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Entrepreneurship and Bank Credit Availability

SANDRA E. BLACK and PHILIP E. STRAHAN*

ABSTRACT

The literature is divided on the expected effects of increased competition and consolidation in the financial sector on the supply of credit to relationship borrowers. This paper tests whether policy changes fostering competition and consolidation in U.S. banking helped or harmed entrepreneurs. We find that the rate of new incorporations increases following deregulation of branching restrictions, and that deregulation reduces the negative effect of concentration on new incorporations. We also find the formation of new incorporations increases as the share of small banks decreases, suggesting that diversification benefits of size outweigh the possible comparative advantage small banks may have in forging relationships.

OVER THE PAST TWO DECADES, the U.S. financial sector has been reshaped by rapid technological innovation and deregulation. In the 1970s, traditional financial intermediaries, mainly banks, provided the lion's share of credit to nonfinancial companies. At that time, banks had the advantage because they were protected from competitive pressures; price competition was limited by Regulation Q, and entry into banking markets was limited by restrictions on in-state branching and interstate banking.

All of this changed over the past 25 years. Starting in the latter half of the 1970s, the U.S. banking system began to be reshaped, both by technological innovations and by the removal of many of these constraining regulations. In the early 1980s, for example, interest rate ceilings were largely removed, allowing banks to compete more vigorously for funds. New technologies like the automated teller machine also enhanced competition within banking, and innovations such as the cash management account offered by nonbank financial companies enhanced competitive pressures from outside the industry. By the end of the 1980s, banks had lost substantial ground to nonbank financial institutions and capital markets; commercial paper and bonds, for example, now exceed bank loans in importance (Figure 1).

During the same period, restrictions on banks' ability to expand into new markets were lifted by state-level legislative initiatives allowing both branching across the state and allowing interstate banking—that is, cross-state

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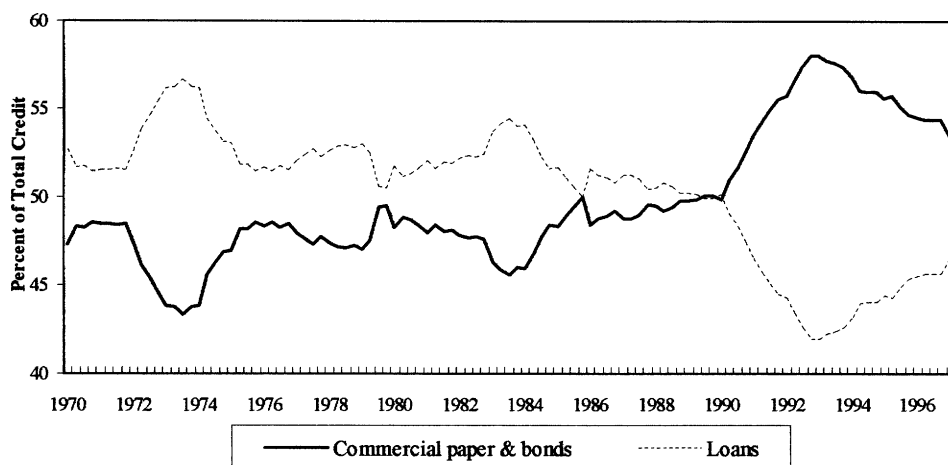


Figure 1. Credit extended to business is becoming more liquid (CP, bonds, loans). Bonds include municipal securities and corporate bonds. Loans include bank loans, other loans, and mortgages.

ownership of bank assets (see Jayaratne and Strahan (1998)). By the early 1990s, almost all states had removed their restrictions on branching and interstate banking (Kroszner and Strahan (1999)). These changes were codified at the national level in 1996 when Congress passed the Interstate Banking and Branching Efficiency Act. Banks may now branch not only within states but also across state lines in most cases, and bank holding companies may buy banks anywhere in the United States.

These technological and regulatory changes not only enhanced the openness and competitiveness of banking markets, but they also set the stage for rapid growth of expansion-minded banks. The banking industry has been consolidating on a nationwide basis, dramatically reducing the importance of small banks (Table I). In the middle of the 1970s, for example, banks with assets under \$100 million (in 1993 dollars) held about 24 percent of all assets, while banks with under \$500 million in assets held about 48 percent of the total. By the middle of the 1990s, these shares had fallen to 15 and 34 percent, respectively. Over the same time, there has been no hint that this consolidation has increased concentration, or retarded competition, in local banking markets.¹ As Table I also shows, the Herfindahl–Hirschmann Index (HHI) of concentration in local markets has remained very constant over this long period of deregulation. Banks have been expanding into new markets rather than combining forces with other banks in their old markets.

But there may be a dark side to this history. Recent theoretical studies have argued that increased competition can hurt small and young firms by reducing the incentive for banks to forge long-term relationships with them.

¹ For evidence that more concentrated banking markets are less competitive, see Berger, Demsetz, and Strahan (1999).

Table I

Trends in Small Bank Market Share and Local Concentration

This table reports the unweighted average across states of the share of assets held by small banks and the local HHI. A small bank here is defined as a bank with \$100 (\$500) million in assets or less, in 1993 dollars. The local HHI equals the sum of squared deposit market shares across all banks operating in a Metropolitan Statistical Area (MSA). For states with more than one MSA, we average the local HHI across all MSAs, weighted by total deposits in each MSA. Figures are computed by the authors from annual *Reports of Income and Condition*.

	Share of Assets Held by Banks with Assets Less Than \$100 Million	Share of Assets Held by Banks with Assets Less Than \$500 Million	Local Deposit-Based Herfindahl-Hirschmann Index
1976	0.239	0.477	0.198
1977	0.237	0.472	0.192
1978	0.227	0.463	0.187
1979	0.225	0.464	0.184
1980	0.229	0.464	0.183
1981	0.235	0.466	0.186
1982	0.232	0.467	0.189
1983	0.223	0.466	0.190
1984	0.211	0.448	0.184
1985	0.203	0.435	0.192
1986	0.195	0.417	0.192
1987	0.182	0.402	0.196
1988	0.183	0.395	0.196
1989	0.180	0.385	0.191
1990	0.173	0.380	0.193
1991	0.170	0.373	0.198
1992	0.164	0.365	0.192
1993	0.157	0.358	0.196
1994	0.150	0.344	0.190

In competitive markets, it may be difficult for borrowers to commit to maintaining a long-term relationship, so lenders may be less willing to offer credit on good terms early on. Consolidation also has its potential downside, again for smaller, younger firms looking for credit. Small banks have traditionally been important lenders to small firms, and some authors have argued that this role reflects their comparative advantage in relationship lending. Small banks, the argument goes, are better than large banks at relationship lending that depends on “soft” information. Large banks, in contrast, specialize in transaction lending to more mature firms that depends on “hard” data (e.g., audited financial statements) where less discretion is involved.

While there may be theoretical reasons why increased competition and consolidation could reduce credit availability to small and new businesses, one can argue the other side as well. The first-order effect of banking competition is to spur innovation and force prices closer to marginal costs. This process should help all borrowers (and depositors, too). Increased bank size that comes with consolidation also ought to lower lending costs overall, both

because size reduces the need to hold costly capital, and because banks' incentives to monitor their borrowers effectively are enhanced when their probability of failure is reduced through diversification (Diamond (1984)). Whether the advantages of competition and consolidation offset their potential costs to small and young firms, then, is an empirical question, and the empirical evidence (reviewed below) is decidedly mixed.

