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Abstract

The effect of credit market competition on borrower default is theoretically ambiguous, because the quantity of credit supplied may rise or fall following an increase in competition. We investigate empirically the relationship between credit market competition, lending to households, and personal bankruptcy rates in the United States. We exploit the exogenous variation in market contestability brought on by banking deregulation at the state level: after deregulation, banks faced the threat of entry into their state markets. We find that deregulation increased competition for borrowers, prompting banks to adopt more sophisticated credit rating technology. In turn, these developments led previously excluded households to enter the credit market. We document that, following deregulation, (1) overall lending increased, (2) loss rates on loans decreased, and (3) bankruptcy rates rose. Further, we find that lending and bankruptcy rates increased more in states with greater actual (rather than potential) entry, and that credit card productivity increased after the removal of entry restrictions. These findings suggest that entrants brought with them enhanced underwriting technology that allowed for credit extension to new borrowers.

Key words: consumer bankruptcy, banks, competition

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1 Introduction

The last quarter century saw a large increase in the share of consumers filing for personal bankruptcy, thereby seeking a discharge of their unsecured debt. This increase led in 2005 to the largest and most comprehensive change to U.S. bankruptcy law since 1978. Interestingly, unsecured debt relative to income also showed a similar trend throughout the period. This rapid increase in bankruptcy and consumer credit occurred throughout a time when bankruptcy law remained virtually unchanged. While the causes behind the rise in bankruptcies still remain an open question, two potentially significant events took place in this period: dramatic bank deregulation and technological change in the generation of consumer credit. Banking deregulation, by removing barriers to entry, increases credit market competition and therefore affects the equilibrium supply of credit; new screening technologies change the way loans are made, allowing for interest rates to better reflect underlying risk. In this paper we ask whether changes in credit market competition and technological change played a role in the increase in consumer bankruptcy.

While the increase in bankruptcy has been the subject of much debate, the empirical literature has mostly focused on cross sectional differences in personal bankruptcy. In particular, it has revolved around legal institutions as a way to answer whether consumers file due to unlucky circumstances, on the one hand, or due to irresponsible borrowing and abuse, on the other hand. Usually, researchers have exploited the different asset exemptions across U.S. states (that is, the amount of assets protected from creditors when a person files) to determine how important financial incentives are in a person's decision to file. Yet bankruptcy rates in the U.S. have shown a rising trend that should have little to do with institutional differences, given that there was basically no change in the law throughout the period.

Our paper contributes to this literature by addressing the question of rising bankruptcies from a different angle by analyzing the variation in bankruptcy over time and focusing on credit markets. It is somewhat surprising that changing conditions in credit markets have received little attention in the bankruptcy literature, since bankruptcy should have an inseparable relationship with credit markets, as a person first needs to get credit before

bankruptcy becomes an issue.

To explore our question, we use a reduced-form empirical approach by taking advantage of the dramatic changes in the U.S. banking industry throughout the 1980s and early 1990s. The banking industry experienced a major transformation as barriers to entry into local and state markets were gradually removed starting in the late 1970s. Indeed, while bankruptcy law has remained virtually unchanged since 1978, banking markets have experienced enormous changes over the last quarter century. Over the period, U.S. states lifted restrictions on branching within the state as well as barriers to interstate banking. While determining the degree of market power is usually difficult, here we use the exogenous state-level variation in deregulation dates as a way to measure the impact of competition in banking markets on consumer bankruptcy. Moreover, we try to explore the mechanism behind the changes in personal bankruptcy following deregulation and the ensuing increase in competition. In particular, we analyze the availability of credit following deregulation using data from bank balance sheets and income statements. Finally, we use an improved dataset on personal bankruptcies. The standard state-level bankruptcy totals count repeated filings by the same household as separate petitions, artificially inflating the number of bankruptcies. (Households may file repeatedly for technical reasons related to state bankruptcy laws but unrelated to their underlying distress.) We use identifiers available in the raw filing data from the Administrative Office of the U.S. Courts to remove many of these repeated entries, thereby constructing a more accurate measure of state-level bankruptcy filing totals.

We find that bank deregulation increased competition among banks for borrowers, leading them to adopt more sophisticated credit rating technology. In turn, these developments led previously excluded households to enter the credit market. First, we find that the removal of entry restrictions by out-of-state banks into the state market was associated with increases in the rate of personal bankruptcy. Moreover, the effect is economically significant. Second, we find that deregulation was associated with increases in the rate of growth of credit card loans. Third, following deregulation, overall bank risk, measured as the loss rates on loans, decreases. Taken together, these three findings imply that the distribution of borrowers has changed. In other words, increased competition led banks to extend credit on the extensive margin –as opposed to the intensive margin– by lending to new households, including higher

and lower risk borrowers that were previously out of the credit market. It is in this manner that bank risk has decreased while bankruptcy rates increased. In turn, this new lending suggests an enhanced ability to discriminate credit risk and therefore a role for technology, which we explore further. Interstate banking deregulation allowed entry by the larger out-of-state banks, who likely brought with them enhanced screening technologies. Indeed, exploiting the difference between potential and actual entry following the removal to entry restrictions, we find that bankruptcy and credit increase more in states with greater actual entry. Moreover, following the work of Petersen and Rajan (2002), we use credit card loan productivity as a proxy for the use of new screening technologies. We find that credit card loan productivity also increases following interstate deregulation, thereby confirming that the new screening technologies allowed lending to new consumers.

In addition, we explore alternative factors affecting consumer bankruptcy, based on the findings from previous literature which focuses on a person's decision to file. We do this both as a way to obtain the marginal effects of other potential drivers as well as to better isolate deregulation-driven supply effects from demand effects on bankruptcy. We find that negative shocks to income, as captured by the unemployment rate and the divorce rate in the state, increase the incidence of bankruptcy, and that the effect is economically significant. In addition, the bankruptcy rate is higher in states with a higher homestead exemption, where more assets are protected from creditors when filing, a result found in much of the previous literature.

Our findings suggest that at least part of the increase in bankruptcies is due to credit market liberalization. This stands in apparent contrast to the results from the large literature on banking deregulation, which has found that liberalization leads to a host of positive outcomes, including greater bank efficiency, lower prices and higher loan quality, as well as to higher rates of new business formation and faster economic growth. Although consumer bankruptcy filings can per se be seen as a negative outcome, our results suggest that some of the increase is due to more and better lending to households. The lower bankruptcy rates prevailing under the previous regime may in part have been because significant parts of the population were denied credit and hence could never have benefited from consumer bankruptcy. Our results thus suggest that, while the legal environment in which lenders

and borrowers operate is obviously important, further research into the consumer lending industry, including the effects of increased access to credit, is required to fully assess the welfare implications of consumer bankruptcy.

The paper is organized as follows. The next section provides some background on personal bankruptcy law in the U.S., as well as recent trends. Section 3 provides a brief review of the literature on personal bankruptcy as well as on the theories relating credit market competition with borrower default. Section 4 introduces the data and the empirical model and strategy. Section 5 introduces and discusses the results. Section 6 concludes.

2 Background on personal bankruptcy in the U.S.

The incidence of personal bankruptcy among consumers increased significantly throughout the eighties and nineties. Generally speaking, consumers can file under either Chapter 7 or Chapter 13 of the bankruptcy code. A Chapter 7 filing requires the consumer to liquidate all non-exempt assets in exchange for the elimination of most unsecured debts. A Chapter 13 filing allows the consumer to avoid liquidating assets, although the consumer is required to make payments on outstanding unsecured debts for up to five years. Here, we focus on Chapter 7 bankruptcy, where the debtor is given a "fresh start" (Chapter 7 constitutes the bulk of bankruptcy filings in the U.S., making up more than 70 percent of total filings every year). Figure 1 shows the time series of Chapter 7 filings as a share of U.S. population since 1980.[1] As shown, the rate of Chapter 7 filings has increased significantly over the past two decades: the rate in 2004 is more than triple that of 1980, and the total number of filings increase to over one million a year towards the end of the series.[2] The average rate in the period is 0.22 percent, or 2.2 filers per 1,000 persons, which is 600,000 filers on average per year. Laws governing consumer bankruptcy changed relatively little throughout this period.

[1] Personal bankruptcy rates shown in the figure are based on data from the Administrative Office of the U.S. Courts (AOUSC), with the authors' adjustments as explained in the data section of the paper. Revolving credit data are taken from the Federal Reserve Statistical Release.

[2] The causes behind the temporary dips in the bankruptcy data series are not obvious. There are some fluctuations in the micro data as collected by AOUSC, which could reflect reporting changes in certain years that led to a fraction of cases to be missing. Given that in our analysis we include time fixed effects and the fact that these are reporting errors at the nationwide level, the errors just add noise to our model (measurement error in the dependent variable).

The Bankruptcy Reform Act of 1978 was the first overhaul of the law since 1898.[3] Prior to the comprehensive Bankruptcy Abuse Prevention and Consumer Protection Act of 2005, there were only minor revisions to bankruptcy law, which introduced slight changes to curtail fraud and adjusted federal asset exemptions for inflation.[4]

Interestingly, household debt showed a similar trend throughout the period. As can be appreciated from the other series shown in Figure 1, revolving consumer credit adjusted by disposable income –a reasonable measure of unsecured consumer credit – increased along with the bankruptcy rate. Indeed, the share of revolving consumer credit more than triples throughout the period. The story is not much different if we were to use the series on revolving consumer credit per person, which more than quadruples.

A similar picture arises at the level of the state. Figures 2 and 3 show U.S. states grouped by Chapter 7 personal bankruptcy filings per 1,000 persons in both 1980 and 1994. We focus here on the period 1980-1994 since this is the sample that we will use in the empirical analysis (for reasons that will be stated later). As can be seen from the darkening of colors from 1980 to 1994, most states shifted to a higher bankruptcy rate category, and indeed, all states experienced an increase in the bankruptcy rate over the period, as shown in Figure 4.

