Capital Market Competition and the Resolution of Financial Distress: Evidence from Corporate Bankruptcy Filings

Mahsa S. Kaviani[*]
Hosein Maleki[†]

Fox School, Temple University

Abstract

We study how credit market competition impacts the resolution of borrowers' distress. By exploiting positive shocks to competition in the banking industry, we document that higher competition leads to a significant decline in the rate of non-financial firms' bankruptcy filings. This decline predominantly stems from a sharp reduction in Chapter 11, as opposed to Chapter 7 filings. Changes in economic conditions, firm fundamentals or banks' preference for risk cannot explain the results. We show that fewer filings are driven by better bank monitoring, higher incentive to to avoid inefficient outcomes, and improved outcomes of private, pre-court workouts. Distressed firms also benefit from improved outcomes and fewer liquidations following a Chapter 11 filing, as well as shorter duration of the legal bankruptcy process.

[*]Mahsa S. Kaviani (*corresponding author*): Fox School of Business, Temple University, Philadelphia, PA. Email: kaviani@temple.edu,
[†]Hosien Maleki: Fox School of Business, Temple University, Philadelphia, PA. Email: hmaleki@temple.edu,

I. Introduction

A major functions of any credit market is how it resolves corporate default and facilitates the reorganization of firms in financial distress. The processes that govern the resolution of corporate distress and bankruptcy are widely characterized as time consuming, expensive, and inefficient.[1] Precisely because these inefficiencies lead to sizable social and economic costs[2] it is important to grasp how credit market developments impact outcomes and efficiencies of corporate distress. This leads to the central question of this paper: how do credit market competition impacts the resolution of borrowers' financial distress? Surprisingly, while a rich literature has examined the economic effects of credit market competition at the time of contracting (see Petersen and Rajan (1995) and Boot and Thakor (2000)), only scant attention has been made to the time of borrowers' distress (see Dinc (2000); Gormley et al. (2016)). This study documents that these effects are in fact large and widespread, influencing multiple dimensions of both pre- and post-filing processes.

In this paper we focus on the banking sector as a major provider of liquidity in credit markets. Studying the banking sector is also appealing here due to the banks' unique characteristics in the bankruptcy literature as the more sophisticated lenders, and their superiority in efficiently resolving distress (Stein (1989); Dahiya et al. (2003) Gilson (1990); Bulow and Shoven (1978); Smith and Warner (1979); Hart et al. (1995); Bolton and Freixas (2000) and Hotchkiss et al. (2008)' Demiroglu and James (2015)). So, we specifically ask whether higher competition in the banking industry leads to more efficient resolution of distress and bankruptcy of the non-financial firms. Noticeably, the literature provides contrasting predictions about the effect of bank competition on the outcome of borrowers' distress. On the one hand, relationship with a monopolistic bank in less competitive markets (see Petersen and Rajan (1995)) may incentivize banks to better resolve borrowers' temporary distress as they are able to share future surplus (Mayer (1988) and Hellwig (1991)). On the other hand, as shown by Chemmanur and Fulghieri

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[1]Inefficiencies in bankruptcy procedures are widespread. For example, Djankov et al. (2008) documents that only 36% of countries in their sample are able to reach the efficient outcome, when the efficient outcome is to keep the bankrupt business as a going concern as opposed to liquidating it.

[2]For example in 2008, the overall value of the filing firms exceeds \$1.2 Trillion, affecting directly more than 600,000 employees. The economic effect of bankruptcies are also large in non-crisis years. For example in 2005, the total value of the filing firms exceeds \$135 Billion dollars, affecting more than 520,000 employees.

(1994) and Dinc (2000), banks' reputational concerns in more competitive regimes may motivate banks to exert the costly effort, hence improve the efficiency of distress resolution and avoid inefficient liquidation of the borrower.

To disentangle these competing expectation, we empirically examine the effect of an increase in bank competition on multiple aspects of bankruptcy and distress resolution processes. First, we focus on the number of bankruptcy filings and explore how credit market competition impacts the rate at which firms file for bankruptcy. Second, we investigate possible explanations and the mechanisms through which credit market competition impacts the number of filings. In doing so, we also address the number of distressed firms and shed light on the outcome of pre-filing, private debt renegotiations. Third, we explore the resolution of distress after a firm formally files under Chapter 11, both in terms of the outcome and duration.

One identification concern is that credit market competition may be endogenously related with the rate of distress and bankruptcy in the economy. We address this concern primarily by exploiting the staggered timing of the interstate bank deregulation in the U.S. economy that took place gradually during the early 1980's to early 1990's. The literature shows that by enabling banks to enter new geographical locations, these deregulatory forces created strong competitive pressures in the banking industry (Black and Strahan (2002); Chava et al. (2013); Amore et al. (2013) and Cornaggia et al. (2015)). The plausibly exogenous timing of these deregulatory events and the fact that these events took place in different states at different points of time provides an ideal setting to study the effect of credit market competition on corporate distress.

For this study, we compile more than 1,900 filings over 1980 to 2006 that covers both public and significant private firms bankruptcy filings. Our empirical tests are based on a difference-in-difference setting as in Bertrand and Mullainathan (2003). This setting allows us to compare the rates of bankruptcy filings in treatment (deregulated) states pre- and post- deregulation with those of control (non-deregulated) states. Using this setting, we find that increase in credit market competition that followed the interstate banking deregulation led to a sharp decline in the population-adjusted number of bankruptcy filings. After adjusting for the number of establish-

ments in a state, the interstate banking deregulation leads to 10% to 12% decline in the number of firms that file for bankruptcy. Importantly, the reduction in the number of filings is almost entirely driven by fewer Chaper 11 filings, and not Chapter 7 filings.

While the staggered timing of bank deregulation provides possibly exogenous variations in credit market competition, we formally examine the endogeneity issues regarding the effect of unobservables and the timing of banking deregulation, using two falsification studies. First, we address the effects of unobserved variables using a placebo test. In this study we use the same distribution as the original deregulatory dates to randomly re-reassign deregulation dates to states in multiple repetitions, similar to Chava and Roberts (2008) and Cornaggia et al. (2015). We show that the baseline results largely disappear in the randomly re-assigned samples. This finding confirms that there are no otherwise confounding unobserved shocks that coincide with the staggered timing of deregulation in different states. Second, we address the reverse causality between the number of filings and bank deregulation by studying the possible pre-existing trends in the data. Examining the temporal dynamics of bankruptcy filings around deregulation dates, we document strong evidence against the existence of such trends in the data.

But what drives this sharp decline in filings? To answer this questions, we explore the relevance of a menu of alternative explanations. First, we show that our results are not influenced by an increase in the supply of credit in the deregulated states by properly controlling for the state-level structure of the banking industry. Similarly, our results not influenced by the demand for credit in the deregulated state, proxied by a states' market and industry characteristics. Added to that, we emphasize that post-deregulation improvements in economic growth, better firm fundamentals, or banks' avoidance of risky lending are not likely to drive our results.

Next, we investigate the mechanisms through which credit market competition impacts the rate of corporate bankruptcy filings. Motivated by the related literature, we identify two possible mechanisms namely the post-deregulation improvements in bank monitoring of borrowers, and improvements in the outcomes of pre-Chapter 11 private workouts. The studies of Dick and Lehnert (2010) and Jayaratne and Strahan (1998) highlight the importance of banks' monitoring

in highly competitive settings and show that in response to increase in competition, banks tend to improve the monitoring of their borrowers. That being the case, improved bank monitoring can lead to fewer bankruptcy filings by enabling banks to detect and address the sources of risk before the firm gets too close to an eminent default. Not only monitoring helps banks detect the earlier signs of distress, the literature also shows that it facilitates banks and creditors consent to restructuring plans privately, by reducing the information asymmetry between banks and borrowers (Gilson et al. (1990); DeAngelo (1988)). In reality, monitoring can be especially costly for smaller banks that have weaker financial muscle to invest in better monitoring technologies. The post-deregulation entry of larger, tech-savvy banks leads to greater investment in screening technologies and facilitates monitoring (See Hombert and Matray (2016); Dick and Lehnert (2010); Boyd and De Nicolo (2005)). We confirm this conjecture by showing that in states where banks invested more in monitoring technologies, deregulation had a stronger effect on the reduction in the rate of bankruptcy filings and especially so on the number of Chapter 11 filings.

We also examine the relevance of the second mechanism, by examining whether the decline in the number of filings can be explained by better pre-court private renegotiation outcomes. The literature provides theoretical and empirical grounds for improved pre-court outcomes in a competitive credit market. Absent monopoly rents and increased competitive pressures, banks have reputational incentive to exert extra effort to resolve bankruptcies more efficiently and avoid inefficient liquidation. As restructuring in pre-court workouts are more efficient than restructuring during a formal bankruptcy process (Gilson et al. (1990); Hotchkiss et al. (2008); Demiroglu and James (2015)), it is even more beneficial for banks to exert effort and reach a restructuring agreement in private workouts. In an important theoretical study, Dinc (2000) shows competition positively impacts banks' reputational concerns. More support for the reputation channel is provided by Chemmanur and Fulghieri (1994). This study shows that the desire to obtain reputation for achieving "right" renegotiation outcomes as opposed to inefficient liquidation provides banks with incentives to allocate more resources to better resolve borrowers' bankruptcies (see also Aoki (1993) and Boot et al. (1993)). Consistent with the above prediction, we find strong

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evidence that following bank deregulation, significantly fewer distressed firms will eventually file for Chapter 11 protection.

Next, we study the efficiency of bankruptcy processes by turning to the bankruptcy outcomes of formal Chapter 11 filings. Consistent with the improvement in efficiency argument, we find enhanced outcomes and shorter durations of the bankruptcy process, following the deregulatory events. After the deregulation, the ratio of bad outcome, i.e. liquidation, to good outcome, i.e. emergence and acquisition, falls significantly. The duration of Chapter 11 also shortens, after the interstate banking deregulation.

This paper contributes to two strands of literature. First, we contribute to the literature on corporate bankruptcy and restructuring determinants (Altman (1968); Edmister (1972); Mensah (1983); Gilson et al. (1990); Dahiya et al. (2003); Demiroglu and James (2015) and Gormley et al. (2016)), by identifying the important role of credit supply factors. This paper, to the extent of our knowledge, is the first study to document empirically how important credit market competition are in the resolution of borrowers' distress, *after* the bank has offered lending to the firm in good times (Dinc (2000)). We document first-handed empirical support that the effect of credit market competition goes beyond the point of contracting and can largely influence the resolution of distress and default. Second, we add to the literature on the superior role of banks in resolving borrowers' distress (Gilson (1990); Demiroglu and James (2015); Bulow and Shoven (1978); Smith and Warner (1979); Hart et al. (1995); Bolton and Freixas (2000) and Hotchkiss et al. (2011)), by providing evidence that reputational concerns can improve banks' incentive to achieve higher efficiencies in the resolution of borrowers' distress.

The rest of the paper proceeds as follows. In Section II, we describe data sources and summary statistics. Section III reports model specifications and empirical results for the number of bankruptcy filings. Section V studies the underlying mechanisms by exploring the role of monitoring, and pre-court private workouts. In Section VI we study the outcomes and duration of Chapter 11 fillings. Section VII performs a series of robustness tests, and Section VIII concludes the paper.

