 2001-2010, by 2001 Quartile

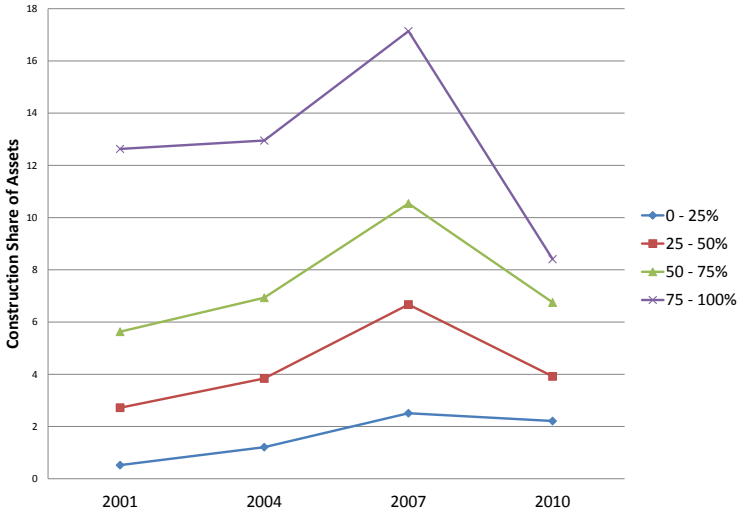
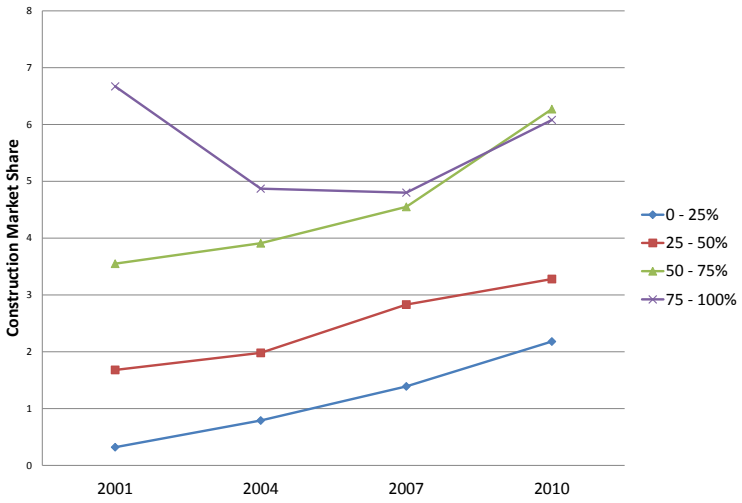


Figure 2.2: Change in Market Share 2001-2010, by 2001 Portfolio Concentration Quartile



2.5 Conclusions

This paper demonstrates heterogeneity in firms' ability to identify high-quality investment projects based on market experience. The results leave us wondering whether organizations are unwilling to undermine their sources of strategic advantage or unable to recognize and managage more complex risk factors across projects at an organization level. While the banking industry is distinct in many respects, this paper draws broad lessons that can be applied across industries. Banks' need to manage future demand uncertainty is driven by the fact that banks bear risks associated with customers' inability to meet their future payment obligations. We might consider related problems in industries defined by high switching costs, fixed costs, or long-term contracts such that screening capabilities are an important component of future costs. For example, insurance companies must price policies and screen new customers based on future demand for coverage. Many service organizations enter into long-term contracts with clients as well, in which demand variability affects the organizations' future costs. More generally, there are many industries in which firms make large capital investments and rely on projected cash flows from these projects. This paper suggests that prior literature has underestimated the extent to which there may be heterogeneity in firms' ability to make such decisions, and the extent to which prudent management of these risks by individuals within the firm will contribute to a coherent organizational strategy.

3. REGULATORY OVERSIGHT IN BOOM AND BUST MARKETS: LESSONS FROM COMMERCIAL BANKING

3.1 Introduction

In many industries, policy is enacted at the firm level by public servants who are given broad authority and discretion with which to enforce regulation. How should firms evaluate the impact of this ongoing , discretionary aspect of government oversight on their operating environment? In particular, what determines differences in whether regulatrs are likely to intervene proactively to limit market activity, or how they respond during a crisis? Despite the prevalence of regulatory oversight in the U.S and abroad, across industries as diverse as finance, food, pharmaceuticals, this issue has received only sparse attention in the strategy literature.

I study this question in the context of a particularly risky line of business in the highly regulated US commercial banking industry. In the US, regulatory agents regularly monitor investment decisions at banks, focusing on both robust loan-level risk management and overall portfolio positioning for risk exposure. The system relies on discretionary oversight, rather than "rules" because firms' risk exposures necessarily vary with economic conditions. If effective, enforcement agencies play an important role in limit managers' incentives to take excessive risks and forestall destructive competitive dynamics among firms. In times of crisis, agencies can limit the scope of the disaster and restore confidence in industry. Agency effectiveness,

however, may rely on a number of organizational factors: delegation of authority within the agency, agency and examiner resources, and incentives. Yet, the degree to which regulatory enforcement environment introduces variation in firms' choices and performance are relatively open questions in both the strategy literature and the banking literature.

However, the 2008 banking crisis provides ample evidence that regulators in this industry have not been entirely successful at enforcing their mandate. This study focuses on one line of business that has proved to be particularly problematic for banks – construction and development lending – and identifies variation in regulators' ability to monitor both investment quality and overall exposure to this line of business. I focus on an industry subgroup, community banks [1] for whom construction lending has been particularly destructive.

Several features of US commercial banking regulation make it an excellent setting in which to understand how organizational aspects of regulatory oversight affect its implementation. The first is that regulatory oversight in the banking industry is characterized by significant agency discretion and broad enforcement authority over bank behavior, and the second is that agencies broadly harmonize their rules and official guidance to enforcement officers. As a result, enforcement differences across firms are largely created by differences among agencies rather than by differences in formal policy regimes. Finally, banks within a particular geographical area can also opt into one of several overlapping jurisdictions. Thus, overlapping regulatory jurisdictions following broadly harmonized policies allow me to use variation both across states and within states to explore how various features of the regulatory environment affect

[1] "Community banks," a subgroup of U.S. commercial banks, are defined as those with less than $1 billion in assets and a local deposit base. The characteristics defining this industry subgroup are discussed in more detail in Section 2.

risk-taking.

Since banks regulated under different oversight regimes compete in the same market, I use a matched sample of banks to test whether variation in oversight is associated with superior performance in managing risk across the credit cycle. I also use a unique dataset on agency characteristics to identify variation in regulators' effectiveness in monitoring loan quality and risk exposures. The empirical analysis shows that neither underwriting quality nor bank's pre-crisis construction market risk exposures vary with regulatory regime or regime characteristics. However, there is significant variation in response in times of crisis. Federal regulators are much severe in limiting banks' lending after the 2008 housing crisis. The analysis of regulatory agencies' resources and incentives shows shows that this does not reflect "capture" but a responsiveness to the need of small banks combined with a robust regulator presence at local agencies. These resuts suggest firms should carefully consider how government agencies respond in crisis; this is particularly important for managers in any industry that faces industry-level shocks, such as environmental or pubic health disasters.

3.2 Setting

This paper considers how the the organization of regulatory enforcement impacted the dramatic growth and equally dramatic collapse of construction lending in the US commercial banking industry. Below, I describe the regulatory environment for commercial banks in the United States as one that allows for significant discretion across agencies and individual examiners, which has the potential to introduce variation across regulatory jurisdictions. It is through this variation that we may be able to features of the regulatory environment that led to the catastrophic

exposures to construction lending at many community banks.

3.2.1 Commercial banking supervision in the United States

The havoc that banking crises can wreak on the economy has led federal and state legislatures to set up agencies to regulate the banking industry. These agencies issue guidance to banks on the implementation of sound lending practices and prudent risk management, and monitor individual banks' adherence to these policies through periodic Safety and Soundness examinations and application review. Regulatory agencies define minimum standards for adequate capital and portfolio quality, and regularly monitor banks' financial ratios in order to identify problem institutions.

Because these rules are not sufficient to identify complex firm-level risks or changes in market conditions, agencies also issue general guidance to banks on the implementation of sound lending practices and regularly monitor banks' portfolio quality through on-site examinations. These exams are designed to make qualitative assessments of banks' internal controls and capacity to manage shocks to their earnings and capital. During the on-site visit, which is generally scheduled to last one week, bank examiners perform a loan-level analysis of a bank's portfolio and discuss bank policies with bank management in detail. With respect to real estate lending, banks face maximum limits on the ratio of construction loans to total capital, and exposure limits for individual borrowers. In addition, regulatory guidance indicates that banks must establish internal guidelines for "appropriate" limits and standards for all lines of credit. Managers are required to maintain a written policy that identifies origination, underwriting, and loan monitoring procedures, as well as portfolio diversification policies and describe how these policies are consistent with firms risk

tolerance. [2] In evaluating banks' management, examiners may take issue with the soundness of these internal policies, such as the way in which a bank organizes its information systems for monitoring risk and portfolio performance, or may ask the bank to re-appraise the collateral or increase loss reserves for a particular loan. They may enforce these actions through informal, confidential recommendations, initiated through letters of concern or meetings with the Board of Directors, or may escalate to formal, public actions for problem institutions. They also have the authority to initiate civil or criminal actions, dismiss individual employees or close "problem" institutions.

In short, regulatory agencies – in particular individual examiners – have significant discretion and broad enforcement authority over firms' behavior in the banking industry. This system of highly discretionary oversight is appropriate for an industry in which exposure to risk can be prudently managed by institutions with strong screening and governance policies. However, despite the considerable strategic and public policy implications, there is very little empirical research indicating how this model of continuous, discretionary oversight leads to effective management of credit quality standards or overall risk exposures. The U.S. commercial banking industry provides an ideal setting in which to study variation in firms' regulatory oversight environment because regulation is enforced by a number of different agencies following broadly harmonized rules. This allows us to focus on features of firms' enforcement environment, both at the organization-level and the individual examiner-level, that create variation in firm's choices.

Geographically overlapping regulatory jurisdictions allow us to attribute differences in behavior among firms to differences in features of banks' oversight environ-

[2] See Interagency Guidelines for Real Estate Lending Policies, 12 CFR Part 365 (FDIC).

ment while controlling for firm and market characteristics. There are three federal agencies and fifty state agencies that carry out bank examinations. This byzantine system of state and federal agencies arose out of an early American compromise allowing banks to be chartered under either state law or federal law.[3] National Banks (NB), chartered under federal banking law, are supervised by the Office of the Comptroller of the Currency (OCC), while State Banks (SB), chartered under a particular state's banking law, are supervised by their local State Banking Agency (SBA). Following the banking crises of the 1980s, state-chartered banks also came under the joint supervision of one of two federal agencies. State banks that are Federal Reserve members are also periodically examined by the Federal Reserve Bank (FRB) in the district which they are charted, and non-members are examined by the Federal Deposit Insurance Corporation (FDIC).[4] Many of the legal differences among regulatory regimes have dwindled due to competition for charters.[5] The three federal agencies have made a substantial effort to harmonize oversight policy to in order to avoid "charter-shopping."[6] A 2005 survey conducted by Insight Express and summarized

[3] The "dual" character of U.S. banking law has been rationalized – and periodically upheld by legislations and judicial rulings – for the past 150 years under the argument that jurisdictional competition supports a regulatory system that is both responsive and efficient (Scott, 1977; Butler and Macey, 1988; Rosen, 2005).

[4] In addition to co-supervising state member banks, the FRB supervises Bank Holding Companies (BHC), of which 80% of banks form a part, and the FDIC can intervene institutions with federal deposit insurance (all banks).

[5] A number of differences between charters were eliminated by the passage of the Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991 and the Riegle-Neal Interstate Banking and Branching Efficiency Act (IBBEA) of 1994. By 2003, 48 states have adopted "wild card" statutes giving state bank supervisors the right to allow state banks to engage in any "activities" that are allowed to national banks, and national banks are allowed to engage in all activities that have been enumerated under state banking statutes (Johnson, 1995; Schooner, 1996; Schroeder, 2003). For a discussion of the evolution of charter values see Blair and Kushmeider (2006).

[6] Since 1979, the Federal Financial Institutions Examination Council (FFIEC) has coordinated regulatory policy by requiring uniform reporting requirements and defining standard examination practices. State banking regulation choices are often coordinated loosely through the Conference of State Bank

in the *American Banker* reports that examiners from the various regulatory agencies tended to have similar scores on flexibility, fairness, thoroughness and consistency across regulatory agencies (*American Banker* 8/12/2005). Thus, we have a setting in which broad harmonization of regulatory standards allows us to focus on differences in supervision practices to define firms' regulatory environment.

3.2.2 *Construction and development lending at community banks*

Regulatory enforcement has the potential to play a large role in the performance of community banks. Community banks, or those banks in the US with less than $1 billion in assets and a local deposit base, represent 90% of banking institutions in the US, but less than 10% of the country's total banking assets. Nonetheless, teams examiners travel to the headquarters of every community bank in the country, usually for one to two weeks every year, while also endeavoring to continuously monitor the health of every bank remotely through quarterly financial statements (Call Reports). Examiners may be physically present at even small, healthy banks for 10% of the annual working hours. Relative to local bank managers, examiners tend to be highly trained in risk management and have broad industry experience. In this paper, I consider the impact of regulatory enforcement on community banks' most highly cyclical product line, construction and development loans.

Community banks are generally not geographically diversified and have become increasingly reliant on construction lending as a core line of business. Over the past 15 years development of information technologies that improve credit scoring and customer management have allowed larger national and regional banks to expand

Supervisors (CSBS). In 2006, a State Liaison Committee was included in the FFIEC, but state agencies did not have a formal role before this.

into the "relationship banking" space traditionally occupied by community banks, leaving construction loans as one of these banks' last important product lines (DeYoung, 2008). While consumer lending accounted for 16% of community bank loans in 1996, by 2010 they accounted for only 5%. Small business lending similarly declined 5% as a share of banks' portfolios, and have lost about 20% of the total market. As a result, real estate lending has accounted for an increasing share of small banks' business, from 50% in 1996 to 70% in 2010. Most of the increase in this share can be attributed to an increasing portion of banks' lending portfolio dedicated to construction and development loans. Construction lending has remained an area attractive to small banks because successful investment in project financing requires acute understanding of borrower potential and emerging conditions in local areas. Unlike mortgage loans, these loans are highly idiosyncratic and are held on banks portfolios rather than commoditized as securities and sold.