The large increase in personal bankruptcy has been interpreted in various ways. On the one hand, some have argued that the increase is the result of consumer abuse of an overly lenient bankruptcy code. On the other hand, some have seen the increase as evidence of growing household distress, driven by increasing housing and medical costs, and, to a certain degree, unfair and abusive practices by lenders. Other factors that have been mentioned as possible causes include the decrease in the social stigma associated with filing for bankruptcy, increase in the availability of information related to the process of filing, and improvements in information processing and credit scoring technology that have increased the supply of loans. The increase in bankruptcies has led to a growing policy debate, spurring a series

[3] The Bankruptcy Reform Act of 1978 was considered debtor-friendly as it increased the amount of assets protected from creditors when filing for bankruptcy.

[4] These include the 1984 Bankruptcy Amendments and Federal Judgeship Act and the 1994 Bankruptcy Reform Act, respectively. From a consumer's point of view, the most important feature of bankruptcy law during the 1978–2005 period was the asset exemption level, which determined the value of assets that the consumer could keep following a Chapter 7 filing. The 1978 Act set uniform national standards for exemptions, but allowed states to opt out and set their own exemptions. Many states quickly passed laws opting out of the federal statute.

of attempts to modify the law. With the April 2005 passage of a comprehensive national reform (effective October 2005), bankruptcy filers must complete a means test in order to determine their eligibility for Chapter 7 bankruptcy, along other changes, making it more difficult for people to file under Chapter 7. While the welfare effects from reform are hard to determine, the potential gain in consumers' access to credit and the lower costs (provided enough competition in credit card market), must be weighted against the reduction of the crude insurance that the bankruptcy option provides against unexpected adverse events [Ashcraft et al. 2006].

3 Personal bankruptcy and the credit market

Economists have adduced two main drivers of the consumer bankruptcy decision: the *strategic motive* sees bankruptcy as driven by the financial benefit from filing, while the *adverse events* theory sees bankruptcy as driven by shocks to income (e.g. unemployment) or expenditures (e.g. medical expenses). Fay, Hurst, and White (2002) find that the financial benefit from filing is the primary driver of bankruptcy, such that consumers take into account the level of generosity of the bankruptcy law in their borrowing and filing decisions. However, they also find that couples undergoing a divorce are likelier to file and that, all else equal, consumers in states with high filing rates are likelier to file, suggesting a role for spillovers (whether from peer effects, advertising, or decreased stigma). Survey evidence suggests that the main cause of bankruptcy is medical problems, followed by divorce and unemployment (see Himmelstein et al. 2005; Sullivan et al. 2000; Warren and Tyagi 2003). Domovitz and Sartain (1999) also find that medical debt due to health problems is the most important household condition determining the decision to declare bankruptcy, though the largest contributor at the margin is credit card debt.

The potential financial benefit from filing is directly related to state asset exemptions. Research has found that consumers are more likely to file for bankruptcy in states with higher exemptions (Fay, Hurst and White 2002), and they are also more likely to be turned down for credit and pay higher interest rates in those states (Gropp, Scholtz and White 1997). Given that state exemptions have not fluctuated much over the last twenty five years

(adjusting for inflation), this literature, while important in providing explanations for the observed cross-sectional differences in bankruptcy rates, provides little guidance as to the reasons behind the secular increase in bankruptcies over the last two decades. One exception is Gross and Souleles (2002) who find declining stigma associated with filing to be the cause behind increasing bankruptcies in the 1990s.

Whatever the reasons for why people file for bankruptcy, credit markets should play an important role. The degree of competition in the credit market determines the equilibrium supply and price of credit, and as a result affects the level of consumer default and personal bankruptcy filings.[5] In spite of the obvious relationship, the link between personal bankruptcy and credit market conditions remains largely unexplored.

While the existence of a link between personal bankruptcy and the credit market is obvious on a priori grounds, the theory offers conflicting views on how credit market competition should affect credit availability and default rates. On the one hand, we might expect competition in credit markets to shift out the supply of credit as existing rents are driven away by entry.[6] Assuming no change in the distribution of consumers and in the absence of a technology shock, an increase in credit should lead to a rise in consumer default as banks lend on the intensive margin and consumers have a greater debt burden (thereby affecting payment ability during times of financial distress). This, however, does not take into account agency problems which pervade the credit market. Keeley (1990) argues that if the effects of moral hazard imposed by deposit insurance are considered, increases in competition will lead banks to take on more risk, as the value of their charter decreases. Thus, his model also predicts an increase in loan default following an increase in market competition, but the mechanism is different, as the total supply of credit is unaffected. On the other hand, some theories of bank-based lending to firms predict that competition should reduce the supply of credit to opaque borrowers and therefore decrease default rates. In Petersen and Rajan

[5] Even in cases of medical problems, consumers might use credit card and mortgage loans to cover the bills, thus transferring the debt claims from the hospitals and physicians to their bank. The evidence suggests that filers with large medical bills are more likely to have taken a mortgage to pay for them relative to other filers (Himmelstein et al., 2005).

[6] One possibility is a Cournot model of bank competition where banks' choice variables are loans and deposits. Then as the number of banks increases (an increase in competition), loan rates decrease and total loans supplied increase. In a world of constrained borrowers, the assumption of Cournot competition might apply in the sense that the market is on the supply side – effectively with banks choosing quantities.

(1995), banks in less competitive markets are willing to invest in building a relationship and lend to lower quality firms, which are usually unincorporated small businesses. These banks anticipate extracting rents from the firm-borrowers in the future, as they are able to initially lend to a firm at a lower rate, thus avoiding problems of asymmetric information, while charging higher rates in the future. Boyd and De Nicoló (2005) revisit the literature on the relationship between competition and bank risk taking and find that when both the deposit and loan market are allowed to respond to changes in competition, greater competition leads to higher deposit rates and lower loan rates, thereby decreasing bank risk and raising the supply of loans. Thus, from a theoretical perspective, the effect of competition on credit supply and borrower default depend on the underlying informational asymmetries between borrower and lenders and the mechanisms used to circumvent them.

4 Data and specification

For our bankruptcy data, we use the annual compilation of petitions made available by the Department of Justice and the Administrative Office of the U.S. Courts (AOUSC), which is the primary public source for consumer bankruptcy data. Each record in the AOUSC data relates a single bankruptcy petition filing. It offers a few fields, including a docket number (court control number), type of filing, the calendar date of filing and county of residence of the petitioner. We use these records to produce annual state-level bankruptcy filing totals. We use the docket number to exclude repeated filings of the same petition. Thus, our data are more accurate than the aggregate numbers at the state-level provided by the AOUSC, which do not take this into account.[7]

Our data covers the period 1980–1994. We focus on this period for several reasons. First, a major modification to bankruptcy law was introduced by the 1978 Bankruptcy Reform Act, which made it easier for consumers to file for bankruptcy by increasing the exemption levels they could claim when filing. This reform was followed by the surge in bankruptcies that ensued over the following two decades. As a result, most data become available starting in

[7] This procedure eliminates counting a technical amendment to an existing case as a new filing. Conceptually, we are interested in studying the decision of a household to initially file for bankruptcy. As a result, our bankruptcy rates tend to be slightly lower than those reported in the media.

1980, which determines our sample's start data. Second, given that our source of exogenous variation in credit market conditions derives from banking deregulation, our sample ends in 1994 since this year a federal law was passed to establish nationwide branching.

In terms of our credit market data, we use data from the Reports of Condition and Income from the Federal Reserve Board to analyze loan growth and loan quality, as well as to construct our measures of bank productivity. We complement these data with those of the Federal Deposit Insurance Corporation Summary of Deposits, in order to build bank market shares at the state level and other measures of market structure and market entry. Our demographic data come from the Bureau of Economic Analysis and other sources (National Center for Health Statistics, Dunn and Bradstreet).

4.1 Banking deregulation

Banking is a highly regulated industry, yet over the last three decades much has changed in terms of the restrictions imposed on a bank's geographic expanse, which have almost vanished. Over the 1980s and early 1990s, in particular, U.S. states gradually removed barriers to banking and branching within and outside the state limits. The fact that states chose to remove these barriers at different times provides us with variation in the competitive conditions in credit markets that is exogenous with respect to consumer bankruptcy decisions. The deregulation of branching and banking across state lines represents an exogenous change to the level of contestability of the market; even if nothing changes, deregulation automatically increases the threat of potential entry, and as such, decreases the market power of incumbents. States usually deregulated *intra*-state banking and then moved to deregulate *inter*-state banking. We analyze both levels of deregulation. In particular, we use the removal of branch restrictions *within* states (by merger and acquisition) and the removal of restrictions to banking *across* state lines (via banking holding companies). Banking deregulation has been extensively studied in the literature. For instance, Black and Strahan (2002) follow a similar approach in their study of the effects of banking deregulation on entrepreneurship.

Table 1 shows states grouped by year of intrastate and interstate deregulation. By 1980, about a third of states had removed restrictions to branching within the state, but only one state had lifted restrictions to interstate banking. The extensive literature on the

effects of banking deregulation finds that deregulation was generally a positive development, leading to greater bank efficiency and competition, lower prices and higher quality, new business formation, and higher economic growth. In terms of market structure, deregulation allowed for considerable consolidation in the industry, mostly through a series of mergers and acquisitions. Moreover, the number of banking institutions and the share of deposits in the hands of small banks decreased substantially.

4.2 Empirical specification

Table 2 shows summary statistics over the period 1980–1994. Following the literature of U.S. banking deregulation in this period, we remove South Dakota and Delaware from the analysis because they are states that provide special tax incentives for credit card banks. Given the leftover 49 states and 15 years of data, we have a total of 735 observations. The state personal bankruptcy rate throughout the period is an average of 1.7 filings per 1,000 persons. For instance, all of the states that allowed interstate banking during our sample period have a higher average personal bankruptcy rate after deregulation relative to the average before deregulation. However, this could be related to the secular rise in bankruptcy rates over the sample period; in our empirical work we control for common variation across years with time dummies.