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II.   Data

We compile a comprehensive dataset using state, firm, macro- and industry-level variables. This dataset includes bankruptcies and their outcomes, as well as information about banking deregulations at different points in time and in different states. Our data ranges from 1980 to 2006. In this section, we describe the data sources in detail, and discuss dataset construction. Variable construction and data sources for each of the variables can be found in Appendix 1.

A.   Bankruptcy Data

Our main source of bankruptcy data is the New Generation Research's Bankruptcy Data (www.bankruptcyata.com). This database provides information on public and significant private companies' bankruptcy filings in the US. We further validate and complement this initial dataset using the UCLA-LePucky database, the Altman-NYU Salomon Center Bankruptcy List and Capital IQ (CIQ). From the resulting dataset, we collect all filing types including Chapter 11 and 7, between 1980 to 2006 and remove the filings of banks and other financial firms. This results in more than 1900 total filings. The choice of 1980 to 2006 as the study period is made for two reasons. First, most data about bankruptcies is available after 1980, due to prior bankruptcy regulation in 1978 called Bankruptcy Reform Act that led to a marked increase in the number of bankruptcy filings. Second, we set the ending year to 2006 to include adequate time for the study of banking deregulation, yet avoid the impact of the financial crisis of 2007-2009.

Next, we construct the dependent variables by counting the number of filings, including Chapter 11 and Chapter 7 in each year for different US states. To account for the difference in the state size and population and the possible effects of growth in state size over time, we follow Dick and Lehnert (2010) and normalize the number of filings by total state population in every given year. This choice also reflects the fact that data for the number of corporations by state-year is not available.

B. Banking Deregulation

The banking industry has historically been one of the most regulated industries in the US. Starting in the late 1970s, a wave of deregulations changed the shape of the banking industry. As a result of these deregulations, US states removed barriers to banking, both within the states and also across different states. The interstate banking, in particular, motivated competition in the industry by allowing the entry of the out-of-state banks into the deregulated states (Black and Strahan (2002) and Dick and Lehnert (2010)). Table 1 shows the timing of the interstate deregulation in different US states. As the table shows, the earliest interstate deregulations start in 1978 in Maine. In 1982 Alaska and New York join Maine and later, the bulk of the deregulation takes place between 1985 and 1987. The main data sources for the timing of deregulation are from Amel (1993) and Jayaratne and Strahan (1996). Importantly, the effects of deregulation on the banking industry have been widely studied and the related findings of Jayaratne and Strahan (1998), Jayaratne and Strahan (1996), and Black and Strahan (2002) emphasize that they lead to an increase in bank size and credit competition.

[**Insert Table 1 About Here**]

B1. Interstate Banking Deregulation

Interstate Banking Deregulation: Since the passage of the McFadden Act of 1927, and the following Bank Holding Company Act of 1956, interstate banking activities were largely prohibited in the US until late 1970's where the first attempts for the legalization of cross-border banking activities were made. In 1978 Main allowed out-of-state banks to purchase banks headquartered in its borders, and by 1996 all fifty-one states permitted interstate banking. During 1980's, the US banking system experienced widespread interstate banking deregulations. As a result of these deregulations the competition in the banking industry increased dramatically, and capital flow across state borders gained significant mobility (Morgan et al. (2004)).

C. Banking Industry Data

We obtain data about the banking industry from two main sources. The first source is the Federal Financial Institutions Examination Council's Reports of Condition and Income (Call Reports). Second, we use Federal Deposit Insurance Corporation's (FDIC) databases that contain information on branch-level variables such as the amount of deposits, and banks total assets.

D. State-Level Data

As discussed earlier, it is possible that a state's economic conditions drive both deregulations in the banking industry and the number of bankruptcy filings in that state. While we address possible effect of unobservables in our econometric settings, we also include a set of economic indicators to ascertain that our results are not driven by a state's economic conditions. Following Rice and Strahan (2010), we control for the log of state GDP and to account for its persistent effect, we also include its first lag in our studies.

Cornaggia et al. (2015) show that another important state-level variable that is able to endogenously impact the timing of banking deregulation is the state's labor force structure. We use two sets of variables to account for labor share variations. Following Morgan et al. (2004) and Cornaggia et al. (2015), we compute the composition of the state-level labor force across seven industries including construction, finance, manufacturing, mining, transportation, trade, and government. Added to that, we also construct a state-level concentration of labor force, using a Herfindahl-Hirschman index. We also control for state-level unemployment rate and personal income growth. Our main source of data for the above state-level variables is the database of the Bureau of Economic Analysis (BEA).

E. Summary Statistics

Following the literature, we remove South Dakota and Delaware from the sample, due to uniquely differential bankruptcy laws. In our final sample, we have a total of 1934 bankruptcy filings. The sample summary statistics are reported in the two panels of Table 2. Panel A reports the mean and

standard deviations of the bankruptcy-related variables, including the annual population-adjusted (per million state population) filings as well as the population-adjusted number of Chapter 11 and Chapter 7 filings. The table shows that each year on average, there are 1.41 filings per every million state residents while there are only 0.05 Chapter 7 filings in the similar scale. Focusing on the effective dates, bankruptcy filings on average take 639 days to resolve, and this duration varies significantly on a case-by-case basis (standard deviation is 610 days).

The bottom four rows report the summary statistics of Chapter 11 outcomes, categorized into liquidated, emerged, acquired, and dismissed. Similar to the main variables, we construct these variables by counting the number of the reported outcomes conditional on Chapter 11 filings and then normalizing the result by the state population. As the table shows, most of the Chapter 11 filers eventually emerge from bankruptcy. The second most prevalent outcome is liquidation and acquisition is the third common outcome. A few cases are also dismissed by the bankruptcy court. Dismissal of the case can be due to a petition by the creditors or by a joint petition by creditors and borrowers. Dismissal can also be a result of borrower's failure to follow certain procedural rules. As the dismissal of a Chapter 11 removes the automatic stay, it can be also considered as a negative outcome.

[**Insert Table 2 About Here**]

In Panel B of Table 2 we report summary statistics for the metrics of the banking structure as well as average state-level charge-offs. The average number of top banks per state is 20, meaning that on average 20 largest banks in each state together hold more than 50% of total state deposits. The state banks' diversification index illustrates on average how geographically diversified are the banks located in each of the states. Geographic diversification here is defined as a bank's deposit-weighted number of branches in states other than the main office. This measure is then averaged at the state level. As the diversification measure here is defined as a Herfindahl-Hirschman index, a value of 0.89 indicates that individual banks are not generally diversified across state borders. It is not surprising since most of the local banks that shape the bulk of the sample are only active in only one state. State deposits Herfindahl index shows how diversified the state deposits are

across different banks located in that states. The average of 0.05 suggests that state deposits on average are very well diversified across different banks. Finally a large fraction of deposits are held at small banks, with less than 100 million dollars of total assets.

III.   Credit Market Competition and Corporate Bankruptcy Filings

The main objective of this section is to document how credit market competition impacts corporate bankruptcy rates. We first introduce the main specification. We show that the results are not driven by supply or demand for credit in different states. Next, we explore the number of different types of filing (Chapter 11 vs. Chapter 7) and examine whether the post-deregulation real economic developments at firm- or state-level can explain the results. Upcoming sections formally address the remaining endogeneity concerns, and document the underlying mechanisms through which bank deregulation impacts bankruptcy filings.

A.   Specification

To identify changes in credit market competition, we use interstate banking deregulation dates in the US economy. The staggered timing of these deregulatory events provides plausible exogenous variations in the credit market competition (Chava et al. (2013); Amore et al. (2013); Hombert and Matray (2016); and Cornaggia and Li (2017)). An advantage of these deregulatory events is that the existence of multiple shocks mitigates the general problem that can inflict empirical studies that rely solely on a single shock, where results may be driven by an unobserved concurrent variable or shock. Our economic model is a difference-in-difference model similar to Bertrand and Mullainathan (2003) and Amore et al. (2013). We estimate the following baseline specification

$$Bankruptcy_{j,t} = \beta_0 + \beta_1 InterState_{j,t} + \gamma X_{j,t} + State_j + Year_t + \epsilon_{j,t} \tag{1}$$

where j and t index state and year, respectively. The dependent variable, $Bankruptcy_{j,t}$ is the number of corporate bankruptcy filings in a state per 10,000 establishments located in that state,

in a given year. $InterState_{j,t}$ is a state-level dummy variable that equals one for years *after* the interstate deregulation, and equals zero otherwise. $X_{j,t}$ is a vector of state and banking sector controls. $State_j$ is the state fixed-effect, $Year_t$ is the year fixed-effects and $\epsilon_{i,t}$ is the error term. Including the year fixed-effect accounts for annual changes in the credit market that are common to all states. The state fixed-effect, $state_j$, captures the state-level time-invariant unobservables that may influence the results. For example, the number of corporate bankruptcies across different states may vary due to the inherent differences in state-wide characteristics that are not already captured through state-level controls. Thus, including state fixed effects mitigates the concern that other state-level characteristics may drive the results. In this DID model the identifying assumption is that variations in credit market competition captured by state-level deregulations are dispersed both across state and time. The treatment sample consists of firms in the deregulated states after the deregulation event. The coefficient of interest is β_1. If increased banking competition results in fewer bankruptcy filings by firms, then we expect to capture a negative sign for this coefficient. It is noteworthy that all independent variables in Equation 1 are standardized thus our results show the impact of one standard deviation change in the independent variables on the level of the outcome variable ($Bankruptcy_{j,t}$).

Related to the above DID setting, one concern is that the outcome variables may be serially correlated. In this case, the DID specification may over-reject the null as a result of inflated standard errors (Bertrand et al. (2004); Donald and Lang (2007)). We take certain steps to ensure that our results are not influenced by the over-rejection problem. First, our dependent variables (number of filings) are aggregated at the state level and therefore dependent and independent variables, as well as the treatment, are at state level. This aggregation to large extent mitigates the problem of correlation across firms that share the same state when the dependent variable is studied at state level (Angrist and Pischke (2008)). Importantly as Angrist and Pischke (2008) and Donald and Lang (2007) argue, since the treatment variables are already aggregated at state level, our results are unlikely impacted by inflated standard errors. Second, similar to Cornaggia et al. (2015) we cluster the standard errors by year to account for serial correlations in time.

Finally, to further ensure about the validity of our results to other suggestions in the literature (see for example, Bertrand et al. (2004) and Amore et al. (2013)) we repeat the main tests with state-level clustering as well as double clustering by state and year, and find that the results remain robust.

B.   Main Results

Results from the above specification are reported in the first column of Table 3. To address the possible impact of the state-level growth following banking deregulation, we control for the log of state's GDP ($Ln(GDP)$) to proxy for a state's level of economic development. Following Rice and Strahan (2010) we also include the first lag of the $Ln(GDP)$ to account for the persistent effects of the GDP. The first row of the table reports the impact of the interstate deregulations on bankruptcy outcomes. As expected, following the interstate deregulation the number of population-adjusted filings decline by 9%, and the effect is highly statistically significant.