Construction loans are speculative project loans that rely on borrowers' ability to generate value from the underlying real estate collateral, so repayment is heavily dependent on both the borrower's ability to execute the project and on future conditions the local real estate market. Lenders are exposed to the risk that borrowers are unable to anticipate market conditions (and left with an empty apartment complex) or unable to properly manage and finance the project (and left with a half-built apartment complex), and also the risk that the underlying value of the real estate collateral declines. Construction loans are generally short-term, so demand and existing cash flows can deteriorate rapidly with a change in local demand. Thus, with increasing portfolio concentration in this line of business, banks also face significant liquidity risk.

Evidence from the last ten years demonstrate the volatile "boom and bust" nature

of construction and development lending at community banks. Between 2000 and 2007, home prices at sale rose 56% on average across all US states, and by as much as 245%. Over the same period, construction lending in the US grew almost 250% with the increase in real estate values, from a total volume $172 to $419 billion. Community banks more than tripled their volume of these loans, doubling the share of all business done at these banks.

The boom in construction was followed by a rapid collapse when real estate prices started to decline in 2008. As demand for new loans contracted, banks were forced to reckon with a collapse in the value of collateral and delinquency on existing loans. Table 1 illustrates the growth and decline in construction lending at small banks over this period. The total volume of construction loans at small banks grew from $45 billion in 2001 to $115 billion in 2007, followed by a collapse to $61 billion in 2010. The average size of banks lending portfolio tripled from $10 to $30 million, increasing to almost a quarter of all real estate lending and 12% of banking assets. Over the period from 2008 to 2010 real estate lending contracted to nearly half of its previous value on banks' balance sheets, from 12% of assets to 6%. Banks' average balance of non-performing construction loans, or loans with payments over 90 days past due, increased over the period from an average of 1% to an astronomical 10% for all banks. This collapse in asset value threatened the solvency of small banks, who maintain average capital around 9% of assets.

3.2.3 Theories of bureaucratic behavior

It hardly seems possible that the statistics in Table 1 represent a heavily regulated and supervised industry, as banking regulation in the US is designed precisely to circumvent these excessively cyclical dynamics. Below, I discuss theory related to how

Table 3.1: Construction Lending Growth and Performance, 2001-2010

	Construction Share of Assets			Non-performing Loan Ratio		
	Mean	**Std Dev**	**Max**	**Mean**	**Std Dev**	**Max**
2001	3.66	5.20	60.81	0.95	5.49	100.00
2002	3.87	5.41	65.06	0.96	5.48	96.71
2003	4.22	5.78	61.46	1.00	5.53	100.00
2004	4.97	6.57	57.74	0.94	5.96	100.00
2005	6.01	7.77	66.60	0.69	4.93	100.00
2006	7.23	9.02	77.36	1.25	5.21	100.00
2007	7.95	9.54	76.80	3.39	8.85	100.00
2008	7.81	8.78	73.00	6.36	12.58	100.00
2009	6.23	6.61	45.03	7.28	13.63	100.00
2010	4.60	4.82	36.91	2.19	7.93	100.00

Note: This table reports mean, standard deviations, and maximum values, calculated over all banks in the sample by year. **Construction Share of Assets** is defined as a bank's total construction loans and land development loans scaled by total assets, measured in percentage points. **Non-Performing Loan Ratio** is defined as total construction and land development loans that are more than 90 days past due on payments or in non-accrual status, scaled by total loans in this category, measured in percentage points. Both variables are derived from FFIEC Call Reports accessed from the Federal Reserve Bank of Chicago. Sample represents 49,815 observations from a sample of 6,354 community banks 42 U.S. states between 2001 and 2010. Community banks are defined as banks with less than $1 billion in total assets, and more than 50% of deposits located in the local area in which the bank is headquartered.

the organization of oversight may influence regulatory behavior in this setting. The empirical analysis tests how these aspects of the regulatory environment affect construction loan quality and exposures for co-located banks under different supervisory regimes.

Organizational Structure. One way to explain differences in firms' regulatory environment is to consider the differences that arise from centralization of decision-making within regulatory agencies. We would expect that local agencies have differential access to information, resulting in more responsive policy (Eppen, 1979; Aoki, 1986; Laffont and Zantaman, 2002). On the other hand, delegation of authority in large organizations may increases exposure to agency problems, implying lax enforcement over banks' cyclical tendencies and poor monitoring of credit quality

(Alchian and Demsetz, 1972). Thus, theory is mixed (and hotly debated in practice) as to how centralization of decision making should affect regulators' behavior.

Among U.S. banking regulators, there is a clear contrast in organizational scale at the state versus the national level. The national bank regulator, the OCC, is both more hierarchical and less geographically disperse than the state regulators. Regulatory policy for national banks is formulated in Washington, DC, and implemented through four district offices that oversee 66 field offices throughout the country. In contrast, state banking regulators are located in every state, with almost twice as many field office locations, and the majority of examiners work in the same office where policy is made. Anecdotally, there has been a proliferation of commentary on the authoritarian federal response to the banking crisis industry publications such as the *American Banker*:"Many community bankers said their examiner, once a trusted adviser who helped the bank improve its operations, is now more concerned with defending his or her performance to superiors in Washington." *(American Banker, 1/26/2011).* The veracity of these impressions are tested in the empirical analysis.

Capture. One common explanation for bureaucratic organizations' ineffectiveness in regulating industry behavior is that agencies' priorities are influenced by industry priorities. In the economics literature, bureaus' objective is to maximize production subject to their budget allocation (Niskanen, 1968; Downs, 1965). Based on this assumption, bureaucratic agencies' optimal policies may differ as their sources of revenue vary (Stigler, 1971; Peltzman, 1976; Spiller, 1990). For example, bank regulators' production function is usually defined as some preference over industry growth and stability (Rotheli, 2010). We would expect that a budget maximizing regulator that is funded through industry revenues will favor a higher level of growth than a regulator that is funded through taxpayer money (Kiyotaki and Moore, 1997). We would

also expect that, other things held equal, the banking industry benefits from regulatory agencies that improve banks' ability to screen and monitor individual loans, and that regulator funded by bank revenues should be more sensitive to dramatic credit contraction. The empirical analysis tests for evidence of capture by comparing banks according to funding sources.

Resources. Resource constraints at regulatory agencies are likely to exacerbate both the information gap between firms and regulators and regulators' ability to take action against non-compliant firms. As a result, regulatory resource constraints should affect firms' optimal compliance strategy – firms are more likely to violate policy if regulators are perceived to have a lower probability of observing violations or initiating enforcement action (Becker, 1968, see Heyes, 2000 for a literature review). This theory of constrained enforcement predicts that banks would be more likely to take on risk when regulator resources are low. A complementary perspective is that regulatory resources are associated knowledge flows between firms and regulators. According to this theory, regulatory resources should also be associated with improved risk management at firms. While there is empirical evidence that hard resource constraints on bureaucratic agencies may limit their ability to enforce stated policies (Siegel, 2005; Jackson and Roe, 2009), there is very little research that addresses this question in a context where regulators act as expert monitors rather than industry "police". The empirical analysis tests the hypothesis that resources increase regulators' effectiveness at monitoring loan quality and limiting excessive pro-cyclical expansions and contractions using agency budgets as a proxy for resources.

A related issue is how variation in information and resources at the examiner level affect policy implementation across firms. A reasonable prediction would be that examiners with higher quality information and training are better equipped to

identify risky activities at banks. Bank examiners with poor information also have weak incentives to enforce policy unilaterally and herd on enforcement actions (Boot and Thakor, 1993). To the extent that examiner discretion acts as a substitute for statutory regulation, greater examiner resources should be associated with a more fair, appropriate implementation of policy across constituents (Lipsky, 1980). In other words, greater regulatory resources at the examiner level should be associated with policy differentiation across low- and high-quality firms. Banks supervised by examiners with superior training and resources are less likely to demonstrate excessive market risk exposures during boom markets or excessive contractions during a bust. The empirical analysis uses examiner pay and examiner turnover as a proxy for the skill level and knowledge of the exam force.

Theory and empirical evidence related to each of these factors are presented in Section 4.

3.3 Methodology, Data and Sample

The objective of the empirical analysis in this paper is to test whether that variation in regulatory oversight may explain variation differences in banks' exposure to the volatile construction lending industry. Variation in regulatory oversight both within and across states allows me to compare outcomes at banks located in similar economic environments supervised under different oversight regimes. This identification strategy has the benefit that it is not confounded by other unobserved features of the local environment, but the shortcoming that I only observe the marginal effect (differences) across jurisdictions rather than absolute effects.

3.3.1 *Key measures and identification*

I use three measures of bank performance to test which regulators were relatively more effective at limiting risks related to the construction lending market. The first tests is whether banks exhibit systematic differences in underwriting standards, as measured by loan delinquencies after 2008. Second, I test whether there are differences in banks' overall construction lending exposures at the height of the market boom. Finally, I test whether there are differences in banks' credit contraction during the bust.

Underwriting standards. The first questions is under what conditions regulatory oversight introduces variation in banks' capacity identify high-quality construction loan projects. A common concern during a market boom is that managers have short-term incentives to "join the herd" by lowering credit quality standards, particularly as markets heat up, because managers are often rewarded relative to peers but all suffer downturns equally (Rajan, 1994; Devenow and Welch, 1996). A rapid influx of new customers and project types may also increase the asymmetric information problem between borrowers and lenders. By monitoring underwriting standards and helping banks identify weaknesses in their internal control systems, bank examiners can serve as an external resource to firms, particularly in a new and booming line of business.

I use the shock of 2008 to identify revealed differences underwriting quality across banks. To measure differences in credit quality across regulators are measured using banks' balance of non-performing construction loans (NPL) – the amount of loans classified as over 90 days past due or in non-accrual status – as a share of total construction loans. Table 1 shows that the percentage of loans over 90 days past due reached almost 10% at the average bank by 2010, with a standard deviation of 15%

across banks. Within a particular market, differences in banks' delinquency levels reveal differences in the quality of a banks' loan portfolio. These differences in quality could be due to differences in risk profile borrowers, development projects, or the appraised value of the land, but all relate to either poor information or higher risk tolerance reflected in banks' underwriting standards, monitoring, or payment structure. Differences in NPL are identified according to the following specification (where t=2008, 2009, 2010):

$$NPL_{i,t} = \alpha + \beta_0 \text{reg feature}_{i,t} + FIRM_{i,t}\eta' + MKT_{i,t}\theta' + MSA_{i,t}\phi' + State_{i,t}\gamma' + Year_t\zeta' + \varepsilon_{i,t} \tag{3.1}$$

Where "reg feature" represents the relevant regulatory agency characteristic, and an increase in β_0 represents a decrease in credit quality.

Banks' NPL are only publicly available from 2001, limiting the sample to the period 2001-2010. One potential difficulty with this measure is that differences among banks may arise due to differences in accounting for potential losses. More aggressive charge-offs, an income statement measure of the value of loans banks do not expect to recover, may result in lower NPL ratios over time. Although I do not expect this to be the main source of differences among banks, I as a robustness check I test to all tests on NPL I test for differences among banks' net charge-off ratio (NXO) as a percent of construction loans.

Market risk exposures. Another question this paper addresses is whether there are differences in regulator's willingness to limit banks' market risk exposures during

during the construction market boom. The system of discretionary supervision allows bank examiners to strike a balance between growth and stability – a strict limit on banks' construction lending exposures reduces banks' earnings, but also reduces the impact of future demand shocks. How do organizational features of oversight impact the balance that enforcement agencies strike between these two? Examiners' ability to pro-actively limit banks market activity may be limited by a number of factors, explored in section 4. Anecdotal evidence suggests that this challenge was a significant one for regulators. Comptroller of the Currency John C. Dugan, quoted in the American Banker, described the role of bank supervisors responding to growth in the construction lending industry: "He tagged the asset as the cause of hundreds of failures just 15 years ago... He said that banks have been entering the business without the proper expertise, and that regulators have a responsibility to ensure they are operating safely. If examiners are properly trained, he said, they ought to be able to judge whether a bank is taking on too much risk... the differences among the agencies may go beyond how the guidelines read to how examiners should implement them."[7] Growth in construction exposures at community banks did not go unnoticed by the agencies charged with monitoring these risk exposures. Between 2001 and 2007 regulatory agencies published multiple analyses of evolving market risk of the construction lending sector.[8]

The volume of construction loans on banks' balance sheet in 2007, normalized by total assets, is the primary measure of construction lending exposure. [9] I use the

[7] "Agencies Still At Odds Over Real Estate Guidance," *American Banker*, October, 2006.

[8] For example, "Assessing Commercial Real Estate Risk," *Supervisory Insights*, June 2004; "CRE Loans: Are Underwriting Standards Slipping?" *American Banker*, July, 2005; "Examiners Report on Commercial Real Estate Practices," *Supervisory Insights*, December, 2006

[9] Construction loan balances are available from banks FFIEC Call Reports, reported as "Construction, land development, and other land loans", or item RCON1415 from Schedule RC-C on FFIEC 031. Infor-

following specification to test variation in banks' risk exposure in 2007 before the 2008 housing crisis:

$$cshare_i = \alpha + \beta_0 \text{reg feature}_i + FIRM_i\eta' + MKT_i\theta' + MSA_i\phi' + State_i\gamma' + \varepsilon_i \tag{3.2}$$

Where "reg feature" represents the relevant regulatory agency characteristic, and an increase in β_0 represents an increase in risk exposure relative to similar banks.

Credit crunch. The third outcome that this paper examines is whether regulatory enforcement agencies exacerbate the collapse in credit following the 2008 housing crisis. It is commonly argued that risk-averse examiners may take an overly aggressive stance in limiting banks' lending after a market collapse by imposing excessive limits on credit exposures regardless of portfolio quality (Sharpe, 1998). In this case, regulator's unwillingness to exercise discretion to distinguish between institutions may be very costly to the economy as a whole. Anecdotal evidence suggests that borrowers' demand for credit since 2008 has exceeded banks' willingness to lend and that examiners play a large role in the contraction.[10] According to analysts interviewed

mation relating to the type of projects (commercial or residential) that these loans finance is not publicly available. However, in the sample of community banks these loans are strongly correlated with banks' investment in multifamily property developments, suggesting that most of these short-term loans are precursors to longer-term mortgages on multifamily residential properties. These loans are secured by real estate and have a term of less than 5 years.