Have moves toward more competition and consolidation in the financial sector helped or hindered entrepreneurship by limiting the availability of credit to small and young firms? We attempt to resolve this question by estimating how the rate of new business incorporations changed with enhanced competition and consolidation following deregulation in the banking industry. This is an admittedly indirect approach. Data on lending to small and young firms over a relatively long span of time is not available. Thus, our empirical strategy boils down to linking measures of the competitiveness and structure of banking to our measure of entrepreneurship in a reduced form.

We find that these developments have unambiguously *raised* the rate of business incorporations. In a simple reduced-form approach, we find higher rates of incorporation following deregulation of both restrictions on branching and restrictions on interstate banking, controlling for business cycle conditions. Moreover, states with more concentrated local banking markets have lower rates of incorporation, and when these states opened their local markets to external competition by removing restrictions on branching, the rate of incorporations rose. At the same time, the effect of banking market concentration became insignificant after branching deregulation. Consolidation has also increased the rate of new business incorporations. In particular, new incorporations rose as the share of large banks in a state increased.

The next section discusses the previous research in this area, focusing first on evidence that credit availability generally is an important determinant of entrepreneurship, and then describing in greater detail the theoretical and empirical evidence on how competition and consolidation in financial services may affect relationship lending, and, by extension, the rate of new business formation. Section II describes our empirical strategy, and we report the results in Section III. Section IV concludes.

I. Entrepreneurship and Finance

A. Entrepreneurship and Liquidity Constraints

There is a large literature that suggests that finance is important for entrepreneurs. Liquidity constraints place important roadblocks before potential entrepreneurs; individuals with more assets are more likely to become self-employed and to succeed in small businesses. Evans and Jovanovic (1989), for example, find that individuals with more assets are more likely to become self-employed. Holtz-Eakin, Joulfaian, and Rosen (1994a, 1994b) find that individuals who have received large inheritances are more likely

Table II
The Importance of Banks to Small Business

This table reports average use of different kinds of banking services by small business from the 1993 *National Survey of Small Business Finance*. See Cole and Wolken (1995) for details.

Number of Full-time Equivalent Employees	Percentage of Small Firms Using			
	Any Commercial Bank Service	A Checking Account	Any Credit Facility	A Line of Credit
0–1	81	90	42	16
2–4	90	97	55	23
5–9	93	98	67	32
10–19	96	99	76	40
20–49	97	99	78	53
50–99	96	99	86	56
100–499	99	99	88	60

to succeed in running small businesses, and in Holtz-Eakin and Rosen (1999), they find that entrepreneurial activity in Germany is retarded relative to the United States by limited access to capital. Additionally, Hubbard and Gentry (1999a) report that entrepreneurial households hold a substantial share of overall household wealth, and that nonbusiness assets helps predict the likelihood and success of entrepreneurial activity. Huck et al. (1999) find that new businesses rely heavily on credit from informal sources such as business contacts and family, and Avery et al. (1998) find that bank loans to small businesses tend to be personally guaranteed. Finally, Fairlie (1999) finds a lower level of minority-owned businesses, in part because of their lower levels of wealth.² While numerous studies have shown that new business creation is bounded by liquidity constraints, there has been little work focusing on how the structure of the financial sector affects entrepreneurship.

B. Competition, Banks, and Small Business Lending

We know that banks are important to small and young firms in the United States, which suggests a link between bank structure and new business creation. Nearly 90 percent of even the smallest U.S. businesses use banking services. Most have a checking account, and almost half of businesses with fewer than two employees have a credit facility of some kind from a bank or other financial institution (Table II). Not only do small U.S. businesses borrow from banks, but they also tend to concentrate their borrowing at a sin-

² More broadly, Fazzari, Hubbard, and Petersen (1988) argue that access to internally generated cash can raise investment even among large firms because external funds are costly to raise. This interpretation of the relationship between cash flow and investment, however, is controversial (see Kaplan and Zingales (1997)).

gle bank with which they have a long-term relationship (Petersen and Rajan (1994)). The nature of these relationships is an important feature of small business lending; long-term relationships enable banks to collect private information on the credit worthiness of small firms. Recent evidence suggests that the cost of credit is reduced when banks forge relationships with small businesses. Petersen and Rajan find that small firms that have established a relationship with a bank are less likely to use expensive trade credit, and Berger and Udell (1995) find that small firms with banking relationships pay lower interest rates on lines of credit.³

As noted in the introduction, there has been a recent trend toward increased competition in the banking sector. Banks are no longer protected from competition by barriers to in-state branching and interstate banking. Moreover, nonbank financial institutions have become increasingly important providers of credit to new businesses. In recent years, a number of studies have questioned how these developments toward increased competition will affect relationship lending. Competition makes it easier for borrowers to switch lenders, which can reduce the incentive to invest in relationships at the outset. On the other hand, Boot and Thakor (2000) argue that competition may raise the rewards to activities that allow lenders to differentiate themselves from other lenders, thereby raising the incentive to invest in relationships.

Developments toward greater competition have probably reduced the costs of providing credit on average. Conventional analysis of market power would clearly predict that more market openness and an expansion of the number of competitors should lead to reduced prices, making customers better off. As evidence, Jayaratne and Strahan (1998) find declines in average loan prices of about 40 basis points following branching deregulation overall, although they do not look at lending to small business. According to this simple view, entrepreneurial activity ought to be enhanced by increased competition in banking. This view, however, does not account for the importance of relationships in allowing banks and other lenders to extend credit to potential entrepreneurs.

Petersen and Rajan (1995) present a model in which market power *helps* new businesses by allowing banks to forge long-term relationships with them. They argue that with market power, banks can subsidize borrowers during some periods because they can extract rents during other times. In competitive markets, however, firms have access to alternative sources of credit, so banks cannot offer low prices early on because they lack the market power to recover those investments later. As evidence, they show that interest rates on bank loans fall more slowly with the age of the relationship in concentrated markets than in unconcentrated markets, suggesting some intertemporal cross subsidization.⁴ Bonaccorsi di Patti and Dell'ariccia (2001) provide further evi-

³ See also Berger and Udell (1998) and Cole (1998) for evidence on relationship lending.

⁴ One limitation of this evidence is that data from the *National Survey of Small Business Finance* are cross-sectional. Thus, Petersen and Rajan cannot follow a given lending relationship over time. Rather, they can only compare firms with short relationships against other firms with longer banking relationships.

dence along these lines. They find that Italian firms that are more opaque (e.g. firms with fewer physical assets) may benefit more (or are harmed less) from concentrated banking markets than firms that are less opaque.

Other evidence is less supportive that competition reduces the incentive for banks to invest in private information and make relationship loans. While Cetorelli and Gambera (2001) find that industries that rely heavily on external finance grow faster in countries with concentrated banking systems than they do in countries with more open and competitive banking, they find a *negative* overall effect of banking concentration on economic growth. Fisman and Raturi (2000) use data from five African countries to show that trade credit is more prevalent when suppliers are in competitive industries.

