

**FEDERAL RESERVE BANK OF ST. LOUIS**  
**SUPERVISORY POLICY ANALYSIS WORKING PAPER**

Working Paper 2006-01

**U.S. Banking Deregulation and Self-Employment:  
a Differential Impact on Those in Need**

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This draft: June 2006

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# U.S. Banking Deregulation and Self-Employment: a Differential Impact on Those in Need\*

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## Abstract

Starting in 1978, the U.S. banking sector was gradually deregulated in terms of restrictions on geographical expansion. This paper examines the impact of intrastate branching deregulation on (state-specific) self-employment income growth rate. If post-reform changes in the banking structure led to improved lending to previously underserved (potential) businessmen, their self-employment income would accelerate, as banks are the prime source of finance for self-employment. Based on a simple model adopted from Evans and Jovanovic (1989), it is hypothesized that banking deregulation would particularly impact self-employment of discriminated against social groups. Consistent with the hypothesis, cross-state evidence suggests that the growth rate of self-employment income increased after reform, with the effect being more pronounced for women and non-white minorities at the low end of income distribution. Based on the obtained results, this paper suggests that more competitive banking environment after branching reform has mitigated prejudicial discrimination in lending. The analysis casts light on real effects of banking deregulation, on the effect of consolidation in the banking sector on individuals targeted by the Equal Credit Opportunity (ECOA) and the Community Reinvestment Act (CRA), and on a function of competition in reducing discrimination.

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\*I thank Bent Sorensen, Charlotte Ostergaard, Chinhui Juhn, Aimee Chin, Roy Gardner, and Alton Gilbert for their help and valuable comments. The responsibility for any errors remains my own.

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# 1 Introduction

This paper empirically shows that removal of bank branching restrictions had a positive impact on self-employment income growth rates for females and minorities at the low end of income distribution. The analysis is based on a simple theoretical model, adopted from Evans and Jovanovic (1989), showing how improvements in banking can affect self-employment of previously discriminated groups of the labor force.

Since the late 1970s, the structure of the U.S. banking industry has changed considerably following deregulation of restrictions on intrastate branching and interstate banking. As a result, competition and efficiency in the banking sector increased. Banks are the prime source of finance for the self-employed (Cole and Wolken (1995)).

Self-employment is an alternative to unemployment, providing a way out of poverty. Moreover, it is one of the sources of upward economic mobility. This is particularly true for minorities and women to the extent they are subject to discrimination—taste-based or statistical—in the labor market.<sup>1</sup> To become self-employed, one needs to either possess large asset/wealth holdings or to borrow from a financial institution. Relatively poor individuals, and especially women and minorities among them, are denied credit more often. First of all, they do not have a lot of assets that may serve as collateral. Second, they are on average riskier business owners. Third, regulated banks may have just preferred not to finance certain groups (i.e., they were employing some taste-based, non-economic discrimination practices) and could get away with it since there simply was no competition in the banking industry.

Even though it is prohibited by law to discriminate in lending on the basis of race and gender and there are several government programs, subsidy plans, and laws that create an incentive for lending to relatively poor, women, and non-white minorities, these groups are still ‘underserved’ (i.e., they are receiving much less credit, rejected more often, and if accepted—charged higher rates and fees).<sup>2</sup>

Prior to deregulation of branching restrictions, there were two nationwide laws, targeted to increase lending to underserved communities: the Equal Credit Opportunity Act (ECOA) in 1974 and the Community Reinvestment Act (CRA) in 1977. The ECOA prohibited discrimination in lending based on race, gender, marital status, etc., and the CRA created a set of incentives for companies to invest in local (underserved) communities, which is seen by many as a potential to decrease discrimination in lending in these markets.

While it is potentially hard to separate the long-run effects of earlier (nationwide)

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<sup>1</sup>Statistical (economic) discrimination is a discrimination based on credit applicants’ potential risk; taste-based (non-economic) discrimination is a discrimination based on preferences of a lender regarding the personal (mainly demographic) characteristics of potential borrowers.