C.   Controls for Banking Market Structure

The timing of deregulation in the banking industry may not be exogenously determined, but can well be under the influence of state-level competitive forces and related political processes that affects the interaction between markets and politics (Jayaratne and Strahan (1998); Chava et al. (2013)). In this regard, Dick and Lehnert (2010) suggests that the time of a deregulatory event may be set when the competitive forces in the banking industry reach the adequate strength that is needed for making regulatory changes. In this view, changes in regulation are merely natural steps towards more liberalization in the course of market development. The evidence supporting this idea is also provided by Rice and Strahan (2010). This study suggests that deregulation can be a result of political pressure from large banks that are willing to expand outside of state boundaries on one side; and small banks who benefit from more restrictive regulations in place, on the other.

To address the possible pressures from the banking industry on the timing of deregulation, we control for the banking market structure. These controls enable us to study whether the results

are driven by deregulatory events, or by piecemeal changes in the states' degree of competition. In the next four columns of Table 3, we include variables that directly measure and describe the banking market structure. These controls include the states' number of top banks, geographic diversification, concentration of banks' deposits, and fraction of deposits in small banks, in columns 2 through 5, respectively. Column 6, the most comprehensive setting, controls for these proxies concurrently. These controls are described as follows. The number of top banks is defined as the minimum number of banks that is needed to form at least 50% of state deposits. Thus, a smaller number of top banks signifies higher concentration of state deposits in fewer banks.

[**Insert Table 3 About Here**]

We control for banks' geographic diversification in Column 3. To construct this variable we first compute the geographical diversification of each of the banks located in a state. We do so by first, computing the Herfindahl-Hirschman Index (HHI) of the banks' deposits in different states. Next, we make this variable state-level by averaging it in each year across all banks located in a state. Following the interstate deregulation, banks were able to expand beyond the state borders and therefore to achieve better geographical diversification. Geographic diversification allows banks to reduce the cost of funds through expanding their deposit base (Deng and Elyasiani (2008)). Moreover, from a portfolio theory framework, geographic diversification can result in lower earnings volatility through the coinsurance effect (Lewellen (1971); Boot and Schmeits (2000)).

Empirical evidence in the literature supports this expectation. Studies have shown that interstate banking results in more profitability but lower earnings volatility, market and insolvency risks (Deng and Elyasiani (2008); Akhigbe and Whyte (2003); Hughes et al. (1999)). Geographic diversification can also have a negative side. Lack of information about a new geographical location, coupled with excessive organizational structure can intensify the agency problem (Acharya et al. (2006); Baele et al. (2007)). Thus, interstate diversification may lead to increased bank risk-taking through activities such as excessive high-risk lending, and investment in risky assets motivated by higher competitive pressure (Demsetz and Strahan (1997); Chong (1991); DeLong

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([2001](#)). Therefore, geographical diversification can impact banks' risk preferences in lending activities and hence may influence the borrowers' bankruptcy rates.

Controlling for geographic diversification is not only important after the interstate deregulation, but also before it. Arguably, while prior to the interstate deregulation geographic diversification across state borders was not possible, the pressure for achieving such diversification may be driven by unobserved state-level determinants, such as ex-ante capacity of banks to diversify within the state. The column 3 of this table reports the results while controlling for banks' geographical diversification and shows that the results remain largely unchanged.

In the fourth column, we control for states' deposit concentration. This variable is defined as the Herfindahl-Hirschman Index of deposits in different banks located inside a state. Compared to the geographical diversification which is primarily a bank-level variable, the states' deposit concentration is a state-level variable by construction. Lower deposit concentration in a state signifies that deposits are more *diversely* allocated, which implies better grounds for competition in the credit market. Importantly, controlling for deposit concentration has almost no impact our results.

Finally, we control for the states' fraction of deposits in small banks. Small banks are defined as those with less than $100 million in total deposits. This variable is motivated by the findings of Kroszner and Strahan (2001), showing that states with large presence of small banks were the last to deregulate, since smaller banks may lose the most from a state's opening up to competition from out-of-state, larger, stronger banks. In the fifth column of Table 3 we show that our results remain robust to controls for the role of smaller banks. Finally in column 6, we form the most comprehensive model by including all the above controls in the regression. Importantly, the results remain robust to controlling for the above measures of banking structure. The interstate deregulation indicator largely and significantly reduces the number of filings.

D. Chapter 11 vs. 7 Filings

Next, we explore the reduction of bankruptcy filings in more detail by studying the effect of credit market competition on different types of filing. We specifically ask are filings under Chapter 11

and Chapter 7 similarly impacted by credit market competition? To address this question, we obtain data about the filing types and study their response to bank deregulation in separate settings. Our econometric model is similar to the base-case regression in Equation 1 and can be summarized as follows; where in separate regressions the dependent variable, $FilingType_{j,t}$, takes the number of Chapter 11 and Chapter 7 filings normalized by state population.

$$FilingType_{j,t} = \beta_0 + \beta_1 InterState_{j,t} + \gamma X_{j,t} + State_j + Year_t + \epsilon_{i,t} \qquad (2)$$

In the above model, control variables are the same as to those used in Equation 1, including the banking structure indicators. Similarly, the standard errors are clustered by year. Table 4 reports the results. The odd and even columns use the per-million state resident population-adjusted number of Chapter 11 and Chapter 7 filings as the dependent variable, respectively. In the first two columns, we limit the control variables to the log of state-level GDP and its lagged values. Columns 3 and 4 include controls for the structure of the banking industry. Interestingly, this table depicts that the credit market competition only reduces the number of Chapter 11 filings and has almost no impact on the number of filings under Chapter 7. The effect on Chapter 11 filings is economically large and statistically highly significant. Depending on the specification, after the interstate banking deregulation the number of population-adjusted Chapter 11 filings falls between 10 and 12 percent. This effect is robust to both the states' economic conditions and the structure the banking industry.

[**Insert Table 4 About Here**]

Findings so far are worth further attention. While what we find in Table 3 demonstrates a marked reduction in the number of the filing firms, Table 4 highlights that this effect is almost entirely resulted from fewer Chapter 11 filings. Of course fewer filings can be considered a positive outcome but, this reduction may also be influenced by changes in states' and firms' economic conditions after the banking deregulations. In fact, the literature shows that increased bank competition that followed banking deregulations can have real economic effects (see Black and

Strahan (2002); Rice and Strahan (2010); Kerr and Nanda (2009); Beck et al. (2010); Morgan et al. (2004); Favara and Imbs (2015); Chava et al. (2013); Cornaggia et al. (2015); Amore et al. (2013) and Hombert and Matray (2016)). For example, Black and Strahan (2002) show that bank deregulations have helped entrepreneurs and lead to the formation of new incorporations. They also show that more openness to interstate banking provides cheaper financing for corporate borrowers. Morgan et al. (2004) shows that the deregulation-induced integration in the banking industry impacts the depth and duration of business cycles; and Chava et al. (2013), Cornaggia et al. (2015), Amore et al. (2013) and Hombert and Matray (2016) show that deregulation influences firms innovativeness.

Therefore in the rest of this section we test whether improvements at firm- or state-level conditions after the banking deregulation can impact our results. For this purpose, first we test the influence of post-deregulation improvements in states' economic conditions and growth and study whether the results remain robust. Next, we test whether the results are influenced by improvements in firm fundamentals and the emergence of a better pool of firms in the economy. and finally, we examine whether the banks' post-deregulation preference for safer loans drives the results.

E. Better State-Level Economic Growth

Here we address the possible impacts of state-level growth indicators on the number of filings. This study is motivated by two important findings in the literature. First, deregulation in the banking industry can spur growth in the economy by providing more, cheaper loans to businesses (Rice and Strahan (2010)) and motivating entrepreneurship (Black and Strahan (2002)). Therefore, the reduction in the number of bankruptcy filings can be a mere result of improvements in the states' growth outcomes after the banking deregulation.

Second, banking deregulation can be driven endogenously not only by the pressure from the banking industry (supply side), but also by the the demand-side factors (Black and Strahan (2002); Cornaggia et al. (2015); Chava and Roberts (2008)). States that are hosts to more innovative, risk-taking industries may have more incentive to bargain for deregulation in the

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banking industry due to higher demand for credit. Deregulation in this scenario can thus be reflective of the level of credit-appetite in the deregulated state.

To test whether our results are impacted by changes in state-level characteristics after banking deregulations, we control for a comprehensive menu of state-level variables including states' GDP and its lagged values, as well as the states' personal income growth, level of unemployment, product market competition, and labor force dispersion. The unemployment rate and growth of personal income are from the Bureau of Economic Analysis (BEA). The state product market competition is constructed similar to John et al. (2008), as the sales dispersion of firms located in that state measured by a Herfindahl-Hirschman index (HHI).

[**Insert Table 5 About Here**]

Finally, we follow Cornaggia et al. (2015) and Morgan et al. (2004) and control for a measure of labor-force allocation in different industries. We compute the share of labor-force in eight industry sectors in each state-year. The eight sectors include construction, government, finance, manufacturing, mining, service, trade, and transportation. Then, we control for the concentration of labor force across these eight industries, for state j in year t. The concentration variable is defined as the sum of squares of labor shares in the eight sectors.

Columns 1 to 4 test, in separate settings, whether the results stay robust after controlling for these state-level growth indicators. Column 5 reports the most comprehensive model by including all the above controls simultaneously. We extend this study in columns 6 and 7 by focusing on Chapter 11 vs. Chapter 7 filings. After controlling for all the above-mentioned growth indicators, the results remain robust as the bulk of the decrease in filings stems from reduction in Chapter 11 filings. The number of Chapter 7 filings yet remains not significantly different from zero. Overall, this test provides important evidence against the influence of economic growth on our results.

F. Better Pool of Firms

Greater supply of credit and improvements in lending terms after the banking deregulation can provide better growth opportunities for firms. Better pool of firms in a state can indicate lower

rates of distress and lead to reduced number of bankruptcy filings. To test this possibility we explore two different improvements in firm fundamentals in the deregulated states. First, we account for measures of firm performance including size, leverage, market to book, profitability and Tobin's Q. Second, we account for indicators of firm's credit worthiness, following the idea that better credit availability and growth can improve firms' credit quality and thus reduce the probability of distress (Gormley et al. (2016)). To account for firms' credit worthiness, we control for firms' Z-Score, distance to default (DTD) and credit ratings.

For this study, we obtain accounting data for all firms available in the Compustat database during our sample period. Next, we construct profitability and credit-worthiness variables for each firm in different years including size, book leverage, market to book ratio, profitability, Tobin's Q, Z score, distance to default, and firms' credit rating. We determine the lowest quartile values for each of these variables, i.e. the quartile that pertains to the lowest credit or operational quality. Next, in each state-year we compute the average of these variables in the lowest quartile. Thus we test whether controlling for these variables can impact out results. The econometric models we use are similar to those of Table 3. Importantly, if post-deregulation improvements in the quality of firms drive our results, then we expect that including these control variables to significantly weaken the impact of post-deregulation indicators. Results are reported in Table A.1.

[**Insert Table A.1 About Here**]

The first panel (Columns 1 to 3), controls for the measures of firm performance including size, leverage, market to book, profitability and Tobin's Q; and the second panel (Columns 4 to 6), controls for measures of firms' credit worthiness including Z-Score, distance to default and credit rating. Across all columns of Table A.1 the effect of interstate banking deregulation on total filings and especially on Chapter 11 filings remains large, negative and highly significant. In various columns of the first row, the total number of filings drop between 10 and 12 percent, which is a large effect. This effect is similar to what we report in the 3, and similarly, decline in Chapter 11 filings form the bulk of the effect. As expected, there is no impact on Chapter 7 filings.