Recent cross-country evidence also suggests that banking competition fosters a more competitive and open industrial sector, particularly for bank-dependent sectors (Cetorelli (2001)). Cetorelli argues that banks with market power may favor firms with whom they have already established long-term relationships, thereby reducing credit availability to potential new firms who threaten to compete with incumbents and render the bank's loans to those incumbents less valuable. Thus, even though concentration in banking may raise the rewards to investments in long-term relationship, banking concentration may still harm potential entrepreneurs looking to start new businesses.

Given the uncertainty in both the theoretical and empirical literature, enhanced competition could plausibly help *or* hinder entrepreneurs' access to credit. Our empirical tests attempt to resolve this uncertainty by looking directly at how changes in the structure of the U.S. banking industry that enhanced the openness of markets and raised competitiveness have affected entrepreneurial activity (i.e., new business incorporations).

C. Consolidation and Entrepreneurial Activity

At the same time that it enhanced competition, deregulation and consolidation in banking have led to a decline in the importance of small banks (Figure 2). A number of recent studies have argued that small banks possess a better technology for relationship lending than large banks. Berger and Udell (1996), for example, argue that because of the importance of long-term financial relationships, the technology of lending to small businesses differs fundamentally from the technology of other types of lending. Larger firms with well-established track records may be able to borrow based on readily observable information. Similarly, most residential real estate, as well as consumer lending, is now based on credit scoring models. On the other hand, small business (relationship) loans may require tighter control and oversight over loan officers by senior management than do loans based on simple ratio analyses or credit scoring models. As a consequence, the complexity of large banks may lead to organizational diseconomies that make relationship loans more costly. In contrast, they argue that senior management of small banks

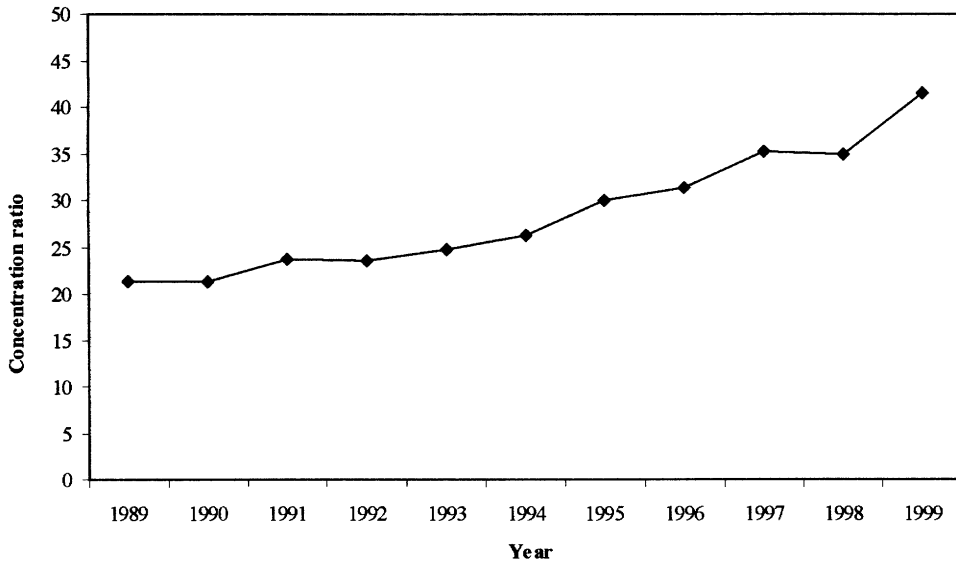


Figure 2. Concentration ratio of the largest eight banking organizations in the United States. The concentration ratio equals the share of total assets held by the largest eight banking organizations in the United States. A banking organization is a top-tier bank holding company or a stand-alone bank.

can monitor lending decisions closely, so they can authorize more nonstandard, relationship loans.⁵

The stylized fact that motivates this idea is that small banks hold a larger fraction of their assets in small business loans than large banks do. However, this cross-sectional pattern may reflect small banks' inability to lend to large firms, rather than large banks' inability to lend to small firms. A small bank can only remain well diversified if it avoids large loans. Moreover, regulations restrict bank lending to a single borrower to 10 to 15 percent of capital (Spong (2000)). So, for instance, regulations prevent a bank with \$100 million in assets (a small bank) and \$10 million in capital from making any loan greater than \$1.5 million. Since the cross-sectional relationship between bank size and small business lending is difficult to interpret, a number of recent papers have estimated the effects of mergers and acquisitions on small business lending. However, the results have been mixed.⁶

⁵ In fact, Cole, Goldberg, and White (1999) and Berger, Miller, Petersen, Rajan, and Stein (2002) find that large banks are more reliant on observable firm characteristics in making lending decisions than small banks.

⁶ Some papers find that lending to small business increases when small banks are acquired, suggesting the increased scale increases a bank's willingness to lend, while others find declines in lending following mergers. Our results support this first set of papers. See Keeton (1996, 1997); Peek and Rosengren (1996, 1998); Strahan and Weston (1996, 1998); Craig and dos Santos (1997); Kolari and Zardkoohi (1997a, 1997b); Walraven (1997); Zardkoohi and Kolari (1997); Berger et al. (1998, 1999); Jayaratne and Wolken (1999); and Sapienza (2002).

Strahan and Weston (1998) argue that size-related diversification may offset the potential organizational diseconomies in relationship lending. Diamond (1984) shows theoretically that the costs associated with delegating the monitoring of borrowers from the principal (depositors) to the agent (the bank) decline with diversification because diversification makes the bank more transparent to the depositor. A large bank's superior ability to diversify credit risks across borrowers reduces the (agency) cost of lending to risky and opaque borrowers. Thus, large banks may be lower cost lenders generally than smaller banks.⁷

If small banks really can provide relationship loans at lower cost than large ones, we ought to find that recent consolidation in banking, and the associated decline in small banks, has reduced the amount of entrepreneurial activity. In contrast, if large banks are lower cost lenders than small ones overall, and if there are no important diseconomies in relationship lending, then we ought to see just the opposite.

II. Empirical Methods and Data

Our empirical approach is to estimate how entrepreneurial activity in a state/year varies with measures of credit supply conditions related to the theories described above, and how entrepreneurial activity varies with measures of demand conditions (mainly national and state business-cycle factors). By using state-level aggregates in a panel data set, we can exploit changes in restrictions on banks' ability to expand both within and across state lines. Restrictions on bank expansion across geographical boundaries go back to the 19th century. Although there was some deregulation of branching restrictions in the 1930s, most states either prohibited branching altogether (the "unit banking" states) or limited branching until the 1970s, when only 12 states allowed unrestricted statewide branching. Between 1970 and 1994, however, 38 states deregulated their restrictions on branching.⁸

In addition to facing restrictions on in-state branching, the Douglas Amendment to the 1956 Bank Holding Company Act prohibited a bank holding company from acquiring banks outside the state where it was headquartered unless the target bank's state permitted such acquisitions. Since no state allowed such transactions in 1956, the amendment effectively barred interstate banking organizations. Starting in the earlier 1980s, many states began to enter regional or national reciprocal arrangements whereby their banks could be bought by any other state in the arrangement. This history

⁷ As evidence, Strahan and Weston show that lending to small businesses increases after small banks are acquired. Berger et al. (1998) also find increases in small business lending after small banks are acquired due to increased lending by other banks operating in the same market as the consolidating banks.