[10] It is unclear whether the sustained decline in lending between 2008 and 2010 can be attributed to slower demand, a more conservative outlook by bankers, capital constraints, or more stringent examination standards by regulators (for a review of empirical literature on "credit crunches," see Sharpe, 1995).

on the issue: "There are concentration issues with what percentage of capital they're allowed to allocate towards commercial real estate... Some of it is definitely driven by regulatory overzealousness. The demands they're making are completely irrational and unreasonable." Another one notes: "...the issue is if you're a small community bank and ... the [Office of the Comptroller of the Currency] shows up and says, "We don't want you to do home construction lending,' there's nothing for you to do. You might as well just put a 'for sale' sign on the front door and walk out door. ... That's exactly what's going on out there." (*American Banker* 5/31/2011)

The uniformity of the decline in construction lending exposures across institutions, illustrated in Table 1, suggests a supervisory response. Construction lending as a share of assets declined a remarkable 6% between 2007 and 2010, but just as interesting is the unprecedented drop in the *maximum* share at any bank from 76% to 37% of assets (the maximum share never measured less than 50% before the crisis), and the decline of the standard deviation to 5%. Thus, beyond identifying factors that contribute to regulators' limits on banks' market exposures, I also consider whether oversight is associated with differences in credit growth for high-performing firms relative to low-performing firms after the market collapse. This question of policy differentiation after a crisis is exceptionally important for managers in any industry that faces correlated shocks, such as environmental or pubic health disasters, but there is little empirical work that investigates determinants of regulatory behavior after a crisis.

To measure the crunch in construction lending, I use the year-over-year change in construction lending as a share of assets in the three years between 2008 and 2010, controlling for the exposure level. I use the following specification to test the extent of

a credit crunch that can be attributed to banks' regulatory enforcement environment:

$$dcshare_{i,t-t-1} = \alpha + \beta_0 \text{reg feature}_i + \beta_1 \text{cshare}_{i,t-1} + FIRM_{i,t}\eta' + MKT_{i,t}\theta' + MSA_{i,t}\phi' + \varepsilon_{i,t} \tag{3.3}$$

Where "reg feature" represents the relevant regulatory agency characteristic, and an increase in β_0 represents a more dramatic decline in construction lending relative to a banks' asset base. In an alternative specification, I also test whether regulatory enforcement varies across institutions by comparing the credit crunch at high-risk banks (those with high NPL) with others, using an interaction term.

3.3.2 Data sources

The empirical analysis draws on a number of measures describing variation in the regulatory environment falling under three broad categories: structure, incentive problems, and resource constraints. There are two main data sources for the measures used in the analysis. The identity of banks' chartering authority (state or federal), and all measures derived from this classification, are derived form information reported in the Call Reports. All characteristics of state banking authorities are compiled from information in *A Profile of State-Chartered Banking*, published biannually by the Conference of State Bank Supervisors (CSBS), a national professional organization for state banking agencies. Data on organizational features of the OCC were collected from annual reports and correspondence. In the analysis that follows, I contrast state-chartered banks (supervised by state banking authorities) with nationally-chartered banks (supervised by the OCC), but I do not distinguish state

banks based on their federal co-supervisor (the FDIC or the FRB system) for the sake of simplicity. Doing so does not impact the results. Each measure is summarized in Table 2, and described in more detail in subsequent sections.

State vs. National Banks. I test whether the degree of policy-making centralization affects regultory behavior using indicators for state versus national banks. Each banks' chartering authority is defined in the FFIEC Call Reports. I use a dummy variable indicating whether a bank is chartered under state authority to compare national OCC-supervised banks to the set of all state-supervised banks.

Agency funding sources. To test whether "capture" is a valid lens through which to interpret agency behavior, I focus on how agencies' funding sources affect policy implementation. I classify agencies according to funding sources, indicating whether agencies are primarily funded from allocations from a State General Fund (SGF) or the collection of assessment fees from the banks within the agency's jurisdiction. To account for the political sensitivity of funding, I distinguish between agencies that receive funding based on discretionary processes versus those at which budget allocation decisions are defined by statute. I also control for the community banks' share of total assets under supervision within an agency's jurisdiction, as this is likely to attenuate agencies' sensitivity to performance of the sector, as more competitive industry exacerbates the risk of the credit cycle. Community banks represent between 2 and 4% of banks under OCC supervision, while at state agencies the average is 27% and the maximum is 67%. The CSBS *Profile* provides funding sources for all state banking agencies, and information for the OCC was collected from annual reports. The OCC is funded almost entirely through bank assessment fees and has discretion over its budget. State agencies are classified according to their funding sources in Table 3.

Table 3.2: Regulatory Agency Characteristics, Sample Average

	Mean	**Std Dev**
Budget ratio	1.92	6.53
Examiner ratio	7.44	21.35
Entry-level salary ($thous)	45.47	6.81
New examiner ratio		
		Share
Receives State General Funds		20.81%
Financed primarily through SGF		15.55%
Statutory budget		40.59%
Bank revenue dependence		68.56%
Employment restrictions		66.97%

Note: This table reports means and standard deviations of supervisory agency characteristics for 49,815 observations from a sample of 6,354 community banks 42 U.S. states between 2001 and 2010. Community banks are defined as banks with less than $1 billion in total assets, and more than 50% of deposits located in the local area in which the bank is headquartered. All nominal dollar series are adjusted to 2005 prices using the BEA GDP deflator unless otherwise noted. Values reported relate to characteristics of banks' supervisor agency, and are averaged over the sample of all banks. All state-agency data are derived from data in the bi-annual *Profile of State Chartered Banking* generously shared by the Conference of State Bank Supervisors (CSBS), and national agency data are derived from annual issues of the OCC *Quarterly Journal* and *Annual Report*. In some cases, state data series with missing values are interpolated across years. **Budget ratio** is the ratio of a bank's supervisory agency's budgeted supervision dollars, in millions, to the logged sum of all commercial banking assets under supervision by that agency. Where available, budget figures were adjusted to reflect the share of budget allocated to commercial banking supervision. **Examiner ratio** is the ratio of a bank's supervisory agency's examiners to the logged sum of all commercial banking assets under supervision by that agency. **Entry-level salary** is the annual starting salaries for commercial bank examiners at a bank's supervisory agency, scaled in thousands of dollars. These figures are adjusted for inflation and state-level regional price parity (RPP, Aten, 2008). This value is set to 0 for national banks. **New examiner ratio** indicates the percentage of bank examiners employed by banks' supervisor with less than 2 years of experience. This value is set to 0 for national banks. The indicator **Receives State General Funds** indicates that portion of a banks' supervisory agency's budget is funded through allocations from a general fund (=1). **Financed primarily through SGF** indicates whether a bank's supervisory agency relies on a general fund allocation for more than 75% of total budget (=1). **Statutory budget** indicates whether agencies report that Statute determines how funds are collected, allocated, appropriated and spent (=1). **Bank revenue dependence** indicates bank's supervisory agency rely on revenues collected from fees assessed on banks to fund more than 75% of the agency budget (=1). **Employment restrictions** indicates whether bank's supervisors face any statutory restrictions in employment opportunities after terminating agency employment.

Table 3.3: Funding Sources by State

Bank Revenue Exceeds 75% of Budget
Alabama, Arkansas, California, Colorado, Florida, Illinois, Iowa, Minnesota, Missouri, North Dakota, Ohio, Oklahoma, Texas, Utah, Washington
Agency Primarily Funded by State General Fund
Arizona, Georgia, Iowa, Maryland, Massachusetts, Minnesota, Nevada, New Mexico, Oklahoma

Note: Data derived from bi-annual *Profile of State Chartered Banking* published by the Conference of State Bank Supervisors (CSBS)

Budget levels. I proxy for regulatory resources at the agency level with measures of agency's budget and examiner force data derived from the CSBS publication *A Profile of State-Chartered Banking*, scaled by the log of total assets under supervision.[11] I use the log of total assets under supervision because the human capital demanded per banking dollar are likely to be non-linear.[12] The examiner ratio used in the analysis is the number of commercial bank examiners scaled by log of assets under supervision. Budget ratio is defined as millions of commercial banking supervision dollars per billion of assets (or dollars per thousand). In 2005, the average state banking agency supervised $15 billion in assets. The budget ratio ranged from 0.03 to 22.41, with a mean of 5.

Examiner turnover and pay The measure of examiner turnover is the percentage of examiners with less than two years of experience, and reflects the fact that examin-

[11] Budget data are adjusted by GDP deflator. Where applicable, budget figures were adjusted to reflect the share of budget available for commercial banking supervision. Examiner figures represent examiners available for commercial banking supervision. In cases of missing values between volumes, linear interpolation approximates series growth. Data for 2010 are not available, 2009 data are agency projections. Total assets under supervision includes all U.S. commercial banks, even those out-of-sample.

[12] One potential issue with this analysis is that we do not know the appropriate functional form to relate resources to bank-level outcomes. This approach is one of many considered; this choice does not substantially affect the results.

ers may acquire knowledge of market conditions and banks' practices and policies through repeated engagement; lower turnover facilitate the exchange of "soft" information between firms and regulators that is particularly difficult to codify. On the other hand, examiner tenure may lead to secondary effect on agents' behavior. Repeated interactions may influence examiners' judgment or lead to collusive behavior (Shleifer and Vishny, 1993); it is an empirical question which of these two has a stronger influence on examiner behavior.

I test the hypothesis that resources available to agents affect policy implementation using entry-level examiner salaries to proxy for differences in the perceived examiner quality across states and a measure of examiner turnover to proxy for examiner job experience. Wages should reflect differences in the quality of bank examiners as financial professionals, and higher wages also may be associated with increased effort to acquire high quality information (Akerlof, 1982). Of course, without more specific information on labor mobility in this market it is difficult to tell whether salary levels reflect a true efficiency wage, so estimates are to be taken as suggestive of correlation. Salaries are only observed for state agencies, so variation reflects cross-sectional difference among states. Levels reported in the *Profile* are adjusted for inflation and state-level regional price parity (RPP, Aten, 2008).

Controls. I consider a range of firm-level and environmental factors that may also drive banks' exposure to construction lending and loan quality measures. Means and standard deviations of these control variables are reported in Table 5. Information about the financial position and balance sheet composition of U.S. commercial banks is based on accounting data from FFIEC Call Reports made accessible by the Federal Reserve Bank of Chicago. These come with the typical caveats associated with accounting data, but better estimates of banks' assets and liabilities are not available

for such a complete sample. Information regarding the geographic location of banks' branch-level deposits comes from the FDIC Summary of Deposit database. Nominal data series are converted to real using the BEA GDP deflator.

To control for the differences in local demand for construction lending, I consider market size, home prices, unemployment rates, population growth and income levels in the local areas in which banks do business.[13] Because banks are required to report the location and volume of deposits, I use banks' annual branch deposit volume as a measure of their geographic exposure to a given MSA and weight all MSA-level measures by banks' exposure to that area. The first control, market size, is the sum of all construction loans outstanding for community banks in a given MSA within a given year. Opportunities in residential real estate investment are measured using the state-level Home Price Index (HPI) from the Federal Housing Finance Agency (FHFA). This index has some shortcomings – it represents the value of sales, and thus might lag the true value of homes in a downturn if prices decline; it does not incorporate changes in the value of commercial real estate; and it is not available at the MSA level for the full sample. Still, more accurate data were not available. Levels and changes are included in the model. I measure opportunities in the commercial and industrial development markets using county-level unemployment rates, gross state product per capita, and state-level population growth. Since "excessive competition" is often cited as a determinant of deteriorating loan standards, I include a deposit-weighted Herfhindal (HHI) index for local concentration. To address other unobserved heterogeneity in across states, I include state-level fixed effects and year fixed effects for models with annual variation.

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[13] Factors influencing construction lending markets are discussed in the *Comptroller's Handbook on Commercial Real Estate and Construction Lending*.

Table 3.4: Control Variables.

Control	Mean	Std Dev
Market Controls		
Construction market size	10.13	2.51
Local HHI	0.22	0.13
Home price index	1.29	0.23
Change in HPI	0.03	0.06
Unemployment rate	5.79	2.22
Population growth	0.85	0.76
Real state GDP per captia	39.96	5.16
Bank Controls		
Age (log)	3.51	1.03
assets	167.34	170.56
% Earning assets	93.26	2.63
% Deposit funding	22.33	9.81
Capital ratio	15.20	4.26
Average ROE	13.54	7.47
Earnings volatility	4.21	7.46
Market share	33.13	37.32
		Share
Holding Company Parent (0-1)		84.69%
State Bank (0-1)		77.18%

Note: This table reports means and standard deviations for 49,815 observations from a sample of 6,354 community banks 42 U.S. states between 2001 and 2010. Community banks are defined as banks with less than $1 billion in total assets, and more than 50% of deposits located in the local area in which the bank is headquartered. All nominal dollar series are adjusted to 2005 prices using the BEA GDP deflator unless otherwise noted. Values reported for **Market Controls** are averaged over observations in the sample. Banks' market level measures arve are averaged over values in the MSA's where banks operate branches, weighted by banks' deposits in each MSA (called "deposit-weighted" here). Deposit weights derived from FDIC Summary of Deposits data. **Construction market size** is defined as billions of dollars in construction loans made by all community banks within the MSA in which a bank is headquartered. **Local HHI**, a measure of market concentration, is calculated for each bank-year observation as the deposit-weighted average MSA-level Herfhindal Index (HHI). HHI is defined as the sum of squared deposit market shares (measured in percentage points) for each MSA-year over the sample of all commercial bank branches in the MSA. **Home price index** is the Federal Housing Finance Agency's (FHFA) annual state-level index of home prices estimated using seasonally adjusted sales price data, calculated in state where the bank is headquartered, scaled to 2000=1 for all states. **Change in HPI** is the year-over-year change in this index. **Unemployment Rate** is derived from the series reported at the county level by the Bureau of Labor Statistics, and is calculated for each bank-year as the deposit-weighted average unemployment rate, measured in percentage points. **Real state GDP per capita** is derived from the series reported at the state level by the US Bureau of Economic Analysis and scaled by annual state population estimates from the US Census. Population growth is the year-over-year change in the US Census bureau population estimates by state, measured in percentage points. **Bank Controls** are based on data series derived from the FFIEC Call Reports, accessed through the Federal Reserve Bank of Chicago website, and the FFIEC National Information Center (NIC). All are reported at the bank-year. **Age (log)** is the natural log of years since the original charter that a bank operates under was founded. **Assets** is total assets as reported in the Call Reports, measured in millions of dollars. **% Earning Assets** is defined as all items on banks' balance sheet that earn interest (Total Assets excluding Cash, Intangibles, Real Estate, Fixed Assets, Corporate Investments, and Risk Reserves), measured in percentage points. **% Deposit funding** is the banks' total domestic demand deposits scaled by assets, measured in percentage points. **Capital ratio** is banks total risk-based capital scaled by risk-weighted assets, as defined by regulatory capital requirements, measured in percentage points. **Average ROE** is banks' total net income excluding taxes and extraordinary items scaled by bank equity capital, averaged over the 5 years prior to the current period, measured in percentage points. In the regression analysis, this variable is coded as **Low Performer (0-1)** which indicates whether Average ROE is above (=1) the median for the MSA in which a bank is headquartered. **Market share** is bank's total construction and land development loans scaled by Construction Market Size in the MSA in which banks are headquartered, measured in percentage points. **Holding Company Parent** indicates whether the commercial bank is owned by a Bank Holding Company (=1). **State Bank** indicates banks' chartering and regulatory authority.

