Bank Capital Ratios and the Structure of Nonfinancial Industries

Seung Jung Lee Viktors Stebunovs*

August 25, 2011

Abstract

We exploit variation in commercial bank capital ratios across states to identify the impact of higher capital ratios on firm creation and size in the manufacturing industries. We control for omitted financial and nonfinancial variables that may affect firm dynamics by exploiting variation in external finance dependence across industries. Our panel regressions suggest that, for industries dependent on external finance, a percentage point increase in the capital ratio has no statistically significant effect on firm creation but leads to a decline in average firm size, as measured in employees, of 0.7 to 1.4 percent the following year and a decline of 4 to 6 percent in the long term. The number of firms might not necessarily decline in response to more limited access to finance as setting up a business may not be that costly and some of the displaced workers may actually establish new businesses. Our results highlight the potential effects that tightening capital adequacy standards, such as Basel III, may have on firm dynamics in the industries dependent on external finance.

JEL Classification: G21, G28, L25
Keywords: bank capital ratios, bank capital regulation, micro structure of firms.

We are grateful to Mark Gertler, Philip Strahan, John Driscoll, and Jose Berrospide for helpful discussions. We also thank seminar participants at the Federal Reserve Board and session participants at the Midwest Macroeconomics Conference for helpful comments and suggestions. Michael Levere provided outstanding research assistance. Beth Kiser provided us with easy access to the Summary of Deposits (SOD) data. All errors and omissions are our own responsibility alone. The views expressed in this paper are solely the responsibility of the authors and should not be interpreted as reflecting the views of the Board of Governors of the Federal Reserve System or of anyone else associated with the Federal Reserve System.

*Division of Monetary Affairs, Federal Reserve Board, 21st Street and Constitution Avenue, NW, Washington, DC 20551. E-mail:seung.j.lee@frb.gov,viktors.stebunovs@frb.gov, respectively.

1 Introduction

This paper investigates the effects of banks' balance sheet pressures on the structure of nonfinancial industries. More specifically, we look at how state-level capital ratios of commercial banks affected the microstructure of manufacturing establishments for a sample period that includes two waves of changing capital regulatory standards. This empirical investigation is motivated by the recent financial crisis and the large balance sheet adjustments (in the form of deleveraging) that presumably will have been made in anticipation of changes in regulatory capital requirements from Basel II and Basel III. Although a large part of the adjustments in capital ratios made since the height of the most recent financial crisis have been affected by capital injections through the Trouble Assets Relief Program (TARP), the current international and domestic proposals for stricter capital rules will probably force banks to increase their capital ratios even further. If TARP was implemented with the hope of easing banks' balance sheet pressures to stimulate lending during the financial crisis, stricter capital standards will be set with the hope of buttressing the banking sector to withstand any future crises, but with presumably real costs to firms and households.

As, historically, banks' adjustment to higher capital ratios have been associated with stricter lending standards, such as higher loan spreads, and lower loan volumes, we examine the potential effects that these adjustments to limit credit may have had on the structure of manufacturing industries. Our main identification assumption is that the adjustments reflected in banks' balance sheets only affect industries that are dependent on external finance. We also calculate state-level capital ratios that would tend to be more affected by larger banks, whose balance sheets are reflective of economic conditions of other states and countries, and look at how changes in these capital ratios affect the number and the average size of establishments at the industry-state level during the period between 1977 and 1997. This period encompasses a steady stream of changes in numerical capital standards in the first half of the 1980s, the introduction of Basel I and the leverage ratio in 1990, and the passing of Federal Deposit Insurance Corporation Improvement Act (FDICIA) in late 1991.

A strand of policy papers and other research has focused on how capital regulation and banks' balance sheet pressures affected capital ratios, loans, and bank risk during this period. Furlong [1992] analyzes how higher capital ratios relative to an estimated target positively affects lending. Aggarwal and Jacques [1998] looks at the extent to which FDICIA boosted capital ratios and reduced bank risk. Finally, Keeley [1988] presents evidence that, especially for the largest BHCs, uniform capital requirements introduced in the early 1980's increased the book capital ratios for the capital-deficient banks by adjusting assets rather than capital compared to capital-sufficient banks.[1] All of these studies examined the effects reflected in banks' balance sheets. However, a drawback of this approach is that this does not take into account the possible substitution of funding sources at the firm level. One might imagine that firms will substitute away from more expensive bank funding to cheaper alternatives, perhaps mitigating the effect of higher capital ratios and more expensive bank funding on firms' economic activity. In our analysis, to address this issue, we look at the real effects

[1]There is also an abundunt amount of literature on how capital ratios or deviations from a target ratio affects loan growth - see Berrospide and Edge [2010], Bernanke and Lown [1991], Hancock and Wilcox [1993], and Hancock and Wilcox [1994]. Our analysis, however, is more concerned with the real effects of deleveraging (in terms of higher capital ratios) rather than the relationship between loan growth and a given level of leverage.

that can be seen from firm level data.

Less related to capital regulation *per se*, other research has focused more on market-based motives to adjust banks' balance sheets, which has provided implications for how capital levels may be related to spreads on loans. Diamond and Rajan [2000] discusses the incentives of low-capital banks to charge higher spreads on loans for cash-flow purposes, while Allen, Carletti, and Marquez [2008] argues that banks' equity capital is a credible commitment to reduce moral hazard. To test empirical implications of these theories, Santos and Winton [2010] find that low-capital banks charge higher spreads for low-cash-flow borrowers and lower spreads for high-cash-flow borrowers compared to high-capital banks as argued in Diamond and Rajan [2000] and Fischer, Mattes, and Steffen [2009] find that high-capital banks are able to charge higher spreads in general as argued in Allen, Carletti, and Marquez [2008], both using the same LPC syndicated loan database for large corporations, but for different periods. In our analysis, we look at a more complete universe of firms by using the state-level U.S. Census Country Business Patterns data.

Finally, another strand of research has focused on how the (de)regulation of the broader banking industry has had real economic consequences for non-financial industry structure. For example, Cetorelli and Strahan [2006] find that inter and intra-state branching deregulation in the United States had significant effects on the entry and average size of establishements in the manufacturing sector, mostly in the 1980s. Cetorelli [2004] investigate how enhanced bank competition in the EU area led to markets in nonfinancial sectors being characterized by lower average firm size in the early 1990s. In addition, using a different dataset and including an analsyis of long-term effects, Kerr and Nanda [2010] find that U.S. banking deregulations induced small changes in startup entry sizes or none at all, while Kerr and Nanda [2009] maintain that both entreprenuership and business closures grew after interstate banking deregulations.

In our paper, we look at how banks' capital ratios affect manufacturing establishment dynamics at the industry-state level. On the surface, our paper is somewhat related to Hancock and Wilcox [1998], which looks at how changes in the dollar volume of capital affected real economic activity at the state level, such as employment, payrolls, and the number of firms by firm size, with a focus on small businesses. However, their analysis was at the state level, limited to the period of 1989-1992, and looked at how dollar-volume changes in capital had real effects. In addition, they simply use lags of state-level capital as instruments to assess the impact on real activity. In contrast, we look at how changes in capital ratios, which reflect mostly adjustments in assets, affect the average size of establishments (and the extent that new establishments are created) at the industry-state level for the period 1977-1997. We also stress that our measure of state-level capital ratios, which are usually heavily influenced by bank operations in other states, nationally, or internationally, may provide sufficient exogenous variation in capital ratios that are not affected by economic conditions in a given state. Garmaise and Moskowitz [2006] also use a similar argument to address possible reverse causality by studying the effects of changes in large bank mergers on changes in crime at the MSA level. Furthermore, we use the identification assumption used by Cetorelli and Strahan [2006] in that firms that are in industries that are heavily dependent on external finance are the ones that are affected by such changes as opposed to firms that are not, which helps us to deal with omitted variable bias. Though capital ratio adjustments may change for a variety of reasons

including changes in market discipline and shocks to earnings in general, over the longer term, they likely provide a good proxy for bank balance sheet pressures to obtain a certain level of leverage.

Based on the literature, our first testable hypothesis is that the formation of establishments based on external finance should be negatively affected by banks' balance sheet pressures to increase capital ratios (or deleverage). This may occur through a variety of channels such as stricter lending standards. However, we are open to the possibility that higher capital ratios may not necessarily be negatively related to the creation of firms. Such a view is consistent with the literature on lending relationships such as in Berger and Udell [1998] and Petersen and Rajan [1994], which rely on data from the Survey of Small Business Finance, that show nascent firms depending less on bank loans than longer established firms. In addition, setting up an establishment (the extensive margin) may not be that costly relative to maintaining or expanding one, where the decision may be more based on the demand for goods a firm faces as opposed to the supply of credit. Finally, layoffs by firms that are induced by stricter lending standards may spur some creation of establishments, which may end up actually increasing the number of establishments in times of distress. Aaronson, Rissman, and Sullivan [2004], for example, document the increase in the number of firms, which was accompanied by a fall in employment at the aggregate level, in the context of the 2001 recession.

In contrast, we are more assertive of our second hypothesis, which is that adjustments to higher capital ratios negatively affect firm size (the intensive margin). Although our period of analysis coincides with two waves of tightening capital adequacy standards, banks may have also increased capital ratios due to low cash flow or to increase reputational capital. Regardless, such capital ratio adjustments and deleveraging are, almost by definition, accompanied by a more limited supply of credit if we assume issuing equity is costly. This will presumably lead to stricter lending standards and terms, such as higher loan spreads, that decreases investment on the intensive margin. Recent policy papers, such as Elliott [2009] have used such a channel to estimate the effects of new capital regulations on the broader economy. For our purposes, such dynamics are reflected in the the average size of firms measured by employee per establishment, as we assume capital and labor are largely complementary.

In examining both the effects on firm creation and firm size, we look at both short and long-term effects of higher capital ratios. These two effects may not necessarily be similar in magnitude and direction. One might imagine that a severe initial impact of higher capital ratios on availability and pricing of credit and, hence, firm dynamics might dissipate somewhat over time as firms switch to cheaper sources of funding. Alternatively, the long-term effects on firm dynamics might be more adverse than the short-term effects if the adjustment of bank balance sheets is a prolonged process and firms are not able to find cheaper alternatives to bank funding, for example, because of informational opaqueness, highlighting the advantage of commercial banks in screening.

The outline of the paper is as follows. The first section provides a linear history of various capital ratios at commercial banks. In particular, we describe the various changes to capital adequacy guidelines in the first half of the 1980s and the early 1990s and the time-series of aggregated and state-level capital ratios during that period. The second section provides a description of our sample of establishments based on the U.S. Census County Business Patterns Survey. The third section goes over our empirical strategy and the specification of our econometric model(s) and summary

statistics of the variables of interest. After detailing our panel regression results, we further control for endogeneity by using the difference GMM procedure introduced by Arellano and Bond [1991]. We detail the significance of the macro real effects to manufacturing industries by estimating how many employees would be displaced, both in the short-run and in the long-run. We provide reinforcing evidence of the real effects of banks' balance sheet adjustments due to higher capital ratios with panel and dynamic-panel regressions on growth rates. We end with some concluding remarks in the final section by comparing our results to other studies that focus primarily on estimating the real effects of the new Basel III regulations.