⁸ While branching was generally restricted, banking companies could expand in some states by forming multibank holding companies (BHCs).

presents us with a convenient laboratory to explore how entrepreneurship has been affected by the increased competition and rapid consolidation in banking that followed state-level deregulation.

A. Measuring Entrepreneurial Activity in a State

Our measure of entrepreneurial activity is based on a variable related to the rate of business creation in a state: the log of new business incorporations per capita during the year, which is compiled annually by Dun and Bradstreet (D&B). This series comes from the individual states and is available back into the 1960s; however, our analysis begins in 1976 due to limits to other variables in the model.⁹ (Summary statistics for the new business series, along with the other variables in the model, are reported in Table III.)

D&B also collects data on business “starts” as an offshoot of their credit database. D&B counts a firm as a start in a given year if it appears on the credit database for the first time in that year and if the firm’s year of birth occurred three years earlier or less. The business starts series only becomes available after 1985. Since our focus is on the technological and regulatory changes that go back to the middle of the 1970s, this variable is less useful than the incorporations data.¹⁰ However, the incorporations and starts data are highly correlated across states, as we would expect. For example, the cross-state correlation ranged from a low of 0.58 in 1994 to a high of 0.71 in 1988. There is one important exception, however. The number of incorporations in Delaware is about 20 times the average number of incorporations in the other states (per capita), while the number of starts in Delaware is very close to the average. This difference reflects favorable legal treatment of incorporations in that state. In addition, measures of banking structure in both Delaware and South Dakota are skewed by the presence of credit card banks in those states. We therefore drop both of these states from all of our regressions.¹¹

⁹ Although more recent data are available, we end our estimation in 1994 because passage of the Interstate Banking and Branching Efficiency Act opened the possibility for banks to operate across state lines. Thus, our use of state-level aggregates would become problematic after 1994.

¹⁰ The starts series also responds negatively to current business conditions and positively to lags of business conditions. This pattern suggests that the series is driven in part by demand for credit by cash-constrained young firms, as well as from changes in the underlying rate of new business creation.

¹¹ We compared incorporations per capita and starts per capita with the number of new establishments per capita, which is available from the Small Business Administration starting in 1989. From 1989 to 1994, the cross-state correlation between incorporations and new establishments ranges from 0.53 to 0.58 and cross-state correlation between starts and new establishments ranges from 0.41 to 0.68. Since the data on new establishments are only available during the 1990s, however, they are not suited to the panel methods used here, particularly since we want to focus on the effects of state-level branching and interstate banking deregulation that had been nearly completed by the end of the 1980s.

Table III
Summary Statistics

This table reports summary statistics for variables included in our regression analysis of new incorporations. The regression is based on a balanced panel data set for all states except Delaware and South Dakota from 1976 to 1994. New incorporations are based on state-reported data, compiled by Dun & Bradstreet. The postbranching indicator equals one during the years after a state permits branching by merger and acquisition; the postinterstate banking indicator equals one during the years after a state permits interstate banking. Personal income growth is reported by the Bureau of Economic Analysis. The Herfindahl Index is the sum of squared market shares based on deposits for all MSAs in the state. For states with more than one MSA, we average this across MSAs weighted by depositors. This series is constructed by the authors, from the FDIC's *Summary of Deposits*. The fraction of a state's total banking assets held by small banks and the fraction of assets held by banks in different capital-asset ratio categories are constructed by the authors from banks' financial statements in the *Reports of Income and Condition*. The share of workers in a state and year with a college degree or more is compiled from the March *Current Population Survey*. The banking productivity measures are also constructed by the authors from data in the *Reports of Income and Condition*. For this calculation, "business loans" is defined as commercial and industrial loans plus commercial real estate loans. FTE employees are full-time equivalents.

	Mean	Standard Deviation
Number of new incorporations (per 1000 people)	2.448	1.327
Postbranching indicator	0.564	0.496
Postinterstate banking indicator	0.420	0.494
Personal income growth	0.083	0.040
Deposit Herfindahl index (average of MSAs in state)	0.191	0.067
Fraction of assets in small banks (<\$100 million)	0.203	0.173
Fraction of assets in small banks (<\$50 million)	0.095	0.098
Fraction of assets in small banks (between \$50 & \$100 million)	0.108	0.083
Fraction of assets in small banks (between \$100 & \$500 million)	0.238	0.128
Share of banks with capital/assets < 2%	0.005	0.020
Share of banks with capital/assets between 2% & 4%	0.022	0.067
Share of banks with capital/assets between 4% & 6%	0.289	0.212
Share of banks with capital/assets between 6% & 8%	0.411	0.173
Share of population with a college degree	0.233	0.048
Bank productivity: Log of business loans/FTE employees	5.763	0.497
Bank productivity: Log of total loans/FTE employees	6.623	0.448
<i>N</i>	823	823

B. Explanatory Variables

B.1. Competition and Market Power

Exogenous changes in competition are often difficult to observe empirically. Banking deregulation, however, provides a nice way to examine the effects of changes in the competitive environment on entrepreneurship. Deregulation of restrictions on bank expansion, both within and across states, has been shown to improve bank efficiency, to enhance corporate control,

and to limit market power.¹² The history of deregulation is particularly useful from an empirical standpoint because states deregulated both restrictions on interstate banking and within-state branching at different times. Thus, we can look at the effects of both types of deregulation in the panel model, even after controlling for both time effects and state fixed effects. We capture the effects of each type of deregulation by including an indicator equal to one after a state permits branching by merger and acquisition within its borders, and another indicator equal to one after a state permits interstate banking (i.e., after a state allows bank holding companies in other states to buy their banks).

The two types of deregulation are somewhat distinct in their effects. Deregulation of restrictions on branching reduces entry barriers into new markets and also enhances the corporate takeover market by making it easier for banks to gain control over other bank's assets. With branching deregulation, a bank may enter a new market, either by buying branches or by opening new branches. Also, the cost of acquiring another bank is reduced because an acquiring bank may merge the target bank's operation into its existing franchise. By reducing entry barriers, branching deregulation reduces banks' ability to raise prices above costs in concentrated markets. Interstate banking deregulation, however, only affects who can own bank assets. Prior to deregulation, only bank holding companies located within a state could buy banks chartered in that state, while, after deregulation, bank holding companies operating in other states could do so. Thus, interstate banking deregulation can be interpreted as a positive innovation in the openness of the corporate takeover market.^{13,14}

In addition to looking at changes in competition induced by deregulation of the industry, we also look at measures of competition directly by including a measure of local market concentration, equal to the deposit HHI, calculated as the deposit-weighted average of the HHI indexes of the Metropolitan Statistical Areas (MSAs) in a state/year. The Herfindahl index for each local market is defined as the sum of squared market shares, where market shares are based on branch-level deposit data from the FDIC's *Summary of Deposits* data set. So, for example, if a bank owned 10 branches within an

¹² On efficiency and regulation, see Flannery (1984) and Jayaratne and Strahan (1998, 1999); on corporate control, see Prowse (1997) and Schranz (1993); on market power, see Evanoff and Fortier (1988) and Keeley (1990).