Differences in managerial experience or risk tolerance should be important factors determining banks' investment decisions and relative performance. To capture this, I control for bank age (log) as a measure of firm experience. I also control for volatility in firms' return on equity (ROE) over the previous five years. Differences in asset base, financing, retail orientation, and liquidity are also controlled for using banks' total asset size (in millions of inflation-adjusted dollars), the percent of interest-earning assets on banks' balance sheet, the percentage of bank funding that originates from retail depositor funding, and banks' regulatory total capital, all scaled by total assets. Since banks owned by a holding company parent may have access to internal capital markets and internal managerial resources, I control for parent company ownership. All these measures are derived from Call Report data. Banks' market position is measured in terms of market share and relative profitability. As a determinant of construction lending growth, banks' construction loan market share proxies for banks' ability to favorably dictate the terms of loan contracts. Relative profitability is coded as a binary variable, with "Low Performer" indicating that banks' average ROE over the previous 5 years was below the median in the market in which a bank is headquartered. I also control for market power using banks' market share in construction lending. This metric is defined as the volume of construction loans at a given institution scaled by the sum of all construction loans outstanding at other community banks headquartered in the same MSA or county.[14]

[14] This variable suffers from some measurement error when banks operate in multiple MSAs but this error is limited by the fact that all banks have at least 50% of deposits in the headquartering MSA or county.

3.3.3 *Sample selection*

One challenge to attributing firms' behavior to their regulatory environment is convincingly controlling for both firm heterogeneity and the impact of local economic conditions. This challenge makes the commercial banking, and community banks in particular, an excellent setting for such a study. In the first case, due to quarterly filing requirements, historical data is publicly available about commercial banks' strategic choices, legal organization and ownership over time. We also know a fair amount about the geographic areas where banks do business. Although data on the locations of borrowers is not available, banks are required to report the location and volume of deposits, so we can use banks' branch size as a measure of their geographic exposure to given areas. By studying banks that are concentrated in a single economic area we are able to approximate the location of banks' loans more closely.

My initial sample is a panel of all commercial banks in the US between 2007 and 2010 with less than $1 billion in assets, defined by the FDIC Statistics division as "community banks."[15] I drop banks that have over 50% of deposits originating from outside of their home MSA or county. I drop banks headquartered in states and MSAs with too few observations for sufficient comparison. The 42 states included in the sample are listed in Appendix A. Table 5 characterizes the institutions in this sample – the median size is only $145 million in assets, with 3 branches and 42 employees.

Tables 6 and 7 present OLS regressions on all market controls and all firm controls with the dependent variables.

[15] Including banks up to $10 billion, the threshold that most agencies use to assign in-house examiners, includes another 400 institutions but does not substantially affect the results that follow.

Table 3.5: Sample Distribution of Bank Size

	Assets	**Branches**	**FTE**
5th Percentile	$21 million	1	8
25th Percentile	$56 million	1	18
50th Percentile	$106 million	3	34
75th Percentile	$210 million	5	65
95th Percentile	$543 million	11	164

Note: This table reports sample distribution for 49,815 observations from a sample of 6,354 community banks 42 U.S. states between 2001 and 2010. Community banks are defined as banks with less than $1 billion in total assets, and more than 50% of deposits located in the local area in which the bank is headquartered. All nominal dollar series are adjusted to 2005 prices using the BEA GDP deflator unless otherwise noted. All measures vary by year. **Assets** is total assets reported on banks' FFIEC Call Report, accessed from the Federal Reserve Bank of Chicago. **Branches** is total number of deposit-holding branch locations indicated by the FDIC Summary of Deposits database. **FTE** is number of Full-time equivalent employees at banks as reported on banks' FFIEC Call Report.

Table 3.6: Market Determinants of Construction Loan Quality and Exposure

	NPL Ratio	**Construction Exposure**	
	2008-10	**Level 2007**	**Growth, 2008-10**
	(1)	**(2)**	**(3)**
Market size (log)	0.4308***	1.4249***	0.1973***
	4.45	18.48	12.52
Market growth	-0.9194***	-0.0578	0.9200***
	-4.29	-0.35	12.87
Local market HHI	1.1969	2.6314***	0.2665
	0.98	2.62	1.39
Home Price Index	-17.1246***	-16.8669	6.5115***
	-6.50	-0.72	6.78
Change in Home Price	6.1198	-2.3165	4.0268***
Index	1.13	-0.02	3.22
Unemployment rate	0.0524	-0.4186***	-0.0480***
	0.62	-3.73	-3.82
State population	-0.9410***	6.6497*	0.1067*
growth	-3.79	1.70	1.85
Real GSP per capita	0.0017	-0.0371	0.0403*
	0.02	-0.91	1.73
Real GSP per capita	-12.5251*	109.7616	0.4367
growth	-1.90	1.43	0.26
MSA weights	Yes	Yes	Yes
State, Year fixed effects	Yes	Yes	Yes
Adj. R-squared	0.118	0.479	0.383
Observations	12920	4538	12920

Note: This table reports OLS regressions of banks' market environment on the growth of bank-level exposure to construction lending, by time period, and the quality bank loan portfolios after 2008. Sample of community banks and independent variables defined as in Table 4. The dependent variable in Column 1, **NPL Ratio**, or non-performing loan ratio, is the percentage of all construction loans that have been classified as over 90 days past due or in non-accrual status, measured in percentage points. The dependent variable in Columns 2 and 3, **Construction Exposure**, is the level in 2007 (Column 2) and year-over-year changes (Column 3) in bank construction and development loan as a share of total assets, measured in percentage points. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors clustered on bank identifier.

Table 3.7: Firm-level Determinants of Construction Loan Quality and Exposure

	NPL Ratio	**Construction Exposure**	
	2008-10	**Level 2007**	**Growth, 2008-10**
	(1)	**(2)**	**(3)**
Age (log)	1.1908***	-1.0200***	-0.0916**
	6.15	-5.68	-2.55
Assets	2.3350	-8.0943***	-2.1072***
	0.89	-3.37	-4.81
Assets squared	-2.4598	9.8643***	1.6177***
	-0.93	3.41	3.27
Earning assets	-0.2874***	-0.0146	0.0190**
	-6.13	-0.28	2.21
Deposit funding	-0.0239	-0.0590***	-0.0020
	-1.46	-4.48	-0.84
Capital ratio	0.0010	-0.1991***	-0.0302***
	0.03	-7.78	-5.65
Holding company	0.2031	-0.1757	0.0560
parent (0-1)	0.51	-0.51	0.83
Market share	0.0439***	0.0778***	0.0164***
	7.62	20.00	18.51
Earnings volatility	0.4168***	0.0434**	-0.0288***
	9.02	2.04	-5.22
Low Performer	1.2031***	-0.0231	0.0453
	4.36	-0.11	1.01
MSA weights	Yes	Yes	Yes
State, Year fixed effects	Yes	Yes	Yes
Adj. R-squared	0.165	0.574	0.405
Observations	12179	4308	12179

Note: This table reports OLS regressions of banks' market environment on the growth of bank-level exposure to construction lending, by time period, and the quality bank loan portfolios after 2008. Sample of community banks and independent variables defined as in Table 4. The dependent variable in Column 1, **NPL Ratio**, or non-performing loan ratio, is the percentage of all construction loans that have been classified as over 90 days past due or in non-accrual status, measured in percentage points. The dependent variable in Columns 2 and 3, **Construction Exposure**, is the level in 2007 (Column 2) and year-over-year changes (Column 3) in bank construction and development loan as a share of total assets, measured in percentage points. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors clustered on bank identifier.

3.3.4 Sample matching

As explained in Section 2, banks can choose to be chartered under either state or federal authority. In using oversight regime to estimate the causal effect of policy centralization, I face two potential estimation issues that could lead to biased estimates of policy-makers' effect on bank choices.

In comparing state and nationally chartered banks, I must confront estimation bias due to endogeneity of regime choice. Banks' charter selection is driven by national and state charters' distinct advantages to banks' scale and scope choices. Banks interested in operating across state lines or that are part of a larger holding company interested in reducing supervision costs may prefer national charters. State-level regulation of lending practices or permissible activities vary widely, so the relative benefits of either charter depend on banks' business models. While banks can apply to switch charters, the application process involves increased scrutiny so switching is only an option for high- performing banks.[16]

I deal with this selection issue by matching banks on observable firm characteristics. Table 3 shows that there may be some differences in our sample among the banks that choose state and national charters. State banks tend to be smaller and younger, with lower market shares and operating in more competitive and low-income markets. They are less likely to be part of a holding company or SEC registered. In matching samples, I match on all bank-level characteristics. I also identify market-level covariates that are most significant in determining charter choice using regression analysis (not reported).

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[16] Between 1995 and 2005, 989 commercial banks switch supervisors. Of these, 306 switch from a state charter to a national charter, 276 switch from a national charter to a state charter (SBA supervised), and the rest switch between FRS and FDIC-supervision under the State charter. Rosen (2005) finds that switches among the three primary federal regulators are not associated with increased risk at the bank level, and are weakly associated with performance improvement.

Table 3.8: Covariate Imbalance: State vs. National banks

	Unmatched Sample			Matched Sample		
	National	**State**	**% Diff**	**National**	**State**	**% Diff**
Age (log)	3.59	3.48	3.11	3.63	3.61	0.55
Assets ($ mill)	0.19	0.16	17.14	0.15	0.15	0
% Interest earning assets	93.16	93.29	-0.13	93.29	93.32	-0.03
% Deposit funding	23.51	21.98	6.72	23.16	22.56	2.62
Total Risk-Based Captial Ratio	15.58	15.09	3.19	15.79	15.15	4.13
Holding Company Parent (0-1)	0.86	0.84	2.35	0.87	0.87	0
Construction Market Share (%)	37.25	31.9	15.47	33.89	31.39	7.65
Avg ROE	13.73	13.48	1.8392	13.07	13.68	-4.56
StDev ROE	4.07	4.25	-4.32	4.09	4.05	0.98
Construction Market Size ($bill)	10.01	10.17	-1.58	9.82	10.04	-2.21
Local HHI	0.23	0.22	4.44	0.22	0.22	0
Home Price Index (seas adj.)	1.29	1.3	-0.77	1.28	1.28	0
Change in Home Price Index	0.04	0.03	28.57	0.04	0.04	0
Unemployment rate (%)	5.72	5.81	-1.56	5.63	5.7	-1.23
Population growth (%)	0.9	0.84	6.89	0.82	0.84	-2.4
Real state GDP per captia ($ thous)	40.51	39.8	1.76	40.41	39.76	1.62

Note: Samples matched using Coarsened Exact Matching (CEM) as described in text to treat imbalance in regulatory charter choice, where **National** represents banks with a national charter supervised by the Office of the Comptroller of the Currency (OCC) and **State** represents banks with a state charter supervised by their local state authorities. Covariates used in the matching algorithm based on regression results indicating determinants of charter choice (not reported); these variables are bank age, asset size, earning assets share, deposit funding share, state GDP per capita, 5-year average and standard deviation of ROE, and holding company parent. I also include population growth and change home price index (HPI) and require a match within time periods (2001-2007) and (2008-2010). Variables described in Table 5. Column **% Diff** represents differences between State and National bank averages, scaled by average the level.

To achieve estimates of charter choice using a balanced sample, I use the Coarsened Exact Matching (CEM) algorithm suggested by Blackwell et. al (2010) to match banks within multivariate strata of these influential factors.[17] I require an exact match for binary indicators, and match banks only within the two broad sample periods of (2001-2007) and (2008-2010). Unfortunately, sample size prohibits me from matching banks within states. Columns 4-6 of Table 3 shows that matching significantly decreases differences in the profile of state and national banks in the sample.

This approach has two potential shortcomings. The first is that it does not address omitted variables correlated with banks' choice of charter. For example, if banks perceive a difference in regulator tolerance for risky activities, more banks will select into that regime. Second, it eliminates from the sample banks that are much more likely to be in one regulatory regime than the other. Essentially, this is the group for whom regulators compete; if regulatory behavior varies according to firms' propensity to switch regulators, I only am able to estimate regulators' behavior across firms for whom regulators compete.

3.4 Results and Discussion

The overarching theme of the tests below is to identify how mechanisms of policy implementation affect risk-taking in the volatile construction lending industry. I compare exposure growth and asset quality at differently regulated firms as a function of the structure, resources and incentives of their regulatory agencies. Since regulation is implemented at the firm level by field examiners, I consider both organizational-level and examiner-level characteristics that drive these choices at firms. I account for

[17] Limiting the match to the most influential factors reduces the dimensionality problem of matching without compromising its effectiveness in reducing sample bias. Regime choice regressions on the matched reveal that none of the covariates in are significantly correlated with regime choice.

imbalance in regime choice with matching techniques.