To explore how competition in banking markets affects the rate of personal bankruptcy, we study the relationship between personal bankruptcy and the two banking deregulation events at the state level. Since deregulation exogenously shifts the contestability in the market and finding measures of market power is not straightforward, we think that the deregulation event offers a great opportunity to explore the question of how competition and bankruptcy are related. In particular, we specify the following equation:

$$y_{j,t} = \alpha_j + \tau_t + \beta_1 InterstateBanking_{j,t} + \beta_2 IntrastateBranching_{j,t} + \gamma_0 IncomeGrowth_{j,t} + \gamma_1 IncomeGrowth_{j,t-1} + \epsilon_{j,t} \quad (1)$$

Here $y_{j,t}$ represents the number of personal bankruptcy petitions per 1,000 persons in state j and year t; α_j is a state-fixed effect; τ_t is a year fixed-effect; $Interstate\ Banking_{j,t}$ and

$IntrastateBranching_{j,t}$ are indicator variables equal to one for states that allow interstate banking and intrastate branching, respectively (and zero otherwise).[8] The year fixed effects capture nationwide changes in bankruptcy rates, most obviously the secular rise in bankruptcies. The state fixed effects capture differences in the bankruptcy rates across states due to time-invariant factors such as state demographic makeup and the state legal framework and culture.[9] Formal statutes and the informal cultural differences in attitudes of bankruptcy court trustees vary considerably across states and obviously influence the household bankruptcy decision. For example, Florida, Texas and a few other states have *unlimited* homestead exemptions; creditors in these states have no claim on a debtor's home equity, regardless of the value of the home. In order to control for time-varying state-level factors affecting the bankruptcy rate, we include current and lagged (by one year) state personal income growth. While the removal of restrictions to geographic expansion directly affects the supply side of the credit market, controlling for personal income growth should capture changes on personal bankruptcy driven by the business cycle. The last term in the equation above, $\epsilon_{j,t}$, is a random disturbance.

5 Results

5.1 Deregulation and personal bankruptcy

5.1.1 Main result

Table 3 shows results from our basic specification where we estimate the state personal bankruptcy rate as a function of the two deregulation events. State and year fixed effects are included. We also introduce personal income growth, including a one year lag, to control for demand factors driving the bankruptcy rate. Based on this specification, interstate banking deregulation appears to have a positive and statistically significant effect on the share of individuals that file for bankruptcy. Branching deregulation within the state also shows a

[8] Thus, the deregulation indicator takes on the value of one the year of the deregulation and every year after that, thereby capturing the "long-run" effect of deregulation.

[9] Age distributions are an important demographic factor, with households from more recent cohorts likely having a different attitude towards debt than households from earlier cohorts.

positive impact on personal bankruptcy, but the coefficient is not statistically significant. While both types of deregulation should have increased competitive pressures on banks by allowing new bank entry, interstate banking deregulation appears to have been most significant in affecting consumer credit market conditions. This is not surprising given that interstate deregulation opened up the state market to banks from all over the country, whereas intrastate deregulation only allowed for a market redistribution among banks in the state. In particular, interstate deregulation allowed out-of-state banks to take control over state banks, and this could have increased their lending aggressiveness, especially through these banks' greater access to funds and better lending technologies, since out-of-state banks tended to be larger. These increased competitive forces from outside banks appears to have led to higher personal bankruptcy.

The result is economically meaningful as well. In particular, we can trace a 6 percent increase in the filing rate directly to interstate banking deregulation, based on the sample median (1.5 bankrupt per 1,000 persons). Moreover, personal income growth has a negative effect on personal bankruptcy, such that for a one percentage point increase in personal income growth, the rate of personal bankruptcy decreases by 3 percent. This is not surprising since during good economic times, keeping all else constant, people are less likely to find themselves in financial stress and therefore be forced to file for bankruptcy.

5.1.2 Banking market structure

One possibility is that states deregulated once the competitive forces were strong enough to make a move towards liberalization part of a natural market evolution, in which case the deregulation indicators would simply be capturing the degree of competition at the time of deregulation. Thus, it is important to control for the banking market structure in the state to explore whether the deregulation effect still holds.

Table 4 reports results when we include variables directly measuring the banking market structure in the state. In particular, we introduce diverse measures of market concentration, including (i) the joint deposit share of the top three banks in the state; (ii) the number of banks that control over half of state deposits; and (iii) the state Herfindahl-Hirschman index (HHI) for deposit shares. Since market structure and the degree of personal bankruptcy in a

given year might be jointly determined, we lag our market structure variables by one year to diminish the possibility of endogeneity. We find that even when we control for these measures of market structure, banking deregulation, by exogenously changing competition, continues to show a significant positive effect on personal bankruptcy.[10] In fact, the magnitude of its effect increases slightly. In particular, we find that a decrease in concentration, as evidenced by a decrease in the joint share of the top three state banks, is associated with an increase in personal bankruptcy. Similarly, an increase in the number of state banks jointly holding at least half of state deposits (also a decrease in concentration) is also associated with an increase in personal bankruptcy. Finally, lower concentration as measured by a decrease in the HHI is also associated with an increase in personal bankruptcy, but the coefficient is not statistically significant.[11]

5.1.3 Demand factors driving bankruptcy

As already mentioned, the empirical literature has focused on demand-side explanations of personal bankruptcy. In the next table, we introduce variables to account for some of the demand factors usually believed to be central to consumer bankruptcy in the U.S. As noted earlier, the survey and anecdotal evidence point to three main types of adverse event as causing bankruptcy: unemployment, unpaid medical bills, and divorce.

We begin by introducing in our basic specification the state unemployment rate, since data are available for all states and all years and the series presents a lot of within-state variation which is required for identification of the coefficient on the variable when state

[10] Moreover, the results on concentration measures also hold if we remove the deregulation indicators, addressing concerns related to the potential endogeneity of regulation.

[11] It is common to assume an unambiguous correlation between market concentration and competition in the market, based on some competition models (such as Cournot), such that lower concentration should be associated with greater competition. Note, however, that this assumption might not hold. Dick (2006) finds that following banking deregulation in the 1990s, concentration showed little variation in local banking markets (measured a the the level of the metropolitan statistical area), while banking concentration actually increased at the regional level (where the region encloses several states). This occurred inspite the fact that competition in local markets is likely to have increased throughout the period following deregulation. Note that here we use within-state variation to identify the coefficient on concentration measures. When we look at this variation within the sample, we find that while most states experience an increase in concentration from 1980 to 1994, about 40 percent of states have a negative annual growth rates in concentration on average, which could explain the negative relationship between concentration and bankruptcy that we find. Moreover, when we add an interaction term between the interstate deregulation and our concentration measures, we find, not surprisingly, that deregulation matters more (greater positive effect) in high concentration states, which is reasonable since the latter had presumably the most to gain from the removal of barriers to entry.

fixed effects are included. Note that we lag the unemployment rate one year to account for the possibility that it might take a while for the dependent variable to respond to changes in demand factors. The results are shown in column (i) of Table 5, where the unemployment rate appears to indeed play a role of importance in personal bankruptcy, with a coefficient that is highly significant both statistically and economically. In particular, a one standard deviation increase in the unemployment rate increases personal bankruptcy by 27 percent. Moreover, the inclusion of the unemployment rate raises the statistical significance and magnitude of the deregulation effect, which goes from a 6 percent to a 10 percent increase in personal bankruptcy. This suggests that controlling for this demand factor is important.

In column (ii) of the table, we introduce the state divorce rate (also lagged one year) to control for another potentially significant demand factor. Unfortunately, data are not available for a few years and states, and as a result, we lose 40 state-year observations (plus 1980 since we lag the variable). While the coefficient on the divorce rate is positive, as we would expect, it is not statistically significant. This is likely due to the little variation of the series within a given state. However, when we remove the state fixed effects, and include nine region fixed effects instead (thereby still controlling for much of the unobserved heterogeneity in a state), the coefficient is both statistically and economically significant, with a one standard deviation increase in the divorce rate leading to a 7 percent increase in consumer bankruptcy.[12] This is shown in column (iii). Thus, unemployment appears to play a more important role in determining bankruptcies relative to divorce. For the case of the incidence of health bills, we would like to use the share of the population over 65 years of age without health insurance as a proxy. However, the data are only available starting in 1987, and the coefficient is positive but statistically insignificant (results not shown). These results coincide with much of the survey and anecdotal evidence and provide some interesting quantitative evidence on their effect on personal bankruptcy.[13]

[12]The random effects specification is rejected, and therefore it cannot be used to estimate the coefficient on the variable of interest consistently.

[13]The anecdotal evidence also suggests that consumers take on home equity loans to pay for credit card debt during times of low interest rates and home mortgage refinancing, which are usually times of high house prices. The flip side of this occurrence is household distress during times of high interest rates and low house prices. To explore this, we introduce in our specification the state housing price index (lagged one year). Indeed, we find that higher house prices are associated with a lower rate of consumer bankruptcy, providing support for the anecdotal evidence (results not shown). In particular, a one standard deviation increase in

As we discussed, several papers have found that the financial benefit to filing for bankruptcy plays an important role in the household bankruptcy decision. The potential financial benefit from filing is directly related to state asset exemptions. While state laws vary along many dimensions, the largest and best-measured exemptions are those related to the equity in the primary residence (the so-called "homestead exemption"). In table 6 we show the results of our baseline specification augmented with state homestead exemptions. Note that since the homestead exemption shows little or no variation over time in a given state, we cannot identify the exemption level's marginal effect from that of the state fixed effect. Thus, as we did previously with the divorce rate, which also shows little within-state variation, we estimated a model with region fixed-effects instead. As we would expect, we find that a greater state homestead exemption is associated with a greater degree of consumer bankruptcy, as shown in column (i).[14] In particular, an increase in the homestead exemption from the 25th ($10,000) to the 75th ($60,000) percentile of the distribution is associated with a 2 percent increase in the bankruptcy rate. While this appears economically small, especially given the important role the homestead exemption has been found to play elsewhere, it does not account properly for the fact that some states have unlimited exemption levels. In the column (ii) of the table, we incorporate instead an indicator variable for whether the state has an unlimited homestead exemption. The results indicate that states with unlimited exemption have larger bankruptcy rates that are on average 31 percent higher relative to other states.