¹³ Hubbard and Palia (1995) analyze the effects of interstate banking deregulation on compensation of bank CEOs. They find a higher level of pay and a greater sensitivity of pay to performance following this type of deregulation.

¹⁴ Note that deregulation may not be strictly exogenous to demand for credit from entrepreneurs. States with more entrepreneurs may be more likely to deregulate their banking systems in order to offer better banking services to the entrepreneurial sector. In fact, Kroszner and Strahan (1999) show that states with more small firms deregulated restrictions on branching earlier. Nevertheless, the other results regarding the effects of bank structure remain even if we drop the deregulation variables. In addition, we estimated the model during the pre-deregulation period only and found similar results for the effects of both concentration and bank size as those reported below.

MSA, this bank's market share would equal the sum of all of its deposits in those 10 branches, divided by the total deposits held by all bank branches within that market. For a market with a single bank owning all of the branches, the HHI would equal one, whereas in a perfectly atomistic market, the HHI would approach zero. In one set of specifications, we include the branching indicator, the HHI, and their interaction to test whether declines in entry barriers affect the relationship between concentration and new business incorporations.¹⁵

B.2. Consolidation and Small Bank Market Share

To test whether consolidation and the associated decline in small banks' market share has hurt entrepreneurs, we include the share of total assets held by small banks in a state/year. We define a bank as "small" if it holds \$100 million or less in assets (in 1993 dollars). Thus, the numerator of the small bank market share equals the sum of all bank assets held by banks with total assets below \$100 million; the denominator equals the sum of all bank assets in the state/year. We also test the sensitivity of our results to this definition, allowing for differential effects by the fraction of assets held by different-sized banks in the state. Data on bank size come from the *Reports of Income and Condition* (The "Call Report").¹⁶

B.3. Bank Financial Condition

While not the focus of our study, the financial health of the banking industry may affect the availability of credit and, by extension, entrepreneurship and the rate of business creation. In an environment where their liabilities are insured, weak banks have an incentive to look for risky lending opportunities, such as lending to new businesses. Depositors holding claims at poorly capitalized banks have little or no incentive to prevent this risk-seeking behavior. This moral hazard problem became severe during the early and mid-1980s in the thrift industry here in the United States.¹⁷ In contrast, banks may reduce their risky lending in response to a "capital crunch." Partly in response to concerns about bank solvency, the Basle Accord of 1988

¹⁵ Of course, one might prefer to use a loan-based measure of market concentration for these purposes, since we are interested in how competition affects lending. Unfortunately, unlike deposits, loan data are not available at the branch level, making it impossible to compute MSA-level market shares based on loans.

¹⁶ In an earlier draft, we also tested whether the amount of merger and acquisition activity in a state/year was associated with declines in new business incorporations by adding the ratio of assets purchased via M&A during a state/year to total assets in the state to our model. The coefficient on this variable was not statistically significant.

¹⁷ During the early 1980s, the moral hazard problem associated with deposit insurance may have been particularly acute because declines in bank charter value increased their incentive to engage in high-risk activities (Keeley (1990) and Demsetz, Saidenberg, and Strahan (1996)). In addition, moral hazard problems were exacerbated by the explicit "too big to fail" doctrine articulated in 1984 in the wake of a large bank failure (O'Hara and Shaw (1990)).

led to formal capital adequacy standards for all internationally active banks. The Accord tightened capital standards and linked these standards explicitly to a bank's portfolio risk (Demsetz and Strahan, 1995). Concern about banking and thrift solvency in the United States led to passage of the Financial Institutions Reform, Recovery, and Enforcement Act in 1989 and the FDIC Improvement Act in 1991. Each of these laws tightened the regulation of financial institutions in the United States, in part to mitigate perceived problems with deposit insurance and financial institutions' propensity to take risks. The greater emphasis on capital regulations suggests that poorly capitalized banks may have lent less than well-capitalized banks to risky, small businesses.

The credit crunch view suggests that declines in bank capital will lead to restrictions in lending, while the moral hazard view predicts the opposite. Both ideas may have some relevance, and their effects may depend on the degree of financial deterioration. For example, it may be that when financial conditions become critically low, such as they were in New England during the early 1990s, regulatory pressures become sufficiently important to induce banks to cut back on their lending. At low, but not critically low, levels of capital, however, moral hazard effects may dominate. To allow for differential effects of bank financial condition, we include variables measuring the share of all banking assets in a state/year held by banks with capital-assets ratios in the following categories: less than two percent, two to four percent, four to six percent, and six to eight percent. Data on both capital and assets are collected from the Call Report.

B.4. New Technologies and Bank Lending

Recent evidence by Petersen and Rajan (2002) suggests that the growing use of information technologies in banking has changed the nature of small business lending. They find that the average distance between small business borrowers and their lenders has been increasing over time as a result of better information technologies, suggesting that banks lend more at arm's length now than in the past. A concrete example of this phenomenon has been the success of credit scoring models to underwrite loans to small businesses. Credit scoring models use widely available information about borrower quality, such as the credit history of the proprietor, to estimate the likelihood that a particular small business loan will default; loan applications with a sufficiently low default likelihood (high "score") are granted. Such models are very common for credit card lending and work in very similar ways when applied to small business loans (Mester (1997)). These innovations have increased efficiency in lending; institutions are able to make decisions at lower cost and no longer need to be geographically close. Nevertheless, these technologies may reduce the amount of financial and human capital devoted to *relationship* loans. Thus, even if lending costs fall on average, it may be that smaller relationship borrowers find credit less available as a result of the new technologies.

Unfortunately, there are no direct measures of banks' use of, or investment in, information technology. Instead, we follow Petersen and Rajan (2002) and use a proxy for bank labor productivity instead, equal to the log of the ratio of all business loans made by banks in a state/year to total full-time equivalent (FTE) workers in banking. We define business loans as commercial and industrial loans plus commercial real estate loans. As a second proxy for productivity, we use the log of total loans divided by FTE workers. Both variables come from data compiled on the Call Report.

B.5. Demand-Side Variables

In an effort to isolate supply effects, we also include variables to control for demand conditions. First, we use personal income growth in the state, collected from the Bureau of Economic Analysis, to account for business cycle factors. We allow for an extensive lag structure, as there is evidence that business cycles affect new business incorporations with many lags. Moreover, by adding many lags of state income growth to the regression, we are attempting to purge our banking variables of variation stemming from demand-side conditions so that their coefficients reflect changes in credit supply conditions. Second, we include the share of workers in the state with a college education or more, from the *March Current Population Survey*.¹⁸ Finally, we include both state and time fixed effects.¹⁹ For all of the regressions, all but one of our explanatory variables are measured as of the end of the year prior to the year in which we measure the rate of business incorporations. The one exception is the personal income growth variable, which is measured during the same year as the dependent variable.

III. Results

A. Basic Specifications

Table IV reports our most basic specification, focusing on the total effect of bank deregulation on new incorporations. Column 1 shows the results when we look at the relationship between the deregulation indicators and new incorporations with only state and time effects. Both branching deregulation and interstate banking deregulation appear to have a positive effect

¹⁸ Davis, Haltiwanger, and Schuh (1990) show that job creation in new, small plants varies procyclically with the business cycle, although less so than job creation in older plants. Evans and Leighton (1989) find that entrepreneurial activity is higher among better educated people. Bates (1990) reports that highly educated people are more likely to start businesses that survive.