3.4.1 Results

State vs. National Banks. The merits of federalism is a hotly debated topic, and the tests in this section aim to measure whether state or federal regulators are more effective in acting as an effective external monitory for banks' loan quality, and at enforcing counter-cyclical risk management. As described in Section 3, I use a sample of state and national banks matched on observables to reduce bias in the estimates. Table 9 compares regressions results on the matched and unmatched sample on regulatory regime. A comparison of Column 1 and Column 4 suggests that differences in banks propensity to invest in construction lending across regimes explains some of the differences across supervisory regimes. Once we match on other observable bank and market characteristics, a significant difference in banks' retreat from construction lending after the financial crisis can be attributed to regulatory regime. After controlling for firm and market characteristics, Column 6 shows that state banks' construction lending share contracted on average 18% less per year than national banks. Between 2008 and 2010, this large effect is about a quarter of the average drop in construction lending business share for average banks over this period. While the difference raises questions about the mechanism, the fact that such a difference exists suggests that supervisory behavior was, on average, a significant factor limiting the extension of credit for banks. State banks tend to be less conservative in limiting banks' credit. This finding is consistent with anecdotal evidence on the positioning of the agencies after the crisis.

Table 3.9: Construction Loan Quality and Exposure, Matched Sample

	Unmatched Sample			Matched Sample		
	NPL Ratio	Construction Exposure		NPL Ratio	Construction Share	
	2008-10	Level 2007	Growth, 2008-10	2008-10	Level 2007	Growth, 2008-10
	(1)	(2)	(3)	(4)	(5)	(6)
State Bank	-0.6237*	0.2114	0.2429***	-0.2951	0.3210	0.1830***
	-1.91	0.94	5.09	-0.73	1.44	3.46
Age (log)	1.1904***	-1.0185***	-0.0913**	1.2607***	-1.0413***	-0.0629
	6.15	-5.68	-2.55	5.08	-4.97	-1.32
Assets	1.7957	-7.9232***	-1.9077***	0.3809	-7.6825***	-2.1170***
	0.68	-3.25	-4.32	0.12	-2.79	-4.34
Assets squared	-2.0800	9.7130***	1.4482***	1.1618	10.9930***	1.8519***
	-0.79	3.34	2.92	0.33	3.03	3.17
Earning assets	-0.2841***	-0.0157	0.0177**	-0.2453***	0.0477	0.0269***
	-6.07	-0.30	2.06	-4.46	1.05	2.95
Deposit funding	-0.0253	-0.0586***	-0.0014	-0.0159	-0.0446***	0.0008
	-1.55	-4.44	-0.61	-0.74	-3.29	0.28
Capital ratio	-0.0062	-0.1968***	-0.0273***	0.0328	-0.2014***	-0.0231***
	-0.16	-7.63	-5.05	0.74	-7.64	-4.26
Holding company	0.1712	-0.1641	0.0680	0.7872*	-0.6783*	0.1007
parent (0-1)	0.43	-0.48	1.01	1.67	-1.70	1.12
Market share	0.0435***	0.0780***	0.0165***	0.0459***	0.0726***	0.0152***
	7.56	20.08	18.64	6.75	18.07	16.48
Earnings volatility	0.4166***	0.0429**	-0.0287***	0.3705***	0.0417**	-0.0210***
	9.02	2.02	-5.20	5.60	2.35	-3.46
Low Performer	1.1926***	-0.0170	0.0491	1.4841***	-0.0695	0.0590
	4.33	-0.08	1.10	4.57	-0.34	1.24
Market controls	Yes	Yes	Yes	Yes	Yes	Yes
MSA weights	Yes	Yes	Yes	Yes	Yes	Yes
State, Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.166	0.574	0.406	0.135	0.577	0.385
Observations	12179	4308	12179	10326	3786	10326

Note: This table reports OLS regressions of bank-level characteristics on the growth of banks' construction lending portfolio. The dependent variable in Column 1 and 4, **NPL Ratio**, or non-performing loan ratio, is the percentage of all construction loans that have been classified as over 90 days past due or in non-accrual status, measured in percentage points. The dependent variable **Construction Exposure**, defined as the bank construction and development loan assets as a share of total assets, is the 2007 level in Columns 2 and 4 and the year-over-year change in Columns 3 and 6 . The columns compare the full **Unmatched Sample** of community banks, described in Table 5, to the **Matched Sample** of community banks, described in Table 9, over pre-and post-crisis time periods. Samples are matched on State Bank using a Coarsened Exact Match (CEM) algorithm. **State Bank** (=1) indicates banks with a state charter supervised by their local state authorities, while (=0) indicates banks with a national charter supervised by the OCC. Other independent variables are defined in Table 5. The lag level of Construction Lending Share is included but not reported. **Market Controls** included but not reported are Market Size, Local HHI, Home Price Index, Change in HPI, Local unemployment, Population growth, Real GSP per capita, as defined in Table 5. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors, clustered on bank identifier.

Which states drive these differences? Tables 10, 11 and 12 report variation across states in each of the dependent variables (Column 1) and report the difference between state and nationally regulated banks (Column 2) using an interaction between the state fixed effect and the state bank indicator. For all tables, the omitted state is North Carolina. State charter indicator is not included, so the coefficients on Column 2 can be interpreted as driving the underlying average effect.

Table 10 reports differences in 2007 construction lending exposure levels across states and between state and nationally chartered banks. The coefficients show first that there are very large differences across states, and that there is variation in the degree to which state and nationally chartered banks engaged in construction lending. For example, in South Carolina and Massachusetts, state banks were relatively more conservative than their national bank peers, while in Arkansas and Washington they were more aggressive. However, the overwhelming majority of states show no significant difference between the two.

Table 11 reports delinquency levels by state, controlling for banks' exposure levels. California, Florida, and Nevada have extremely high delinquency rates compared to the average state. Across states, there appears to be significant heterogeneity in the degree to which state bank regulators monitor loan quality. In New Jersey, Arizona and Utah, state banks vastly under perform their national peers, while in South Carolina and Tennessee report lower delinquency levels. Finally, Table 12 shows that the result that state banks contract less rapidly during the credit crunch than national banks seems to be driven by very strong results from Arizona, where the difference between state and national banks is over 6 percentage points, and by smaller effects in Idaho, Maryland, New Jersey.

Table 3.10: Construction Exposure in 2007, by State and Regulator

	State Banks			State Banks	
	(1)	(2)		(1)	(2)
Alabama	-4.7011**	0.1374	Nebraska	-6.3655***	0.6773
	-2.22	0.08		-4.03	0.94
Arizona	15.7094*	-10.2014	Nevada	5.6348	
	1.82	-1.15		1.45	
Arkansas	-5.4433***	2.2242**	New Jersey	-8.6462***	2.9828
	-3.49	2.40		-3.13	0.98
California	-3.7477*	0.3195	New Mexico	-1.4002	-1.4581
	-1.82	0.18		-0.54	-0.59
Colorado	-1.3224	-2.6111*	New York	-7.8002***	-0.3536
	-0.71	-1.66		-4.42	-0.26
Connecticut	4.9085	-4.4058	North Dakota	-7.3705***	-0.3765
	1.14	-0.49		-4.57	-0.47
Florida	-0.9584	-1.8001	Ohio	-8.3817***	-0.1633
	-0.29	-0.58		-5.56	-0.27
Georgia	3.9050	-0.7170	Oklahoma	-5.6933***	1.6058**
	1.50	-0.31		-3.62	2.22
Idaho	-0.8549	1.8846	Pennsylvania	-8.6905***	-2.2653***
	-0.58	0.63		-5.28	-2.61
Illinois	-5.8379***	0.6367	South Carolina	2.2171	-5.3134***
	-3.88	1.30		1.15	-3.25
Indiana	-6.5743***	0.3088	South Dakota	-6.6159**	-0.2148
	-3.85	0.30		-2.53	-0.10
Iowa	-6.6736***	0.3619	Tennessee	-2.4036	-1.3171
	-3.92	0.40		-0.96	-0.62
Kansas	-4.1948**	0.0593	Texas	-5.0941***	1.0495*
	-2.46	0.06		-3.39	1.65
Kentucky	-6.4683***	0.1850	Utah	12.0140**	1.9454
	-4.17	0.27		2.56	0.32
Louisiana	-6.2157***	1.6595	Vermont	-7.0403***	-0.6470
	-2.69	0.87		-3.44	-0.37
Maryland	-6.2208*	1.3082	Virginia	-6.4852***	1.9825
	-1.90	0.42		-2.90	1.07
Massachusetts	-7.9885***	-4.0798**	Washington	-3.8075	6.0249**
	-4.66	-2.35		-1.52	2.23
Michigan	-7.5858***	2.1140**	West Virginia	-6.2023***	-0.9588
	-4.80	2.53		-3.53	-0.84
Minnesota	-4.6674***	-0.5341	Wisconsin	-3.9442**	-0.7539
	-2.86	-0.65		-2.34	-0.82
Mississippi	-7.1617***	1.5930	Wyoming	-4.6927**	0.5400
	-3.61	1.06		-2.41	0.33
Missouri	-5.1594***	1.2156*			
	-3.34	1.83			

Note: This table shows state-level fixed effects (Column 1) and state chartered bank x state level fixed effects (Column 2) for construction exposure levels using the regression specification from Table 9. Dependent variable is construction lending share of assets in 2007 measured in percentage points. Averages are compared to North Carolina mean of 17.95.

Table 3.11: Delinquency Levels, 2008-10, by State and Regulator

	State Banks				State Banks
	(1)	(2)		(1)	(2)
Alabama	-3.0572*	2.6113**	Nebraska	-0.6513	-0.7841
	-1.86	2.24		-0.35	-0.50
Arizona	-8.3676***	12.1721***	Nevada	6.6824**	
	-3.02	4.10		2.20	
Arkansas	3.3345	-6.1835*	New Jersey	1.2507	10.0888**
	0.96	-1.91		0.44	2.16
California	8.9790***	-1.6635	New Mexico	-1.0206	3.3726**
	3.00	-0.56		-0.60	2.25
Colorado	-1.1762	0.3468	New York	-1.0892	1.8782
	-0.35	0.11		-0.49	1.49
Connecticut	4.1225	1.5001	North Dakota	16.0713	-8.8391
	0.64	0.22		1.27	-0.69
Florida	7.8564***	-2.9917	Ohio	-0.6102	-3.4129
	2.95	-1.38		-0.24	-1.56
Georgia	1.0310	-0.3220	Oklahoma	-3.1020	1.5486
	0.58	-0.21		-1.54	0.87
Idaho	13.7841***	-8.8551**	Pennsylvania	-1.1461	2.8926**
	8.72	-2.33		-0.74	2.10
Illinois	1.4045	-1.7351	South Carolina	2.1413	-3.1591***
	0.85	-1.52		1.24	-2.62
Indiana	-3.4894*	1.5266	South Dakota	9.0525	-7.2503
	-1.84	0.95		1.47	-1.10
Iowa	3.4127	-2.6098	Tennessee	-0.5020	-2.0989*
	0.95	-0.76		-0.33	-1.78
Kansas	0.1945	-0.7459	Texas	-3.5744***	-0.0802
	0.11	-0.46		-2.88	-0.21
Kentucky	-1.2870	-0.5082	Utah	-2.3622*	5.5491***
	-0.62	-0.31		-1.73	2.64
Louisiana	-2.7119*	1.0233	Vermont	5.1599	-6.7585**
	-1.83	1.03		1.39	-2.07
Maryland	2.6731	1.7543	Virginia	1.0723	0.4818
	1.12	1.58		0.49	0.29
Massachusetts	-1.3560	0.2381	Washington	6.1952	1.6223
	-0.55	0.12		1.27	0.33
Michigan	-5.9028**	0.9101	West Virginia	-2.7090	1.1501
	-2.43	0.53		-1.39	0.95
Minnesota	1.7531	0.4657	Wisconsin	-1.0585	2.5914*
	0.99	0.33		-0.64	1.77
Mississippi	-3.4163*	-0.4535	Wyoming	2.5610	-1.0624
	-1.80	-0.48		0.73	-0.47
Missouri	-2.5428*	0.5680			
	-1.88	0.70			

Note: This table shows state-level fixed effects (Column 1) and state chartered bank x state level fixed effects (Column 2) for construction exposure levels using the regression specification from Table 9. Dependent variable is non-performing construction loans as a percentage of all construction loans. Averages compared to North Carolina, mean of 5.02%.

One explanation for this difference is that local regulatory agencies during the credit crisis is that they allow a more "permissive" policy for troubled firms. I test this mechanism by comparing credit contraction across regulatory regimes for firms with relatively high delinquency levels or in high-risk locations. Table 13 reports a regression of construction lending share growth during the crisis for three different subsets of firms: those in the top quartile of NPL rates nationally ("High NPL"), those in the top quartile of NPL rates within their home MSA ("Relative High NPL") and the MSAs with the highest overall level of NPL relative to other MSAs. I interact each of these terms with the indicator for state banks. Table 11 shows that the banks with the highest NPL levels and cities with the highest NPL levels show the largest contraction in construction lending, as expected. In two of the three cases, supervisory regime does not affect the results. However, Columns 1 and 2 show that local regulators are more lenient in credit contraction for high NPL banks. While the worst performing banks supervised by the OCC contract their construction lending portfolios on average 50% per year, state banks only contract about 10%.

Another possibility is that national banks' exit from construction lending demonstrates differences among agencies in enforcing minimum compliance standards, as opposed to differences in regulatory discretion. Federal agencies have established inter-agency guidelines examination of on Real Estate lending policies at banks. These inter-agency guidelines stipulate maximum loan-to-value (LTV) ratios for underwriting construction loans which vary by borrower type but range between 65% and 85%. When the value of the underlying real estate collateral changes, banks must classify loans with amounts in excess of the maximum LTV limits and these loans can not exceed 100% of the value of banks' risk-based capital.[18] While states have

[18] Inter-agency Guidelines, CFR 12 Part 365.