Overall, this result shows that changes in firm-level characteristics after banking deregulations cannot explain the decline in the number of bankruptcy filings.[3]

G. Banks' Preference for Safer Loans

Increase in competition can impact the risk preference of banks. When banks cannot share the benefits of risky projects with firms in future periods, they may only provide funding for less risky projects (Petersen and Rajan (1995)). In a related study, Boyd and De Nicolo (2005) show that the overall riskiness of bank loan portfolios may *decrease* in more competitive environments, as borrowers tend to risk-shift less when banks reduce the price of loans. In another related study, Deng and Elyasiani (2008) show that interstate diversification of banks leads to reduced riskiness of banks. In fact if banks prefer to take less risk after the deregulation and offer only safer loans, then a decline in the number of bankruptcy filings may be mechanically capturing an increase in banks' lending conservatism.

To address this possibility, we set up a difference-in-difference model similar to Equation 1 and control for average industrial charge-offs in a state to capture the possible effects of change in bank lending behavior. We make this variable state-level by averaging it each state-year observation. If change in banks' attitude towards risk drives our results, we expect that the effect of interstate banking deregulation on the number of filings to weaken after conditioning on the level of charge-offs. Table 7 presents this analysis.

<div align="center">

[Insert Table 7 About Here]

</div>

Results show that the negative and significant impact of the interstate banking deregulation on the rate of bankruptcy filings remains almost intact after controlling for charge-offs. Moreover, there is no change in the conclusion regarding the response of Chapter 11 vs. Chapter 7 filings after we control for bank charge-offs. This finding demonstrates that the lower rates of bankruptcy filings is not driven by reduction in the risk-portfolios of banks.

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[3]For robustness test, we also compute average the above variables using all Compustat firms. The results remain largely unchanged and are reported in Table **??** of the Internet Appendix.

IV.   Additional Endogeneity Tests

A.   Placebo Tests

We address the possible influence of unobservables on our results. As suggested by Kroszner and Strahan (2001), Chava et al. (2013), and Cornaggia et al. (2015), our results may be influenced by unobserved state-level variables or shocks that are able to drive both the state's timing of deregulation and also impact firms decision of filing for bankruptcy. The staggered nature of deregulation mitigates this concern to large extent as there is a minute chance that a series of unobserved shocks with the same effect on our variables of study occur in a similar staggered fashion, and concurrently with the regulatory events of interest. Nevertheless, to ascertain about the validity of our results we employ a formal placebo test.

In this test, we first obtain the empirical distribution of the deregulatory dates form Rice and Strahan (2010). Next, using the same distribution, we randomly reassign the timing of the interstate banking deregulations across different states and repeat the process 10,000 times and re-estimate the base-case regression model. The idea behind the construction of this test is that if our results are driven by banking deregulation, then random reassignment of the deregulation dates should erode the results or at least significantly weaken them. On the other hand, if our results are *not* driven by the interstate deregulations, the incorrect reassignment of deregulation dates should not influence them since the main driver of the number of filings will remain intact.

[**Insert Table 8 About Here**]

Results are reported in Table 8 As expected, the effect of interstate banking deregulation almost entirely disappears. Not only the magnitude of the effect falls significantly, it also loses its statistical significance. While unreported for brevity, other control variables maintain similar coefficients as in the main table. This result strongly refutes the possible influence of unobservables on the results and corroborates the significant impact of interstate banking deregulations on the number of bankruptcy filings.

B.   Temporal Dynamic Analysis

In this section, we address a possible reverse causality between the number of bankruptcy filings and states' banking deregulation. Results can be affected by reverse causality if there is a correlation between the number of bankruptcy filings located in a state and that state's timing of deregulation events. In fact, a state's stance toward deregulating the banking industry can be impacted by prior rates of bankruptcies in that state. For example, states with lower corporate bankruptcy rates may become attractive to out-of-state banks and therefore these banks may endeavor to enter these states through lobbying interstate deregulation. Local banks can benefit from lower bankruptcy rates and it may motivate them to expand by entering other parts of the state.

We test whether the results are affected by the existence of such pre-deregulation trends. To do so, we explore the dynamic effects of bankruptcy filings around banking deregulation events. Specifically, we study the dynamics of bankruptcy responses to the interstate deregulation around the deregulation dates as suggested by Bertrand and Mullainathan (2003). If the results are driven by pre-existing trends in bankruptcy filings, then we should observe a reduction in the number of bankruptcy filings in years prior to the deregulation date. On the other hand, if our results are not driven by such pre-existing trends then we expect that interstate deregulation to impact the number of filings only *after* the deregulation years.

We set up a temporal dynamic analysis in a multiple neighborhoods around the deregulation years. We define four dummy variables to identify the years before and after the interstate banking deregulation. Specifically, $Before^{(1:3)}$ ($After^{(1:3)}$) equal one in years one, two and three before (after) the deregulation and are zero otherwise for each state. The next dummy variable, $After^{(\geq 4)}$ equals one for all years equal to or greater than four years after the deregulation in each state. Finally, $Before^{(\leq 4)}$ is set to one for all years equal to or smaller than four years before

the deregulation date in each state. The related econometric model can be presented as

$$Bankruptcy_{j,t} = \beta_0 + \beta_1 Before^{(\leq 4)} + \beta_2 Before^{(1:3)} + \beta_3 After^{(1:3)} + \beta_4 After^{(\geq 4)}$$
$$+ \gamma X_{j,t} + State_j + Year_t + \epsilon_{i,t}. \tag{3}$$

where $Bankruptcy_{j,t}$ is the number of state-wide bankruptcies, $X_{j,t}$ is a set of supply-side controls, $State_j$ and $Year_t$ are state and year fixed-effects respectively. We report the results in Table 9.

[**Insert Table 9 About Here**]

Results show that the effect of interstate deregulations appears only after the deregulation date. Focusing on three-year intervals, the coefficient of the pre-interstate deregulation $Before^{(1:3)}$ are insignificant while post interstate deregulation indicator $After^{(1:3)}$ indicates a strong, negative impact. Similarly, while the coefficient estimate of $After^{(\geq 4)}$ is large and significant, the coefficient estimate of $Before^{(\leq 4)}$ remains insignificantly different from zero. This illustrates that state-level number of filings have no significant variations before the onset of banking deregulations. To summarize, these results reject the existence of prior trends in risk-taking and mitigate concerns about reverse causality.

V. Underlying Mechanisms

A. Improvement in Banks' Monitoring Technology and Bankruptcy Filings

The literature shows that in response to increased competition, banks will have more incentive to undertake the monitor of borrowers. To enhance the screening of firms, banks are shown to invest in better monitoring technologies. Jayaratne and Strahan (1998) argue that following banking deregulations, reduction in loan losses is a result of improvements in the quality of monitoring and screening of borrowers. Dick and Lehnert (2010) corroborate this argument by showing that the adoption of better monitoring technologies enables banks to better detect the activities of borrowers, and especially so when borrowers are riskier and more opaque. Importantly, the interstate banking deregulation allowed the entry of large, efficient and tech-friendly banks into

the deregulated states, and these banks are shown to be more likely to invest in screening and monitoring technologies (Dick and Lehnert (2010)).

Better monitoring reduces the information asymmetry between banks and borrowers, therefore facilitates distressed debt restructuring. Gilson et al. (1990) show that when information asymmetry is high, borrowers have incentive to influence the perception of creditors about their financial conditions to gain better restructuring terms in workouts. Supporting evidence for Gilson et al. (1990)'s argument is provided by DeAngelo et al. (1990), as firms in financial distress use accruals to influence negotiations with lenders. Because banks anticipate this "lemons" problem, they become less likely to agree on restructuring plans, therefore renegotiations can ultimately fail. Better monitoring can also enable banks to identify risks and prevent default pro-actively. Therefore, we expect that improvements in banks monitoring of borrowers to lead to fewer bankruptcy filings.

To test this mechanism, we follow the method introduced by Petersen and Rajan (2002). The idea is that banks with better screening technologies need fewer full-time employees to monitor borrowers and thus for them the ratio of bank loans to the number of full-time employees tends to be higher. In this approach, we define the quality of the screening technology as the ratio of bank's total business lending divided to the number of full-time equivalent (FTE) employees, where both variables are obtained from the FDIC database.

[**Insert Table 10 About Here**]

We identify states with better monitoring technologies using a dummy variable *BetterScreening* that equals one for states with screening quality above the national median, and zero otherwise. Our econometric model can be summarized as follows

$$Bankruptcy_{j,t} = \beta_0 + \beta_1 InterState_{j,t} \times BetterScreening_{j,t}+$$
$$\beta_2 InterState_{j,t} + \gamma X_{j,t} + State_j + Year_t + \epsilon_{i,t}. \tag{4}$$

where, $InterState_{j,t}$ is the post-deregulation indicator. The interaction term, $InterState_{j,t} \times BetterScreening_{j,t}$, captures the effect of interstate deregulation on the bankruptcy filings of

states with better screening technologies. $X_{j,t}$ includes state-level controls as well as controls for the structure of the banking industry. $State_j$ and $YEAR_t$ indicate state and year fixed-effects, respectively and $\epsilon_{i,t}$ is the error term. In separate tests, we replace the total number of filings with Chapter 7 and Chapter 11 filings as the dependent variables.

Results are reported in Table 10. This table reports the effect of better screening technologies on the overall number of filings, as well as total Chapter 11 and Chapter 7 filings by interacting the *BetterScreening* dummy with the indicators of interstate banking deregulation. Results in the first two rows of Table 10 show clearly that the interstate deregulation results in a pronounced decrease in total bankruptcy filings in the states that invested more in information technologies. Focusing on the most comprehensive specification for the total filings in Column 4, the negative and highly significant coefficient estimate of the interaction term (coefficient = -0.04, t-stat = -3.40) shows an additional 5% decline in the population-adjusted number of filings in the states with better post-deregulation screening technologies. Results across different columns reverberate the former findings that the decrease in corporate bankruptcies is predominantly the outcome of reduction in the number of Chapter 11 filings. Overall, this result illustrates that better monitoring enables banks to more successfully reach this objective.

B.   Number of distressed firms and improvement in private debt renegotiations

Is the reduction in the number of filings driven by improvement in the outcomes of pre-court private renegotiations? In fact, firms generally file for Chapter 11 if the private workouts fail, or else if there is no option for conducting such workouts at the time of distress, e.g. when firm fundamentals are poor or when creditors are highly dispersed. Private, out of court workouts are generally known to be more efficient than formal bankruptcy processes in that they are faster and less costly therefore. Bankruptcy procedures are lengthy and erode firm value (Ericsson and Renault (2006); Djankov et al. (2008); Demiroglu and James (2015)). They impose significantly more costs on firms, because the legal complexities of Chapter 11 results in inflated legal fees (Stein (1989)). Moreover, the legal complexities of formal bankruptcy procedures motivates lawyers to prolong the firm's stay in Chapter 11 (Gilson et al. (1990)). As bank financing of firms

facilitates out of court restructuring (Gilson et al. (1990); Demiroglu and James (2015)), the higher efficiency of private workouts can motivate banks to exert effort to improve the handling of workouts and avoid Chapter 11, contributing to a better reputation.