¹⁹ Differences in tax rates, for example, may affect the incentive for entrepreneurial activity; including the state effects should eliminate much of this variation (see Hubbard and Gentry (1999b) for evidence). We have estimated our models using measures of the state tax burden (sales tax receipts/state income and corporate + individual income tax receipts/state income); inclusion of these variables does not change the statistical or economic significance of any of our results. We do not include these results because we lose two years of data when we include the tax variables.

Table IV
Panel Regression Relating Incorporations
to Deregulation Indicators

This table reports regressions based on a balanced panel data set for all states except Delaware and South Dakota from 1976 to 1994. New incorporations are based on state-reported data, compiled by Dun & Bradstreet. The postbranching indicator equals one during the years after a state permits branching by merger and acquisition; the postinterstate banking indicator equals one during the years after a state permits interstate banking. Personal income growth is reported by the Bureau of Economic Analysis. The R^2 (within) reports the R^2 after removing (i.e., de-meaning) the state fixed effects, while the R^2 (overall) reports the R^2 before removing the state fixed effects.

Dependent Variable	Log(New Incorporations per Capita)	
Postbranching indicator	0.043* (0.019)	0.038* (0.016)
Postinterstate banking indicator	0.111* (0.024)	0.079* (0.021)
Personal income growth _{<i>t</i>}	—	1.31* (0.19)
Personal income growth _{<i>t</i>-1}	—	1.12* (0.18)
Personal income growth _{<i>t</i>-2}	—	0.73* (0.17)
Personal income growth _{<i>t</i>-3}	—	0.81* (0.15)
Personal income growth _{<i>t</i>-4}	—	0.66* (0.16)
Personal income growth _{<i>t</i>-5}	—	0.66* (0.16)
Personal income growth _{<i>t</i>-6}	—	0.77* (0.15)
Share of population, college degree	—	0.37* (0.21)
<i>N</i>	823	823
R^2 (within)	0.367	0.540
R^2 (overall)	0.884	0.915

* Statistically significant at the 10 percent level.

on new incorporations, suggesting that increased competition from opening up banking markets leads to an increase in entrepreneurship. Column 2 shows the results when we include demand-side variables, including contemporaneous and six lags of personal income growth, along with the share of the population with a college degree. Personal income growth enters with a significant number of lags, and, as expected, the rate of incorporations is strongly procyclical. While the inclusion of these variables does reduce the coefficients on the deregulation indicators somewhat, they remain statistically significant.

Not only are the effects of deregulation statistically significant, they are economically significant as well. Since the dependent variable is measured in logs, the results suggest that following deregulation of restrictions on branching, the number of new incorporations per capita rose by 3.8 percent; following deregulation of restrictions on interstate banking, the number of new incorporations per capita rose by 7.9 percent.²⁰ This effect is quite large relative to the effect of the state business cycle on new business incorporations. For example, an increase in personal income growth of one percent would generate an increase in incorporations of a little more than one percent initially, and this increase would eventually peter out after about six years.

Table V reports the results when we introduce other measures of banking structure in a state/year. In this more complicated model, the coefficients on both branching deregulation and interstate banking shrink toward zero; the coefficient on the branching indicator in column 1 falls by 0.028 and loses statistical significance, while the coefficient on interstate banking falls by 0.019 but remains statistically significant. These changes occur because both small bank market share and local market concentration decline following deregulation and because these two variables are both negatively related to new incorporations (discussed below). For example, in a regression of the share of a state's assets held by banks with assets below \$100 million on the two regulatory indicator variables (along with state and time fixed effects), the coefficient on the branching deregulation indicator equals -0.039 and the coefficient on the interstate banking indicator equals -0.022 . Both of these coefficients are statistically significant at the one percent level. Thus, the market share of small banks is 6.1 percentage points lower, on average, after both forms of deregulation than before. These structural changes therefore help explain the effects of deregulation.

Columns 1 and 2 of Table V reveal a strong *negative* relationship between banking market concentration and new business incorporations. The estimated coefficients imply that a standard deviation increase in bank concentration is associated with a decline in business formation of about three percent. Before continuing, it is worth noting that while there is no overall trend toward increased competition during our sample (Table I), some states experienced increases and some experienced decreases. For example, the local HHI in Massachusetts increased by 0.098 from 1976 to 1994, while the HHI in Oregon fell by 0.080. This within-state variation in the HHI is, of course, necessary for identification, since our model removes any cross-sectional variation with the state fixed effects. This result supports the conventional view that banks with market power limit the supply of loans to potential entrepreneurs looking to start new businesses. The result runs counter to arguments that market power helps new firms by raising the rewards to the formation of long-term relationships.

²⁰ In all the following results, we are including personal income growth and the six lags along with the share of the population in the state with a college education. These coefficients are available upon request from the authors.

Table V
Panel Regression Relating Incorporations to Deregulation
Indicators and Measures of Banking Structure

This table reports regressions using a panel data set for all states except Delaware and South Dakota, 1976 to 1994. New incorporations are based on state-reported data, compiled by Dun & Bradstreet. The postbranching indicator equals one during the years after a state permits branching by M&A; the postinterstate banking indicator equals one during the years after a state permits interstate banking. Personal income growth is reported by the Bureau of Economic Analysis. The Herfindahl Index is the sum of squared market shares based on deposits for all MSAs in the state. This series is constructed by the authors, from the FDIC's *Summary of Deposits*. The fraction of a state's total banking assets held by small banks and the fraction of assets held by banks in different capital-asset ratio categories are constructed by the author from banks' financial statements in the *Reports of Income and Condition*. The share of workers in a state and year with a college degree or more is compiled from the March *Current Population Survey*. The R^2 (within) reports the R^2 after removing (i.e., de-meaning) the state fixed effects, while the R^2 (overall) reports the R^2 before removing the state fixed effects.

Dependent Variable	Log(New Incorporations per Capita)			
Postbranching indicator	0.010 (0.016)	0.011 (0.016)	-0.067* (0.035)	-0.064* (0.036)
Postinterstate banking indicator	0.060* (0.020)	0.061* (0.020)	0.065* (0.020)	0.066* (0.020)
Deposit Herfindahl index (average of MSAs in state)	-0.492* (0.172)	-0.480* (0.173)	-0.798* (0.212)	-0.780* (0.214)
Herfindahl index * postbranching indicator	—	—	0.421* (0.171)	0.412* (0.174)
Fraction of assets in small banks (<\$100 million)	-0.725* (0.138)	—	-0.680* (0.139)	—
Fraction of assets in small banks (<\$50 million)	—	-0.496* (0.283)	—	-0.558* (0.283)
Fraction of assets in small banks (between \$50 & \$100 million)	—	-0.923* (0.252)	—	-0.792* (0.257)
Fraction of assets in small banks (between \$100 & \$500 million)	—	0.065 (0.100)	—	0.068 (0.100)
Share of banks with capital/assets < 2%	-0.827* (0.244)	-0.812* (0.246)	-0.812* (0.243)	-0.796* (0.245)
Share of banks with capital/assets between 2% & 4%	0.659* (0.090)	0.664* (0.090)	0.658* (0.089)	0.663* (0.090)
Share of banks with capital/assets between 4% & 6%	0.126* (0.053)	0.128* (0.053)	0.142* (0.053)	0.144* (0.053)
Share of banks with capital/assets between 6% & 8%	0.059 (0.053)	0.061 (0.053)	0.068 (0.053)	0.068 (0.053)
<i>N</i>	823	823	823	823
R^2 (within)	0.602	0.603	0.605	0.606
R^2 (overall)	0.927	0.927	0.927	0.928

* Statistically significant at the 10 percent level.