The literature has found a series of positive developments following banking deregulation, including increases in market efficiency, business formation, and higher economic growth. Thus, deregulation, by increasing the dynamism of the economy, in the form of Schumpeterian "creative destruction", could be followed by greater consumer bankruptcy. Small business bankruptcies could show up as consumer bankruptcies since many small business owners (such as those of sole proprietorships or partnerships with unlimited liability) file under the personal bankruptcy code, and not business bankruptcy, when the business they own enters into distress.[15] To account for this possibility, we introduce in our basic speci-

the housing price index leads to a 6 percent decrease in the bankruptcy rate.

[14] Note that the effect from interstate deregulation doubles. Moreover, the intrastate deregulation becomes statistically significant. However, this result, as we have seen, does not stand the test of inclusion of state fixed effects.

[15] Moreover, the empirical evidence suggests that personal wealth plays a significant role in the allocation

fication a proxy for business churning, measured as the log of new business incorporations, adjusted by the state population, in non-bank sectors.[16] Column (i) of Table 7 shows the results, where we find that greater firm creation is associated with a lower rate of personal bankruptcy. Note that the interstate banking deregulation effect increases in magnitude. Thus, small business bankruptcies do not appear to be responsible for the increase in consumer bankruptcies. In the next column of the table we consider Chapter 13 consumer bankruptcy, which is of a much different nature compared to Chapter 7. While the latter is a complete debt discharge (minus non-exempted assets), the former is a debt-repayment program, such that most of the debt is eventually paid-off. Interestingly, when we consider Chapter 13 bankruptcy, the results on firm creation are exactly reversed: greater business formation is associated with a larger bankruptcy rate –though the result is not statistically significant. While a consumer who is in debt and undergoing financial distress but has little or no wealth (outside exempted assets) will be eager to have her debts written off, as opposed to going through a debt repayment plan, the business owner would prefer the latter in order to protect her business. Thus, business bankruptcies appear to be responsible for some Chapter 13 filings, but not Chapter 7. What is also of interest in the second result is that interstate deregulation appears to increase the rate of Chapter 13 filings as well, which is not surprising in light of the result in Black and Strahan (2002) who find that banking deregulation increases the rate of business start-ups, presumably through an increase in the loan supply to small businesses.

5.1.4 Discussion

Our results document that, even controlling for financial distress and legal variables, bank deregulation is associated with the rise in personal bankruptcy rates from 1980 through 1994. In the next section we investigate the mechanism underlying this association. However, note that our results so far are consistent with the model of Livshits, MacGee, and Tertilt (2006), who calibrate an equilibrium model of personal bankruptcy in a heterogeneous agent life

of small business loans [Avery et al. 1998]. Pledges of personal assets and guarantees are used as substitutes for business collateral, and these make owners *personally* liable for business debts.

[16] Our data on new firm entry are those used in Black and Strahan (2002), who kindly provided it for our purposes. The original source of the data is Dunn and Bradstreet.

cycle model with incomplete markets. They find (as have others) that increased income and expense uncertainty cannot quantitatively explain the rise in bankruptcies since the 1970s. However, they do find a role for credit market factors such as decreased transactions costs of lending. Thus, in their paper a technological improvement leads to increased filings. Our paper provides the first empirical confirmation of such a link.

5.2 Mechanism: Deregulation, credit availability and new technologies

We now turn to the analysis of the mechanism behind the reduced-form relationship between banking deregulation and the incidence of personal bankruptcy we have documented earlier. In particular, we explore what happened to the supply of credit and to its allocation following deregulation. In theory, competition can either shift out the supply of loans, or simply change the allocation of credit among borrowers, or both (and according to some models, the supply could also decrease). The question of interest to us is whether banks, facing stronger competitive forces, extended more loans to consumers (either to existing borrowers –the intensive margin–, or new borrowers –the extensive margin), as opposed to shifting resources from less risk to more risk, with no increase in loans.

Determining what occurs to the loan supply is important for various reasons. While it is not straightforward to make welfare inferences resulting from changes in the loan supply, it is likely that an increase in the loan supply, as opposed to a portfolio reallocation, would make consumers relatively better off.[17] Moreover, there is a large literature that documents that greater access to credit increases economic growth (Levine 1997; Beck and Levine 2003).

5.2.1 Credit availability and bank risk

We have so far shown that the removal of entry restrictions into banking markets is associated with increased incidence of personal bankruptcy. Such market liberalization increases the degree of contestability of these markets and therefore changes the equilibrium supply of credit.

[17] One situation where the increase in the loan supply could make consumers worse off is in the case of predatory lending.

Previous studies have found evidence of an increase in credit following banking deregulation. In their study of branching deregulation and economic growth, Jayaratne and Strahan (1996) found some evidence of an increase in credit, though they attribute the increase in economic growth to improvements in bank lending quality. Black and Strahan (2002) also find that deregulation increases the rate of business incorporations, thus suggesting an increase in credit availability for this sector.

We find the data supports the expansion of the availability of credit following deregulation, and, in particular for our purposes here, the supply of consumer credit. Table 8 shows a state loan growth regression, as a function of deregulation and state and year fixed effects (this is similar to the methodology applied in Jayaratne and Strahan (1996)). The first column shows results for total loans, and the second focuses on credit card loans. We build our state loan growth figures from individual banks' balance sheet data, which we aggregate to the state level to obtain the change in overall loans from one year to the next. Note that we have winsorized the state-year observations in the 1th and 99th percentiles of the distribution to minimize measurement error and the presence of potential outliers.[18] We find that both intrastate branching and interstate banking deregulation increase the rate of total loan growth by over 4 percent (based on sample median). A similar result is obtained for credit card loan growth, which also increases by around 4 percent following each deregulation. Although this reduced-form approach is in general not suitable for efficiency analysis, an increase in the supply of credit is likely to reduce interest rates (for a given risk category and keeping demand constant), decrease financial constraints for consumers (allowing them greater consumption and production possibilities), and could also allow new consumers to access credit.

Next, we explore the effects of deregulation on overall bank risk. For the latter, we use charge-off losses adjusted by total loans, also derived from the banks' balance sheet and income statement data, which we aggregate at the state level. Table 9 presents results for the effect of deregulation on loan portfolio quality. We find that deregulation increases loan quality by reducing charge-off losses, though the effect is larger for the interstate deregulation.

[18] This is a procedure similar to trimming but instead of throwing out the N extreme values, we replace them with the two extreme values left after removing them. We follow this approach in order to keep a balanced panel.

This result is similar to that found by Jayaratne and Strahan (1996).[19] It is also similar to Jayaratne and Strahan (1998) who argue that the decrease in loan losses results from the improvement in the screening and monitoring quality of borrowers by banks – implying that banks might even be lending to some higher risk categories despite the observed increase in loan portfolio quality.

Our results indicate that deregulation increased the supply of credit, and that banks behaved more efficiently in their allocation of credit following deregulation. In the case of interstate deregulation, where we find that bankruptcies increase following deregulation, the finding of decreased overall bank risk is of particular interest. It suggests that the distribution of borrowers changed, such that there was lending to new households. Put differently, if banks were extending the new credit only to their existing borrowers – the intensive margin–, it would not be possible to have both an increase in bankruptcies and a decrease in bank risk, which is what we find. Either the existing borrowers are being overburdened with debt, such that bankruptcies increase as well as bank risk, or banks are allocating credit more efficiently, which reduces risk and should have no effect on bankruptcies. Thus, our findings are consistent with competition on the extensive margin. Thus, the observed increase in personal bankruptcy is likely to be the result of new consumers gaining access to credit (rationed before deregulation). This suggests a role for technology. Indeed, previous literature suggests that the credit card industry has been progressively targeting higher risk consumers since the 1980s [Morgan and Toll, 1997; Black and Morgan, 1999], as well as the increasing use of risk-based pricing in consumer loans [Edelberg, 2003; Mester, 1997]. We explore the role of technology in the next section.

[19]Note that while our methodology is similar to that found in Jayaratne and Strahan (1996), there are some differences. First, while the latter focus only on intrastate deregulation, we also analyze the interstate banking deregulation. Second, Jayaratne and Strahan (1996) do find a significant increase in credit following deregulation in one of their models (weighted least squares) but not in another (ordinary least squares). This leads the authors to conclude that the evidence on loan growth is not as robust as their finding of improvements in loan portfolio quality following deregulation. The sample in Jayaratne and Strahan (1996) covers 1972-1992, while our sample covers 1980-1994. Thus, the seventies could be driving the result in Jayaratne and Strahan (1996).