Table 3.12: Construction Lending Contraction, 2008-10, by State and Regulator

		State Banks			State Banks
	(1)	(2)		(1)	(2)
Alabama	1.2065**	-0.5752	Nebraska	-0.1869	0.4275*
	2.16	-1.43		-0.38	1.93
Arizona	3.2681**	-6.0815***	Nevada	-0.9971	
	2.18	-3.66		-0.94	
Arkansas	0.5761	-0.3704	New Jersey	-2.5421***	-0.8499**
	1.12	-1.35		-3.32	-2.11
California	-0.9549	-0.4085	New Mexico	-1.7920***	0.1772
	-1.33	-0.62		-2.7	0.31
Colorado	-1.0748	0.6143	New York	-2.7336***	0.7086*
	-1.46	0.9		-3.88	1.7
Connecticut	-3.1639***	1.7941*	North Dakota	-1.7370***	-0.0162
	-2.78	1.76		-3.55	-0.08
Florida	-1.0122	0.8362	Ohio	1.4793***	0.0913
	-1.21	1.12		3.02	0.46
Georgia	-0.9667	1.3262	Oklahoma	-0.1323	-0.1206
	-0.97	1.4		-0.31	-0.58
Idaho	0.4345	-2.7540***	Pennsylvania	-1.2786**	0.2071
	0.9	-3.61		-2.47	1.05
Illinois	-0.287	0.1086	South Carolina	-0.0668	0.5586
	-0.67	0.84		-0.08	0.71
Indiana	0.9130**	0.1375	South Dakota	-0.807	0.0155
	1.98	0.81		-1.56	0.04
Iowa	-0.3722	0.2375	Tennessee	-0.4697	0.9729
	-0.8	0.97		-0.65	1.51
Kansas	-0.3906	0.1346	Texas	-0.5889	-0.152
	-0.9	0.58		-1.4	-0.75
Kentucky	0.5326	-0.0561	Utah	-6.9221***	6.1888***
	1.16	-0.3		-16.67	5.56
Louisiana	-1.0544**	0.2456	Vermont	-2.0442***	0.3691***
	-2.06	0.68		-3.39	3.25
Maryland	1.5539	-4.2963***	Virginia	-1.4206	-0.4985
	1.06	-3.47		-1.61	-0.72
Massachusetts	-1.2159**	0.1622	Washington	-1.6068	-1.942
	-1.99	0.49		-0.92	-1.08
Michigan	2.7901***	-0.1462	West Virginia	0.1299	0.4509
	4.32	-0.88		0.23	1.35
Minnesota	-0.4044	0.0604	Wisconsin	0.0007	-0.0065
	-0.91	0.34		0	-0.02
Mississippi	0.545	0.2505	Wyoming	-4.3095***	0.9902
	0.87	0.6		-4.24	1.51
Missouri	0.092	-0.0537			
	0.23	-0.34			

Note: This table shows state-level fixed effects (Column 1) and state chartered bank x state level fixed effects (Column 2) for construction exposure levels using the regression specification from Table 9. Dependent variable is year-over-year change in construction lending share of assets. Average compared to North Carolina, mean of -1.71%.

Table 3.13: Construction Loan Quality and Exposure, by Bank Distress, Credit Crunch

	Construction Exposure, Annual Growth, 2008-10					
	(1)	(2)	(3)	(4)	(5)	(6)
State Bank	0.1949***	0.1122*	0.2000***	0.1888***	0.2026***	0.1629***
	3.56	1.95	3.64	3.33	3.70	2.76
High NPL	-0.2242***	-0.5279***				
	-3.41	-4.41				
High NPL x SB		0.3967***				
		2.92				
Relative High NPL			-0.1003	-0.2040		
			-1.12	-1.09		
Relative High NPL x SB				0.1363		
				0.65		
MSA High NPL					-0.2997***	-0.4418***
					-4.79	-3.64
MSA High NPL x SB						0.1825
						1.34
Bank, Market controls	Yes	Yes	Yes	Yes	Yes	Yes
MSA weights	Yes	Yes	Yes	Yes	Yes	Yes
State, Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.320	0.321	0.319	0.319	0.321	0.321
Observations	10418	10418	10418	10418	10418	10418

Note: This table reports OLS regressions on the growth of banks' construction lending portfolio during the economic downturn of 2008-2010 in light of banks' delinquency levels. The dependent variable in each regression is the year-over-year change in **Construction Exposure**, defined as the bank construction and development loan assets as a share of total assets. Regression is on matched samples of community banks, which are matched on State Bank using a Coarsened Exact Match (CEM) algorithm, as described in Table 9. **State Bank** or **SB** (=1) indicates banks with a state charter supervised by their local state authorities, while (=0) indicates banks with a national charter supervised by the OCC. Other independent variables are defined in Table 5. The lag level of Construction Lending Share is included but not reported. **High NPL** indicates whether a bank's non-performing loan ratio for construction loans is in the top quartile in the country within a given year (=1). **Relative High NPL** is a dummy variable indicating whether a bank's non-performing loan ratio for construction loans is in the top quartile within bank's home MSA within a given year (=1). **MSA High NPL** is a dummy variable indicating whether a MSA's average non-performing loan ratio for construction loans is in the top quartile for all MSAs in a given year. **High NPL x SB**, **Relative High NPL x SB**and **MSA High NPL x SB** are interactions of these three measures with State Bank indicator. **Bank controls** included but not reported are Age (log), Total assets, Earning Asset share, Assets squared, Deposit funding share, Capital ratio, Holding Company Parent, Market share, Earnings Volatility, and Low Performer. **Market Controls** included but not reported are Market Size, Local HHI, Home Price Index, Change in HPI, Local unemployment, Population growth, Real GSP per capita, as defined in Table 5. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors, clustered on bank identifier.

some leeway in setting their own maximum LTV limits[19] all state banks are subject to examinations by the FRB or FDIC.[20]

Since capital limits have pose hard constraints on banks' ability to extend more credit, it is possible that differences between state and national banks arise from implementation of the "100 percent rule" policy. I test whether annual construction lending share growth between 2008 and 2010 as a function of bank capital levels. Table 14 shows that state banks also systematically differ from national banks in their implementation of the lending limit rule, support for the idea that differences among state and national banks are due to differences in policy implementation across agencies.[21] Column 3 shows that state-supervised banks that fall above the exposure limit are much more likely to maintain credit levels than OCC-supervised banks, controlling for capital levels.

These results all suggest that national bank regulators were much more aggressive than state bank regulators in limiting banks' ability to extend credit after the financial crisis. At state banks, the construction lending business contracts over 0.2% less as a share of assets during the contraction. The difference during the contraction is substantial, almost a 20% of the average decline in banks' lending exposures. This difference is robust in the matched sample and can be attributed to both more lenient implementation of capital limits and more lenient treatment of high-risk firms. Whether banks rationally account for the benefit in choosing a state charter (in ex-

[19] See *A Profile of State Chartered Banking*

[20] These rules have been highly contentious among borrowers seeking credit since 2008. The National Association of Homebuilders (NAHB) has called on regulators to move away from such "rules" and allow regulators to evaluate on a case-by-case basis.

[21] We cannot directly observe the capital limit because only loans in excess of banks' LTV limit are classified against bank capital. Nevertheless, given the systemic drop in prices it is reasonable to assume that nearly all existing loans classified under this standard.

Table 3.14: Construction Loan Quality and Exposure, by Capital Levels, Credit Crunch

	Construction Exposure, Annual Growth, 2008-10		
	(1)	**(2)**	**(3)**
State Bank	0.1673***	0.1595***	0.2162
	3.22	3.06	1.24
Lag Constr. loans	-0.2213***	-0.2109***	-0.2109***
percent of assets	-29.11	-18.70	-18.76
Capital Ratio		-0.0153***	-0.0108
		-3.07	-1.17
Lending Limit flag		-0.4940	-2.2355**
		-0.97	-2.23
Capital Ratio x Limit		0.0157	0.1308*
		0.38	1.78
Capital Ratio x SB			-0.0070
			-0.66
Limit x SB			2.0524*
			1.79
Capital Ratio x Limit x SB			-0.1352
			-1.56
Bank, Market controls	Yes	Yes	Yes
MSA weights	Yes	Yes	Yes
State, Year fixed effects	Yes	Yes	Yes
Adj. R-squared	0.366	0.367	0.367
Observations	10551	10551	10551

Note: This table reports OLS regressions of bank-level characteristics on the growth of banks' construction lending portfolio during the economic downturn of 2008-2010 in light of banks' capital levels. The dependent variable in each regression is the year-over-year change in **Construction Exposure**, defined as the year-over-year change in bank construction and development loan assets as a share of total assets. Regression is on matched samples of community banks, which are matched on State Bank using a Coarsened Exact Match (CEM) algorithm, as described in Table 9. **State Bank** (=1) indicates banks with a state charter supervised by their local state authorities, while (=0) indicates banks with a national charter supervised by the OCC. **Capital ratio** is the lagged level of banks' ratio of total risk-based capital, measured in percentage points. **Lending Limit flag**, also abbreviated as **Limit**, indicates whether the ratio of bank's construction loan portfolio to total bank capital exceeds 100% in the year prior to growth. This is a rough indicator of whether banks fall under regulatory limitations to extend new construction lending credit. **Capital Ratio x SB** is an interaction term between Capital Ratio and State Bank. **Limit x SB** is an interaction between Lending Limit Flag and State Bank. **Capital Ratio x Limit x SB** is a triple interaction between Capital Ratio, Lending Limit Flag, and State Bank. **Bank controls** included but not reported are Age (log), Total assets, Earning Asset share, Assets squared, Deposit funding share, Holding Company Parent, Market share, Earnings Volatility, and Low Performer. Also included but not reported is a control for the lagged value of construction lending share. **Market Controls** included but not reported are Market Size, Local HHI, Home Price Index, Change in HPI, Local unemployment, Population growth, Real GSP per capita, as defined in Table 5. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors, clustered on bank identifier.

change for some unmeasured compensating differential) or whether this difference was an unanticipated windfall is beyond the scope of this paper, and does not materially affect the analysis. Overall, these findings suggests that an understanding of regulators' willingness and ability to interfere in markets in various states of the economy is an important strategic consideration for firms.

Agency funding and capture. One of the most common explanation for excessive risk-taking under the nose of regulatory supervision is that agencies are "captured" by the banks they supervise, potentially because the banks provide an important source of funding. Table 15 identifies differences in banks' construction loan quality and total exposure as a function of supervisory agency funding, using variation across states and between state and nationally regulated banks. In comparing the effect of funding sources on outcomes at community banks, identification comes from differences across state institutions relative to nationally supervised banks. The regressions reported in Columns 1 through 3 shows that agency funding mechanisms do not have a statistically significant effect on either credit quality measures or banks' construction investment exposures. However, Columns 3 and 4 show that an increase in small banks as a share of total assets under supervision is associated with lower construction lending contraction at High NPL banks. This results is consistent with the theory that agencies which primarily supervise community banks are less likely to favor an aggressive contraction in credit. Note that these results completely mediate the effect of "State Bank" on the credit contraction.

Table 3.15: Agency Incentives, Construction Loan Quality and Exposure

	NPL Ratio	**Construction Exposure**		
	2008-2010	**Level 2007**	**Growth, 2008-2010**	
	(1)	**(2)**	**(3)**	**(4)**
State Bank	-0.8261	-0.3339	-0.0750	-0.0905
	-0.84	-1.17	-0.50	-0.60
Financed primarily	2.4347	0.0975	-0.1603	-0.1160
through SGF	1.51	0.23	-0.63	-0.46
Bank revenue	-0.2722	-0.3951	-0.1967	-0.2137
dependence	-0.21	-1.61	-1.29	-1.41
Small bank share of	0.0058	0.0046	0.0052*	0.0037
supervision	0.27	0.78	1.84	1.33
High NPL				-0.4855***
				-3.51
SGF x High NPL				-0.0565
				-0.23
Bank Rev x High NPL				-0.0574
				-0.45
Small Share x High				0.0068***
NPL				3.18
Bank, Market controls	Yes	Yes	Yes	Yes
MSA weights	Yes	Yes	Yes	
State, Year fixed effects	Yes	Yes	Yes	Yes
Adj. R-squared	0.135	0.908	0.386	0.388
Observations	10326	3786	10326	10326

Note: This table reports OLS regressions of banks' regulatory environment on the constuction lending delinquency growth and delinquency levels. Regression is on matched samples of community banks, which are matched on State Bank using a Coarsened Exact Match (CEM) algorithm, as described in Table 9. The dependent variable in Column 1, **NPL Ratio**, or non-performing loan ratio, is the percentage of all construction loans that have been classified as over 90 days past due or in non-accrual status, measured in percentage points. The dependent variable in Columns 2 through 4, **Construction Exposure**, is the level in 2007 (Column 2) and year-over-year changes (Column 3 and 4) in bank construction and development loan as a share of total assets, measured in percentage points. **State Bank** (=1) indicates banks with a state charter supervised by their local state authorities, while (=0) indicates banks with a national charter supervised by the OCC. **Financed primarily through SGF** indicates whether a bank's supervisory agency relies on a general fund allocation for more than 75% of total budget (=1). **Statutory budget** indicates whether agencies report that Statute determines how funds are collected, allocated, appropriated and spent (=1). **Bank revenue dependence** indicates bank's supervisory agency rely on revenues collected from fees assessed on banks to fund more than 75% of the agency budget (=1). This indicator is derived from the *Profile of State Chartered Banking* published by the Conference of State Bank Supervisors (CSBS), and national agency data are derived from annual issues of the *Annual Report*. **Small bank share of supervision** is the share of all assets under a banks' regulator's supervision that are classified as community banks (those with less than $1 billion in assets, located in a MSA, with at least 50% of deposits located in headquarter MSA.) **High NPL** is an indicator for whether a bank's construction NPL ratio is in the top quartile in a given year for all banks with a non-zero construction loan portfolio (=1). **SGF x High NPL, Bank Rev x High NPL** and **Small Share x High NPL** are interaction terms between Financed primarily through SGF, Bank revenue dependence, Small bank share of supervision with the High NPL indicator, respectively. **Bank controls** included but not reported are Age (log), Total assets, Earning Asset share, Assets squared, Deposit funding share, Capital ratio, Holding Company Parent, Market share, Earnings Volatility, and Low Performer. Also included but not reported is a control for the dollar value of construction and development loans in banks' portfolio. **Market Controls** included but not reported are Market Size, Local HHI, Home Price Index, Change in HPI, Local unemployment, Population growth, Real GSP per capita, as defined in Table 5. In addition, I control for the lagged level Construction Lending Share of assets in Columns 1, 3 through 4. I control for the level of the total volume of construction and development loans in Column 2. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors, clustered on bank identifier.