The model in Table V, column 1, also reveals a negative and statistically significant relationship between the fraction of assets in small banks and new incorporations. A one standard deviation decrease in the small bank market share is associated with an increase in incorporations of about 12 percent.²¹ In column 2, we break down the small bank market share into three categories: the share of assets in banks with fewer than \$50 million in assets, the share of assets in banks with \$50 to \$100 million, and the share of assets in banks with assets between \$100 and \$500 million. Here, we find that the effect of size is fairly consistent up to about \$100 million in assets, and then becomes statistically insignificant. In fact, we cannot reject the hypothesis that the coefficients on the first two small bank market share variables are equal to each other. This result suggests that credit availability increases with bank size up to about \$100 million and then becomes insensitive to size. This finding is broadly consistent with studies of economies of scale in banking done with data during the 1980s and early 1990s, which typically found scale economies up to \$100–\$300 million and constant returns to scale thereafter (see Berger et al. (1999)).

The effects of bank financial condition on our measures of entrepreneurial activity suggest, if anything, that a very weak banking system is hard on new businesses, as states with a high share of banking assets held by banks with capital/assets less than two percent have significantly fewer new incorporations. Note that the share of assets held by banks with a capital-asset ratio above eight percent must be omitted from the equation to avoid singularity. The coefficients therefore measure how incorporations vary as a given share of assets moves from the greater-than-eight-percent group to the group in question. The coefficient on the below-two-percent group suggests that a one standard deviation increase in the share of assets held by critically undercapitalized banks reduces business incorporations by 1.6 percent. While this effect may not seem large, consider that in 1989, the share of assets held by these very weak banks in Massachusetts rose to about 10 percent, while the rate of business incorporations there fell by 14 percent. Our regression estimates suggest that a 10 percent share of assets in the

²¹ One concern with this result is that the share of assets in small banks may rise when the banking sector is doing poorly or when loan demand is weak; hence, the result may have to do with banking sector health or loan demand, rather than differences in loan supply stemming from the share of assets held by banks of different sizes. This concern is particularly important in the fixed-effects model, where results are driven by changes in the variables over time, rather than differences across states. To rule out this interpretation, we first estimated the correlation each year between the small bank share and loan *growth*. We found that in 12 of the years, this correlation was negative, and in 7 years this correlation was positive. In addition, we tested for the effects of small-bank market share on the rate of new incorporations in cross-sectional regressions. These results show that states with more assets held by small banks had lower levels of new incorporations consistently over the 1976 to 1994 period. See Table AI in the Appendix.

less-than-two-percent capital group would be associated with a drop in incorporations of about eight percent.²²

In states where many banks are on the margin—banks with capital/assets between two and four percent or between four and six percent—the rate of business incorporations is *higher*. This result is especially strong in the two to four percent group. A standard deviation increase in the share of assets held by these weak, but not critically undercapitalized, banks is associated with an increase in new incorporations of 4.4 percent. This increasing relationship could reflect the effects of the moral hazard associated with deposit insurance noted earlier.²³

B. Market Power and Deregulation Interactions

While competitive pressures increased following branching deregulation, the first two columns of Table V show no significant change in the rate of incorporations after branching, once we control for the structure of the banking environment. As noted above, because we found significant increases in incorporations following branching in the simple models of Table IV, we infer that the effects of branching deregulation occurred, in part, because of changes in market structure such as declines in the share of small banks and changes in local market concentration. These models, however, do not allow the effects of branching deregulation to depend on the level of *concentration* in local banking markets. Perhaps markets with many banks and competitive behavior were not affected much by lower barriers to entry following branching reform.

To explore the effects of branching deregulation and market power further, we introduce an interaction effect between our branching indicator and local market concentration. Following branching deregulation, banks were permitted to enter new geographical markets. Thus, since branching reform lowered barriers to entry into local markets, concentration should matter less after deregulation than before. Similarly, deregulation of branching should matter more in states that had relatively concentrated local markets prior to deregulation.²⁴

²² We have also estimated our model with a set of interaction terms that allow the coefficients on the capital variables to shift after 1988, the year that the Basle Accord was reached and regulatory scrutiny began to become, perhaps, more vigilant. We do not find evidence that regulatory changes have changed our relationship; the *F*-test on these four interaction terms is not statistically significant at the 10 percent level. Moreover, none of these four coefficients is individually significant either.

²³ A potential concern with our use of state-level data is that the relevant geographical scope of the financial/banking market for entrepreneurs may be larger or smaller than the state. For instance, some entrepreneurs may get financial services from banks in other states. This effect, however, would tend to make our results *understate* the true importance of banking to new business creation. Since we do not have data on entrepreneurship at local levels, we cannot explore the scope of these markets in detail.

²⁴ Interstate banking deregulation does not allow direct entry into new markets; rather, it loosens restrictions on bank ownership. Hence, we leave out the interaction effect between interstate banking and concentration. The effect of this interaction is not statistically significant, and its inclusion does not change the other results.

Table V (columns 3 and 4) reports the results when we interact the deregulation variable with local market concentration. As before, incorporations rose by about six percent following interstate banking deregulation, again consistent with improved efficiency and corporate control in banking helping entrepreneurs start businesses and succeed. The impact of branching deregulation, however, depends on a state's level of banking market concentration; branching has little effect in states with low levels of concentration, but its effect becomes positive as market concentration increases. For example, in states with low concentration (HHI around 0.1)—states such as New Jersey, Oklahoma, and West Virginia—the effect of branching deregulation on new incorporations is slightly negative but not statistically significant (-0.025). For states with concentration near the mean, the effect of branching becomes positive but is not statistically significant. In states with very concentrated local markets, however, incorporations increase significantly after branching. For instance, in states with a local HHI of 0.35 (states such as Alaska, Mississippi, and Oregon), branching deregulation has a large, positive effect, raising the rate of new incorporations by eight percent.

Turning the interaction around, we find a small effect of concentration on new incorporations in deregulated states, with a slope coefficient equal to -0.377 (-0.368 in column 4) that is not statistically significant at the five percent level. But when barriers to entry are high because branching is restricted, concentration comes in with a negative and statistically significant coefficient (at the one percent level). For example, with restricted branching, the slope coefficient on the HHI equals -0.798 (-0.780 in column 4), meaning that a one standard deviation increase in concentration is associated with a five percent reduction in new incorporations. This finding is consistent with recent cross-country evidence in Cetorelli (2001), who finds that the positive association between banking concentration and industrial concentration is attenuated by financial development. In the cross-country context, Cetorelli's result suggests that when faced with competition from the capital markets, banks have a harder time restricting credit access to potential competitors to their existing borrowers. In the context of deregulation in the United States, when banks face potential competition from nonlocal banks threatening to enter via branching, the effects of concentration are again attenuated.