One difficulty for this study is the unavailability of data for distressed firms. The scarcity of distress data is more severe for the private firms. We address these issues by focusing on public firms and estimate the number of distressed firms we use the method of Demiroglu and James (2015). The method can be summarized as follows. First, for all non-financial and non-utility firms on CRSP database, we calculate for each firm the three-year cumulative returns. Hence in each year, we identify distressed firms as those in the bottom 5% of the distribution. Second, we exclude from this sample those firms that are unlikely to be distressed such as those with book leverage ratios 30% and those with interest coverage ratios ($EBITDA/InterestExpenses$) greater than 3. Next, we create the first set of the variables of interest, namely the distress-adjusted number of filings by dividing the number of total, Chapter 11 and Chapter 7 filings by the number of distressed firms in each year. Then, we re-estimate the regression model presented in Equation 1 for each of the above variables as the dependent variables. Results of this study are reported in Panel A of Table 11.

[Insert Table 11 About Here]

In columns 1 to 6 of this table, we report the results using the distressed-adjusted number of total filings, while controlling for the state- and banking-industry-level characteristics. The dependent variable in columns 1 to 3 (All firms) is the number of distressed Compustat firms divided by the total number of establishments in the state, computed annually. The dependent variable in columns 4 to 6 (Public firms) is the number of distressed Compustat firms divided by the number of Compustat firms in that state. This panel clearly depicts that conditional on becoming distressed, fewer firms will have to file for bankruptcy protection. For example, column 1 shows that the number of distress-adjusted firms drops by 9% (t-stat = -2.29) after the deregulation. The effect on the number of Chapter 11 filings is particularly large (coefficient = -0.08, t-stat = -2.33) while there is almost no response from the number of Chapter 7 filings

(coefficient = -0.00, t-stat= -0.47). This finding is consistent with the hypothesis that reduction in the number of bankruptcy filings can be a result of improved private, pre-court workouts, where more firms can successfully restructure debt without having to formally file for bankruptcy. One concern in Panel A is that the dependent variable is a ratio. The negative impact captured in this panel may be the result of increase in the denominator (number of distressed firms), and not the reduction in the filing firms. In Panel B we re-estimate our results using the number of distressed firms as the main dependent variable. The dependent variable in Column 7 is the number of distressed firms in the Compustat database in each state-year observation. In column 8 we adjust this number by dividing it to the number of establishments in the state. The results clearly indicate that the higher competition does not translate to a meaningful change in the number of distressed firms, as the impact of banking deregulation on the number of distressed firms is not significantly different from zero.

VI.   Bank Competition and the Efficiency of Bankruptcy Outcomes

So far we have documented a robust, negative impact of bank deregulation on state-level rate of bankruptcy filings. In this section we study whether increase in bank competition can impact the efficiency of the bankruptcy process, i.e. after formal Chapter 11 filings. If banks exert more effort to achieve higher efficiency in distress resolution, then we expect to observe improvements in the *outcomes* of Chapter 11 filings. Achieving more efficient outcomes means that fewer firms that file for Chapter 11 will eventually have to liquidate. The duration of bankruptcy process is another important contributor to its efficiency, therefore we expect to observe shorter bankruptcy durations after the interstate banking deregulation.

A.   Bankruptcy Outcomes After Chapter 11 Filings

The literature documents that exerting effort enables banks to avoid inefficient liquidation through developing restructuring plans that are more acceptable to the borrowers (Gormley et al. (2016); Bertrand and Mullainathan (2003); Berger and Hannan (1998)). The reputation incentive as dis-

cussed in Chemmanur and Fulghieri (1994), also motivates banks to avoid unnecessary liquidation of firms. Together these effects can change the Chapter 11 outcomes in favor of lower rates for the bad outcomes (*liquidation*) versus the good outcome (*emergence and acquisition*).

After collecting data on Chapter 11 outcomes, we categorize them in three classes of liquidation, reorganization and acquisition. The *liquidation* outcome refers to cases where the petitions for reorganization fails and the distressed firm is not able to achieve a successful outcome with creditors in Chapter 11. *Reorganization* refers to cases where the firm successfully emerges from Chapter 11. The *acquired* outcome refers to cases where the filing firm is acquired during Chapter 11, including acquisitions by creditors. Next, we count the number of each of the outcomes conditional on filing for Chapter 11 in each state-year. For this reason, we have fewer number of observations (540 state-years) in this study. More specifically, if in a given state-year, there has not been a filed 11 case in our sample, we consider the outcome of that state-year as a missing observation. The econometric model here uses the same setting used in Equation 1, where the dependent variable is the population-adjusted number of each of the outcomes conditional on firm's filing for Chapter 11.

Results are reported in Table 12. The coefficient of interest is that of the interstate deregulation indicator. This table has four panels, each of which include two adjacent columns. First, second and third panels study the impact of bank deregulations on liquidated, reorganized and acquired outcomes, respectively. In the fourth panel, we study the number of dismissed cases. The first column in each panel reports the univariate regression results, and the second column adds state-level control variables as used in the basecase study. Across all models, we include state and year fixed effects and results are clustered by year.

[**Insert Table 12 About Here**]

Results in the first three panels (columns 1 to 6) show that bank deregulation mainly impacts the "liquidation" outcome. The population-adjusted number of liquidations conditional on having filed for Chapter 11 falls by 5 percent. The effect of deregulation on the population-adjusted number of reorganizations and acquisitions is not significantly different from zero. This result

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highlights the important effect of banking market competition on banks incentives to resolve borrowers' distress and bankruptcy more efficiently. The fourth panel (columns 7 and 8) studies the ratio of bad outcomes to good outcomes. Importantly, this panel shows that there is a significant reduction in the ratio of bad to good outcomes where depending on specification ranges from 32 to 39 percent. This finding is highly consistent with our primary expectation regarding the improvements in bankruptcy outcomes following credit market competition.

The last panel shows that the number of dismissed cases drops after the interstate deregulation. When Chapter 11 filing is dismissed, the automatic stay is revoked and creditors become able to seize firms' assets, therefore dismissal of a Chapter 11 case can cause large business disruptions and lead to the loss of firm value. The reduction in the number of dismissed cases is a positive development, and banks can partially influence this number by avoiding to petition for dismissal. Overall, this result is consistent with the conjecture that credit market competition motivates bank to better resolve distress and default of borrower.

B. Bankruptcy Durations

Another important aspect of efficiency in the bankruptcy procedures is the amount of time spent in bankruptcy. Shorter durations are more efficient outcomes because they reduce both direct (Gilson et al. (1990)) and indirect (Franks and Torous (1989) and Thorburn (2000) and Bris et al. (2006)) bankruptcy costs, by lengthening the adverse effect of bankruptcy on product and capital markets. Creditors would naturally prefer a two-year bankruptcy procedure compared to an alternative five-year.

We define bankruptcy duration under Chapter 11 as the number of days between the filing date and the effective date which is a date that an outcome, including liquidated, emerged or acquired, is recorded for Chapter 11 filings. We make this variable state-level by averaging it at state-level in each given year. The econometric model is similar to Equation 1, where we use the logarithm of duration variable as the dependent variable. Results are reported in Table 13. In the multiple columns of the first row, we estimate the effect of the interstate banking deregulation. The results depict that bank deregulation shortens bankruptcy duration. Depending on the

specification, the log of duration of bankruptcy filings until the "effective date" declines between 68 and 88 percent after the interstate deregulation, that signifies to approximately 50 percent reduction in the number of days.

[Insert Table 13 About Here]

This large and significant effect is in line with our findings on bankruptcy outcomes, and strongly corroborates the idea that banks exert effort to improve efficiency by reducing the bankruptcy duration. Overall, results in this section provide strong evidence consistent with the conjecture that better out of court renegotiations post-deregulation can be driving our results.

VII. Robustness Tests

A. Control for Other Banking Deregulations

We address the possibility that the results may be influenced by other waves of banking deregulation that overlapped with parts of our study period. Particularly, the intrastate bank branching and the interstate banking deregulation of 1994, known in the literature as the Interstate Banking and Branching Efficiency Act (or IBBEA).

Intrastate Branching Deregulation: The expansion of banks inside their headquartered states has been limited in much of the last century. In 1970's, the majority of states had restrictions in place for in-state bank expansions and branching. For example, branch banking was prohibited in Florida until 1977. After this point, banks were only allowed to open branches inside the borders of the county in which their main head-office was located, and only after 1988 banks were allowed to open branches across the state (Jayaratne and Strahan (1998)). It is noteworthy that prior to the intrastate branching deregulation, some states had allowed intrastate expansion of banks through forming multi-bank holding companies (MBHC's). One concern is that the impact of intrastate branching may be minute in states that had already allowed expansion through MBHC formation. However, Jayaratne and Strahan (1998) shows that the impact of

intrastate branching deregulation was large, even in the presence of MBHC provisions for two reasons. First, expansion through forming MBHC is costly, because they need multiple boards of directors and need independent capitalizations for each of the subsidiaries. Second, the intrastate deregulation had a significant impact on the structure of the US banking industry by enabling banks to enter local markets through opening new branching (de novo branching).

IBBEA Interstate Deregulation: Impacting the time period close to the end of our sample period, the IBBEA allowed bank branching in the deregulated states by out-of-state banks. While this deregulation started in 1994, it took until 2005 for all states to implement some measures of interstate branching deregulation. This Act allowed banks to enter different states freely, however it also allowed states to raise barriers to branching by out-of-state banks. Rice and Strahan (2010) document these state-level entry restrictions by creating an index (henceforth RSindex). This index ranges from zero to four, where zero means no entry restrictions and four signifies the highest level of restriction raised by a state.

[**Insert Table 14 About Here**]

To ascertain that the results are not influenced by the above banking deregulations, we set up separate regressions similar to Equation 1 and control for the effects of the intrastate deregulation and the IBBEA by including the intrastate dummy as well as the RSindex in the model. Results are reported in Table 14. As the table shows, controlling for the intrastate and the IBBEA deregulations does not impact our results. The coefficient of the interstate banking deregulation remains high and significant, signifying the robustness of our results to the intrastate and IBBEA deregulations. The insignificant effect of the IBBEA can be due to the fact that this wave of deregulation takes place close to the end of our sample period.

B. Remove Dismissed Cases

In this section, we test the robustness of our results to the exclusion of dismissed bankruptcy cases. In some cases bankruptcy filings can be dismissed. For example, if creditors are not

satisfied with debtors progress after the exclusivity period, they can request that the case be dismissed or converted to Chapter 7. Dismissal can also be based on agreement of both parties. In other cases, failures to follow procedural rules, such as failing to pay case filing fees, may also result in the dismissal of the case by the bankruptcy court. It is possible that the particular nature of these cases impact our results. Therefore, we test whether the main results hold if we exclude the dismissed cases.

Here, we exclude these observations from the sample and test whether the results remain robust to this exclusion. We find that there is almost no difference in the results compared to the Table 3 after we exclude the dismissed outcomes, indicating that our findings are not impacted by dismissed cases. For brevity, results are provided in the Internet Appendix.