5.2.2 Bank entry and new credit evaluation technologies

The enhanced ability to discriminate credit risk after deregulation suggests a change in the technologies used to generate consumer credit. The interstate banking deregulation removed barriers to entry by out of state banks. This enabled the entry of larger, more efficient and technologically savvy banks, who likely brought enhanced screening technologies. The evidence indicates that larger banks adopted new lending scoring technologies earlier than small banks in the 1990s.[20] This is hardly surprising, given that the adoption of these technologies should have been easier for large banks who may exploit scale economies in consumer lending, both in terms of their geographic scope and operations scale, and have greater access to secondary loan markets for loan securitization. The new technologies automated underwriting standards through the use of a credit score, thereby allowing rates to adjust interest rate premiums to better reflect underlying consumer risk. This was an important innovation in consumer credit markets, as before, banks would simply post one "house rate" for a given consumer loan type, rationing out very high risk consumers in order to avoid adverse selection problems (as in Stiglitz and Weiss (1981), given the difficulty in telling risks apart).[21]

Figure 5 shows a schematic relationship between risk and credit before and after interstate deregulation and the introduction of new technologies as suggested by our results. Before the introduction of enhanced screening technologies, banks were simply posting a "house rate" targeted at consumers in some middle risk range, thereby rationing out very high risk individuals, on the right, as well as very low risk individuals, on the left, who were not willing to pay such high rate. This is shown on the left graph of Figure 5, where the rectangle represents the amount of credit extended to these consumers. After interstate deregulation and the introduction of better technologies to evaluate credit, the loan officer

[20] Berger et al. (2004) find that the adoption of small business credit scoring by larger banking organizations in the mid 1990s is associated with increased credit availability, higher average loan spreads, and greater risk, likely as a result of banks' expansion into more risky segments.

[21] The technologies used by banks in consumer lending have changed significantly since the 1980s, including the automation of underwriting standards and use of credit scoring in consumer loans (Jonhson 1992; Mester 1997), the advent of securitization in mortgages and credit cards (Johnson 2002) and the reduction in data storage costs (Bostic 2002). As already mentioned, Edelberg (2003) finds that lenders increasingly adopted risk-based pricing in consumer loans during the mid 1990s, leading to more high-risk households accessing credit.

has at her disposal a faster computer, more data storage capability, and in particular a software program that allows her to compute a score for each consumer based on certain observed characteristics. In this manner, the interest rate better reflects the underlying consumer risk, and the bank is able to solve the adverse selection problem that previously led it to ration out very high risk individuals, as well as offer attractive rates to low risk individuals. Thus, the bank can now also extend credit to individuals at both sides of the middle range which was targeted before the new scoring technology. In relative terms, how much credit is extended to each group? Our results of higher bankruptcies along with lower bank risk after interstate deregulation suggest a credit schedule that is decreasing in consumer risk, such that the amount of credit extended to high risk individuals is less than that extended to low risk individuals. This is depicted in the right graph of Figure 5.[22] Indeed, this fits in nicely with the anecdotal evidence on subprime lending by credit card companies, which says that lenders offer small credit lines to high risk consumers, keeping them on a tight leash at the outset, but increase credit lines as these consumers pay back on time, build a good credit history, and therefore move down the risk schedule. With such schedule, consumer bankruptcies per person should increase following the extension of credit to new borrowers in higher risk categories, while overall bank risk, measured as bad loans per dollar lent, should decrease due to the relatively larger extension of credit to borrowers in lower risk categories.

Recall that our results so far indicate that both the interstate and the intrastate deregulations increase the supply of credit and decrease bank risk. In terms of personal bankruptcy, however, there is an important difference between the two phases of deregulation, which provides further support on the role of screening technologies. While intrastate branching deregulation leads to an increase in the loan supply, such effect does not translate into an increase in bankruptcies, unlike the case of the later interstate banking deregulation. This is not surprising. The removal of branching restrictions did not allow entry by new banks, but rather it forced a redistribution of the state market among the set of state banks. Thus,

[22]Note that the technology shock should also affect consumers that were obtaining credit before. The new screening technology allows for the previous pooling equilibrium on the middle risk consumers to become a separating equilibrium, such that higher risk consumers within this pool are likely to receive relatively less credit than before deregulation while lower risk consumers within this pool are likely to receive relatively more credit.

there is no reason to expect a change in the technologies used in loan pricing, which involve a fixed cost investment. The results related to this first stage of deregulation are consistent with the end of the "quiet life," as state banks faced more competition from each other – they could now buy competitors' branches – and were forced to profit maximize and therefore allocate credit more efficiently. Such behavior would naturally lead to lower bank risk. This is similar to the findings in the literature on banking deregulation. As already mentioned, Jayaratne and Strahan (1996) study intrastate deregulation and find that it led to an improvement in the allocation of credit. In a recent paper, Bertrand et al. (Forthcoming) study banking deregulation in France in the 1980s (involving the privatization of many state banks) and find that banks after deregulation are much less willing to bail out poorly performing firms, as they were forced to allocated credit more efficiently. The second stage of deregulation, however, is different, because it involves entry by new banks, who bring in improved technologies. Thus, the increase in credit is allocated differently, some of it now going to higher and lower risk consumers relative to those served before the technological change, as consumer risk can be better discriminated and priced appropriately. With higher risk consumers obtaining credit, the number of consumers filing will naturally increase.

Next, we develop a two-pronged approach to actually test for whether our results are driven by the introduction of new screening technologies following the removal of entry restrictions. First, we use *actual* out-of-state bank entry as an approximation to the use of better technologies to evaluate credit. While deregulation removed barriers to entry by out-of-state banks, thereby raising the contestability of the state market, it did not necessarily lead to entry. Thus, we use the difference between *potential* and *actual* entry as a proxy for the introduction of better screening techniques. Second, we explore the effect of deregulation on the use of new screening technologies by developing an alternative, more direct measure of banks' use of these technologies, based on Petersen and Rajan (2002).

Entry by out-of-state banks We begin with our exploration of actual entry. If out-of-state banks bring in enhanced screening technology, states experiencing greater entry should see larger increases in the bankruptcy rate and credit supply. We measure actual out-of-state bank entry as the share of state deposits held by out-of-state banks in a given state and year.

Table 10 shows the results. Note that we simply add a term for out-of-state entry since the variable is only relevant after deregulation, and therefore acts as an interaction term with the deregulation event.[23] Our results indicate that bankruptcy increases substantially more in states with more out-of-state entry. In particular, as shown in column (i) of Table 10, in high entry states (defined as those in the top quartile of the distribution of out-of-state deposit share, who have a median out-of-state deposit share of 52 percent), the bankruptcy rate increases by 17 percent following interstate deregulation, compared to an 8 percent increase in the case of low entry states (the bottom quartile of the distribution, with a median out-of-state deposit share of 0.2 percent).

One concern from the above results is that the states that did not experience as much out-of-state bank entry could be systematically different from those that experienced a significant amount – related to certain factors not already captured by the state fixed effects and other included time-varying factors. In particular, banks in the former states could have been exposed to greater competitive forces before the deregulation actually took place. Under stronger competitive pressures, banks could have been led to increase their investments in screening technology, thereby increasing their ability to discern risk before the actual deregulation. To control for this potential factor, we introduce the share of state assets in the hands of small banks, defined as those with deposits of less than $100M, as a way to capture time-varying factors that could be affecting the decision to deregulate. This follows from the work of Krozner and Strahan (1999), who find that states with large small bank presence were the last ones to remove bank branching restrictions – presumably as they had the most to lose from greater competition. The results are shown on column (ii) in Table 10. Even when we control for this additional measure of market structure, the earlier effect from out of state bank entry continues to hold.

Table 11 shows similar results for overall loans and credit card loans, where we find that states with high out-of-state bank entry have a higher increase in loan growth compared to that of low out-of-state bank entry states, especially in the case of credit card loans.

[23] Technically, some states did experience some degree of entry by out-of-state banks before interstate deregulation, due to bilateral legal deals with neighboring states. For simplicity of interpretation, we set our actual entry variable to zero in the years before interstate deregulation. Our results are actually stronger if we let the variable reflect the factual amount of entry before deregulation.

In particular, states with high out-of-state bank entry have an increase in credit card loan growth of 7 percent following interstate deregulation, relative to a 3 percent increase in the case of low entry states. For the case of overall loans, the results are similar in magnitude, though the coefficient on bank entry becomes statistically significant once we control for market structure factors. Moreover, consistent with the prior literature, a greater small bank presence is associated with lower loan growth.

Use of enhanced screening technologies While the above findings are consistent with entry by out-of-state banks introducing better technologies for credit evaluation following interstate deregulation, it is nevertheless an indirect test. It could be argued that entry by out-of-state banks simply imposes greater competitive forces on in-state banks. In particular, our results on entry could be related to the fact that, in the presence of sunk costs, the threat of entry might not have the same effect on the contestability of the market as actual entry. In this section, we develop a more direct test of the use of new credit evaluation technologies following interstate deregulation. Ideally, we would like to use the variance in quoted interest rates (conditioned on consumer characteristics) over time. With greater use of risk-based pricing, the interest rate variance should increase. These data, unfortunately, are not available. Instead, we follow Petersen and Rajan (2002), who use lending productivity as a proxy for the banks' use of information technology. They find that the distance between small businesses and their lenders increases over time as a result of improvements in lender productivity, as the greater use of credit scoring models and other investments in information technology should allow a loan officer to generate a larger number of loans. Given the lack of data on loan originations, their measure of lender productivity is normalized by the total volume of loans.

To test the hypothesis that our earlier findings are due to the adoption of better credit screening technologies, we follow a similar approach and use the ratio of credit card loans to total bank employees as a proxy. Table 12 presents the results. We find that the removal of entry restrictions to out-of-state banks increases credit card loan productivity, and the effect is economically significant. In particular, we find that productivity increases by 12 percent following interstate deregulation. These results suggest that new screening

technologies allow for the new lending observed following deregulation, with the resulting increased access to credit for both lower and higher risk consumers.

6 Conclusion

The last quarter century saw a sharp increase in the rate of personal bankruptcy, accompanied by a similar increase in the availability of credit, with only minor modifications to personal bankruptcy law. We explore this rise in bankruptcies, studying various factors leading to personal bankruptcy, but focusing on the role played by credit market conditions. In particular, the paper analyzes the relationship between competition in credit markets and consumer default. Using variation from state-level banking deregulation over a fifteen year period, we find that the removal of restrictions to competition in banking markets has led to an increase in the rate of consumer bankruptcy. This has occurred via two channels: increase in credit and the use of new screening technologies introduced after deregulation which allowed credit to be extended to new consumers. This interaction between competition and technology gave access to credit to previously excluded borrowers, as the new technology allowed for credit evaluations to depend more heavily on the underlying consumer risk. Thus, although the risk of any given borrower defaulting did not necessarily rise, the presence of many extra borrowers in the population perforce increased the bankruptcy rate.