Budget levels. Another common explanation for excessive risk-taking in regulated industries is that enforcement agencies do not have the financial or human resources to monitor firms effectively. Table 16 reports the effect of agency resources on construction market exposure for banks and on delinquency levels, using variation across states and between state and nationally regulated banks. The results in Columns 1 shows that, controlling for budget levels, a relatively larger exam force is correlated with higher delinquency levels. For a given agency budget level, the number of agents *increases* banks' average delinquency levels, rather than decreases. This result could reflect reverse causality, but it is useful to note that exam force levels were measured in 2008, and NPL levels reported in the three following years. Column 2 shows that neither financial or human resources are associated with higher construction construction lending exposures during the housing boom. Consistent with Table 12, Column 3 and 4 of Table 13 indicate that the volume of assets under supervision, or the density of the banking sector for a given jurisdiction, are positively correlated with a less severe credit crunch, as are budget levels.

*Examiner pay and turnover.*Table 17 reports regressions on construction lending exposures as a function of examiner turnover. The key result from Table 14 is that regulators with high turnover in the exam force are less likely to have extreme credit contraction at the poorest performing banks. This result suggests that newer civil servants are less likely to take an aggressive approach with respect to crisis response. Poor resources at the level of the civil servant are another explanation for failures of bureaucratic effectiveness.

Table 18 shows tests differences in examiner salary on banks' construction lending choices. In 2007, examiner salaries ranged from $28,000 to $62,000, with a standard deviation of $7,000. Columns 1 and 2 show that salary levels are not associated with

Table 3.16: Agency Resources, Construction Loan Quality and Exposure

	NPL Ratio	**Construction Exposure**		
	2008-2010	**Level 2007**	**Growth, 2008-2010**	
	(1)	**(2)**	**(3)**	**(4)**
State Bank	2.0065	4.8944	1.3857*	1.4005*
	0.49	0.31	1.86	1.89
Examiners per asset	0.0005***	0.0057	0.0000	-0.0001
sup.	3.83	1.12	0.35	-0.86
Budget per asset	-1.1221	-2.5299	2.6620*	2.1659*
sup.	-0.29	-0.81	1.71	1.70
Assets under	0.0005	0.0010	0.0002	0.0002*
supervision	0.56	0.32	1.63	1.66
High NPL				-0.4365***
				-3.19
Exam ratio x High				0.0001
NPL				1.17
Budget ratio x High				1.3590
NPL				1.27
Bank, Market controls	Yes	Yes	Yes	Yes
MSA weights	Yes	Yes	Yes	Yes
State, Year fixed effects	Yes	Yes	Yes	Yes
Adj. R-squared	0.134	0.907	0.387	0.389
Observations	10216	3723	10216	10216

Note: This table reports OLS regressions of banks' regulatory environment on the constuction lending delinquency growth and delinquency levels. Regression is on matched samples of community banks, which are matched on State Bank using a Coarsened Exact Match (CEM) algorithm, as described in Table 9. The dependent variable in Column 1, **NPL Ratio**, or non-performing loan ratio, is the percentage of all construction loans that have been classified as over 90 days past due or in non-accrual status, measured in percentage points. The dependent variable in Columns 2 through 4, **Construction Exposure**, is the level in 2007 (Column 2) and year-over-year changes (Column 3 and 4) in bank construction and development loan as a share of total assets, measured in percentage points. **State Bank** (=1) indicates banks with a state charter supervised by their local state authorities, while (=0) indicates banks with a national charter supervised by the OCC. **Budget ratio** is the ratio of a bank's supervisory agency's budgeted supervision dollars, in millions, to the sum of all commercial banking assets under supervision by that agency in 2008. Where available, budget figures were adjusted to reflect the share of budget allocated to commercial banking supervision. **Examiner ratio** is the ratio of a bank's supervisory agency's examiners to the sum of all commercial banking assets under supervision by that agency in 2008. These state-agency data are derived from data in the bi-annual *Profile of State Chartered Banking* shared by the Conference of State Bank Supervisors (CSBS), and national agency data are derived from annual issues of the OCC *Quarterly Journal* and *Annual Report*. **Total assets supervised** is the log of all banking assets supervised under banks' regulatory agency. **High NPL** is an indicator for whether a bank's construction NPL ratio is in the top quartile in a given year for all banks with a non-zero construction loan portfolio (=1). **Budget Ratio x High NPL** and **Examiner ratio x High NPL** are interaction terms between Budget and Examiner ratios with the High NPL indicator. **Bank controls** included but not reported are Age (log), Total assets, Earning Asset share, Assets squared, Deposit funding share, Capital ratio, Holding Company Parent, Market share, Earnings Volatility, and Low Performer. Also included but not reported is a control for the dollar value of construction and development loans in banks' portfolio. **Market Controls** included but not reported are Market Size, Local HHI, Home Price Index, Change in HPI, Local unemployment, Population growth, Real GSP per capita, as defined in Table 5. In addition, I control for the lagged level Construction Lending Share of assets in Columns 1, 2 and 5 through 8. I control for the level of the total volume of construction and development loans in Columns 3 and 4. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors, clustered on bank identifier.

Table 3.17: Examiner Turnover, Construction Loan Quality and Exposure

	NPL Ratio		**Construction Exposure**	
	2008-2010	**Level 2007**		**Growth, 2008-2010**
	(1)	**(2)**	**(3)**	**(4)**
State Bank	0.1552	0.0627	0.0981	0.0958
	0.21	0.31	1.17	1.14
New examiner ratio	-2.6052	-0.4053	0.5101	-0.1105
	-0.72	-0.43	1.22	-0.27
High NPL				-0.3847***
				-5.72
New examiner ratio x				1.6616***
High NPL				4.94
Bank, Market controls	Yes	Yes	Yes	Yes
Bank, Market controls	Yes	Yes	Yes	Yes
State, Year fixed effects	Yes	Yes	Yes	Yes
Adj. R-squared	0.135	0.908	0.386	0.389
Observations	10320	3786	10320	10320

Note: This table reports OLS regressions of banks' regulatory environment on the constuction lending delinquency growth and delinquency levels. Regression is on matched samples of community banks, which are matched on State Bank using a Coarsened Exact Match (CEM) algorithm, as described in Table 9. The dependent variable in Column 1, **NPL Ratio**, or non-performing loan ratio, is the percentage of all construction loans that have been classified as over 90 days past due or in non-accrual status, measured in percentage points. The dependent variable in Columns 2 through 4, **Construction Exposure**, is the level in 2007 (Column 2) and year-over-year changes (Column 3 and 4) in bank construction and development loan as a share of total assets, measured in percentage points. **State Bank** (=1) indicates banks with a state charter supervised by their local state authorities, while (=0) indicates banks with a national charter supervised by the OCC. **New examiner ratio** is the percentage of examiners at a bank's supervisory agency with less than two years of experience. This value is set to 0 for national banks. **Bank controls** included but not reported are Age (log), Total assets, Earning Asset share, Assets squared, Deposit funding share, Capital ratio, Holding Company Parent, Market share, Earnings Volatility, and Low Performer. Also included but not reported is a control for the dollar value of construction and development loans in banks' portfolio. **Market Controls** included but not reported are Market Size, Local HHI, Home Price Index, Change in HPI, Local unemployment, Population growth, Real GSP per capita, as defined in Table 5. In addition, I control for the lagged level Construction Lending Share of assets in Columns 1, 3 through 4. I control for the level of the total volume of construction and development loans in Column 2. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors, clustered on bank identifier.

differences in a deterioration of underwriting standards or higher exposure levels. Column 3 shows that higher salaries are associated with less aggressive contraction at problem banks. These results are difficult to interpret without more information about the labor market for bank examiners; high salary could reflect a shortage in demand for highly qualified examiners or a highly selective exam force. Thus, this result warrants further investigation with a more sophisticated dataset.

Table 3.18: Examiner Salary, Construction Loan Quality and Exposure

	NPL Ratio		**Construction Exposure**	
	2008-2010	**Level 2007**	**Growth, 2008-2010**	
	(1)	**(2)**	**(3)**	**(4)**
State Bank	-0.2895	0.0240	0.2008***	0.1992***
	-0.65	0.20	3.56	3.53
Entry-level salary	-0.3232	-0.2859	-0.0080	-0.0441
	-0.59	-1.65	-0.13	-0.80
High NPL				-0.4651***
				-5.72
Salary x High NPL				0.0083***
				5.26
Bank, Market controls	Yes	Yes	Yes	Yes
Bank, Market controls	Yes	Yes	Yes	Yes
State, Year fixed effects	Yes	Yes	Yes	Yes
Adj. R-squared	0.130	0.907	0.390	0.393
Observations	9536	3337	9536	9536

Note: This table reports OLS regressions of banks' regulatory environment on the constuction lending delinquency growth and delinquency levels. Regression is on matched samples of community banks, which are matched on State Bank using a Coarsened Exact Match (CEM) algorithm, as described in Table 9. The dependent variable in Column 1, **NPL Ratio**, or non-performing loan ratio, is the percentage of all construction loans that have been classified as over 90 days past due or in non-accrual status, measured in percentage points. The dependent variable in Columns 2 through 4, **Construction Exposure**, is the level in 2007 (Column 2) and year-over-year changes (Column 3 and 4) in bank construction and development loan as a share of total assets, measured in percentage points. **State Bank** (=1) indicates banks with a state charter supervised by their local state authorities, while (=0) indicates banks with a national charter supervised by the OCC. **Entry-level salary** is the annual starting salaries for commercial bank examiners at a bank's supervisory agency, scaled in thousands of dollars. These figures are adjusted for inflation and state-level regional price parity (RPP, Aten, 2008). This value is set to 0 for national banks. **Bank controls** included but not reported are Age (log), Total assets, Earning Asset share, Assets squared, Deposit funding share, Capital ratio, Holding Company Parent, Market share, Earnings Volatility, and Low Performer. Also included but not reported is a control for the dollar value of construction and development loans in banks' portfolio. **Market Controls** included but not reported are Market Size, Local HHI, Home Price Index, Change in HPI, Local unemployment, Population growth, Real GSP per capita, as defined in Table 5. In addition, I control for the lagged level Construction Lending Share of assets in Columns 1, 3 through 4. I control for the level of the total volume of construction and development loans in Column 2. **MSA weights** are a set of weighted MSA fixed effects, where banks exposure to an MSA (=1) is weighted by the share of banks' deposits originating from that MSA in a given year, using FDIC Summary of Deposits data on branch locations and deposit volumes. **State fixed effects** indicate the state in which a bank is headquartered in a given year. Coefficients marked with *, *, and ** are significant at the 90%, 95% and 99% level. T-statistics given below coefficients, estimated with robust standard errors, clustered on bank identifier.

3.4.2 *Discussion*

Taken together, the results from this analysis suggest that the organization of regulatory institutions is an important lens through which to which to understand firms' business environment, particularly in times of crisis. During the credit expansion leading to 2007, we see very little difference on average across banks' underwriting standards or exposure to construction lending as a share of assets as a function of their regulator characteristics. However, there is variation at the state level that is not captured by these easily measurable characteristics of the regulator.

In the aftermath of a large shock, we see that locally regulated banks experience a less severe credit crunch, due partially to more lenient application of rules on undercapitalized banks and banks with relatively high delinquencies. This result is most pronounced at state agencies that supervise a number of small institutions and have relatively strong resources, but does not reflect differences in industry funding. A lesson for firms in regulated industries is that and awareness of the characteristics of regulators that shape the enforcement environment is particularly important in times of crisis.

One caveat to these results is that they are derived from a matched sample of banks. Matching has the advantage of providing a relatively homogeneous and balanced sample, but in a setting where regulators must compete for bank charters to maintain legitimacy, the fact that large differences do not arise among banks that have low switching costs may not be surprising. Competition among regulators is not unique to this setting, because globalization and firm mobility force regulators to compete in many industries. However, while identification of the phenomenon in this study relies on overlapping jurisdictions, it impossible to say whether the competitive aspect of regulatory behavior drives these results, so care should be taken in

generalizing these results to other settings.

3.5 Conclusion

This paper demonstrates that the institutions constituting firms' regulatory enforcement environment are an important source of performance variation, particularly in times of crisis. Overall, the results imply that regulatory choice – and the manner in which firms engage with regulators – can be an important dimension of competitive strategy. While these results draw primarily on exogenous structural features of oversight, I identify dimensions of government relationships that are strategically important for firms' regulatory strategy, particularly when industries experience a shock (Porter, 1990; Baron, 1995). While management scholars have recognized the importance of government policy on firms' competitive environment (Shaffer, 1995), there is only limited research on *how* the variation in business-government interface within industry affect firms (Hillman and Keim, 1995). Firms' regulatory environment is not always defined by clear legal standards but enacted by human agents embedded in organizations, and institutional context is an important filter through which firms can evaluate regulators' willingness and capacity to work with firms in times of crisis.

APPENDIX

States Included in Sample

Alabama	Louisiana	Ohio
Arizona	Maine	Oklahoma
California	Maryland	Pennsylvania
Colorado	Mississippi	South Carolina
Connecticut	Minnesota	Tennessee
Florida	Missouri	Texas
Georgia	North Carolina	Utah
Iowa	North Dakota	Virgina
Illinois	Nebraska	Washington
Indiana	New Jersey	Wisconsin
Kansas	New York	West Virginia
Kentucky		

WORKS CITED

Ades, Alberto, and Rafael Di Tella. 1999. "Rents, Competition and Corruption." *American Economic Review* 89 (4), 982-994.

Akerlof, George. 1982. "Labor Contracts as Partial Gift Exchange," *Quarterly Journal of Economics* 97: 543-69.

Agarwal, Sumiy, David Lucca, Amit Seru, and Francesco Trebbi. 2012. "Inconsistent Regulators: Evidence From Banking." NBER Working Paper No. 17736.

Arrow, Kenneth. 1962. "The Economic Implications of Learning by Doing." *The Review of Economic Studies*

Aten, Bettina. 20085. "Estimates of State and Metropolitan Price Parities for Consumption Goods and Services in the United States, 2005," Working Paper, *Bureau of Economic Analysis*.

Ayres, Ian and John Braithwaite. 1995. *Responsive Regulation: Transcending the Deregulation Debate*. Oxford: Oxford UP.

Baker, George, Robert Gibbons, and Kevin J. Murphy. 1994. "Performance Measures in Optimal Incentive Contracts." *Quarterly Journal of Economics* 109 (4), 1125-1156.