VIII.   Conclusion

In this paper, we study the impact of credit market competition on the rate of bankruptcy filings at the state level, by focusing on the banking industry. Using the staggered timing of banking deregulations in the US to capture exogenous variations to the credit market competitions, we identify a causal impact from credit market competition on firms' bankruptcy rates. We find that the increase in bank competition leads to a large and significant decline in the number of state-level bankruptcy filings. This decline predominantly is the result of a reduction in Chapter 11 filings. Two underlying mechanisms drive the results. First, improvements in banks' monitoring of borrowers and second, higher success rates in pre-bankruptcy private workouts. We also shed light on the outcomes of formal Chapter 11 bankruptcy filings, and find strong evidence for improvements in bankruptcy filings. Following the banking deregulation, not only the ratio of bad (liquidation) to good (emergence and acquisition) outcomes falls, but the duration of the legal process falls significantly.

The results highlight the important role of banks in the resolution of borrowers' distress and default. In fact our study documents significant economic benefits from banking deregulations, since fewer bankruptcy cases implies a reduced loss of firm value and employment. Since our

results are robust to post-deregulation changes in state-level aggregate economic outcomes, the reduction in filings is unlikely caused by the decline in state-wide economic activism. The results in this paper call for more in-depth studies of the considerable impact of credit market developments on corporate bankruptcies and the resolution of distress, which to this date have been largely absent from the literature.

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Table 1: Deregulation Dates by State

This table reports the dates of interstate deregulations by state.

State	Interstate deregulation
Alabama	1987
Alaska	1982
Arizona	1986
Arkansas	1989
California	1987
Colorado	1988
Connecticut	1983
Delaware	1988
District of Columbia	1985
Florida	1985
Georgia	1985
Hawaii	After 1994
Idaho	1985
Illinois	1986
Indiana	1986
Iowa	1991
Kansas	1992
Kentucky	1984
Louisiana	1987
Maine	1978
Maryland	1985
Massachusetts	1983
Michigan	1986
Minnesota	1986
Mississippi	1988
Missouri	1986
Montana	1993
Nebraska	1990
Nevada	1985
New Hampshire	1987
New Jersey	1986
New Mexico	1989
New York	1982
North Carolina	1985
North Dakota	1991
Ohio	1985
Oklahoma	1987
Oregon	1986
Pennsylvania	1986
Rhode Island	1984
South Carolina	1986
South Dakota	1988
Tennessee	1985
Texas	1987
Utah	1984
Vermont	1988
Virginia	1985
Washington	1987
West Virginia	1988
Wisconsin	1987
Wyoming	1987

Table 2: Summary Statistics

This table reports summary statistics for the main variables of this study. Panel A reports the bankruptcy-related variables. Variables are computed at state level. Corporate bankruptcy is the number of total bankruptcies in each given state-year observation. Filing 11 and Filing 7 are the number of Chapter 11 and 7 filings in state-year observations, respectively. It should be noted that these figures only represent the "initial" filings, therefore Chapter 11 filings that are eventually converted to Chapter 7 are only once counted as Chapter 11 filings. The next three variables, Filed11: Liquidated, Emerged and Acquired illustrate the state-year number of outcomes after a firm formally files under Chapter 11 bankruptcy. Dismissed cases are the number of those Chapter 11 filings that were eventually dismissed by the court. Filed11: Ratio of bad to good outcomes is the ratio of the number of Chapter 11 filings that were liquidated in each year, divided by that years' number of of filers that successfully emerged or became acquired. Filed 11 Duration effective date is the number of days from Chapter 11 filing to the effective day. Panel B reports summary statistics for the banking market characteristics at the state-level. The sample period is from 1980 to 2006. Variables are described in detail in Appendix 1.

Panel A			
Variable	N	Mean	Std. Dev.
Corporate bankruptcy	1323	1.46	3.41
Filling 11	1323	1.41	3.25
Filling 7	1323	0.05	0.28
Filed11: Liquidated	540	0.98	1.98
Filed11: Emerged	540	1.43	1.91
Filed11: Acquired	540	0.36	0.76
Dismissed cases	1323	0.11	0.42
Filed11: Ratio of bad to good outcome	387	0.23	0.49
Filled 11: Duration effective date	393	583	525

Panel B			
Variable	N	Mean	Std. Dev.
Number of top banks	1323	20.86	21.62
State banks' diversification	1323	0.89	0.06
State deposits Herfindahl index	1323	1.00	0.07
Fraction of deposits in small banks	1323	0.94	0.12
Charge-offs	1323	0.11	0.00

Table 3: Main Results

This table reports the panel regression results of banking deregulation on the number of corporate bankruptcy filings. The results are based on a balanced panel of all states excluding Delaware and south Dakota. For this table, we estimate Equation 1, where dependent variable is the number of bankruptcy filings adjusted by the number total establishments divided by 10,000 in the state. Interstate banking is a dummy variable that becomes equal to one the year after the interstate deregulation in each state. The sample period is from 1980 to 2006. Variable definitions are provided in Appendix 1. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Interstate banking	-0.05***	-0.05***	-0.05***	-0.05***	-0.04***	-0.05***
	(-3.51)	(-3.84)	(-3.50)	(-3.39)	(-3.50)	(-3.77)
Ln state GDP	0.01	0.01	0.01	0.00	-0.00	-0.02
	(0.11)	(0.09)	(0.07)	(0.04)	(-0.01)	(-0.16)
Ln state GDP(t-1)	0.28**	0.29**	0.29**	0.28**	0.26**	0.30***
	(2.49)	(2.59)	(2.67)	(2.56)	(2.43)	(2.87)
Number of top banks		-0.02**				-0.02**
		(-2.17)				(-2.77)
State banks' diversification			-0.02			-0.02
			(-0.71)			(-0.78)
State deposit Herfindahl index				-0.01		-0.01
				(-0.42)		(-0.44)
Fraction of deposit in small banks					-0.02	-0.01
					(-0.74)	(-0.71)
Constant	0.25***	0.27***	0.27***	0.25***	0.24***	0.28***
	(4.69)	(4.91)	(4.21)	(4.32)	(4.99)	(4.63)
State fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1323	1323	1323	1323	1323	1323
Adjusted R2	0.368	0.369	0.369	0.368	0.369	0.372

Table 4: Chapter 11 vs. Chapter 7

This table reports the panel regression results of population-adjusted number of Chapter 11 Vs. Chapter 7 filings in each state except Delaware and south Dakota. The dependent variables are adjusted by the number of establishments in any given state-year divided by 10,000. Interstate banking is a dummy variable that becomes equal to one the year after the interstate deregulation in each state, and equals zero otherwise. The sample period is from 1980 to 2006. Variable definitions are provided in Appendix 1. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

	(1) Filling 11	(2) Filing 7	(3) Filling 11	(4) Filing 7
Interstate banking	-0.04*** (-3.48)	-0.00 (-1.63)	-0.05*** (-3.75)	-0.00 (-1.26)
Ln state GDP	0.01 (0.11)	0.00 (0.01)	-0.01 (-0.12)	-0.00 (-0.38)
Ln state GDP(t-1)	0.25** (2.37)	0.03** (2.14)	0.27** (2.74)	0.03* (1.99)
Number of top banks			-0.02*** (-2.81)	-0.00 (-0.83)
State banks' diversification			-0.02 (-0.73)	-0.00 (-0.63)
State deposit Herfindahl index			-0.01 (-0.33)	-0.00 (-1.55)
Fraction of deposit in small banks			-0.01 (-0.62)	-0.00 (-1.46)
Constant	0.23*** (4.66)	0.02** (2.37)	0.25*** (4.71)	0.02* (1.96)
State fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Observations	1323	1323	1323	1323
Adjusted R2	0.363	0.102	0.366	0.106

Table 5: Control for State Growth and Characteristics

This table reports the panel regression results for controlling for a host of state level characteristics, including personal income growth, unemployment, product market competition in a state and labor force composition in a state. The dependent variable is the number of bankruptcy filings adjusted by the number total establishments divided by 10,000 in the state. Delaware and south Dakota are excluded. Interstate banking is a dummy variable that becomes equal to one the year after the interstate deregulation in each state. The sample covers from 1980 to 2006. Variable definitions are provided in Appendix 1. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

	(1) Total	(2) Total	(3) Total	(4) Total	(5) Total	(6) Filling 11	(7) Filing 7
Interstate banking	-0.05***	-0.05***	-0.05***	-0.05***	-0.05***	-0.04***	-0.00
	(-3.65)	(-3.52)	(-3.71)	(-3.54)	(-3.17)	(-3.19)	(-1.10)
Ln state GDP	0.02	0.01	-0.02	-0.01	0.03	0.03	-0.00
	(0.20)	(0.10)	(-0.24)	(-0.11)	(0.22)	(0.25)	(-0.26)
Ln state GDP(t-1)	0.26**	0.28**	0.31***	0.30***	0.27*	0.24*	0.03
	(2.08)	(2.57)	(2.95)	(2.83)	(1.96)	(1.90)	(1.58)
Number of top banks	-0.02***	-0.02***	-0.02***	-0.02**	-0.02***	-0.02***	-0.00
	(-2.80)	(-2.87)	(-2.83)	(-2.64)	(-2.80)	(-2.87)	(-0.96)
State banks' diversification	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.00
	(-0.80)	(-0.80)	(-0.77)	(-0.79)	(-0.80)	(-0.76)	(-0.58)
State deposit Herfindahl index	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.00
	(-0.44)	(-0.45)	(-0.47)	(-0.47)	(-0.50)	(-0.41)	(-1.45)
Fraction of deposit in small banks	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.00*
	(-0.70)	(-0.68)	(-0.69)	(-0.64)	(-0.59)	(-0.47)	(-1.91)
Personal income growth	-0.00				-0.00	-0.00	-0.00
	(-0.56)				(-0.36)	(-0.25)	(-0.94)
Unemployment		0.00			0.00	0.00	-0.00
		(0.68)			(0.64)	(0.72)	(-0.47)
State competition			-0.00		-0.00	-0.00	-0.00
			(-0.34)		(-0.34)	(-0.22)	(-1.51)
Labor force dispersion				0.02	0.02	0.04	-0.01
				(0.38)	(0.42)	(0.78)	(-0.97)
Constant	0.28***	0.27***	0.28***	0.28***	0.29***	0.26***	0.02**
	(4.78)	(4.60)	(4.67)	(4.93)	(5.10)	(5.09)	(2.23)
State fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1323	1323	1321	1323	1321	1321	1321
Adjusted R2	0.371	0.371	0.371	0.371	0.370	0.365	0.112

Table 6: Better Pool of Firms

This table reports the panel regression results for number of bankruptcy filings adjusted by the number of establishments in the firms' state, divided by 10,000 in all US states except Delaware and south Dakota. Here, we control for firm-level characteristics. The first panel (columns 1 to 3) account for improvements in firms' profitability measures and the second panel (columns 4 to 6) account for changes in credit worthiness. Firm-level controls are computed as the state-year average of the lowest-quality quartile of firms in the Compustat database. Interstate banking is a dummy variable that becomes equal to one the year after the interstate deregulation in each state. The sample covers from 1980 to 2006. Variable definitions are provided in Appendix 1. [*], [**], and [***] indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