2 Brief History of Capital Regulation and Capital Ratios

2.1 Bank Capital Regulation Changes in the Early 1980s

Capital regulation by the federal bank regulatory agencies in the 1970s was conducted through ad-hoc target capital ratios based on peer-group comparisons along with bank-specific considerations.[2] The long-term fall in bank capital levels and the failures of several large banks, however, prompted bank regulators to consider enforcing a fixed minimum level of capital relative to assets on the balance sheet in 1979. Though the banking industry resisted such developments at first, due to the concern over banks' foreign debt exposure and exposure to the deteriorating energy industry, the the Office of the Comptroller of the Currency (OCC) and the Federal Reserve Board succeeded in announcing minimum capital guidelines in December 1981. 17 multinational banks were exempted from this requirement and continued to be regulated and supervised on an ad-hoc basis.[3] In August 1983, the guidelines were amended so that the multinational banks had to adhere to the same minimum capital requirements as regional banks, though prior to the amendment, the multinatinal banks had already strengthened their capital positions through the prompting of the federal agencies. The International Lending Supervision Act of 1983 empowered the three federal financial regulatory agencies, including the FDIC, to establish and enforce minimum capital reguirements for all banking institutions. As a result, in 1985, all banks and BHCs had to maintain a primary capital ratio of 5.5 percent or more and a total capital ratio of at least 6 percent.

All told, from 1981 to 1985 multinational banks saw their primary capital ratio requirement increase from having no pre-set requirement to having at least 5.5 percent, whereas regional banks

[2]For more information on capital regulation in the 1980s, see Federal Deposit Insurance Coporation, *A history of the 80s: Lessons for the Future*, July 28, 1999.

[3]The new guidelines were based on three categories of banks under the supervision of the OCC and the Federal Reserve Board: community banks with assets under $1 billion were subject to minimum primary and total capital ratios of 6 percent, regional banks with assets over $1 billion were subject to minimum primary ratio of 5 percent and total capital ratio of 6 percent, while the seventeen largest banks (the multinationals) did not have to adhere to preset numerical guidelines. The definition of the primary and total capital ratios changed over time. In 1985 primary capital consisted of stockholders' equity, perpetual preferred stock, loan loss reserves and certain debt instruments that must be converted to common or preferred stock at maturity, while total capital consisted of primary capital plus secondary capital instruments such as limited-life preferred stock and certain qualifying debt instruments. These definitions were slightly different at the bank holding company level. The FDIC enforced a more stringent capital standard based on its own definition of adjusted capital to adjusted assets which was unifrom across all state nonmember banks regardless of size. Vokey and Kearns [1985] provides a detailed description of the changes in capital regulation during the early 1980s, while Berger, Herring, and Szegö [1995] provides a review of the role of bank capital and describes the dramatic decrease in equity as a percent of assets since the first half of the 19th century.

saw their primary capital requirement increase from 5 percent to 5.5 percent. Finally, community banks saw their primary capital requirement actually decrease from 6 percent to 5.5 percent.

2.2 Bank Capital Regulation Changes in the Early 1990s

Soon problems with the uniform numerical minimum capital requirements began to surface. First, banks did not need to hold capital for off-balance sheet assets, though losses could potentially stem from such exposures. Second, banks had plenty of opportunity for capital arbitrage as on-balance sheet exposures required a fixed level of capital irregardless of how risky the exposures were. Third, for multinational banks, different capital standards across jurisdictions led to competitive inequity concerns.

As a result, the United States agreed to the Basel I international accord on capital adequacy standards in 1988, which tried to address the three concerns by introducing the concept of risk-weighted assets which allocated risk-weights to different types of exposures (including off-balance exposures). Risk-weighted assets were used as the denominator in calculating minimum regulatory capital ratios. Likewise, banks had to maintain a tier 1 capital ratio of at least 4 percent and a total risk-based capital ratio of at least 8 percent by the end of 1992.[4]

The three federal regulatory agencies then in 1990 agreed upon a leverage ratio, defined simply as tier 1 capital to average unweighted assets, which was derived from the capital ratios used since the mid 1980s for regulatory purposes. According to Berger, Richard, Kashyap, Scalise, Gertler, and Friedman [1995], the leverage ratio was introduced to capture risks not considered in the Basel I risk-based capital standards. The new rules stated that banks had to maintain a leverage ratio of at least 3 percent.

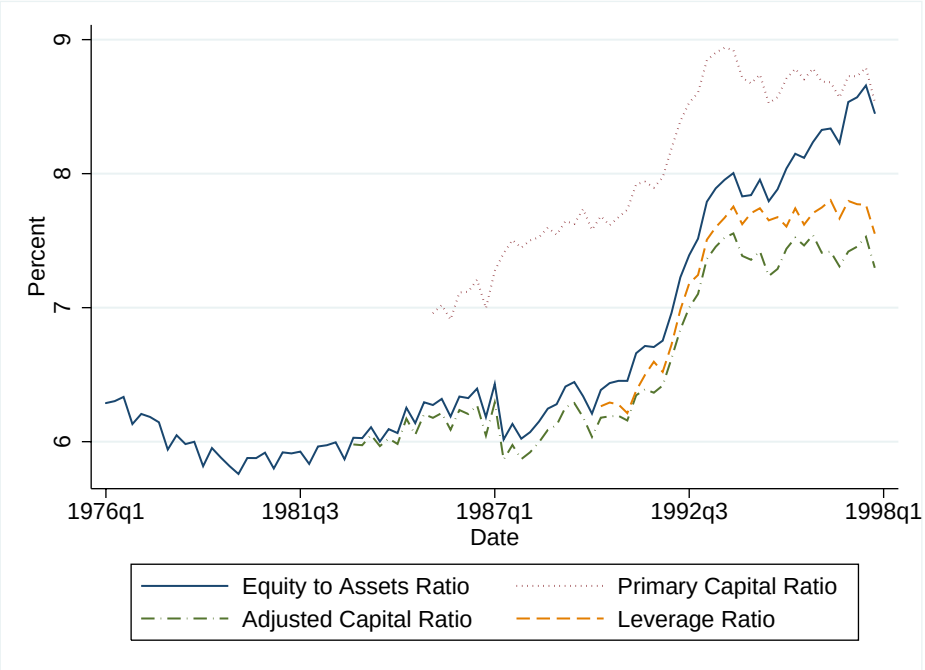
Finally, FDICIA was passed in 1991 and took effect in 1992, which established five capital categories or thresholds for each of the three new regulatory capital ratios and had corresponding menus of mandatory and optional enforcement actions, otherwise known as Prompt Corrective Action (PCA), as the capital ratios declined. The adequate level of capital was defined as at least 5 percent for the leverage ratio, 6 percent for the tier 1 capital ratio, and 10 percent for the total risk-based capital ratio, each 2 percentage points above the respective minimums.

2.3 Bank Capital Ratios

Increases in aggregate regulatory bank capital ratios and the simple equity to assets ratio at commercial banks have broadly been consistent with the two waves of changes in capital adequacy standards. Although data for the primary and total capital ratios used for regulatory purposes in the early 1980s is not available due to data limitations on several deduction items, the simple equity to assets ratio in Figure 1 steadily rises during the first half of the 1980s. The primary and total capital ratios continue to rise afterwards, but this is due to the dramatic increase in loan loss reserves in the banking industry. Later, the new regulatory capital standards set in place during

[4]Tier 1 capital consisted of common equity, some preferred stock, minority interest in consolidated subsidiaries less goodwill, while tier 2 capital consisted of loan loss reserves (limited to 1.25 percent of risk-weighted assets), subordinated debt (limited to 50 percent of tier 1 capital), and other preferred convertible stock. The total risk-based capital ratio was defined as the sum of tier 1 and tier 2 capital relative to risk-weighted assets.

Figure 1: Selected Capital Ratios



the early 1990s appears to have been an important factor in increasing the leverage ratio, the tier 1 ratio, and the total risk-based capital ratios. In particular, Wall and Peterson [1987] and Wall and Peterson [1995] argue that capital ratios at the BHC level are determined by two forces - regulatory and market-based, and that, more likely, regulatory forces were the predominant factors that explain capital ratio adjustments seen at the large BHCs during the years 1982 - 1984 and 1990 - 1992. These periods coincided with the two waves of regulatory tightening of capital adequacy standards, especially for the large banks. Furthermore, Flannery and Rangan [2008] attribute the capital build-up in the early 1990s to the market's response to the regulatory innovations that weakened conjectural government guaratnees and enhanced counterparties' incentive to monitor and price default risk. However, the extent to which capital ratios adjusted to new regulations as opposed to market discipline is not estimated and significant changes in the capital ratios may have been due to non-regulatory market-based motivations.

Since the only capital ratio that spans the sample of both waves of changes in capital adequacy standards is the equity to assets ratio, we use an adjusted capital ratio (which is the equity to assets ratio with deductions for intangible assets for both the numerator and denominator) for our analysis. Wall and Peterson [1987] uses the primary capital ratio in analyzing whether regulatory pressures affected capital ratios, which can be roughly be split into the adjusted ratio and the loan loss reserve ratio, which we separately control for in our analysis. Wall and Peterson [1995] uses the leverage ratio in their analysis because Baer and McElravey [1993] find that the leverage ratio was the more binding of standards in the early 90s and because Berger and Udell [1994] find that the

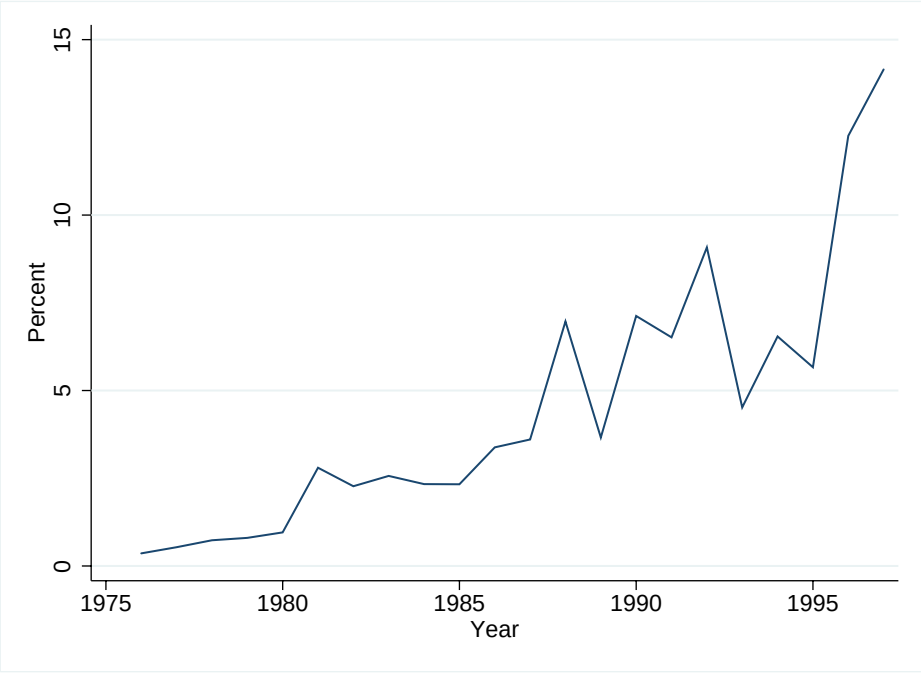
leverage ratio is more related to changes in bank loans than the the tier 1 or total risk-based capital ratios. Without the simple adjustment of deducting intangible assets from both the numerator and the denominator in the adjusted capital ratio, the equity to assets ratio displays a significant upward trend due to increasing M&A activity during the latter part of our sample period. Such activity has been historically associated with large goodwill increases at the acquiring institutions predominantly funded by capital. Likewise, goodwill has been tradionally deducted from regulatory capital calculations as the portion of capital that supports goodwill does not have the ability to absorb losses at a bank in times of stress. The goodwill data item is only available since 1985, but since goodwill comprises the majority of intangible assets, we deduct intangible assets instead. This allows us to use a sample that goes back to 1983. In addition, since we want to take full advantage of the county business pattern data that goes back to 1977 and also encompass the timeframe in which the regulatory environment first began to change in the early 1980s, we replace the adjusted capital ratio with the simple equity to assets ratio prior to 1983. This is not as problematic as replacing the series in later years since prior to 1983, M&A activity was considerably muted than in periods afterwards. For instance, from 1976 to 1982, the average assets of the acquired commercial banks as a percentage of beginning of year total industry assets was 1.2 percent; whereas from 1983 to 1997, average acquired assets was over 6 percent.[5] For our growth regressions, we use changes in the adjusted capital ratio as the explanatory variable in our analysis, which will be already highly correlated with changes in the equity to assets ratio.