<sup>2</sup>See Section 4 for a more detailed discussion.

laws targeted at increase in lending to poor, women, and minorities from the effects of other (de)regulation, this paper exploits the *variation* between the U.S. states in level of competitiveness in the banking sector due to deregulation of restrictions on intrastate branching to test whether there is a differential impact on historically underserved (possibly discriminated against) social groups: relatively poor females and minorities.

This study suggests that banking deregulation, whether or not by intention, stimulated self-employment among previously discriminated groups of the labor force. There are several possible channels through which the effects could take place.

First, banking deregulation led to increased competition in the banking industry.<sup>3</sup> If banks were discriminating against some borrowers based on non-economic factors, according to Becker (1957), they would be less able to do so as competition increases. Discrimination adds to the total costs of lending as a certain parameter. Financial institutions that employed discriminating practices in the regulated industry have higher total costs of transactions than non-discriminators. After branching reform, they would either be driven out of businesses or restructured so as to reduce the discrimination parameter to its minimum.

Second, following branching deregulation, better-run and more efficient banks grew and replaced less efficient banks. Operating costs, loan losses, and the share of non-performing loans decreased.<sup>4</sup> This may indicate that improved banks became better able to screen and identify positive Net Present Value (NPV) projects. If relatively poor women and minorities had good projects and banks were not able to identify them in the regulated environment, deregulation could have increased the possibility of their recognition and financing.

Third, larger and more diversified banks emerged following reform. Dick (2006) finds that, with removal of geographical restrictions on banking, credit risk increases, as geographic diversification provides banks with a hedge against risk. Moreover, Diamond (1984) in a theoretical model shows that a large bank's ability to diversify credit risks across borrowers reduces the agency cost of lending to risky borrowers. These, in turn, made banks more prone to finance risky projects.

Jayaratne and Strahan (1996) finds that the ratio of non-performing loans and loan losses fell after deregulation. My paper shows that the state-specific aggregate self-employment income growth of riskier/previously-discriminated individuals increased. Together these findings may indicate that banks "learned" how to identify good projects among those groups of borrowers more than they became more risk tolerant (i.e., the first two effects dominate).

Besides deregulation of the banking industry, several other factors might have influenced

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<sup>3</sup>See for example Carlson and Mitchener (2005), Stiroh and Strahan (2003), Black and Strahan (2002) for empirical evidence, and Section 2 below for a discussion.

<sup>4</sup>See Jayaratne and Strahan (1998) and Berger and Mester (2003) for empirical evidence.

small businesses and the self-employed in particular. For example, the Small Business Administration (SBA) provides loan guarantees to qualified small businesses. Such guarantees assure the lender that in the event the borrower does not repay the debt and payment default occurs, the government will reimburse the lender for its loss, up to the certain percentage of the SBA's guarantees. This program is the main government tool aimed at increasing credit availability for small businesses.

If state authorities decided to deregulate their banking system and at the same time to increase the amount of loans guaranteed by SBA in order to stimulate small businesses, then the results discussed above would be spurious. As a robustness check, I show that the main result of the paper—the positive effect of reform on the state-specific self-employment income growth of relatively poor women and minorities—holds even after controlling for the state-specific amounts of SBA-guaranteed loans per capita.

The results of this paper are potentially important if applied to other countries besides the United States. Many economies are now committed to removing barriers across banking sectors. For example, deregulation in the European Union is aimed at having a completely integrated banking market on both the supply and demand side (Cerasi, Chizzolini, and Ivaldi (1997)). In Japan, one of the main goals of “Big Bang” financial reform is to increase competition in the financial sector (Allen and Gale (2000)). Competition in banking has its ‘pros and cons’ for economic development (see Section 5 for a discussion). This paper helps to identify an additional ‘pro’ of banking system consolidation and increased competition.

The rest of the paper is organized as follows. The next section briefly presents the history of U.S. banking deregulation. Section 3 describes trends in U.S. self-employment and, in particular, stresses the historical self-employment participation differences by race and gender. Section 4 gives a brief literature review of discrimination in lending practices. Section 5 outlines the possible effects of banking deregulation on self-employment formation. In Section 6, I present the theoretical model. Section 7 describes the data, discusses the empirical strategy and results. Section 8 concludes.