C. New Technologies and Entrepreneurship

As a final test, we estimate whether the advent of information technologies into banking has affected the rate of business incorporations. Since we do not have direct knowledge about banks' investments in information technologies, we model incorporations as a function of banking productivity—the ratio of lending to total FTE workers. This measure may, in part, reflect demand-side shocks that increase lending and lead to temporary increases in measured productivity. Since this effect could bias our results upward, we report the results separately from the main results of the paper. Despite this

Table VI
Panel Regression Relating Incorporations to Deregulation
Indicators, Measures of Banking Structure,
and Bank Productivity

This table reports regressions based on a balanced panel data set for all states except Delaware and South Dakota from 1976 to 1994. New incorporations are based on state-reported data, compiled by Dun & Bradstreet. The postbranching indicator equals one during the years after a state permits branching by merger and acquisition; the postinterstate banking indicator equals one during the years after a state permits interstate banking. Personal income growth is reported by the Bureau of Economic Analysis. The Herfindahl index is the sum of squared market shares based on deposits for all MSAs in the state. This series is constructed by the authors, from the FDIC's *Summary of Deposits*. The fraction of a state's total banking assets held by small banks and the fraction of assets held by banks in different capital-asset ratio categories are constructed by the author from banks' financial statements in the *Reports of Income and Condition*. The share of workers in a state and year with a college degree or more is compiled from the March *Current Population Survey*. The banking productivity measures are also constructed by the authors from data in the *Reports of Income and Condition*. For this calculation, business loans is defined as commercial and industrial loans plus commercial real estate loans. FTE employees are full-time equivalents. The R^2 (within) reports the R^2 after removing (i.e., de-meaning) the state fixed effects, while the R^2 (overall) reports the R^2 before removing the state fixed effects.

Dependent Variable	Log(New Incorporations per Capita)	
Postbranching indicator	-0.039 (0.036)	-0.030 (0.037)
Postinterstate banking indicator	0.059* (0.020)	0.056* (0.020)
Deposit Herfindahl index (average of MSAs in state)	-0.722* (0.211)	-0.676* (0.213)
Herfindahl index * postbranching indicator	0.345* (0.171)	0.315* (0.173)
Fraction of assets in small banks	-0.597* (0.140)	-0.662* (0.138)
Share of banks with capital/assets < 2%	-0.901* (0.243)	-0.874* (0.243)
Share of banks with capital/assets between 2% & 4%	0.633* (0.089)	0.610* (0.090)
Share of banks with capital/assets between 4% & 6%	0.136* (0.053)	0.114* (0.053)
Share of banks with capital/assets between 6% & 8%	0.058 (0.053)	0.039 (0.053)
Bank productivity: log(business loans/FTE employees)	0.101* (0.029)	—
Bank productivity: log(total loans/FTE employees)	—	0.119* (0.036)
<i>N</i>	823	823
R^2 (within)	0.612	0.611
R^2 (overall)	0.929	0.928

* Statistically significant at the 10 percent level.

possibility, note that both of our productivity measures have been rising consistently over time at an annual rate of about one percent. For example, the ratio of business loans per worker rose from \$400,000 (in 1993 dollars) in 1976 to \$540,000 in 1994, and the ratio of total loans per worker rose from \$1.1 million to \$1.3 million over the same period.

We report these results in Table VI. Regardless of our specification (either the log of business lending per FTE or the log of total lending per FTE), increases in our measure of productivity are associated with increases in the rate of new incorporations. The effects are stable across the two measures, and the effects are large, both in the statistical and economic senses. For instance, a standard deviation increase in the ratio of business lending to total FTE workers is associated with an increase in incorporations of about five percent. Thus, despite the fact that banks have been substituting physical capital (data, computers, telephones, etc.) for human capital (loan officers establishing relationships with borrowers) in order to achieve productivity gains over the past few decades, these changes seem to have helped foster entrepreneurship.

IV. Conclusions

The theoretical literature is divided on the expected effects of increased competition and consolidation in the financial sector on the supply of credit to relationship borrowers such as small and new businesses. Our results suggest that policies such as branching and interstate banking reform that fostered competition and consolidation in the banking sector helped entrepreneurship. As evidence, we find that the rate of new incorporations in a state increased significantly following deregulation. We also find that deregulation of restrictions on branching reduced the negative effect of high levels of concentration in local markets. This result makes sense because incumbent banks in previously protected markets must face the potential entry of a large number of competitors following deregulation.

At the same time that banking markets have become more open to competition, the banking industry has experienced nationwide consolidation and a consequent decline in the importance of small banks. We find that the rate of new incorporations in a state increases as the share of small banks decreases. This finding suggests that the diversification benefits of bank size, which reduce delegated monitoring costs, outweigh the possible comparative advantage that small banks may have in forging long-term relationships with borrowers. Consolidation and the associated decline in small bank market share seems to have helped entrepreneurs, not harmed them.

Appendix

Table AI shows cross-sectional regressions of the rate of new incorporations per capita on small-bank share and local market concentration.

Table AI
Cross-sectional Regressions of the Rate of New Incorporations per
Capita on Small-Bank Share and Local Market Concentration

Year	Current Personal Income Growth	Share of Assets in Small Banks	Deposit Herfindahl Index	<i>N</i> <i>R</i> ²
1976	0.609 (1.884)	-0.610* (0.332)	-0.449 (0.898)	47 0.085
1977	2.710 (2.044)	-0.680* (0.319)	0.320 (0.860)	47 0.074
1978	4.020* (1.452)	-1.120* (0.350)	-0.575 (0.888)	47 0.238
1979	3.871* (1.741)	-0.786* (0.324)	-0.766 (0.908)	47 0.226
1980	4.658* (1.452)	-0.408 (0.325)	-0.585 (0.825)	47 0.303
1981	5.293* (1.584)	-1.231* (0.333)	-0.430 (0.858)	46 0.309
1982	6.320* (1.920)	-0.623* (0.313)	-0.023 (0.856)	48 0.293
1983	2.550 (2.606)	-0.729* (0.379)	-0.549 (0.802)	48 0.195
1984	2.548 (2.606)	-0.850* (0.357)	0.053 (0.811)	48 0.204
1985	8.717* (2.901)	-0.541 (0.354)	-0.442 (0.708)	48 0.380
1986	2.494* (2.048)	-1.038* (0.362)	-0.588 (0.758)	48 0.295
1987	3.062 (2.086)	-1.022* (0.355)	-0.978 (0.788)	48 0.337
1988	6.222* (2.441)	-0.656* (0.370)	-1.116 (0.789)	48 0.393
1989	5.799* (2.415)	-1.056* (0.278)	-1.204 (0.829)	48 0.322
1990	4.013 (2.659)	-0.999* (0.319)	-0.748 (0.762)	48 0.195
1991	7.669* (3.005)	-0.988* (0.334)	-0.981 (0.783)	48 0.217
1992	-0.083 (4.270)	-0.636 (0.394)	-0.475 (0.846)	48 0.063
1993	9.094* (3.084)	-0.626 (0.376)	-0.511 (0.762)	48 0.232
1994	3.966 (3.047)	-0.919* (0.406)	0.038 (0.945)	48 0.123

* Statistically significant at the 10 percent level. Standard errors in parentheses.

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