Figure 1 illustrates how the adjusted capital ratio compares to the leverage ratio in the aggregate. The rise in the early 1980s and the sharper rise in the early 1990s reflects banks' deleveraging pressures during the two periods of regulatory capital tightening. The adjusted capital ratio is very similar to the leverage ratio since it was introduced. However, the adjusted capital ratio also deducts other intangible assets such as mortgage servicing rights and includes unrealized gains and losses as part of capital such as cumulative foreign currency valuations since the early 1984 and losses on marketable equity securities since 1989. Likewise, the changes in the adjusted capital ratio not only reflects changes in the regulatory capital environment but may reflect changes in market discpline and financial markets in general, though large and sustained movements have been found to be more correlated with regulatory tightening.

We take advantage of the differences in bank presence in different states to come up with state-level capital ratios. The assumption is that capital ratios at the bank level affect credit supply decisions at the branch level in a given state. For example, credit supply conditions in a given state are represented by the balance sheets of banks that have branches in that state. Whether through regulatory pressures or through market discipline, industries in states that have more banks with higher capital ratios are, ceteris paribus, are assumed to have more limited access to credit to support higher costs of funding, possibly through higher spreads on loans or tighter credit standards in general than for industries in other states. This fact is also consistent with the fact that smaller

[5]In addition, prior to 2001, banks could structure some acquisition transactions to meet certain criteria to record a business combination using the pooling-of-interests accounting method. Unlike the purchase accounting method, which records any price paid above the value of acquired assets (or liabilities) as goodwill, the pooling-of-interests accounting method simply combined the book value of assets and liabilities of the two banks to create a new balance sheet of the combined entity. Pooling-of-interests is now only possible if a combination involves banks within the same bank-holding-company structure.

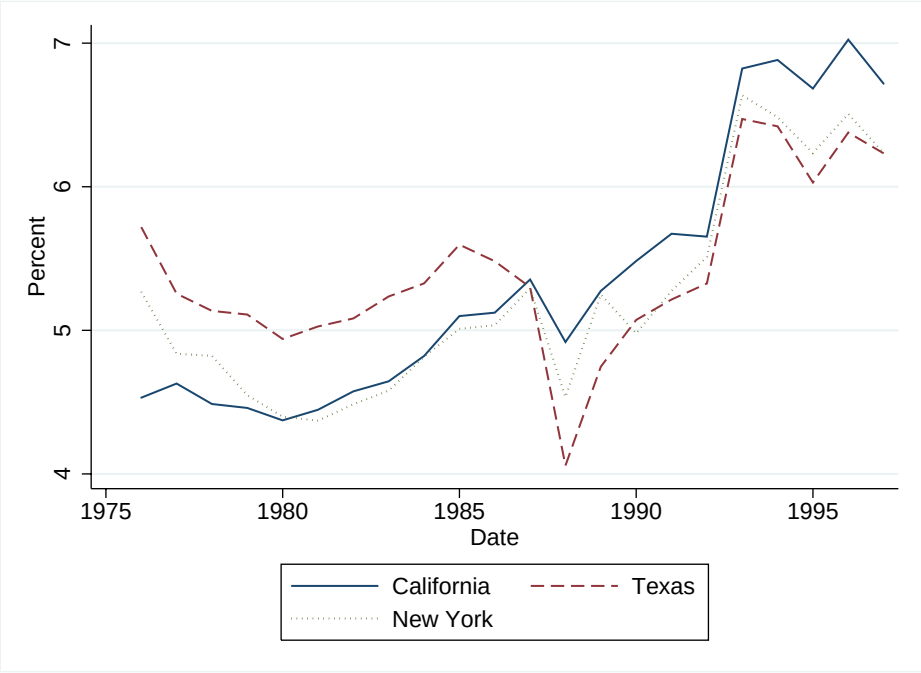
Figure 2: Commercial Bank Mergers as a Percentage of Beginning of Period Industry Assets



banks that have higher capital ratios usually charge higher spreads on their loans. We also emphasize that our measure of state-level capital ratios, which are usually heavily influenced by bank operations in other states, nationally, or internationally, may provide sufficient exogenous variation in capital ratios that are not affected by economic conditions in a given state. Garmaise and Moskowitz [2006] also use a similar argument to address possible reverse causality by studying the effects of changes in large bank mergers on changes in crime at the MSA level, arguing that such merger activity instruments for changes in bank competition at the local level. Nonetheless, we also try to address the possible endogeneity problem by using the Arellano-Bond dynamic panel estimator. Our prior is that firms dependent on external finance should be influenced in a systematically different manner by bank capital ratios in a diffence-in-difference approach. Higher capital ratios should lead to smaller size of firms dependent on external finance at the state-industry level, but not necessarily fewer net creation of businesses or firms at the extensive margin as setting up a business itself may not be that costly and some of the displaced workers at the intensive margin may actually establish new businesses. For example, Aaronson, Rissman, and Sullivan [2004] analyze the variations of self employment at the state level and find it to be countercyclical in the recession of 2001. Finally, we also control for general credit conditions proxied by the real interest rate measured as the rate on one-year Treasury securities minus the inflation rate.

Consistent with Wall and Peterson [1987] and Wall and Peterson [1995] which noted evidence of capital tightening at large BHCs, the state-level loan-weighted capital ratios for California, Texas, and New York, which tended to have higher concentrations of such banks, increases in the early

Figure 3: Adjusted Capital Ratio for Selected States



1980s and once again in the early 1990s as shown in Figure 3. The weights are applied to any bank that has a branch in a particular state to consider the balance sheet pressures at banks with the infrastructure and ability to provide loans in a given state. We assume that the presence of the following branches are enough to affect the credit conditions in a given state - headquarters, full service branches, limited service branches, and loan production offices. These offices do not necessarily hold deposits.[6] We also consider weights by the number of branches and weights that multiply deposits by the loans to deposit ratio at a given bank for a given state for robustness checks.[7]

3 Microstructure of Manufacturing Industries

Our data of interest for the microstructure of firms comes from the County Business Patterns, which is an annual survey conducted by the Census Bureau. These data are said to provide "the best way to consider industry structure over a long span of time at a disaggregated level" as noted by Cetorelli and Strahan [2006] in their study of how bank branching deregulation affected the microstructure of

[6]The branches are based on the National Information Center (NIC), which is a central repository of data bout banks and other institutions for which the Federal Reserve has a supervisory, regulatory, or research interest. Our branch count outnumber branches identified in the FDIC Summary of Deposits data because it includes branches that do not hold deposits.

[7]We use this as a robustness check due to the possibly close linkage between deposits and credit that may have been supported by the Community Reinvestment Act of 1977. However, we prefer our measure because some branches of banks that offer credit do not necessarily hold deposits in the same state.

firms. The annual survey collects data on the number of establishments, employment in mid March of each year, first quarter payrolls, and the annual payrolls. The period of the data we use begins in 1977 and ends in 1997, which encompasses the two waves of changes in regulatory capital adequacy standards. After 1997, the data categorizes industry codes according to the North American Industry Classification System (NAICS) which replaced the Standard Industrial Classification (SIC) system, creating a break in the time series. As in Cetorelli and Strahan [2006], we also distinguish the ten manufacturing industries that are dependent on external finance from the 10 that are not, based on two-digit SIC codes. This identification is based on loans to assets ratios according to the 1998 SSBF, but substantiated by external financial dependence measures for mature Compustat firms from 1980 to 1997.[8] Our assumption is that bank balance sheet pressures, in addition to the deregulation of inter and intra-state banking, only affect those industries which are dependent on external finance. We also note that an establishment in the context of the data is an economic unit in which production occurs, such as a plant, a factory, or a restaurant that employs people, and does not necessary correspond to a firm. However, Cetorelli and Strahan [2006] use the data with evidence that the two types of entities are highly correlated and that the number of firms make up the majority of establishments.

Figure 4 and Figure 5 plot the average establishment size in industries not dependent on external finance and the average in industries dependent on external finance, respectively, measured by employees per establishment and for the three states in Figure 3. At approximately the same periods, once in the early 1980s and again around the early 1990s when regulatory captial standards tightenened for large banks, the average size of establishments dropped noticeably. However, the drop was far more pronounced in Figure 5 for industries dependent on external finance as the scale is far greater than in Figure 4. In contrast, the number of establishments showed less of a dramatic change in the two respective periods. Our sample that spans both periods allows us to control for multiple factors, such as state-level GSP, that may also have contributed to a decrease in the size of establishments in one or both periods. In our data anaysis, we restrict our sample to include only industry-state-year observations that have no missing or zero values for both employees and establishments to maintain a stable and balanced panel.[9]

The scope of the state-level CBP data as of 1997 encompasses 101 million total employees from 6.8 million establishments.[10] For the manufacturing sector that we use based on the state-level data,

[8]The external finance dependence equals the proportion of capital expenditures financed with external funds. According to Cetorelli and Strahan [2006], the ten manufacturing industries (along with their SIC codes) are the following: Chemicals and allied products(28), Electircal and electronic equipment(36), Textile mill products(22), Petroleum and coal products(29), Rubber and plastic products(30), Lumber and wood products(24), Primary metal industris(33), Industrial machinery and equipment(35), and Transportiation and equipment(37). The industries that are not dependent on external finance are the following: Instruments and related products(38), Printing and publishing(27), Miscellaneous manufacturing(39), Stone, clay, glass, and concrete products(32), Furniture and fixtures(25), Fabricated metal products(34), Food and kindred products(20), Apparel and other textiles(23), Tobacco manufactures(21), and Leather and leather products(31).

[9]The majority of the observations with zero values were dropped due to disclosure rules, as no data are provided that would disclose the operations of an individual employer, which creates a natural criterion for our sample as we do not want our results to be determined by very few observations or observations that are based on a single large entity.

[10]This is based on state level data. Based on national CBP data, where disclosure rules do not apply, the 1997 survey encompasses 105 million total employees from 6.9 million establishments. Among these aggregates, there are 18.6 million employees from 393 thousand establishments. Over half of these establishments have less than 10 employees and more than 98 percent of establsihments have less than 500 employees.

industries that are dependent on external finance encompass 7.7 million total employees from 208 thousand establishments and industries that are not dependent on external finance encompass 9.5 million total employees from 175 thousand establishments. When we clean the sample for a balanced panel, these totals decrease about 5 percent each.

4 Empirical Strategy, Specification, and Data Summary

4.1 Empirical Strategy

Figure 6 illustrates the econometric strategy we use, along with the propagation mechanism that may be in force, that relates bank capital ratios to the microstructure of nonfinancial firms. Our first hypothesis is that this will affect firms on the extensive margin, resulting in fewer firms created. However, we note that the number of firms may not necessarily decline with higher capital ratios as setting up a business itself may not be that costly and some of the displaced workers that are affected at the intensive margin establish their own businesses. We are more assertive in our second hypothesis, which states that higher capital ratios will lead to more displaced workers in industries dependent on external finance.