We believe that these results are both quantitatively and qualitatively important, especially in light of the lack of statistical evidence documenting the effects of credit market characteristics and demand factors on the incidence of personal bankruptcy. Importantly, our results indicate that part of the increase in personal bankruptcy in the 1980s and early 1990s can be associated with interstate banking deregulation, following increases in credit market efficiency and credit access to consumers. Thus, we hope our results may shed light on the ongoing debate about consumer bankruptcy in the U.S., which has usually focused on the design of optimal bankruptcy law. Our findings suggest that credit market liberalization, as opposed to changes in bankruptcy law, has been an important factor associated with the increase in bankruptcies.

References

[1] Ashcraft, A., A.A. Dick, and D.P. Morgan (2006). "The Bankruptcy Abuse Prevention and Consumer Protection Act: Means-Testing or Mean Spirited?," working paper.

[2] Avery, R.B., R.W. Bostic and K.A. Samolyk (1998). "The role of personal wealth in small business finance," *Journal of Banking and Finance*, 22: 1019-1061.

[3] Beck, T. and R. Levine (2005). "Legal Institutions and Financial Development," in Handbook for New Institutional Economics, Eds: Claude Menard and Mary M. Shirley, Norwell MA: Kluwer Academic Publishers.

[4] Berger, A.N., W.S. Frame, and N.H. Miller (2004). "Credit Scoring and the Availability, Price and Risk of Small Business Credit," *Journal of Money, Credit, and Banking*, 37: 119-222.

[5] Bertrand, M., A. Schoar, and D. Thesmar (Forthcoming). "Banking Deregulation and Industry Structure: Evidence from the 1985 Banking Act," *Journal of Finance*.

[6] Black, S.E. and D.P. Morgan (1999). "Meet the Borrowers," *Current Issues in Economics and Finance*, Federal Reserve Bank of New York, February.

[7] Black, S.E. and P.E. Strahan (2002). "Entrepreneurship and Bank Credit Availability," *Journal of Finance*, 67:2807-33.

[8] Bostic, R. (2002). "Trends in equal access to credit products," in T*he Impact of Public Policy on Consumer Credit*, eds. T. Durkin and M. Staten, Massachusetts, Kluwer Academic Publishers.

[9] Boyd, J.H. and G. De Nicoló (2005). "The Theory of Bank Risk Taking and Competition Revisited," *Journal of Finance*, 60:1329-1343.

[10] Dick, A. (2006). "Nationwide Branching and Its Impact on Market Structure, Quality, and Bank Performance," *Journal of Business*, 79:567-592.

[11] Domowitz, I. and R.L. Sartain (1999). "Determinants of the Consumer Bankruptcy Decision," *Journal of Finance*, 54:403-420.

[12] Edelberg, W. (2003). "Risk-based Pricing of Interest Rates in Household Loan Markets," Federal Reserve Board Finance and Economics Discussion Series 2003-62.

[13] Fay, S., E. Hurst and M.J. White (2002). "The Household Bankruptcy Decision," *American Economic review*, 92:706-718.

[14] Gropp, R., J.K. Scholz, and M.J. White (1997). "Personal Bankruptcy and Credit Supply and Demand," *Quarterly Journal of Economics*, 112:217-251.

[15] Gross, D.B. and N.S. Souleles (2002). "An Empirical Analysis of Personal Bankruptcy and Delinquency," *Review of Financial Studies*, 15:319-347.

[16] Himmelstein, D.U., E. Warren, D. Thorne, and S. Woolhandler (2005)."Illness and Injury as Contributors to Bankruptcy," *Health Affairs*, Web Exclusives, February.

[17] Jarayatne, J. and P.E. Strahan (1996). "The Finance-Growth Nexus: Evidence from Bank Branch Deregulation," *Quarterly Journal of Economics*, 111:636-670.

[18] Jarayatne, J. and P.E. Strahan (1998). "Entry Restrictions, Industry Evolution, and Dynamic Efficiency: Evidence from Commercial Banking," *Journal of Law and Economics*, 41:239-273.

[19] Johnson, K. (1992). "Legal, Social and Economic Issues in Implementing Scoring in the United States," in *Credit scoring and credit control*, eds. J.N. Crook, D.B. Edelman and L.C. Thomas, New York, Oxford University Press.

[20] Johnson, K (2002). "Consumer loan securitization," in *The Impact of Public Policy on Consumer Credit*, eds. T. Durkin and M. Staten, Massachusetts, Kluwer Academic Publishers.

[21] Keeley, M.C. (1990). "Deposit Insurance, Risk, and Market Power in Banking," *American Economic Review*, 80:1183-1200.

[22] Krozner, R.S. and P.E. Strahan (1999). "What Drives Deregulation? Economics and Politics of the Relaxation of Bank Branching Restrictions," *Quarterly Journal of Economics*, 114:1437-67.

[23] Levine, R. (1997). "Financial Development and Economic Growth: Views and Agenda," *Journal of Economic Literature*, 35: 688-726.

[24] Livshits, I., J. MacGee, and M. Tertilt (2006). "Accounting for the rise in consumer bankruptcies," working paper.

[25] Mester, L. (1997). "What's the point of credit scoring?," *Business Review*, Federal Reserve Bank of Philadelphia, September/October, 3-16.

[26] Morgan, D.P. and I. Toll (1997). "Bad Debt Rising," *Current Issues in Economics and Finance*, Federal Reserve Bank of New York, March.

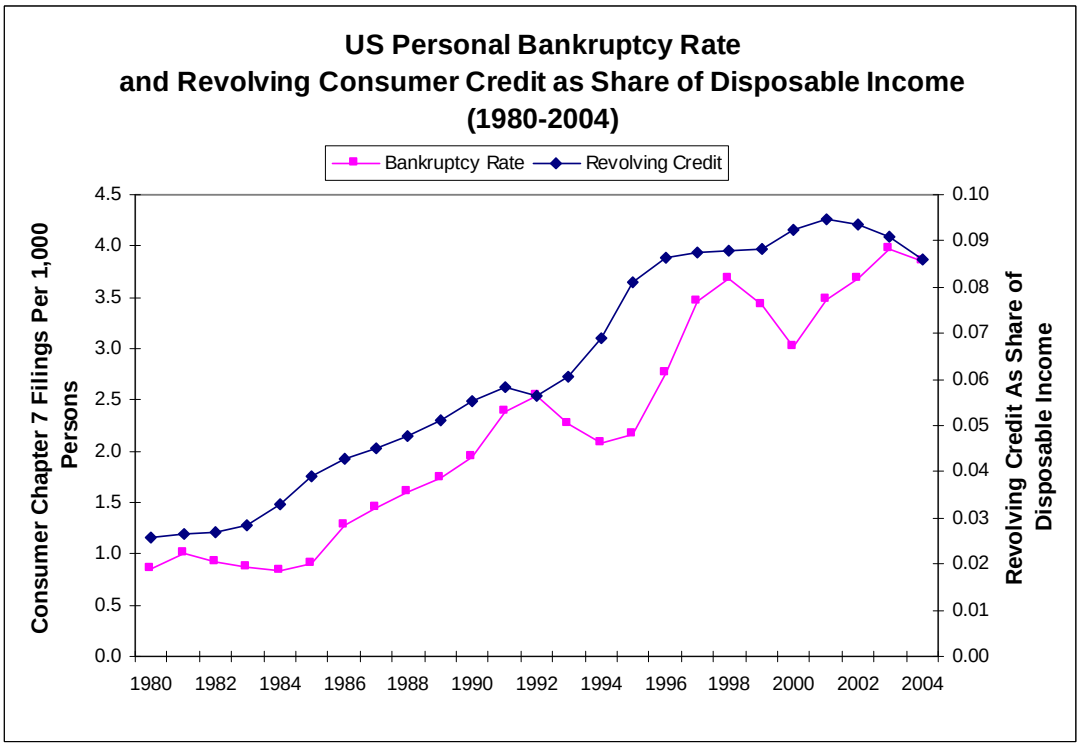
[27] Petersen, M.A. and R.G. Rajan (1995). "The Effect of Credit Market Competition on Lending Relationships," *Quarterly Journal of Economics*, 110:407-443.

[28] Petersen, M.A. and R.G. Rajan (2002). "Does Distance Still Matter? The Information Revolution in Small Business Lending," *Journal of Finance*, 57:2533-2570.

[29] Stiglitz, J.E. and A.Weiss (1981). "Credit Rationing in Markets with Imperfect Information," *American Economic Review*, 71:393-410.

[30] Sullivan, T., E. Warren, and J.L. Westbrook (2001). *The Fragile Middle Class*, Yale University Press, New Haven.

[31] Warren, E. and A. Tyagi (2003). *The Two-Income Trap*, Basic Books, New York.