Bardach, Eugene and Robert A. Kagan. 1981. *Going by the Book: The Problem of Regulatory Unreasonableness*. Philadelphia: Temple UP.

Barney, Jay. 1991. "Firm Resources and Sustained Competitive Advantage," *Journal of Management* 17(1): 99-120.

Baron, David. 1995. "Integrated Strategy: Market and Non-Market Components," *California Management Review* 37 (2): 47-65.

Becker, Gary. 1968. "Crime and Punishment: An Economic Approach," *Journal of Political Economy* 76 (2): 169-217.

Berger, Allen N. and Gregory F. Udell. 2002. "Relationship Lending and Lines of Credit in Small Firm Finance," *The Journal of Business* 68 (3): 351-381.

Blair, Christine E. and Rose M. Kushmeider. 2006. "Challenges to the Dual Banking System: The Funding of Bank Supervision." *FDIC Banking Review Series* 18(1).

Boot, Around, and Anjan V. Thakor. 2000. "Can Relationship Banking Survive Competition?" *The Journal of Finance* 55 (2): 678-713.

Boot, Around, and Arjan Thakor. 1993. "Self-Interested Bank Regulation," *American Economic Review* 83 (2): 206-212.

Broecker, Thorsten. 1990. "Creditworthiness Tests and Interbank Competition," *Econometrica* 58 (2): 429-452.

Butler, Henry and Jonathan Macey. 1987. "The Myth of Competition in the Dual Banking System." *Cornell Law Review* 73, 677-718.

Campbell, Tim, Yuk-Shee Chan, and Anthony Marino. 1992. "An Incentive-based Theory of Bank Regulation," *Journal of Financial Intermediation* 2 (3): 255-276.

Carletti, Elena. 2008. "Competition and Regulation in Banking," in *The Handbook of Financial Intermediation and Banking*, Anjan Thakor and Around Boot, eds. Boston, MA: Elsevier.

Clerides, Sofronis, Saul Lach and James Tybout. 1998. "Is Learning by Exporting Important? Micro-Dynamic Evidence from Colombia, Mexico, and Morocco," *The Quarterly Journal of Economics* 113 (3): 903-947.

Cohen, Wesley, and Daniel Levinthal. 1990. "Absorptive Capacity: A New Perspective on Learning and Innovation," *Administrative Science Quarterly* 35(1): 128-152.

Conference of State Bank Supervisors (CSBS). 2008. *A Profile of State-Chartered Banking*. Washington, DC: CSBS.

Conner, Kathleen R. and C.K. Prahalad. 1996. "A Resource-Based Theory of the Firm: Knowledge versus Opportunism." *Organization Science* 7 (5), 477-501.

Coval, Joshua D. and Tobias J. Moskowitz. "The Geography of Investment: Informed Trading and Asset Prices." *Journal of Political Economy* 109 (4), 811-841.

Crampes, Claude, and Abraham Hollander. 1995. "Duopoly and Quality Standards," *European Economic Review* 39 (1): 71-82.

Darr, Eric, Linda Argote and Dennis Epple. 1995. "The Acquisition, Transfer, and Depreciation of Knowledge in Service Organizations: Productivity in Franchises, " *Management Science* 41 (11): 1750-1762.

DeFond, Mark, Jere R. Francis, and Xuesong Hu. 2011. "The Geography of SEC Enforcement and Auditor Reporting for Financially Distressed Clients." Working Paper. University of Southern California, University of Missouri at Columbia, and University of Oregon (Feburary).

Degryse, Hans, and Steven Ongena. 2008. "Competition and Regulation in the Bank-

ing Sector: A Review of the Empirical Evidence on the Sources of Bank Rents," in *The Handbook of Financial Intermediation and Banking*, Anjan Thakor and Around Boot, eds. Boston: Elsevier.

Devenow, Andrea, and Ivo Welch. 1996. "Rational Herding in Financial Economics," *European Economic Review* 40: 603-615.

DeYoung, Robert. 2008."Safety, Soundness, and the Evolution of the U.S. Banking Industry," in *The Handbook of Financial Intermediation and Banking*, Anjan Thakor and Around Boot, eds. Boston: Elsevier: 347-374.

Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer. 2002. "The Regulation of Entry." *Quarterly Journal of Economics* 117 (1), 1-37.

Downs, Anthony. 1965. "A Theory of Bureaucracy," *The American Economic Review* 55 (1/2): 439-446.

Dyer, Jeffrey H. and Harbir Singh. 1998. "The Relational View: Cooperative Strategy and Sources of Interorganizational Competitive Advantage." *Academy of Management Review* 23 (4), 660-79.

Edwards, Franklin, and Frederic Mishkin. 1995. "The Decline of Traditional Banking: Implications for Financial Stability and Regulatory Policy," *Federal Reserve Bank of New York Economic Policy Review* 1: 27-45.

Eppen, Gary. 1979. "Effects of Centralization on Expected Costs in a Multi-Location Newsboy Problem," *Management Science* 25 (5): 498-501.

Fiorina, Morris P. and Roger G. Noll. 1978. "Voters, Bureaucrats and Legislators: A Rational Choice Perspective on the Growth of Bureaucracy." *Journal of Public Economics* 9 (2), 239-254.

Fisman, Ray. 2001. "Estimating the Value of Political Connections." *American Economic Review* 91 (4), 1095-1102.

Gehrig, Thomas. 1998. "Screening, Cross-Border Banking, and the Allocation of Credit," *Research in Economics* 52 (4): 387-407.

Grant, Robert M. 1996. "Toward a Knowledge-Based Theory of the Firm." *Strategic Management Journal* 17 (Winter Special Issue), 109-122.

Gulati, Ranjay, Nitin Nohria and Akbar Zaheer. 2000. "Strategic Networks." *Strategic Management Journal* 21 (3), 203-215.

Hannan, Michael, and John Freeman. 1977. "The Population Ecology of Organiza-

tions," *American Journal of Sociology* 82 (5): 929-964.

Hawkins, Keith. 2002. *Law as Last Resort: Prosecution Decision-Making in a Regulatory Agency.* Oxford: Oxford University Press.

Helfat, Constance E. 2007. *Dynamic Capabilities: Understanding Strategic Change in Organizations.* Malden, MA: Blackwell Publishing.

Heyes, Anthony. 2000. "Implementing Environmental Regulation: Enforcement and Compliance," *Journal of Regulatory Economics* 17 (2): 107-129.

Heyes, Anthony. 1993. "Environmental Enforcement when Inspectability is Endogenous," *Environmental and Resource Economics* 4 (5): 479-494.

Hillman, Amy, and Gerald Keim. 1995. "International Variation in the Business-Government Interface: Institutional and Organizational Considerations," *Academy of Management Review* 20 (1): 193-214.

Hirano, Keisuke, and Guido W. Imbens. 2004. "The Propensity Score with Continuous Treatments." Unpublished working paper, Harvard University (February).

Jackson, Howell E. and Mark J. Roe. 2009. "Public and Private Enforcement of Securities Laws: Resource-Based Evidence." *Journal of Financial Economics* 93 (2), 207-238.

Johnson, Christian A. 1995. "Wild Card Statutes, Parity, and National Banks – The Renascense of State Banking Powers." *Loyola University Chicago Law Journal* 26, 351-404.

Kane, Edward. 1990. "Principal-Agent Problems in S&L Salvage," *Journal of Finance* 45: 755-64.

Kedia, Simi and Shiva Rajgopal. 2011. "Do the SEC's Enforcement Preference Affect Corporate Misconduct?" emphJournal of Accounting and Economics 51 (3), 259-278.

Keely, Michael C. 1990. "Deposit Insurance, Risk and Market Power in Banking," *The American Economic Review* 80 (5): 1183-1200.

Kelman, Steven, 1981. *Regulating America, Regulating Sweden : A Comparative Study of Occupational Safety and Health Policy.* Cambridge, MA: MIT Press.

Kiyotaki, Nobuhiro, and John Moore. 1995. "Credit Cycles," NBER Working Paper No. 5083.

Kogut, Bruce and Udo Zander. 1996. "What Firms Do? Coordination, Identity and Learning." *Organization Science* 7 (5), 502-18.

Laffont, Jean-Jaques and Jean Tirole. 1993. *A Theory of Incentives in Procurement and Regulation.* Cambridge, MA: MIT Press.

Laffont, Jean-Jaques, and Wilifried Zantman. 2002. "Information acquisition, political game and the delegation of authority," *European Journal of Political Economy* 18 (3) : 407-428.

Leonard-Barton, Dorothy. 1992. "Core Capabilities and Core Rigidities: A Paradox in Managing New Product Development," *Strategic Management Journal* 13 (Special Issue: Strategy Process: Managing Corporate Self-Renewal): 111-125.

Levinthal, Daniel and James March. 1993. "The Myopia of Learning," *Strategic Management Journal* 14 (Special Issue: Organizations, Decision Making and Strategy): 95-112.

Lipsky, Michael. 1980. *Street-Level Bureaucracy: Dilemmas of the Individual in Public Services* New York, NY: Russel Sage Foundation.

Macher, Jeffrey T., John W. Mayo, and Jack A. Nickerson. 2011. "Regulator Heterogeneity and Endogenous Efforts to Close the Information Asymmetry Gap." *Journal of Law and Economics* 54(1), 25-54.

Malloy, Christopher J. "The Geography of Equity Analysis." *The Journal of Finance* 60 (2), 719-755.

Maloney, Michael, and Robert McCormick. 1982. "A Positive Theory of Environmental Quality Regulation," *Journal of Law and Economics* 25 (1): 99-124.

Niskanen, William A. 1968. "The Peculiar Economics of Bureaucracy," *The American Economic Review* 58 (2): 293-305.

Peltzman, Sam. 1976. "Toward a More General Theory of Regulation." *Journal of Law and Economics* 19 (2), 211-240.

Petersen, Mitchell A. and Raghuram G. Rajan. "Does Distance Still Matter? The Information Revolution in Small Business Lending." *Journal of Finance* 57 (6), 2533-2570.

Porter, Michael. 1980. *Competitive Strategy: Techniques for Analyzing Industries and Competitors.* New York: The Free Press.

Pralahad, C. K., and G. Hamel. 1990. "The Core Competence of the Corporation," *Harvard Business Review* 68 (3): 79-91.

Rajan, Raghuram. 1994. "Why Bank Credit Policies Fluctuate: A Theory and Some

Evidence," *The Quarterly Journal of Economics* 109 (2): 399-441.

Riordan, Mick. 1992. "Competition and Bank Performance: A Theoretical Perspective," in Colin Mayer and Xavier Vives (eds.) *Capital Markets and Financial Intermediation*. Cambridge, UK: Cambridge University Press.

Rosen, Peter S. 1997. *Banking Across State Lines: Public and Private Consequences.* Westport, CT: Quorum Books.

Rosen, Richard J. 2005. "Switching Primary Federal Regulators: is it Beneficial for U.S. banks?" *Federal Reserve Bank of Chicago Economic Perspectives* 2005 (3Q), 16-33.

Scharfstein, David, and Jeremy Stein. 1990. "Herd Behavior and Investment," *American Economic Review* 80 (3): 465-479.

Schooner, Heidi Mandanis. 1996. "Recent Challenges to the Persistent Dual Banking System." *St. Louis Law Journal* 41 (Winter), 263-275.

Scott, Kenneth. 1977. "The Dual Banking System: A Model of Competition in Regulation," *Stanford Law Review* 30 (1): 1-50.

Schroeder, John J. ""Duel" Banking System? State Bank Parity Laws: An Examination of Regulatory Practice, Constitutional Issues, and Philisophical Questions." *Indiana Law Review* 36, 197-227.

Shaffer, Brian. 1995. "Firm-level Responses to Government Regulation: Theoretical and Research Approaches," *Journal of Management* 21 (3): 495-514.

Sharpe, Steven. 1990. "Asymmetric Information, Bank Lending and Implicit Contracts: A Stylized Model of Customer Relationships," *Journal of Finance* 55: 1069-1087.

Sharpe, Steven. 1998. "Bank Capitalization, Regulation, and the Credit Crunch: A Critical Review of Research Findings," Working Paper, available at SSRN.

Shleifer, Andrei and Robert W. Vishny. 1983. "Corruption." *Quarterly Journal of Economics* 108 (3), 599-617.

Siegel, Jordan. 2005. "Can Foreign Firms Bond Themselves Effectively by Renting US Securities Laws?" *Journal of Financial Economics* 75 (2): 319-359.

Simunic, Dan A. "The Pricing of Audit Services: Theory and Evidence." *Journal of Accounting Reserach* 18 (1), 161-190.

Spence, A. Michael. 1975. "Monopoly, Quality and Regulation," *Bell Journal of Economics* 6 (2): 417-429.

Spiller, Pablo. 1990. "Politicians, Interest Groups, and Regulators: A Multiple-Principals Agency Theory of Regulation, or "Let Them Be Bribed"," *Journal of Law and Economics* 33 (1): 65-101.

Stein, Jeremy C. "Information Production and Capital Allocation: Decentralized versus Hierarchical Firms." *Journal of Finance* 57 (5), 1891-1921.

Stigler, George J. 1971. "The Theory of Economic Regulation." *Bell Journal of Economics* 2 (1), 3-21.

Svensson, Jakob. 2003. "Who Must Pay Bribes and How Much? Evidence from a Cross Section of Firms." *Quarterly Journal of Economics* 118 (1), 207-230.

Teece, David, Gary Pisano, and Amy Shuen. 1997. "Dynamic Capabilities and Strategic Management," *Strategic Management Journal* 18(7): 509-533.

Tung, Frederick, and M. Todd Henderson. 2011. "Pay for Regulator Performance," *Chicago Law Research Paper Series* Working Paper No. 574.

Wilson, James Q. 1982. *The Politics of Regulation.* New York, NY: Basic Books.

Wilson, James Q. 1991. *Bureaucracy: What Government Agencies Do and Why They Do It.* New York, NY: Basic Books.

Winter, Sidney G. 2003. "Understanding Dynamic Capabilities," *Strategic Management Journal* 24 (10): 991-995.

Yelle, Louis. 1979. "The Learning Curve: Historical Review and Comprehensive Survey," *Decision Sciences* 10(2): 302328.

Zheng, Lu. 1999. "Is Money Smart? A Study of Mutual Fund Investors' Fund Selection Ability," *The Journal of Finance* 54(3): 901933.