Our identification assumption is that the capital ratio adjustments only affect industries dependent on external finance, which accounts for any omitted financial and non-financial variables that may affect firm dynamics. We use state-level capital ratios that are heavily influenced by banks with operations in multiple states and foreign countries, which leads to a more exogenous shifter in financing conditions. Finally, as there may be some states where this is not the case, we use the Arellono-Bond estimator to address the possibility of endogeneity and in our robustness checks, also eliminate the ten largest states in our sample.

4.2 Econometric Specification

Our identification assumption that links bank capital ratios only to the dynamics of firms that are dependent on external finance also encompasses other bank-dependent, banking-industry-dependent variables as well. We also calculate state-level reserve ratios and include them in our regression to control for forward-looking measures of losses on banks' balance sheets that affect only those industries dependent on external finance. Similarly, we assume that deregulation of inter and intra-state banking and the commercial bank HHI index are also related only to industries dependent on external finance as in Cetorelli and Strahan [2006].

In addition, we use lags of all our explanatory variables to limit issues related to reverse causality and include multiple lags to account for dynamic effects. Aggregate credit conditions are proxied by the real interest rate that is calculated by subtracting the inflation rate from the one-year treasury rate. As a proxy for demand, we also control for growth in state level output deflated by the national GDP deflator. We include industry-year fixed effects to control for national trends in the growth of a particular sector. Later, we also examine the relationship between bank capital ratios and the microstructure of firms by using dynamic panel analysis. In addition, we also investigate how the

Figure 4: Average Size of Establishments (in industries not dependent on external finance)

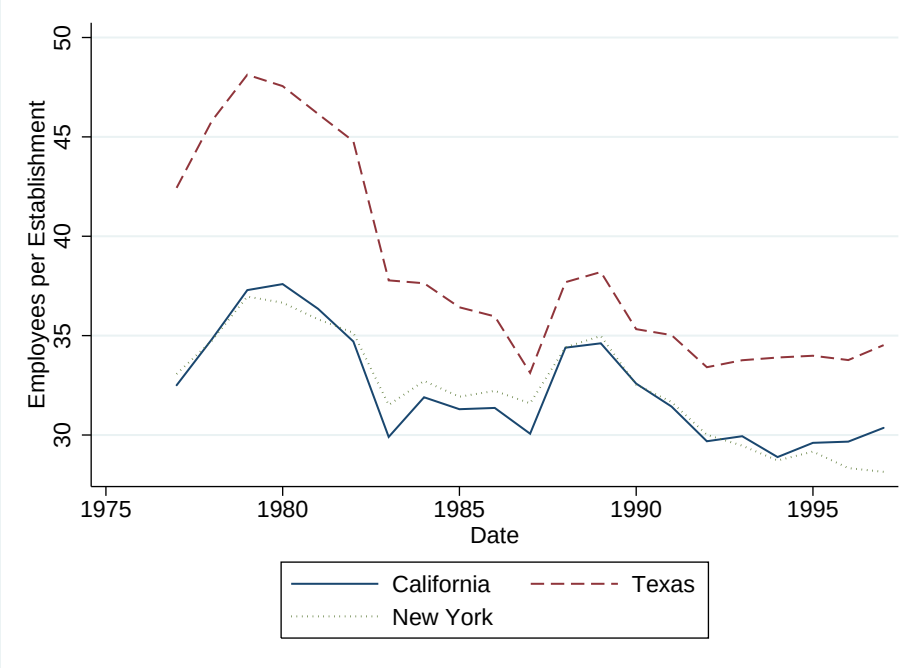


Figure 5: Average Size of Establishments (in industries dependent on external finance)

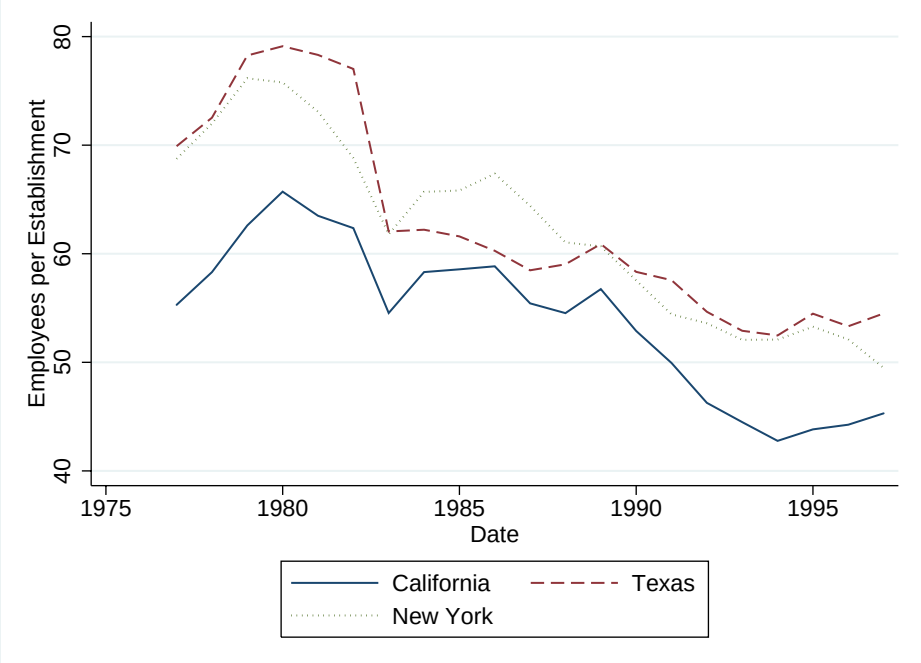
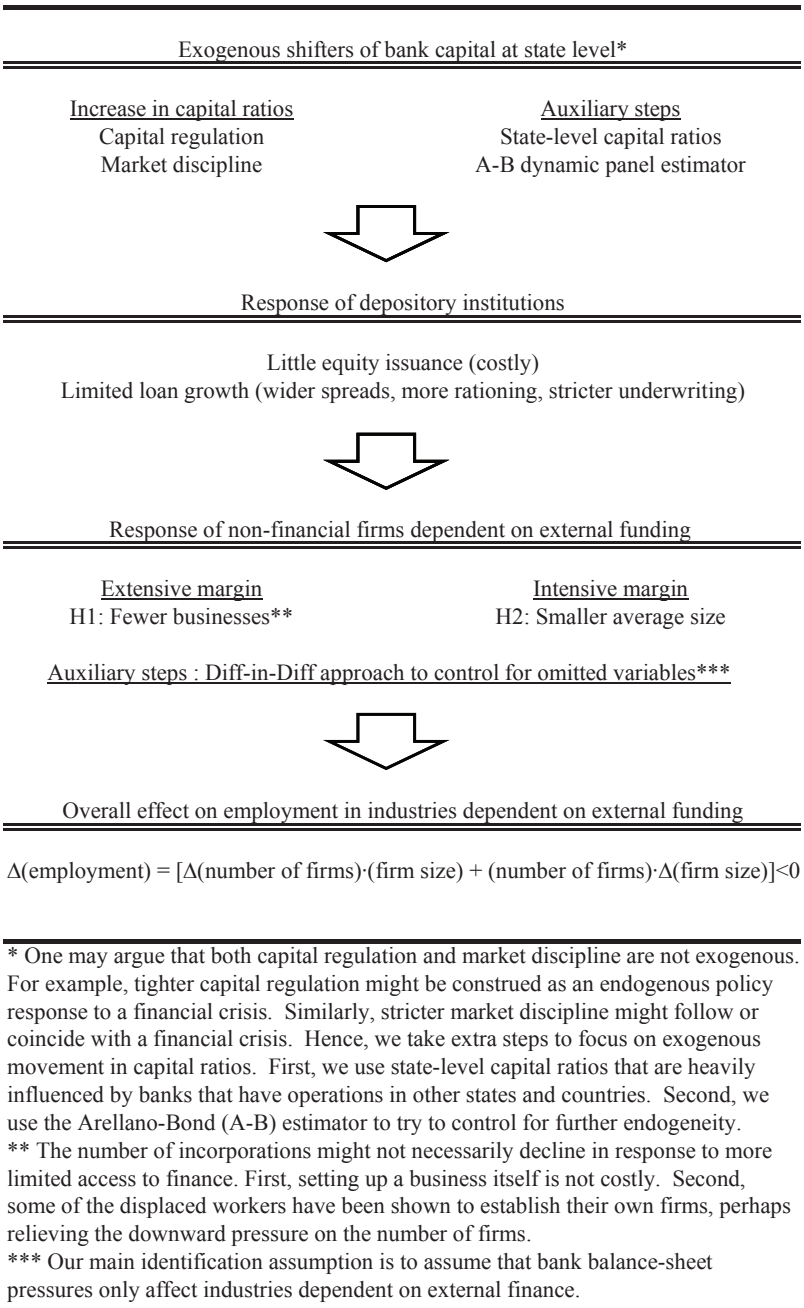


Figure 6: Propagation Mechanism of Bank Balance Sheet Pressures on Firms



growth rates of average size and changes in capital ratios are related to each other, which allows us to control for aggregate trends.

Our basic specification begins with the following:

$$Y_{jst} = \alpha_{js} + \sum_{i=1}^{n-1} \delta_i Y_{jst-i} + \sum_{k=1}^{m} \sum_{i=1}^{n} \beta_{ik} External_j BankVariable_{kst-i} + \sum_{i=1}^{n} \omega_i CreditConditions_{t-i} + \sum_{i=1}^{n} \gamma_i MarketTrends_{st-i} + \kappa_{jt} IndustryTrends_{jt} + \epsilon_{jst}$$

where:

- Y_{jst} is either the log of average size of establishment or log of the number of establishments in sector j and state s
- α_{js} is the coefficient for the sector-state fixed effect
- δ_i is the coefficent of the ith lagged dependent variable[11]
- β_{ik} is the coefficent of *External*, which is an indicator of whether a sector is dependent on external finance, interacted with ith lagged bank variable k, which includes the adjusted capital ratio, the reserve to loans ratio, and the Herfindahl-Hirschman Index (HHI) at the state level, and whether states deregulated inter or intra state bank branching
- ω_i is the coefficient of credit conditions proxied by the real interest rate
- γ_i is the coefficient of the ith lagged state market variable, where the local market trend is captured by the state level gross state product (GSP) or state-year fixed effects
- κ_{jt} is the coefficent of the sector-year fixed effect
- ϵ_{jst} is the error term robust to heteroskedasticity

4.3 Data Summary

Our sample of industry-state-year observations encompass 21 years from 1977 to 1997, including 668 industry-state groups with 14028 observations. Table 2 describes the summary statistics at the industry-state level for manufacturing sectors that are dependent on external finance and those that are not. Industries that are dependent on external finance are generally larger in terms of employees; compared to an average establishment size of 91 employees per establishment, the average size for industries not dependent on external finance is 52. In contrast, there are more establishments which are not dependent on external finance.