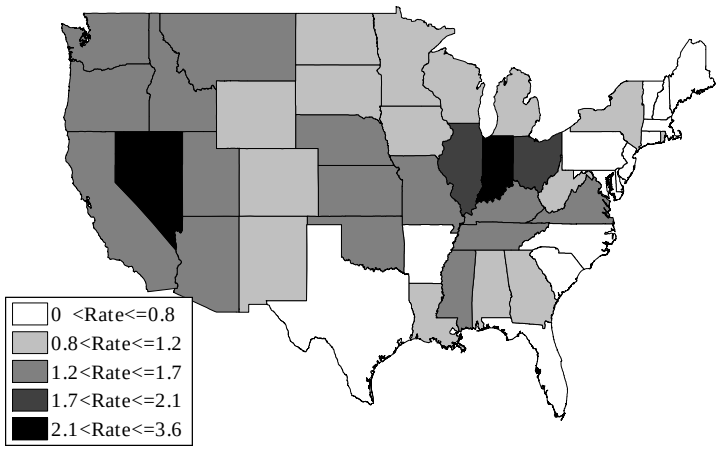


Figure 1: Chapter 7 bankruptcy rate by US state in 1980 (per 1,000 persons)

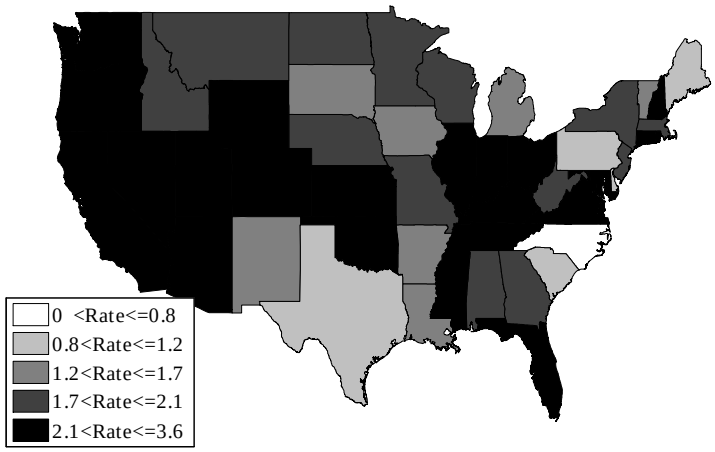


Figure 2: Chapter 7 bankruptcy rate by US state in 1994 (per 1,000 persons)

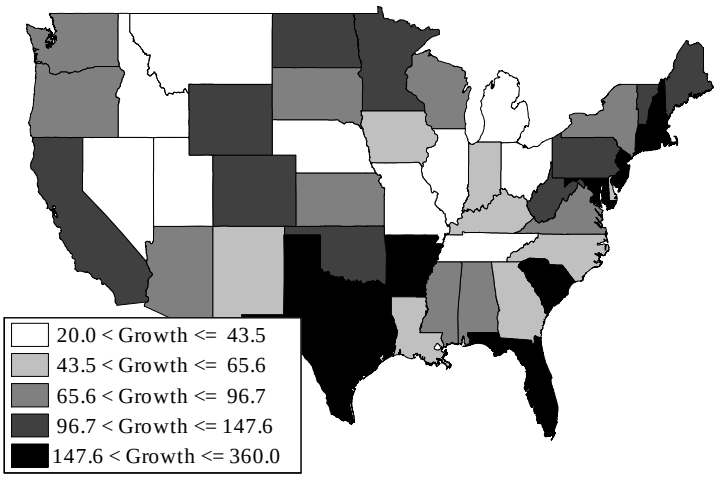


Figure 3: Percent change in the Ch. 7 bankruptcy rate by US state for 1980-1994

Table 1: STATES BY YEAR OF INTRASTATE AND INTERSTATE DEREGULATION

Year	Intrastate branching	Interstate banking
Before 1980	AK, AZ, CA, DC, DE, ID MD, ME, NC, NJ, NV, NY OH, RI, SC, SD, VA, VT	ME
1980	CT	-
1981	AL, UT	-
1982	PA	AK, NY
1983	GA	CT, MA
1984	MA	KY, RI, UT
1985	NE, OR, TN, WA	DC, FL, GA, ID, MD, NC NV, OH, TN, VA
1986	HI, MS	AZ, IL, IN, MI, MN, MO NJ, OR, PA, SC
1987	KS, MI, ND, NH, WV	AL, CA, LA, NH, OK, TX WA, WI, WY
1988	FL, IL, LA, OK, TX, WY	CO, DE, MS, SD, VT, WV
1989	IN	AR, NM
1990	KY, MO, MT, WI	NE
1991	CO, NM	IA, ND
1992		KS
1993	MN	MT
1994	AR	-
After 1994	IA	HI

NOTES.— Intrastate branching refers to the deregulation allowing banks to buy branches within the state by merger and acquisition. Interstate banking refers to the deregulation allowing out-of-state bank holding companies to buy banks in the state that deregulates.

Table 2: STATE LEVEL SUMMARY STATISTICS

Variable	Mean	Std.Dev.
Personal bankruptcy rate (per 1,000) - Ch. 7	1.6671	0.9012
Personal bankruptcy rate (per 1,000) - Ch. 13	0.5901	0.6898
Interstate banking indicator	0.5687	0.4956
Intrastate branching indicator	0.6748	0.4688
Personal income growth	0.0721	0.0354
Personal income growth (t-1)	0.0764	0.0376
Top3 state bank deposit share (t-1)	0.3766	0.2253
Number of top state banks (t-1)	20	25
HHI (t-1)	852	859
Unemployment rate (%)(t-1)	6.7985	2.1541
Divorce rate (per 1,000) (t-1)	5.2243	2.83
Republican state (t-1)	0.8426	0.3645
Homestead exemption ('000)	140.7	296
Unlimited homestead exemption state	0.1197	0.3249
Log of new incorporations per capita (t-1)	0.8515	0.4198
Loan growth: Total loans (t)/ Total loans (t-1)	1.0756	0.0939
Loan growth (real estate)	1.1025	0.1193
Loan growth (residential r.e.)	1.0527	0.1127
Loan growth (credit card)	1.1037	0.1244
Loan growth (comm. and ind.)	1.0531	0.1074
Loan growth (agricultural)	1.0183	0.197
Loan growth (construction)	1.0857	0.2464
Charge-off / Total loans (%)	0.3104	0.3122
Actual entry (out-of-state bank dep. share)	0.1343	0.1964
Share of small banks (deposits <$100M)	0.1583	0.1422
Credit card productivity (C.c. loans'000/#employees)	227.5	479.5
Number of observations	735	

NOTES.—
Sample: 1980-1994.
An observation is a state*year combination.

Table 3: PANEL REGRESSION OF THE EFFECT OF BANKING DEREGULATION ON PERSONAL BANKRUPTCY

	Dependent Variable Personal bankruptcy rate (per 1,000 persons)
Interstate banking indicator	0.0889
	(0.0446)∗
Intrastate branching indicator	0.0350
	(0.0403)
Personal income growth	−3.9270
	(0.5159)∗∗
Personal income growth (t-1)	−5.4105
	(0.5006)∗∗
N	735
R^2 (within)	0.79
R^2 (overall)	0.34

NOTES.— Sample: 1980-1994. The results are based on a balanced panel of all states excluding Delaware and South Dakota. State and year fixed effects are included. The dependent variable is the number of Chapter 7 filers (debt discharge) as a share of total population in the state. The interstate banking and intrastate branching indicators take the value of one starting the year in which the state allows interstate banking and intrastate branching, respectively, and zero otherwise. †significant at 10%; *significant at 5%; **significant at 1%.

Table 4: PANEL REGRESSION RELATING PERSONAL BANKRUPTCY TO BANKING DEREGULATION AND MARKET STRUCTURE

	Dependent Variable Personal bankruptcy rate (per 1,000 persons)		
	(i)	(ii)	(iii)
Interstate banking indicator	0.0870	0.1017	0.0836
	(0.0444)†	(0.0444)∗	(0.0447)†
Intrastate branching indicator	0.0407	0.0600	0.0347
	(0.0403)	(0.0407)	(0.0403)
Top 3 state bank deposit share	−0.5439		
	(0.2210)∗		
Number of top state banks		0.0043	
		(0.0013)∗∗	
HHI			−0.0001
			(0.0001)
N	735	735	735
R^2 (within)	0.79	0.79	0.79
R^2 (overall)	0.32	0.34	0.33

NOTES.— Sample: 1980-1994. The results are based on a balanced panel of all states excluding Delaware and South Dakota. State and year fixed effects are included. The dependent variable is the number of Chapter 7 filers (debt discharge) as a share of total population in the state. The interstate banking and intrastate branching indicators take the value of one starting the year in which the state allows interstate banking and intrastate branching, respectively, and zero otherwise. The regression includes personal income growth and a lag in order to control for the business cycle. The competition variables are lagged one year, to avoid endogeneity bias. The number of top state banks is determined as the number of banks in the set that together hold over fifty percent of state deposits. The HHI is the Herfindahl-Hirschman index at the state level. †significant at 10%; *significant at 5%; **significant at 1%.

Table 5: PANEL REGRESSION RELATING PERSONAL BANKRUPTCY TO BANKING DEREGULATION AND NEGATIVE SHOCKS TO CONSUMERS

	Dependent Variable Personal bankruptcy rate (per 1,000 persons)		
	(i)	(ii)	(iii)
Interstate banking indicator	0.1486	0.1593	0.3011
	(0.0416)**	(0.0429)**	(0.0765)**
Intrastate branching indicator	0.0164	0.0218	0.0938
	(0.0374)	(0.0400)	(0.0658)
Unemployment rate (%)	0.1272	0.1472	0.0416
	(0.0119)**	(0.0132)**	(0.0169)*
Divorce rate (per 1,000)		0.0031	0.0248
		(0.0050)	(0.0092)**
State and year FE	YES	YES	NO
Region and year FE	NO	NO	YES
N	735	649	649
R^2 (within)	0.82	0.81	
R^2 (overall)	0.36	0.35	0.58

NOTES.— Sample: 1980-1994. The results are based on a panel of all states excluding Delaware and South Dakota (some observations are missing for some states in columns (ii)-(iv), due to data limitations). The dependent variable is the number of Chapter 7 filers (debt discharge) as a share of total population in the state. The regressions include personal income growth including a one year lag to control for the business cycle. The interstate banking and intrastate branching indicators take the value of one starting the year in which the state allows interstate banking and intrastate branching, respectively, and zero otherwise. The unemployment rate and divorce rate are lagged one year. †significant at 10%; *significant at 5%; **significant at 1%.