	(1) Total	(2) Filling 11	(3) Filing 7	(4) Total	(5) Filling 11	(6) Filing 7
Interstate banking	-0.04***	-0.04***	-0.00	-0.03**	-0.03**	0.00
	(-3.28)	(-3.30)	(-1.14)	(-2.22)	(-2.33)	(0.48)
Size	-0.01	-0.00	-0.00	-0.02	-0.02	-0.00
	(-0.50)	(-0.34)	(-1.29)	(-1.49)	(-1.32)	(-1.34)
Book leverage	0.00	-0.00	0.00	-0.01	-0.02	0.00
	(0.00)	(-0.24)	(0.89)	(-0.73)	(-1.15)	(1.23)
Market to book	0.00	0.00	0.00	-0.00	-0.00	0.00
	(0.16)	(0.12)	(0.30)	(-0.37)	(-0.44)	(0.65)
Profitability	0.00	0.00	-0.00	0.00	0.00	0.00
	(0.69)	(0.94)	(-0.38)	(0.85)	(1.24)	(0.09)
Tobin's Q	0.01**	0.01**	0.00*	0.02*	0.02	0.01**
	(2.41)	(2.16)	(1.96)	(1.95)	(1.68)	(2.37)
Z score				0.01	0.01	0.00
				(1.25)	(1.36)	(0.62)
Distance to default				-0.02	-0.02	-0.00
				(-1.10)	(-1.13)	(-0.17)
Credit rating				0.00	0.01	-0.00
				(0.69)	(0.75)	(-0.39)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	**1213**	1213	1213	724	724	724
Adjusted R2	0.387	0.383	0.113	0.407	0.405	0.125

Table 7: Banks' Preference for Safer Loans

This table reports the panel regression results for the population-adjusted number of bankruptcy filings in each states except Delaware and south Dakota controlling for characteristics of bankrupt firms. Interstate banking is a dummy variable that becomes equal to one the year after the interstate deregulation in each state. The sample covers from 1980 to 2006. Controls are similar to those of column 6 of Table 3. Variable definitions are provided in Appendix 1. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

	(1) Total	(2) Filling 11	(3) Filing 7
Interstate banking	-0.05***	-0.05***	-0.00
	(-3.56)	(-3.55)	(-1.57)
Charge offs	0.00	0.00	-0.00**
	(0.14)	(0.27)	(-2.59)
Controls	Yes	Yes	Yes
State fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Observations	1323	1323	1323
Adjusted R2	0.367	0.363	0.105

Table 8: Placebo Test

This table reports the Placebo test using the random reassignment of the deregulation dates to different states for 10,000 repetitions, using the original distribution of the deregulations. The dependent variable is the number of bankruptcy filings in each state-year, divided by the number of state's establishments divided by 10,000. We include both Chapter 11 and Chapter 7 filings in each states except for Delaware and south Dakota. Interstate banking is a dummy variable that becomes equal to one the year after the interstate deregulation in each state. The sample covers from 1980 to 2006. Controls are similar to those of column 6 of Table 3. Variable definitions are provided in Appendix 1. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

	(1) Total	(2) Filling 11	(3) Filing 7
Interstate banking- Placebo	-0.01	-0.01	-0.00
	(-0.56)	(-0.45)	(-1.54)
Controls	Yes	Yes	Yes
State fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Observations	1323	1323	1323
Adjusted R2	0.367	0.361	0.106

Table 9: Dynamic test

This table reports the dynamic effect of banking deregulation on corporate bankruptcy. The dependent variables are the per 10,000 establishment adjusted number of bankruptcy filings, as well as Chapter 11 Chapter 7 filings. Delaware and south Dakota are excluded. The related specification is presented in Equation 3. Interstate banking is a dummy variable that becomes equal to one the year after the interstate deregulation in each state. The sample covers from 1980 to 2006. Controls are similar to those of column 6 of Table 3. Variable definitions are provided in Appendix 1. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

	(1) Total	(2) Filling 11	(3) Filing 7	(4) Total	(5) Filling 11	(6) Filing 7
Inter ($<= -4$)	0.02	0.02	-0.00	-0.00	-0.00	-0.00*
	(0.66)	(0.77)	(-1.66)	(-0.16)	(-0.00)	(-1.97)
Inter ($-1:-3$)	-0.00	-0.00	-0.00	-0.01	-0.01	-0.00
	(-0.35)	(-0.30)	(-0.63)	(-0.97)	(-0.87)	(-1.59)
Inter ($+1:+3$)	0.04***	0.04***	0.00	0.04***	0.04***	0.00
	(2.79)	(2.95)	(0.17)	(3.88)	(3.95)	(0.60)
Inter ($>= +4$)	0.07***	0.07***	0.00	0.06**	0.06**	0.00
	(3.29)	(3.30)	(1.35)	(2.72)	(2.73)	(0.50)
Controls	No	No	No	Yes	Yes	Yes
State fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1323	1323	1323	1323	1323	1323
Adjusted R2	0.341	0.339	0.081	0.371	0.365	0.105

Table 10: Bankruptcy and screening technology

This table studies whether states with more investment in screening technology have different number of bankruptcy filings after banking deregulations. The dependent variable is the number of bankruptcy filings, number of Chapter 11 filings and number of Chapter 7 filings in each states except for Delaware and south Dakota, divided by the number of establishments in each state divided by 10,000. The specification method is presented in Equation 4. Interstate banking is a dummy variable that becomes equal to one the year after the interstate deregulation in each state. The sample covers from 1980 to 2006. Variable definitions are provided in Appendix 1. [*], [**], and [***] indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

	(1) Total	(2) Filling 11	(3) Filing 7	(4) Total	(5) Filling 11	(6) Filing 7
Interstate banking	-0.04***	-0.04***	-0.00	-0.05***	-0.05***	-0.00
	(-3.17)	(-3.18)	(-0.84)	(-3.60)	(-3.63)	(-0.94)
InterState*BetterScreening	-0.02**	-0.02*	-0.00	-0.02**	-0.02*	-0.00
	(-2.26)	(-2.03)	(-1.57)	(-2.18)	(-1.94)	(-1.46)
Ln state GDP	0.00	0.00	-0.00	-0.02	-0.02	-0.01
	(0.03)	(0.04)	(-0.10)	(-0.24)	(-0.19)	(-0.49)
Ln state GDP(t-1)	0.30***	0.27**	0.03**	0.32***	0.29***	0.03**
	(2.78)	(2.62)	(2.26)	(3.11)	(2.94)	(2.06)
Number of top banks				-0.02**	-0.02**	-0.00
				(-2.67)	(-2.70)	(-0.74)
State banks' diversification				-0.02	-0.02	-0.00
				(-0.76)	(-0.71)	(-0.62)
State deposit Herfindahl index				-0.01	-0.01	-0.00
				(-0.47)	(-0.35)	(-1.58)
Fraction of deposit in small banks				-0.01	-0.01	-0.00
				(-0.64)	(-0.56)	(-1.31)
Constant	0.27***	0.24***	0.03**	0.29***	0.26***	0.02*
	(4.78)	(4.72)	(2.33)	(4.72)	(4.76)	(1.96)
State fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1323	1323	1323	1323	1323	1323
Adjusted R2	0.370	0.364	0.104	0.373	0.367	0.107

Table 11: Distressed firms: Outcomes after the financial distress, and the number of distressed firms

This table reports panel regression results for the distressed-adjusted number of bankruptcy filings (Panel A), and the number of distressed firms (Panel B). The estimated equations are similar to the baseline specification in Equation 1. The main variable of interest, the interstate banking, is a dummy variable that equals one for years after the interstate banking deregulation in each state, and equals zero otherwise. Control variables include state-level economic and banking structure indicators. The dependent variable in columns 1 to 3, the distress-adjusted number of bankruptcies, is the state-level number of total filings in each year, divided by the number of distressed firms in that year from the Compustat database. Column 5 to 6 (Public firms) adjusts this dependent variable by dividing the number of filings by the public firms by the number distressed firms in the Compustat. In columns 7 we use the number of distressed firms, i.e. the denominator in columns 1 70 6, as the new dependent variable. In column 8 we use the number distressed firms adjusted by the number of total establishments in each state-year. The number of distressed firms is computed using the method of Demiroglu and James (2015). Variable description is provided in detail in Appendix 1. The sample covers from 1980 to 2006. Robust standard errors are clustered by year and are reported in parentheses below the estimates. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

	(1)	(2)	(3) Panel A	(4)	(5)	(6)	(7)	(8) Panel B
	All firms			Public firms				
	Total	Filling 11	Filing 7	Total	Filling 11	Filing 7	Distressed firms	Distressed firms -Adj
Interstate banking	-0.09**	-0.08**	-0.00	-0.06**	-0.03*	-0.00	-2.38	-0.30
	(-2.29)	(-2.33)	(-0.47)	(-2.06)	(-1.83)	(-0.83)	(-1.18)	(-1.24)
Ln state GDP	0.54	0.52	0.02	0.25	0.06	0.03	-63.14**	-3.05
	(1.38)	(1.42)	(0.63)	(1.27)	(0.37)	(0.84)	(-2.36)	(-0.67)
Ln state GDP(t-1)	-0.50	-0.48	-0.02	-0.23	-0.05	-0.03	81.75***	5.17
	(-1.39)	(-1.42)	(-0.55)	(-1.31)	(-0.32)	(-0.88)	(2.97)	(1.09)
Number of top banks	-0.00	-0.00	0.00	-0.01	-0.01*	0.00	11.02**	0.33**
	(-0.09)	(-0.17)	(0.28)	(-1.22)	(-1.95)	(0.46)	(2.52)	(2.15)
State banks' diversification	0.05	0.05	0.01	0.02	0.03	0.01	-0.94	0.30**
	(1.38)	(1.32)	(1.41)	(0.60)	(1.20)	(1.40)	(-0.51)	(2.08)
State deposit Herfindahl index	-0.03	-0.02	-0.00	-0.01	-0.00	-0.00	-2.36***	-0.38**
	(-1.40)	(-1.36)	(-0.76)	(-0.38)	(-0.24)	(-1.14)	(-3.71)	(-2.44)
Fraction of deposit in small banks	0.02	0.02	-0.00	0.00	-0.02	-0.00	8.07***	0.34***
	(0.37)	(0.44)	(-1.05)	(0.01)	(-1.33)	(-0.22)	(5.10)	(3.39)
Constant	-0.06	-0.06	-0.00	-0.01	0.01	-0.01	29.80***	3.32***
	(-0.98)	(-1.02)	(-0.23)	(-0.29)	(0.55)	(-0.92)	(4.45)	(3.41)
State fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	903	903	903	903	903	903	1318	1318
Adjusted R2	0.183	0.173	0.019	0.140	0.134	-0.010	0.689	0.303