Table 3 describes the explanatory variables at the state level. Since we use lagged explanatory variables we consider the sample of state-level bank balance sheet measures from 1976 to 1996, which includes measures for all 50 states and the District of Columbia. During that period and across the different states, the average adjusted capital ratio amounts to 6.4 percent, with a standard deviation of 1.2 percent. Loan loss reserves in relation to loans are lower on average, at 1.7 percent, with a standard deviation of 0.9 percent. As data on the microstructure of establishments are as of March,

[11] To maximize on the number of available observations, we use one fewer lag compared to the other independent variables.

we use a year and three quarters lagged HHI indices since the SOD data is as of June in a given year. The HHI index, or the sum of squared local market commercial bank deposit shares, averages about 0.16 with a standard deviation of about 0.07. Similarly, since gross state product (GSP) is given at the end of a year, we use a year and a quarter lag for real GSP in our regressions. The average, in billions of 2005 dollars, is 1.3 billion with a standard deviation of 1.6 billion from 1975 to 1996. Finally, the post-intrastate branching deregulation indicator and the post-interstate banking deregulation indicator have means of 0.65 and 0.5, respectively, from 1976 to 1996, reflective of the fact that intrastate branching was generally deregulated earlier.

5 Empirical Results

5.1 Panel Regression Results

We look both at the panel regression results for the average size of the establishments and the number of establishments as any change in the average size can be driven by the denominator, the number of establishments. Our basic panel regressions in Table 4 and Table 5 for the number of establishments and the average size, respectively, includes two to three lags of the explanatory variables with coefficients and standard errors robust to heterosckedasticity. Specification (3) includes state-year dummies. The results reveal that there is significant persistence in the dependent variables as up to several lags determine much of the variation in both the average size of establishments and the number. The high R-squareds are also reflective of the numerous dummy controls we use in our specification.

From the results in Table 4, we reject our first hypothesis that there are any negative effects of capital ratios on the creation of establishments. For the average size of establishments, however, the adjusted capital ratio interacted by whether a sector is dependent on external finance or not, shows up statistically significant and is negative, supporting our second hypothesis. Ultimately, a one percentage increase in the adjusted capital ratio leads to between 0.73 to 1.21 percent decline in the average size of the firms that depend on external finance, the following year which is also economically significant. As the adjusted capital ratio seems to have no relation to the number of establishments, such balance sheet adjustments by banks seem to affect mainly the intensive margin of the microstructure of manufacturing firms.

Meanwhile, what does seem to matter at the extensive margin is GSP. For specifications (1) and (2), we can conclude that a 1 percent increase in GSP leads to about a 0.1 percent increase in the number of establishments the following year, though the following year after that the number of establishments decrease. This is reflected in the negative coefficients in the regressions for average size. However, for the panel regressions, this effect is insignificant. As we use contemporary state-year dummies in specification (3) for the regression on the number of establishments, the effects of real GSP are less apparent for the nearer lags, as both are state-level variables, though the third lag does seem to have some positive effect on the number of establishments.

In addition, some of the results shown in Cetorelli and Strahan [2006] for the effects of the HHI index and intra-state branching do remain. For example, there seems to be some statistical evi-

dence that interstate banking and greater decentralization of banks (measured in terms of deposits) increases the number of establishments.

5.2 Dynamic Panel Regression Results

Potential endogeneity problems may arise if changes in the firm dynamics lead to changes state-level output or bank balance sheets that may not be controlled for in our diff-in-diff approach. Although we believe that the state-level capital ratios we construct are exogenous at the state level, we also account for both potential endogeneity and additional panel dynamics, using the dynamic panel estimators using the difference GMM procedure introduced by Arellano and Bond [1991] since our panel dataset consists of a relative short time series (approximately 20 years) relative to the industry-state cross section (over 600 industry-state groups). Furthermore, we assume a linear functional relationship that allows us to take advantage of the Arellano-Bond estimation that deals with autocorrelation in reduced form in the the number of establishments and the average establishment size. Our assumption is that such autocorrelation (and heteroskedasticity) is within industry-state groups, but not across them. In addition, we estimate Windmeijer [2005] standard errors to correct for the finite sample, without which the standard errors are prone to be severely downward biased.

Table 6 and Table 7 reports results for average size with specifications similar to Table 4 and Table 5 with the exception of state-industry and state-year fixed effects. The state-industry effects do not provide variation in the difference equation for which the dynamic panel is based upon. For specification (1), we consider two lags of banks' balance sheet measures, the HHI index, and the log of real GSP. For the first-differenced equations, we use as instruments the third to fifth lags of all the bank balance sheet measures, HHI, and GSP that are used as explanatory variables, and lagged values of all the remaining explanatory variables (as strictly exogenous variables). For specification (2), we use three lags of bank balance sheet measures and use the fourth to sixth lags as instruments. Specification (3) looks at the years 1988 to 1997, where we use up to the thirteenth lag of the banks' balance sheet measures, HHI, and GSP as instruments. Standard errors, in parentheses, are robust to autocorrelation and heteroscedasticity.

We also report goodness-of-fit measures of the squared correlation between the actual and predicted dependent variables. In addition, second-order serial correlation in the first-differenced residuals is tested using a Lagrange multiplier test, while instrument validity is tested using a Sargan-Hansen test of the overidentifying restrictions. In general, we find minimal statistical evidence that second-order serial correlation in the first-differenced resisuals exist, while for the specifications we have showed, the Sargan-Hansen test generally does not reject the validity of the overidentifying restrictions, especially for the average size equations. Goodness-of-fit measures are also exceptionally high, as much of variation in the dependent variable is determined by its own lag and with the introduction of industry-year dummies.

The dynamic panel regression results are generally consistent with the panel regression results. Again, we reject the hypothesis that capital ratios have any effect on the establishment of establishments with the exception of the limited sample period of 1988 to 1997. However, the coefficient

is far less (0.80) in absolute size than the coefficient (-1.22) for the capital ratios interacted with the indicator for dependence on external finance in the dynamic panel regression for average size, implying there is still a substantial effect on the intensive margin. More generally, in the dynamic panel for average size, a one percentage point increase in the capital ratio leads to a 1.21 to 1.41 percent decline in the average size of an establishment in the following year. Another difference between the panel and the dynamic panel regression results is that interest rates seem to matter in a consistent manner, implying higher interest rates are associated with a smaller number of establishments, perhaps due to an increase in business start-ups as firms shed employees in the intensive margin. Again, the coefficients for credit conditions are far greater for the average establishment size than for the number of establishments, implying that there are still notable effects on the intensive margin in the following year.

Finally, compared to the basic panel regression, the significant effect of the HHI index on average size disappears in the dynamic panel regression, while there is evidence that intra state branching had negative effects on the average size of firms.

5.3 Growth Regression Results

We also consider regressing the growth rate of average size of establishments and establishments on the changes in capital ratios to eliminate the persistent trends seen in the levels. Simply taking first differences to the econometric specification described in the basic panel regressions provides similar results in terms of the signs in the coefficients, but for robustness, we continue to allow for sector-state fixed effects. With such adjustments, the growth regressions would then look like the following:

$$\Delta Y_{jst} = \alpha\prime_{js} + \sum_{i=1}^{n-1} \delta\prime_i \Delta Y_{jst-i} + \sum_{k=1}^{m}\sum_{i=1}^{n} \beta\prime_{ik} External_j \Delta BankVariable_{kst-i} + \sum_{i=1}^{n} \omega\prime_i \Delta CreditConditions_{t-i} + \sum_{i=1}^{n} \gamma\prime_i \Delta MarketTrends_{st-i} + \kappa\prime_{jt} IndustryTrends_{jt} + \epsilon\prime_{jst}$$

The average growth rate of establishments in our balanced panel is -0.35 percent with a standard deviation of about 11.1 percent for industries that are dependent on external finance, while the average growth rate is about -0.3 percent with a standard deviation of about 10.5 percent for those are are not dependent on external finance. Meanwhile, the average growth rate of the number of establishments is 1.5 percent with a standard deviation of about 6.8 percent for industries dependent on external finance and the average growth rate is 1.4 percent with a standard deviation of about 6 percent for industries that are not. The mean change in the adjusted capital ratio is 0.05 percent with a standard deviation of about 0.5 percent.

Results in Table 8 and Table 9 is consistent with our findings in terms of levels. Namely, we see that a one percent increase in the change in the adjusted capital ratio leads to about 0.88 to 1.22 percent decline in the growth rate of the average size of establishments without affecting establishments in the extensive margin in the following year. As with earlier results, what seems

to be driving the extensive margin is local market trends proxied by GSP - a one percent increase in the growth rate of GSP leads to about a 0.12 to 0.15 percent increase in the growth rate of the number of establishments.

Dynamic panel regressions with the same specification (excluding the state-year fixed effects) yields similar results. As shown in Table 10 and Table 11, the magnitudes for the effect of capital ratios on the decline in average size ranges from 1.35 to 1.75 percent in the following year with little evidence that capital ratios affect the extensive margin for the full sample period.

5.4 Economic Significance and Long-Run Macro Effects

The economic significance of our results can be quantified by looking at both the short and long-term elasticities with respect to the adjusted capital ratio. The short-run (one-year) elasticities of a percentage increase in the adjusted capital ratio on the average size of establishments are simply defined as the coefficients on the various regression results. For the level equations, they ranged from -0.73 to -1.41 (excluding specification (3) of the dynamic panel regressions). Given that there were about 9.5 million employees for the manufacturing sector dependent on external finance as of 1997, a two percentage point increase in the capital ratio would have led to a displacement of 140 thousand to 270 thousand workers from these sectors in the following year according to the following equation.

$$\begin{aligned}\frac{\Delta Employment}{\Delta Capital\ Ratio} &= \underbrace{\frac{\Delta Number\ of\ Establishments}{\Delta Capital\ Ratio}}_{=0} \times Average\ Size \\ &\quad + \frac{\Delta Average\ Size}{\Delta Capital\ Ratio} \times Number\ of\ Establishments\end{aligned}$$

The long-run elasticities can be defined as the sum of the significant coefficients on the various lags of the adjusted capital ratio divided by one minus the sum of the significant coefficients on the various lags of the dependent variable used as explanatory variables. The long-run elasticities measured in this manner range from -3.48 to -5.88 (again, excluding specification (3) of the dynamic panel regressions), indicating that a one percentage point increase in the adjusted capital ratio leads to a permanent decrease in the number of employees for the sector dependent on external finance of up to 5.88 percent.[12] Likewise, a one percentage point increase in the capital ratio would result in over five thousand displaced employees according to this upper bound as of 1997.

Meanwhile, the short-run and long-run elasticities for the growth regressions are also economically signficant, ranging from -0.77 to -1.01 percent and -1.22 to -1.99 percent, respectively.[13] Indeed, an increase in the capital ratio by one percentage points may result in the manufacturing sector dependent on external finance permanently growing about 0.75 to 2 percentage points less than otherwise.

[12] Including insignificant coefficients, the elasticities range from 0.33 to -5.25, where the positive elasticity is derived from specification (2) of Table 5.

[13] Including insignificant coefficients, the short-run and long-run elasticities range from 0.88 to -1.75 percent and -0.83 to -2.04 percent, respectively.

5.5 Other Robustness Checks

There are other robustness checks we conduct. For example, since simply an introduction of one branch by a large bank sometimes affects aggregated capital ratios disproportionately, we use other measures of state aggregated capital ratios. For example, our panel regression results, which control for endogeneity, is robust to capital ratio measures that are weighted by the number of branches. In addition, we can also weight capital ratios by deposits multiplied by aggregated loan to deposit ratios at a given bank for a given state, though this would ignore the potential to offer credit to businesses that are not headquarted in a state where the bank does not book deposits. We note that these measures would be more prone to endogeneity issues as local economic conditions may affect the balance sheets of banks. Our results are also robust to eliminating two states with many credit-card processing banks and high volatility in their capital ratios, namely Delaware and South Dakota, while also robust to including only smaller states where state-level capital ratios are usually more influenced by banks with presence in multiple states and/or foreign countries. Finally, our results are robust to different proxies for market trends - instead of or addition to state-level real-GSP, we can include state population or aggregate real GDP, but our results change very little.