Table 6: PANEL REGRESSION RELATING PERSONAL BANKRUPTCY TO BANKING DEREGULATION AND STATE HOMESTEAD EXEMPTION

	Dependent Variable Personal bankruptcy rate (per 1,000 persons)	
	(i)	(ii)
Interstate banking indicator	0.2862	0.2869
	(0.0747)**	(0.0752)**
Intrastate branching indicator	0.1220	0.1326
	(0.0617)*	(0.0624)*
Homestead exemption	0.0006	
	(0.0001)**	
Unlimited exemption state		0.4807
		(0.0838)**
N	735	735
R^2	0.60	0.59

NOTES.— Sample: 1980-1994. The results are based on a balanced panel of all states excluding Delaware and South Dakota. Region and year fixed effects are included (region effects replace state fixed effects in order to allow us to identify the coefficient on the mostly time-invariant homestead exemption). The regressions include personal income growth and a lag, as well as the unemployment rate, to control for the business cycle and time-varying demand side factors. The dependent variable is the number of Chapter 7 filers (debt discharge) as a share of total population in the state. The interstate banking and intrastate branching indicators take the value of one starting the year in which the state allows interstate banking and intrastate branching, respectively, and zero otherwise. The unlimited exemption state variable takes on the value of one if the state has an unlimited homestead exemption. †significant at 10%; *significant at 5%; **significant at 1%.

Table 7: PANEL REGRESSION RELATING PERSONAL BANKRUPTCY TO BANKING DEREGULATION AND BUSINESS CHURNING

	Dependent Variable: Personal bankruptcy rate (per 1,000 persons)	
	Chapter 7	Chapter 13
	(i)	(ii)
Interstate banking indicator	0.1089	0.1093
	(0.0443)∗	(0.0446)∗
Intrastate branching indicator	0.0168	−0.0040
	(0.0401)	(0.0403)
Ln(New incorporations per 1,000 persons)	−0.3508	0.1284
	(0.0835)∗∗	(0.0840)
N	735	735
R^2 (within)	0.79	0.40
R^2 (overall)	0.28	0.09

NOTES.— Sample: 1980-1994. The results are based on a balanced panel of all states excluding Delaware and South Dakota. State and year fixed effects are included. The dependent variable in the first (second) column is the number of Chapter 7 (13) filers as a share of total population in the state. Chapter 7 is a debt discharge, while Chapter 13 is a debt-repayment plan. The interstate banking and intrastate branching indicators take the value of one starting the year in which the state allows interstate banking and intrastate branching, respectively, and zero otherwise. The regressions include personal income growth and a lag to control for the business cycle. New incorporations are lagged one year. †significant at 10%; *significant at 5%; **significant at 1%.

Table 8: PANEL REGRESSION RELATING LOAN GROWTH TO BANKING DEREGULATION

	Dependent Variable Loan Growth	
	Total loans	Credit card
Interstate banking indicator	0.0455	0.0409
	(0.0116)**	(0.0133)**
Intrastate branching indicator	0.0404	0.0457
	(0.0105)**	(0.0120)**
N	735	735
R^2 (within)	0.30	0.35
R^2 (overall)	0.28	0.30

NOTES.— Sample: 1980-1994. The results are based on a balanced panel of all states excluding Delaware and South Dakota. State and year fixed effects are included. The dependent variable is $totalloans(t)/totalloans(t-1)$ in the state, where loans include those in the indicated category. The interstate banking and intrastate branching indicators take the value of one starting the year in which the state allows interstate banking and intrastate branching, respectively, and zero otherwise. State*year observations in the 1th and 99th percentiles of the distribution have been winsorized to reduce the influence of extreme values. †significant at 10%; *significant at 5%; **significant at 1%.

Table 9: PANEL REGRESSION RELATING LOAN QUALITY TO BANKING DEREGULATION

	Dependent Variable Charge-offs / Loans (%)
Interstate banking indicator	−0.1550
	(0.0244)**
Intrastate branching indicator	−0.0965
	(0.0222)**
N	735
R^2 (within)	0.35
R^2 (overall)	0.31

NOTES.— Sample: 1980-1994. The results are based on a balanced panel of all states excluding Delaware and South Dakota. State and year fixed effects are included. The dependent variable is the proportion of loans that are charge-offs in the state. The interstate banking and intrastate branching indicators take the value of one starting the year in which the state allows interstate banking and intrastate branching, respectively, and zero otherwise. State*year observations in the 1th and 99th percentiles of the distribution have been winsorized to reduce the influence of extreme values. †significant at 10%; *significant at 5%; **significant at 1%.

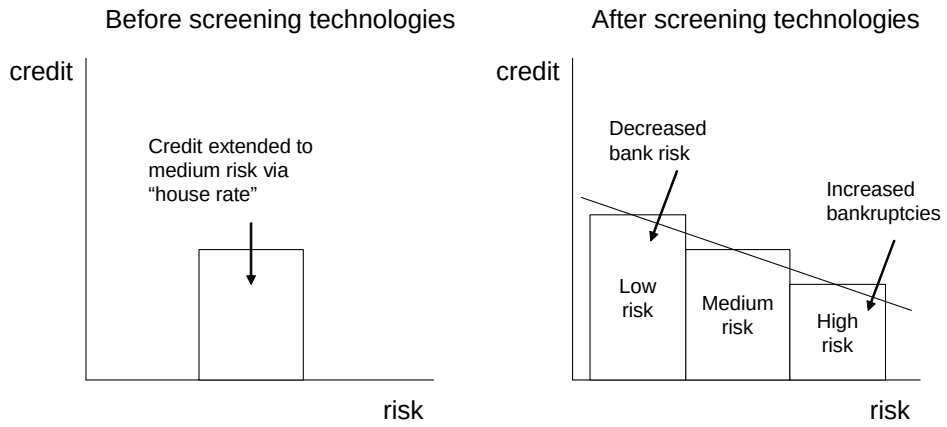


Figure 4: Credit extension and risk categories before and after the introduction of enhanced screening technologies

Table 10: PANEL REGRESSION RELATING PERSONAL BANKRUPTCY TO BANKING DEREGULATION AND OUT-OF-STATE ENTRY

	Dependent Variable Personal bankruptcy rate (per 1,000 persons)	
Interstate banking indicator	0.1240	0.1226
	(0.0424)**	(0.0427)**
Intrastate branching indicator	0.0277	0.0256
	(0.0374)	(0.0380)
Actual entry	0.2688	0.2765
	(0.0978)**	(0.1009)**
Share of small banks		−0.1011
		(0.3301)
N	735	735
R^2 (within)	0.82	0.82
R^2 (overall)	0.36	0.37

NOTES.— Sample: 1980-1994. The results are based on a balanced panel of all states excluding Delaware and South Dakota. State and year fixed effects are included. The dependent variable is the number of Chapter 7 filers as a share of total population in the state. The interstate banking and intrastate banking indicators take the value of one starting the year in which the state allows interstate banking and intrastate branching, respectively, and zero otherwise. Actual entry takes on the value of zero before interstate banking deregulation, since the variable is only relevant after it. Small banks are defined as those with deposits less than 100M (lagged by one year). The regression includes personal income growth and a lag, as well as the lagged unemployment rate, in order to control for demand factors. †significant at 10%; *significant at 5%; ** significant at 1%.

Table 11: PANEL REGRESSION RELATING LOAN GROWTH TO BANKING DEREGULATION AND OUT-OF-STATE ENTRY

	Dependent Variable: Loan Growth			
	Total Loans		Credit Card	
	(i)	(ii)	(iii)	(iv)
Interstate banking indicator	0.0416	0.0352	0.0343	0.0306
	(0.0119)**	(0.0119)**	(0.0136)*	(0.0137)*
Intrastate branching indicator	0.0419	0.0342	0.0484	0.0440
	(0.0106)**	(0.0107)**	(0.0121)**	(0.0123)**
Actual entry	0.0415	0.0670	0.0699	0.0844
	(0.0280)	(0.0284)*	(0.0318)*	(0.0327)**
Share of small banks		−0.3429		−0.1962
		(0.0894)**		(0.1026)†
N	735	735	735	735
R^2 (within)	0.30	0.31	0.36	0.36
R^2 (overall)	0.28	0.20	0.31	0.24

NOTES.— Sample: 1980-1994. The results are based on a balanced panel of all states excluding Delaware and South Dakota. State and year fixed effects are included. The dependent variable is $totalloans(t)/totalloans(t-1)$ in the state. The interstate banking and intrastate banking indicators take the value of one starting the year in which the state allows interstate banking and intrastate branching, respectively, and zero otherwise. State*year observations in the 1th and 99th percentiles of the distribution have been removed due to potential outliers. Actual entry takes on the value of zero before interstate banking deregulation, since the variable is only relevant after it. Small banks are defined as those with deposits less than 100M (lagged by one year). The regression includes personal income growth and a lag, as well as the lagged unemployment rate, in order to control for demand factors. †significant at 10%; *significant at 5%; ** significant at 1%.

Table 12: PANEL REGRESSION RELATING CREDIT CARD LOAN PRODUCTIVITY TO BANKING DEREGULATION

	Dependent Variable Credit card loan productivity
Interstate banking indicator	0.1197
	(0.0495)**
Intrastate branching indicator	−0.0253
	(0.0444)
N	735
R^2 (within)	0.25
R^2 (overall)	0.13

NOTES.— Sample: 1980-1994. The results are based on a balanced panel of all states excluding Delaware and South Dakota. State and year fixed effects are included. The dependent variable, which proxies for the introduction of new screening technologies, is measured as the log of credit card loans (in thousands) over the number of full-time equivalent employees (average over state banks). The interstate banking and intrastate banking indicators take the value of one starting the year in which the state allows interstate banking and intrastate branching, respectively, and zero otherwise. The regression includes personal income growth and a lag, as well as the lagged unemployment rate, in order to control for demand factors. †significant at 10%; *significant at 5%; ** significant at 1%.