Table 12: Chapter 11 Outcomes

This table reports the regression results for impacts of banking deregulation on the outcomes of Chapter 11 filings. The dependent variable is the number of bankruptcy filings, number of Chapter 11 filings and number of Chapter 7 filings in the US states except for Delaware and south Dakota, adjusted by the number of establishments in that state. Interstate banking is a dummy variable that becomes equal to one the year after the interstate deregulation in each state. The sample covers from 1980 to 2006. Demand side controls include personal income growth, unemployment, state competition and labor force dispersion of column 5 of Table 5. Variable definitions are provided in Appendix 1. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Filed11: Liquidated		Filed11: Reorganized		Filed11: Acquired		Bad to good outcome		Dismissed	
Interstate banking	-0.02**	-0.02**	-0.02	-0.01	0.01	0.01	-0.32**	-0.39**	-0.00*	-0.01**
	(-2.58)	(-2.37)	(-0.72)	(-0.35)	(0.56)	(0.60)	(-2.41)	(-2.08)	(-1.85)	(-2.09)
Ln state GDP	-0.04	-0.16	-0.04	0.17	0.04	0.09	-0.96	-1.68	0.02	-0.01
	(-0.26)	(-0.90)	(-0.16)	(0.50)	(0.42)	(0.62)	(-0.56)	(-0.62)	(0.78)	(-0.22)
Ln state GDP(t-1)	0.04	0.15	0.03	-0.11	-0.03	-0.05	1.58	1.80	0.02	0.05
	(0.24)	(0.88)	(0.12)	(-0.33)	(-0.25)	(-0.38)	(1.00)	(0.74)	(0.64)	(1.00)
Number of top banks	-0.00	-0.00	-0.01*	-0.01**	-0.00	-0.00	-0.11	-0.11	0.00	0.00
	(-1.64)	(-1.67)	(-1.97)	(-2.32)	(-0.88)	(-1.07)	(-1.70)	(-1.37)	(0.61)	(0.34)
State banks' diversification	-0.02	-0.02	0.04*	0.03	-0.00	-0.00	-0.17*	-0.14	-0.01	-0.01
	(-1.48)	(-1.50)	(1.72)	(1.39)	(-0.09)	(-0.15)	(-2.00)	(-1.64)	(-1.04)	(-0.97)
State deposit Herfindahl index	0.02	0.02	0.00	-0.00	-0.01	-0.01	0.13	0.16	-0.00	0.00
	(1.35)	(1.42)	(0.32)	(-0.10)	(-0.81)	(-0.66)	(1.15)	(1.38)	(-0.05)	(0.08)
Fraction of deposit in small banks	-0.01	-0.01	-0.01	-0.00	-0.00	-0.00	0.03	-0.02	-0.00	-0.00
	(-1.00)	(-1.18)	(-0.76)	(-0.03)	(-0.53)	(-0.48)	(0.32)	(-0.24)	(-0.42)	(-0.61)
Constant	0.03	0.03	0.09**	0.09**	0.01	0.03	0.50***	0.37	0.04***	0.03***
	(1.67)	(1.46)	(2.72)	(2.40)	(0.31)	(1.37)	(3.43)	(1.66)	(3.79)	(3.90)
Demand side controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
State fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	540	540	540	540	540	540	387	387	1323	1321
Adjusted R2	0.346	0.345	0.295	0.300	0.063	0.074	0.113	0.105	0.078	0.080

Table 13: Durations

This table reports the effect of bank competition on the duration of bankruptcy cases. Interstate banking is a dummy variable that becomes equal to one the year after the interstate deregulation in each state. Duration is the logarithm of the number of days from filing until the effective date. The sample covers from 1980 to 2006. Demand side controls include personal income growth, unemployment, state competition and labor force dispersion of column 5 of Table 5. Variable definitions are provided in Appendix 1. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

	(1)	(2)	(3)	(4)
Interstate banking	-0.68**	-0.88***	-0.88**	-0.74*
	(-2.45)	(-3.16)	(-2.49)	(-2.01)
Ln state GDP	0.01	-0.97	-1.02	-1.83
	(0.00)	(-0.44)	(-0.57)	(-0.85)
Ln state GDP(t-1)	-0.54	0.03	-0.02	0.74
	(-0.26)	(0.01)	(-0.01)	(0.37)
Number of top banks		-0.12	-0.13*	-0.11
		(-1.53)	(-1.86)	(-1.61)
State banks' diversification		-0.05	-0.06	0.03
		(-0.26)	(-0.27)	(0.12)
State deposit Herfindahl index		-0.06	-0.06	-0.09
		(-0.63)	(-0.72)	(-0.82)
Fraction of deposit in small banks		-0.11	-0.13	-0.21
		(-1.02)	(-1.31)	(-1.72)
Constant	6.87***	7.68***	7.89***	7.62***
	(7.07)	(10.73)	(9.10)	(7.31)
Demand side controls	No	No	Yes	Yes
Firm controls	No	No	No	Yes
State fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Observations	393	393	393	337
Adjusted R2	0.329	0.329	0.327	0.327

Table 14: Control for intrastate and IBBEA interstate banking deregulations

This table reports studies the effect of bank competition on the number of filings, adjusted by the number of establishments in each state divided by 10,000. Here, we control for the intrastate branching and IBBEA interstate deregulation. Interstate banking (Intrastate banking) is a dummy variable that becomes equal to one the year after the interstate (intrastate) deregulation in each state. The sample covers from 1980 to 2006. Controls are similar to those of column 6 of Table 3. Variable definitions are provided in Appendix 1. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

	(1) Total	(2) Filling 11	(3) Filing 7
Interstate banking	-0.05***	-0.05***	-0.00
	(-3.77)	(-3.76)	(-1.26)
Interastate branching	-0.00	0.00	-0.00
	(-0.15)	(0.08)	(-1.64)
IBBEA	0.01	0.01	-0.00
	(0.49)	(0.59)	(-1.38)
Controls	Yes	Yes	Yes
State fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Observations	1323	1323	1323
Adjusted R2	0.371	0.365	0.105

Appendix 1: Variable description

Table 1.1: Variable Description

Variable	Description	Source
DEREGULATION INDICATORS		
Interstate banking	A dummy variable that equals one for a state after interstate banking deregulation, and zero otherwise	Black and Strahan (2002)
BANKRUPTCY RELATED VARIABLES		
N. of chapter 11 filings	Number of Chapter 11 filings in a state, per 1,000,000 state population	BankruptcyData.com
N. of chapter 7 filings	Number of Chapter 7 filings in a state, per 1,000,000 state population	BankruptcyData.com
N. of corporate bankruptcies	Number of bankruptcies in a state, per 1,000,000 state population	BankruptcyData.com
BANKING INDUSTRY VARIABLES		
Number of top banks	Number of top banks is defined as the number of banks in each state-year that together hold more than 50% of the state's deposits.	FDIC
State banks' (geographical) diversification	The average of the Herfindahl-Hirschman index of state bank's deposit shares. To create this measure, we first compute the Herfindahl-Hirschman (HHI) index for single banks using their value-weighted deposits in different states. Then in each state, we take average of the HHI of banks located in that state.	FDIC
State deposit Herfindahl Index	The state-level deposits Herfindahl-Hirschman index. We compute this measure as the Herfindahl-Hirschman (HHI) index of deposits in different banks located in that state.	FDIC
Fraction of deposit in small banks	Fraction of total state deposits in small banks, where small banks are defined as banks are with assets less than one hundred million dollars.	FDIC
Charge-offs	The state-level proportion of commercial loans that are charge-offs, to total commercial loans.	WRDS Bank Regulatory (RIAD)
Full-time Equivalent Employees (FTE)	Number of full-time equivalent employees in each state.	CALL reports
Total Business Loans	State-level commercial and industrial loans plus commercial real estate loans.	CALL reports
Screening technology	Ratio of total business loans divided by the number of full-time equivalent employees, for each state.	
STATE-LEVEL VARIABLES		
GDP State (Log)	The natural logarithm of the gross domestic product of each state.	Bureau of Economic Analysis

Continued...

Variable	Description	Source
Labor share (10 to 90)	State-level labor force composition for eight different industry segments: Mining, Construction, Manufacturing, Transportation, Trade, Finance, Service, and Government. The labor share is defined as the fraction of gross product in state i in year t that is from mining (construction, manufacturing, transportation, trade, finance, services, government) industries	BEALaborForceConc
Labor force dispersion	Herfindahl-Hirschman index of labor-shares in each of the above nine industry sectors.	
FIRM-LEVEL VARIABLES		
Assets	The state-level average of the firm assets at the time of filing for bankruptcy.	BankruptcyData.com
Number of employees	The average of the number of employees for firms that file for bankruptcy, in each state.	BankruptcyData.com

Internet Appendix

Table A.1: Better Pool of Firms- Controlling for the average of firm level characteristics
This table reports the panel regression results for number of bankruptcy filings adjusted by the number of establishments in the firms' state, divided by 10,000 in all US states except Delaware and south Dakota. Here, we control for firm-level characteristics. The first panel (columns 1 to 3) account for improvements in firms' profitability measures and the second panel (columns 4 to 6) account for changes in credit worthiness. Firm-level controls are computed as the state-year average of all firms in the Compustat database. Interstate banking is a dummy variable that becomes equal to one the year after the interstate deregulation in each state. The sample covers from 1980 to 2006. Variable definitions are provided in Appendix 1. [*], [**], and [***] indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

	(1) Total	(2) Filling 11	(3) Filing 7	(4) Total	(5) Filling 11	(6) Filing 7
Interstate banking	-0.05***	-0.05***	-0.00	-0.06***	-0.06***	-0.00
	(-3.65)	(-3.65)	(-1.10)	(-2.98)	(-3.01)	(-0.84)
Size	0.01	0.01	0.00*	-0.02	-0.02	0.00
	(0.75)	(0.62)	(1.78)	(-0.73)	(-0.87)	(1.02)
Book leverage	-0.00	-0.00	0.00	-0.00	-0.01	0.00
	(-0.06)	(-0.47)	(1.27)	(-0.94)	(-1.34)	(1.02)
Market to book	-0.09	-0.11	0.02	-0.23	-0.24	0.00
	(-0.93)	(-1.08)	(0.84)	(-1.34)	(-1.39)	(0.26)
Profitability	0.00	0.00	0.00	0.00	0.00	0.00
	(0.69)	(0.67)	(0.22)	(0.92)	(0.85)	(0.62)
Tobin's Q	0.09	0.11	-0.02	0.25	0.25	-0.00
	(0.93)	(1.08)	(-0.84)	(1.41)	(1.49)	(-0.35)
Z score				-0.00	-0.00	0.00
				(-0.50)	(-0.58)	(0.21)
Distance to default				0.00	0.00	-0.00*
				(0.55)	(0.69)	(-1.86)
Credit rating				0.01	0.01	0.00
				(0.83)	(0.78)	(0.84)
Constant	0.30***	0.27***	0.03*	0.07	0.04	0.03*
	(4.19)	(4.15)	(1.99)	(0.59)	(0.39)	(1.86)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1320	1320	1320	939	939	939
Adjusted R2	0.370	0.364	0.108	0.344	0.338	0.083

Table A.2: Control for dismissed cases

This table reports studies the effect of bank competition on the number of filings by excluding the number of dismissed outcomes. The dependent variable is adjusted by the number of establishments in each state divided by 10,000. Interstate banking is a dummy variable that becomes equal to one the year after the interstate deregulation in each state. The sample covers from 1980 to 2006. Controls are similar to those of column 6 of Table 3. Variable definitions are provided in Appendix 1. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

	(1) Total no Dism	(2) Filling 11 no Dism	(3) Filing 7 no Dism
Interstate banking	-0.05***	-0.05***	-0.00
	(-3.62)	(-3.56)	(-1.28)
Controls	Yes	Yes	Yes
State fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Observations	1323	1323	1323
Adjusted R2	0.344	0.334	0.105