6 Conclusion

Our results show that positive changes in the capital ratio results in contractions in the size of establishments. Our method of aggregating bank capital ratios to the state level allows us to take advantage of the exogenous variations in state-level differences in capital ratios.

Our results highlight the potential costs to balance sheet adjustments that may accompany the plethora of proposals to tighten capital adequacy standards and restrict certain banking activities in general. Previous research on the relationship between bank capital ratios was limited to the relationship between bank balance sheets and larger borrowers who also had more access to broader capital markets. More recent policy and academic studies, such as Kashyap, Stein, and Hanson [2010], point to modest effects on loan rates or aggregate output. Our study, by investigating the firm behavior that incorporates even the smallest of establishments may be more relevant to the overall and distributional effects of capital adjustments as banks may adjust a full array of different credit standards and the impact may be disproportionately be felt by certain industries. The uncertain regulatory environment related to Basel III and the Dodd-Frank Act is also akin to the continuous changes banks faced in the regulatory enviroment in the early 1980s and the early 1990s. But important differences in financial markets, such as the explosion in the shadow banking system that occurred since the late 1990s, will complicate an exact comparison.

We tried to disentangle the effects of the effects of demand credit from its supply, and found the former seemed to affect the extensive margin on establishments and the latter the intensive. However, further research will be necessary to disentangle the exactly where most of the bank capital ratio adjustments are resulting from as regulatory changes in capital tends to accompany financial crises and recessions in general, which may also provide incentives for investors and stake-holders to demand more capital.

References

Aaronson, D., E. R. Rissman, and D. G. Sullivan (2004): "Assessing the Jobless Recovery," *Federal Reserve Bank of Chicago Economic Perspectives*, 28(2), 2–20.

Aggarwal, R., and K. T. Jacques (1998): "Assessing the Impact of Prompt Corrective Action on Bank Capital and Risk," *Federal Reserve Bank of New York Economic Policy Review*, 4, 23–32.

Allen, F., E. Carletti, and R. S. Marquez (2008): "Credit Market Competition and Capital Regulation," CFS Working Paper No. 2005/23.

Arellano, M., and S. Bond (1991): "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations," *Review of Economic Studies*, 58, 277–297.

Baer, H., and J. McElravey (1993): "Risk-Based Capital and Bank Growth," Conference on Bank Structure and Competition Proceedings.

Berger, A. K., and G. F. Udell (1994): "Did Risk-Based Capital Allocate Bank Credit and Cause a "Credit Crunch" in the U.S.?," *Journal of Money, Credit and Banking*, 26(3), 585–628.

Berger, A. N., R. J. Herring, and G. P. Szegö (1995): "The Role of Capital in Financial Institutions," *Journal of Banking and Finance*, 19, 393–430.

Berger, A. N., Richard, A. K. Kashyap, J. M. Scalise, M. Gertler, and B. M. Friedman (1995): "The Transformation of the U.S. Banking Industry: What a Long, Strange Trip It's Been," *Brookings Papers on Economic Activity*, 1995(2), 55–218.

Berger, A. N., and G. F. Udell (1998): "The Economics of Small Business Finance: The roles of Private Equity and Debt Markets in the Financial Growth Cycle," *Journal of Banking and Finance*, 22, 613–673.

Bernanke, B. S., and C. S. Lown (1991): "The Credit Crunch," *Brookings Papers on Economic Activity*, 2, 205–247.

Berrospide, J. M., and R. M. Edge (2010): "The Effects of Bank Capital on Lending: What Do We Know, and What Does It Mean?," *International Journal of Central Banking*, 6(4), 5–54.

Cetorelli, N. (2004): "Real Effects of Bank Competition," *Journal of Money, Credit and Banking*, 36(3), 543–558.

Cetorelli, N., and P. E. Strahan (2006): "Finance as a Barrier to Entry: Bank Competition and Industry Structure in Local U.S. Markets," *Journal of Finance*, 61(1), 437–461.

Diamond, D. W., and R. G. Rajan (2000): "A Theory of Bank Capital," *Journal of Finance*, 55(6), 2431–2465.

Elliott, D. J. (2009): "Quantifying the effects on lending of increased capial requirements," Pew Financial Reform Project Briefing Paper 7.

Fischer, M., J. Mattes, and S. Steffen (2009): "Bank Capital Ratios, Competition and Loan Spreads," Working Paper.

Flannery, M. J., and K. P. Rangan (2008): "What Caused the Capital Build-Up of the 1990s?," *Review of Finance*, 12(2), 391–429.

Furlong, F. T. (1992): "Capital Regulation and Bank Lending," *Federal Reserve Bank of San Francisco Economic Review*, (3), 23–33.

Garmaise, M. J., and T. J. Moskowitz (2006): "Bank Mergers and Crime: The Real and Social Effects of Credit Market Competition," *Journal of Finance*, 61(2), 495–539.

Hancock, D., and J. A. Wilcox (1993): "Has There Been a 'Capital Crunch' in Banking? The Effects on Bank Lending of Real Estate Market Conditions and Bank Capital Shortfalls," *Journal of Housing Economics*, 3(1), 31–50.

——— (1994): "Bank Capital and Credit Crunch: The Roles of Risk-Weighted and Unweighted Capital Regulations," *Journal of the American Real Estate and Urban Economics Association*, 22(1), 59–94.

——— (1998): "The "Credit Crunch" and the Availability of Credit to Small Business," *Journal of Banking and Finance*, 22, 983–1014.

Kashyap, A. K., J. C. Stein, and S. Hanson (2010): "An Analysis of the Impact of "Substantially Heightened" Capital Requirements on Large Financial Institutions," Working Paper.

Keeley, M. C. (1988): "Bank Capital Regulation in the 1980s: Effective or Ineffective?," *Federal Reserve Bank of San Francisco Economic Review*, (1), 3–20.

Kerr, W. R., and R. Nanda (2009): "Democratizing Entry: Banking Deregulations, Financing Constraints, and Entrepreneurship," *Journal of Financial Economics*, 94(1), 124–149.

——— (2010): "Banking Deregulations, Financing Constraints and Firm Entry Size," *Journal of the European Economic Association*, 8(2-3), 582–593.

Petersen, M. A., and R. G. Rajan (1994): "The Benefits of Lending Relationships: Evidence from Small Business Data," *Journal of Finance*, 49(1), 3–37.

Santos, J., and A. Winton (2010): "Bank Capital, Borrower Power, and Loan Rates," Working Paper.

Vokey, R. S., and K. L. Kearns (1985): "Issues in Capital Adequacy Regulation," *The Bankers Magazine*, 168, 35–43.

Wall, L. D., and D. R. Peterson (1987): "The Effect of Capital Adequacy Guidelines on Large Bank Holding Companies," *Journal of Banking and Finance*, 11, 581–600.

——— (1995): "Bank holding company targets in the early 1990s: The regulators versus the markets," *Journal of Banking and Finance*, 19, 563–574.

Windmeijer, F. (2005): "A Finate Sample Correction for the Variance of Linear Efficient Two-step GMM Estimators," *Journal of Econometrics*, 126, 22–51.

Table 1: Definitions of Regulatory Capital Ratios

Primary Capital Ratio	Primary capital consisted of stockholders' equity, perpetual preferred stock, loan loss reserves and certain debt instruments that must be converted to common or preferred stock at maturity. Intangible assets except mortgage servicing rights were deducted from both the denominator and the numerator for the ratio of primary capital to assets. Minimum primary capital ratios were introduced in 1981 for community and regional banks and in 1983 for multinational banks. Regulators set a uniform minimum level of the primary capital ratio in 1985 for all banks, thereby raising the minimum ratios for multinational and regional banks, and lowering the ratio for community banks.
Total Capital Ratio	Total capital consisted of primary capital plus secondary capital instruments such as limited-life preferred stock and qualifying debt not included in primary capital. The denominator was the same as for the primary capital ratio. Reguatory minimum total capital ratios were introduced at the same time as those for the primary capital ratio.
Tier 1 Risk-Based Capital Ratio	Tier 1 capital consists of common equity and certain perpetual preferred stock, and minority interest in consolidated subsidiaries less certain intangible assets, such as goodwill, and net unrealized gains on investment account securities classified as available for sale. The tier 1 capital ratio is defined as tier 1 capital relative to risk-weighted assets and was partially introduced in 1989 before being fully adopted in 1992 in accordance with Basel I.
Total Risk-Based Capital Ratio	The total risk-based capital ratio is defined as tier 1 and tier 2 capital relative to risk-weighted assets. Tier 2 capital consists primarily of subordinated debt, preferred stock not included in tier 1 capital, and loan loss reserves up to a cap of 1.25 percent of risk-weighted assets. The total capital ratio was introduced and adopted along with the tier 1 capital ratio in accordance with Basel I.
Leverage Ratio	The leverage ratio is the ratio of tier 1 capital to average tangible assets, which is equal to total average consolidated assets less assets excluded from common equity in the calculation of tier 1 capital. The leverage ratio was introduced in 1990.

Table 2: Summary Statistics at Industry-State Level (1977 - 1997)

	Mean	Standard Deviation
Industries dependent on external finance		
Number of establishments per industry-state	423	671
Average establishment size (employees per establishment)	91	75
Industries not dependent on external finance		
Number of establishments per industry-state	560	854
Average establishment size (employees per establishment)	52	52

Table 3: Summary Statistics at State Level

	Mean	Standard Deviation
Adjusted capital ratio ($CapRatio$)	6.4%	1.2%
Loan loss reserves to total loans ($ResRatio$)	1.7%	0.9%
HHI (sum of squared local market deposit share)	0.16	0.07
Real gross state product in billions of 2005 dollars (GSP)	1.3	1.6
Post-branching deregulation indicator ($Intra$)	0.65	–
Post-interstate banking deregulation indicator ($Inter$)	0.50	–

NOTES: Adjusted capital ratio, loan loss reseves to total loans, and post-branching deregulation and post-interstate banking deregulation indicators are from 1976 to 1996. HHI and Gross state product are from 1975 to 1995.

Table 4: Panel Regression Results for Number of Establishments

Dependent Variable: Log of Establishments	(1)		(2)		(3)	
Lags of Dependent Variable						
Y_{jst-1}	0.88	(115)***	0.79	(44.7)***	0.73	(44.8)***
Y_{jst-2}			0.10	(5.76)***	0.09	(5.72)***
Credit Supply Factors						
$External \times CapRatio_{st-1}$	0.19	(0.68)	0.15	(0.53)	0.16	(0.50)
$External \times CapRatio_{st-2}$	0.04	(0.16)	-0.05	(0.16)	-0.13	(0.30)
$External \times CapRatio_{st-3}$			0.05	(0.26)	0.12	(0.40)
$External \times Interest_{t-1}$	0.18	(0.80)	0.89	(5.19)***	-0.43	(3.21)***
$External \times Interest_{t-1}$	0.22	(2.20)**	-0.25	(0.96)	0.03	(0.26)
$External \times Interest_{t-1}$			0.09	(0.86)	-0.10	(0.67)
$External \times ResRatio_{st-1}$	0.04	(0.15)	-0.01	(0.03)	-0.08	(0.27)
$External \times ResRatio_{st-2}$	0.01	(0.06)	0.24	(0.67)	0.37	(0.78)
$External \times ResRatio_{st-3}$			-0.12	(0.47)	-0.53	(1.53)
$External \times HHI_{st-1}$	-0.07	(1.44)	-0.06	(1.06)	-0.19	(2.52)**
$External \times HHI_{st-2}$	0.09	(1.49)	0.00	(0.03)	0.18	(1.46)
$External \times HHI_{st-3}$			0.12	(1.52)	0.02	(0.18)
$External \times Intra_{st-1}$	0.23	(0.86)	0.38	(1.33)	0.41	(1.17)
$External \times Inter_{st-1}$	0.57	(1.85)*	0.75	(2.25)**	0.49	(1.13)
Credit Demand Factors						
GSP_{st-1}	0.10	(4.68)***	0.12	(4.86)***	-0.08	(0.76)
GSP_{st-2}	-0.11	(5.09)***	-0.16	(4.17)***	-0.45	(3.28)***
GSP_{st-3}			0.02	(1.17)	0.59	(5.15)***
$Industry \times State$		yes		yes		yes
$Industry \times Year$		yes		yes		yes
$State \times Year$		no		no		yes
Number of Observations		13360		12692		12692
Years covered		1978-97		1979-97		1979-97
R-Squared		0.997		0.996		0.993

NOTES: Log of establishments (Y) and log of real GSP is multiplied by 100. Coefficients are reported along with the absolute values of t - statististics in parentheses. *** indicates significanceat the 1 percent confidence level, ** at the 5 percent level, and * at the 10 percent level.

Table 5: Panel Regression Results for Average Size of Establishments

Dependent Variable: Log of Average Size	(1)		(2)		(3)	
Lags of Dependent Variable						
Y_{jst-1}	0.79	(73.7)***	0.72	(44.0)***	0.71	(45.0)***
Y_{jst-2}			0.07	(5.07)***	0.07	(5.05)***
Credit Supply Factors						
$External \times CapRatio_{st-1}$	-0.78	(1.91)*	-0.73	(1.76)*	-1.21	(2.33)**
$External \times CapRatio_{st-2}$	0.61	(1.54)	0.67	(1.33)	0.98	(1.52)
$External \times CapRatio_{st-3}$			0.13	(0.36)	-0.33	(0.65)
$External \times Interest_{t-1}$	-0.53	(2.66)***	-0.69	(2.59)**	-0.39	(1.43)
$External \times Interest_{t-1}$	0.70	(3.76)***	-0.78	(3.93)***	-0.64	(2.56)**
$External \times Interest_{t-1}$			0.42	(3.10)***	0.42	(2.75)***
$External \times ResRatio_{st-1}$	-0.11	(0.31)	-0.35	(0.91)	-0.99	(2.07)**
$External \times ResRatio_{st-2}$	0.07	(0.19)	0.64	(1.08)	1.24	(1.72)*
$External \times ResRatio_{st-3}$			-0.80	(1.59)	-0.78	(1.31)
$External \times HHI_{st-1}$	0.12	(1.13)	0.11	(1.03)	0.14	(1.02)
$External \times HHI_{st-2}$	-0.15	(1.21)	-0.28	(1.78)*	-0.43	(2.15)**
$External \times HHI_{st-3}$			0.17	(1.54)	0.27	(1.93)*
$External \times Intra_{st-1}$	-0.36	(0.79)	-0.54	(1.13)	0.37	(1.20)
$External \times Inter_{st-1}$	0.22	(0.47)	0.23	(0.46)	0.75	(2.35)**
Credit Demand Factors						
GSP_{st-1}	-0.05	(1.18)	-0.05	(1.18)	0.05	(0.36)
GSP_{st-2}	-0.04	(0.68)	-0.03	(0.68)	0.76	(3.64)***
GSP_{st-3}			0.00	(0.00)	-0.74	(4.91)***
$Industry \times State$		yes		yes		yes
$Industry \times Year$		yes		yes		yes
$State \times Year$		no		no		yes
Number of Observations		13360		12692		12692
Years covered		1978-97		1979-97		1979-97
R-Squared		0.970		0.964		0.959

NOTES: Log of average size of establishments (Y) and log of real GSP is multiplied by 100. Coefficients are reported along with the absolute values of t - statistics in parentheses. *** indicates significance at the 1 percent confidence level, ** at the 5 percent level, and * at the 10 percent level.

Table 6: Dynamic Panel Regression Results for Number of Establishments

Dependent Variable: Log of Establishments	(1)		(2)		(3)	
Lags of Dependent Variable						
Y_{jst-1}	0.92	(33.0)***	0.84	(11.3)***	0.72	(11.7)***
Y_{jst-2}			0.09	(1.34)	0.14	(2.50)**
Credit Supply Factors						
$External \times CapRatio_{st-1}$	0.57	(1.46)	0.55	(1.33)	0.80	(2.06)**
$External \times CapRatio_{st-2}$	0.56	(1.24)	-0.36	(0.71)	-0.52	(1.26)
$External \times CapRatio_{st-3}$			-0.18	(0.57)	0.00	(0.05)
$External \times Interest_{t-1}$	2.27	(4.50)***	2.32	(4.74)***	2.11	(3.85)***
$External \times Interest_{t-1}$	1.08	(3.37)***	1.38	(3.53)***	1.49	(4.24)***
$External \times Interest_{t-1}$			-0.26	(0.46)	0.14	(0.23)
$External \times ResRatio_{st-1}$	-0.10	(0.35)	-0.03	(0.09)	0.16	(0.60)
$External \times ResRatio_{st-2}$	-0.16	(0.47)	-0.13	(0.29)	0.18	(0.53)
$External \times ResRatio_{st-3}$			0.20	(0.60)	-0.02	(0.09)
$External \times HHI_{st-1}$	-0.04	(0.37)	0.02	(0.13)	0.06	(0.61)
$External \times HHI_{st-2}$	-0.23	(1.57)	-0.22	(1.16)	-0.24	(1.99)**
$External \times HHI_{st-3}$			-0.02	(0.14)	0.26	(2.17)**
$External \times Intra_{st-1}$	0.03	(0.79)	0.50	(1.10)	-0.23	(0.47)
$External \times Inter_{st-1}$	0.06	(1.85)*	0.36	(0.75)	-0.00	(0.01)
Credit Demand Factors						
GSP_{st-1}	0.03	(0.79)	0.04	(1.02)	0.20	(3.40)***
GSP_{st-2}	-0.06	(1.85)*	-0.10	(2.07)**	-0.15	(2.46)**
GSP_{st-3}			0.02	(0.60)	0.03	(0.88)
$Industry \times Year$		yes		yes		yes
Number of Observations		12692		12024		6012
Years covered		1979-97		1980-97		1988-97
Goodness of fit - $Corr(Y_{jst}, \widehat{Y_{jst}})^2$		0.998		0.998		0.996
Serial correlation(p-value)		0.098		0.664		0.132
Sargan-Hansen (p-value)		0.017		0.017		0.043

NOTES: Log of establishments (Y) and log of real GSP is multiplied by 100. Coefficients are reported along with the absolute values of t - statistics in parentheses. *** indicates significanceat the 1 percent confidence level, ** at the 5 percent level, and * at the 10 percent level.

Table 7: Dynamic Panel Regression Results for Average Size of Establishments

Dependent Variable: Log of Average Size	(1)		(2)		(3)	
Lags of Dependent Variable						
Y_{jst-1}	0.71	(15.8)***	0.60	(10.5)***	0.56	(10.4)***
Y_{jst-2}			0.16	(3.29)***	0.02	(0.48)
Credit Supply Factors						
$External \times CapRatio_{st-1}$	-1.21	(2.22)**	-1.41	(2.47)**	-1.22	(1.97)**
$External \times CapRatio_{st-2}$	0.16	(0.28)	0.42	(0.66)	0.95	(1.38)
$External \times CapRatio_{st-3}$			-0.27	(0.52)	0.13	(0.24)
$External \times Interest_{t-1}$	-2.98	(2.88)***	-3.72	(3.31)***	-3.01	(3.09)***
$External \times Interest_{t-1}$	-0.33	(0.64)	-0.72	(1.27)	-0.58	(1.09)
$External \times Interest_{t-1}$			-1.79	(1.59)	-0.92	(0.82)
$External \times ResRatio_{st-1}$	0.02	(0.04)	-0.35	(0.73)	-0.07	(0.13)
$External \times ResRatio_{st-2}$	0.46	(0.90)	1.07	(1.85)*	0.52	(0.93)
$External \times ResRatio_{st-3}$			-0.57	(1.06)	-0.84	(1.64)
$External \times HHI_{st-1}$	0.28	(1.23)	-0.04	(0.17)	0.02	(0.11)
$External \times HHI_{st-2}$	-0.34	(1.59)	0.09	(0.31)	0.04	(0.17)
$External \times HHI_{st-3}$			-0.22	(0.91)	-0.19	(1.14)
$External \times Intra_{st-1}$	-0.93	(1.33)	-1.53	(2.07)**	-1.63	(1.63)
$External \times Inter_{st-1}$	-0.25	(0.33)	0.73	(1.05)	0.11	(0.09)
Credit Demand Factors						
GSP_{st-1}	-0.07	(0.92)	-0.05	(0.71)	-0.07	(0.81)
GSP_{st-2}	0.00	(0.05)	-0.04	(0.39)	0.16	(1.74)*
GSP_{st-3}			0.01	(0.12)	-0.13	(2.22)**
$Industry \times Year$		yes		yes		yes
Number of Observations		12692		12024		6012
Years covered		1979-97		1980-97		1988-97
Goodness of fit - $Corr(Y_{jst}, \widehat{Y_{jst}})^2$		0.968		0.930		0.969
Serial correlation(p-value)		0.379		0.046		0.488
Sargan-Hansen (p-value)		0.076		0.326		0.055

NOTES: Log of average size of establishments (Y) and log of real GSP is multiplied by 100. Coefficients are reported along with the absolute values of t - statistics in parentheses. *** indicates significance at the 1 percent confidence level, ** at the 5 percent level, and * at the 10 percent level.

Table 8: Panel Regression Results for the Growth in the Number of Establishments

Dependent Variable: Growth of Establishments	(1)		(2)		(3)	
Lags of Dependent Variable						
ΔY_{jst-1}	-0.06	(3.72)***	-0.06	(3.56)***	-0.13	(8.00)***
ΔY_{jst-2}			0.02	(1.21)	-0.05	(3.25)***
Credit Supply Factors						
$External \times \Delta \text{CapRatio}_{st-1}$	0.20	(0.70)	0.30	(1.05)	0.16	(0.47)
$External \times \Delta \text{CapRatio}_{st-2}$	0.14	(0.65)	0.12	(0.56)	0.04	(0.14)
$External \times \Delta \text{CapRatio}_{st-3}$			0.41	(1.36)	0.10	(0.29)
$External \times \Delta \text{Interest}_{t-1}$	0.40	(1.26)	0.49	(2.20)**	0.30	(1.33)
$External \times \Delta \text{Interest}_{t-1}$	0.21	(0.85)	0.23	(1.57)	0.05	(0.26)
$External \times \Delta \text{Interest}_{t-1}$			0.09	(0.83)	0.08	(0.57)
$External \times \Delta \text{ResRatio}_{st-1}$	-0.03	(0.09)	0.00	(0.00)	0.10	(0.31)
$External \times \Delta \text{ResRatio}_{st-2}$	0.21	(0.82)	0.26	(1.00)	0.56	(0.26)
$External \times \Delta \text{ResRatio}_{st-3}$			-0.16	(0.62)	-0.53	(1.63)
$External \times \Delta \text{HHI}_{st-1}$	-0.04	(0.78)	-0.05	(0.84)	-0.20	(2.43)**
$External \times \Delta \text{HHI}_{st-2}$	-0.03	(0.31)	-0.02	(0.17)	0.03	(0.25)
$External \times \Delta \text{HHI}_{st-3}$			0.00	(0.01)	-0.04	(0.43)
$External \times \Delta \text{Intra}_{st-1}$	0.06	(0.16)	0.26	(0.71)	0.39	(0.80)
$External \times \Delta \text{Inter}_{st-1}$	0.22	(0.62)	0.17	(0.48)	-0.05	(0.12)
Credit Demand Factors						
ΔGSP_{st-1}	0.14	(5.29)***	0.15	(5.23)***	0.12	(1.19)
ΔGSP_{st-2}	-0.03	(1.35)	0.01	(0.42)	-0.15	(1.36)
ΔGSP_{st-3}			-0.06	(2.67)***	-0.14	(1.88)*
$Industry \times State$		yes		yes		yes
$Industry \times Year$		yes		yes		yes
$State \times Year$		no		no		yes
Number of Observations		12692		12024		12024
Years covered		1979-97		1980-97		1980-97
R-Squared		0.321		0.330		0.447

NOTES: Growth in establishments and real GSP are in percentages. Coefficients are reported along with the absolute values of t - statistics in parentheses. *** indicates significanceat the 1 percent confidence level, ** at the 5 percent level, and * at the 10 percent level.

Table 9: Panel Regression Results for the Growth in the Average Size of Establishments

Dependent Variable: Growth of Average Size	(1)		(2)		(3)	
Lags of Dependent Variable						
ΔY_{jst-1}	-0.13	(8.90)***	-0.13	(8.63)***	-0.14	(9.81)***
ΔY_{jst-2}			-0.05	(3.90)***	-0.07	(5.41)***
Credit Supply Factors						
$External \times \Delta \text{CapRatio}_{st-1}$	-0.88	(2.11)**	-0.91	(2.28)**	-1.22	(2.24)**
$External \times \Delta \text{CapRatio}_{st-2}$	-0.06	(0.15)	-0.07	(0.21)	0.11	(0.24)
$External \times \Delta \text{CapRatio}_{st-3}$			-0.20	(0.46)	-0.29	(0.53)
$External \times \Delta \text{Interest}_{t-1}$	-1.21	(5.09)***	-0.90	(2.46)**	-0.64	(1.70)*
$External \times \Delta \text{Interest}_{t-1}$	-0.83	(2.86)***	0.22	(0.57)	0.38	(0.92)
$External \times \Delta \text{Interest}_{t-1}$			-0.79	(3.04)***	-0.64	(2.10)**
$External \times \Delta \text{ResRatio}_{st-1}$	-0.07	(0.20)	0.11	(0.33)	-0.69	(1.47)
$External \times \Delta \text{ResRatio}_{st-2}$	0.74	(1.43)	0.53	(1.06)	0.64	(1.06)
$External \times \Delta \text{ResRatio}_{st-3}$			0.90	(2.40)**	0.33	(0.73)
$External \times \Delta \text{HHI}_{st-1}$	0.18	(1.45)	0.18	(1.46)	0.13	(0.88)
$External \times \Delta \text{HHI}_{st-2}$	-0.14	(1.10)	-0.17	(1.34)	-0.32	(1.90)*
$External \times \Delta \text{HHI}_{st-3}$			0.09	(0.71)	0.15	(0.90)
$External \times \Delta \text{Intra}_{st-1}$	-1.26	(1.80)*	-1.35	(1.91)*	-1.49	(1.52)
$External \times \Delta \text{Inter}_{st-1}$	1.04	(1.85)*	1.01	(1.83)*	0.12	(0.15)
Credit Demand Factors						
ΔGSP_{st-1}	-0.01	(0.32)	-0.01	(0.22)	-0.11	(0.79)
ΔGSP_{st-2}	-0.07	(1.94)*	-0.04	(1.26)	0.42	(3.00)***
ΔGSP_{st-3}			-0.12	(3.86)***	0.19	(1.40)
$Industry \times State$		yes		yes		yes
$Industry \times Year$		yes		yes		yes
$State \times Year$		no		no		yes
Number of Observations		12692		12024		12024
Years covered		1979-97		1980-97		1980-97
R-Squared		0.291		0.294		0.379

NOTES: Growth in establishments and real GSP are in percentages. Coefficients are reported along with the absolute values of t - statistics in parentheses. *** indicates significanceat the 1 percent confidence level, ** at the 5 percent level, and * at the 10 percent level.

Table 10: Dynamic Panel Regression Results for the Growth in Establishments

Dependent Variable: Growth of Establishments	(1)		(2)		(3)	
Lags of Dependent Variable						
ΔY_{jst-1}	-0.10	(5.65)***	-0.16	(2.02)**	-0.21	(3.52)***
ΔY_{jst-2}			-0.04	(1.82)*	-0.05	(1.90)*
Credit Supply Factors						
$External \times \Delta \text{CapRatio}_{st-1}$	0.56	(1.42)	0.65	(1.65)	0.87	(2.24)**
$External \times \Delta \text{CapRatio}_{st-2}$	0.02	(0.08)	0.07	(0.25)	0.28	(0.88)
$External \times \Delta \text{CapRatio}_{st-3}$			0.38	(1.29)	0.27	(0.78)
$External \times \Delta \text{Interest}_{t-1}$	1.81	(3.61)***	1.14	(2.61)***	1.12	(2.34)**
$External \times \Delta \text{Interest}_{t-1}$	2.94	(5.02)***	1.62	(2.99)***	1.66	(3.44)***
$External \times \Delta \text{Interest}_{t-1}$			1.48	(0.83)***	1.63	(4.18)***
$External \times \Delta \text{ResRatio}_{st-1}$	0.01	(0.04)	0.13	(0.41)	-0.10	(0.36)
$External \times \Delta \text{ResRatio}_{st-2}$	-0.15	(0.57)	-0.02	(0.07)	0.12	(0.46)
$External \times \Delta \text{ResRatio}_{st-3}$			-0.26	(0.98)	-0.33	(1.13)
$External \times \Delta \text{HHI}_{st-1}$	0.12	(0.92)	0.11	(1.13)	0.03	(0.35)
$External \times \Delta \text{HHI}_{st-2}$	-0.05	(0.61)	-0.04	(0.31)	-0.18	(1.58)
$External \times \Delta \text{HHI}_{st-3}$			-0.03	(0.40)	0.04	(0.46)
$External \times \Delta \text{Intra}_{st-1}$	-0.15	(0.33)	-0.02	(0.04)	0.43	(0.87)
$External \times \Delta \text{Inter}_{st-1}$	0.53	(0.34)	-0.19	(0.53)	0.02	(0.05)
Credit Demand Factors						
ΔGSP_{st-1}	0.11	(2.87)***	0.12	(2.80)***	0.16	(3.33)***
ΔGSP_{st-2}	0.53	(0.16)	0.06	(1.70)*	-0.04	(1.03)
ΔGSP_{st-3}			-0.04	(1.42)***	-0.11	(3.21)***
$Industry \times Year$		yes		yes		yes
Number of Observations		12024		11356		6680
Years covered		1980-97		1981-97		1988-97
Goodness of fit - $Corr(Y_{jst}, \widehat{Y_{jst}})^2$		0.210		0.260		0.291
Serial correlation(p-value)		0.924		0.213		0.348
Sargan-Hansen (p-value)		0.047		0.048		0.049

NOTES: Growth in establishments and real GSP are in percentages. Coefficients are reported along with the absolute values of t - statistics in parentheses. *** indicates significanceat the 1 percent confidence level, ** at the 5 percent level, and * at the 10 percent level.

Table 11: Dynamic Panel Regression Results for the Growth in the Average Size

Dependent Variable: Growth of Average Size	(1)		(2)		(3)	
Lags of Dependent Variable						
ΔY_{jst-1}	-0.11	(6.45)***	-0.27	(4.76)***	-0.23	(4.38)***
ΔY_{jst-2}			-0.05	(3.06)***	-0.06	(3.62)***
Credit Supply Factors						
$External \times \Delta CapRatio_{st-1}$	-1.35	(1.99)**	-1.75	(3.24)***	-1.70	(2.65)***
$External \times \Delta CapRatio_{st-2}$	0.03	(0.08)	-0.88	(1.77)*	-0.48	(0.96)
$External \times \Delta CapRatio_{st-3}$			-0.06	(0.14)	-0.18	(0.37)
$External \times \Delta Interest_{t-1}$	-2.85	(2.58)**	-1.81	(2.89)***	-1.87	(3.25)***
$External \times \Delta Interest_{t-1}$	-3.27	(2.33)**	-1.30	(2.26)**	-1.23	(2.45)**
$External \times \Delta Interest_{t-1}$			-2.07	(2.24)**	-2.00	(2.25)**
$External \times \Delta ResRatio_{st-1}$	-0.50	(0.99)	-0.53	(1.19)	-0.04	(0.10)
$External \times \Delta ResRatio_{st-2}$	0.87	(2.11)**	0.18	(0.36)	0.63	(1.30)
$External \times \Delta ResRatio_{st-3}$			1.01	(2.51)**	0.87	(2.19)**
$External \times \Delta HHI_{st-1}$	0.32	(1.15)	0.19	(0.87)	0.08	(0.48)
$External \times \Delta HHI_{st-2}$	-0.20	(1.39)	0.00	(0.01)	0.24	(1.24)
$External \times \Delta HHI_{st-3}$			0.03	(0.23)	0.20	(1.39)
$External \times \Delta Intra_{st-1}$	-1.13	(1.48)	-1.41	(2.01)**	-1.81	(1.90)*
$External \times \Delta Inter_{st-1}$	0.49	(0.51)	0.41	(0.72)	0.54	(0.65)
Credit Demand Factors						
ΔGSP_{st-1}	-0.09	(1.25)	-0.10	(1.50)	-0.25	(2.99)***
ΔGSP_{st-2}	0.03	(0.51)	-0.10	(1.86)*	-0.06	(1.00)
ΔGSP_{st-3}			-0.10	(2.07)**	-0.07	(1.33)
$Industry \times Year$		yes		yes		yes
Number of Observations		12024		11356		6680
Years covered		1980-97		1981-97		1988-97
Goodness of fit - $Corr(Y_{jst}, \widehat{Y_{jst}})^2$		0.362		0.316		0.426
Serial correlation(p-value)		0.039		0.044		0.085
Sargan-Hansen (p-value)		0.198		0.428		0.182

NOTES: Growth in establishments and real GSP are in percentages. Coefficients are reported along with the absolute values of t - statistics in parentheses. *** indicates significance at the 1 percent confidence level, ** at the 5 percent level, and * at the 10 percent level.

Table 12: Back-of-the-Envelope Macro Effects on Employment

	Panel	Dynamic Panel
First year effect of a 1% increase in adjusted capital ratio	[-70;-115]	[-115;-135]
Long Run effect of a 1% increase in adjusted capital ratio	[-330;-525]	[-340;-560]

NOTES: Back-of-the-envelope macro effects on the change in employment (or displacement of workers) are calculated by multiplying the long-run elasticity of a one percentage increase in the adjusted capital ratio on the average size of establishments with the total number of employees. The number is represented in thousands of employees.