## 2 The History of U.S. Banking Deregulation

The U.S. banking regulation has a long history. Since 1920s, banks’ ability to expand geographically was regulated by state legislation.<sup>5</sup> In essence, the banks were prohibited to branch and establish bank-holding companies both within and across state borders.<sup>6</sup>

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<sup>5</sup>For example, the McFadden Act of 1927 prohibited intrastate branching as it subjected branching of national banks to state authority and the Douglas Amendment to the Bank Holding Company Act of 1956 restricted an interstate expansion via bank-holding companies.

<sup>6</sup>Ever since the U.S. Constitution restricted states’ ability to issue fiat money and tax interstate commerce, states started using banking as a source of revenue. An example of such source of revenue is a charter

The legislative regulations have restricted (a) the creation of multi-bank holding companies, (b) branching by creating a new offspring (de novo branching), and (c) branching by merger and acquisition. The regulation for creation new offspring offices lasted the longest.

The forms and shapes of resulting banking system varied from state to state bearing the imprint of a degree to which the states deregulated their banking industry: from a meager unit banking in some states to a powerful and full-fledged banking industry with intense and extensive branching in other states. The smaller the degree of branching freedom, the more dependant local banks became on state economy and, reciprocally, the state economy became dependant on those banks' performance.

As regulations were gradually relaxed, the bank sector transformed. Changes in competitive pressures, geographic diversification and scale-economies on both the loan- and deposit-side affected loan losses and the cost of capital, and hence the loan interest rates charged to borrowers. Jayaratne and Strahan (1998) find that relaxation of intrastate branching restrictions improved banking efficiency by allowing better-run banks to capture a larger share of local markets. Following deregulation, low-cost banks grew faster than under-performing banks and state averages for loan losses and operating expenses fell. Jayaratne and Strahan show that much of these improvements were passed on to borrowers in the form of lower interest rates on loans.<sup>7</sup>

Following deregulation, considerable consolidation occurred, predominantly through mergers and acquisitions. McLaughlin (1995) documents that deregulation of intrastate branching restrictions caused changes in market structure faster than interstate banking restrictions. She shows that bank holding companies responded promptly and in large numbers to deregulation of branching restrictions by merging previously separated subsidiaries. Responses to interstate deregulations were slower. In the latter case, bank holding companies tended to expand intra-regionally, rather than cross-regionally.

Bank branching, in general, increases competition and forces weak banks to exit the banking system (Carlson and Mitchener (2005)). Stiroh and Strahan (2003) find that intrastate branching and interstate banking deregulation created a more competitive environment by allowing banks to enter new markets and threaten incumbent banks. Branching deregulation significantly affected only small banks, while interstate banking deregulation primarily affected the larger banks. Better banks grew and those performing poorly shrank. Black and Strahan (2002) show that even though the number of small banks began to decline following banking reforms, concentration in the banking industry did *not* increase. Banks

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fee. Since out-of-state banks do not pay fees to receiving states, there is an incentive to prohibit interstate bank entrance. Moreover, if banks are restricted to expand geographically even within state borders, there is a possibility to extract a part of monopoly rent as an additional source of revenue.

<sup>7</sup>They estimate that average loan rates fell by three-fifths of the reduction in loan losses and only find small, generally statistically insignificant, increases in bank profitability after deregulation.

were expanding into new geographical areas instead of combining forces in previously-local markets.

Jayaratne and Strahan (1996) show that GDP and income growth rates increased following intrastate branching deregulation. Morgan, Rime, and Strahan (2004) show that economic volatility within states decreased after banking deregulation as banks become more integrated. Dick (2006) finds that with removal of geographical restrictions on banking, credit risk increases, as geographic diversification provides banks with a hedge against risk. Demyanyk, Ostergaard, and Sorensen (2005) show that personal income insurance increased after bank branching reform, suggesting that risk sharing among banks may have increased. Keeley (1990) argues that banking deregulation led to both increased competition in the banking sector and decreased banking profits. Berger and Mester (2003) show that the ratio of non-performing loans decreased following banking reform.

### 3 Minority Participation in Self-employment

“Owning your own business” seems to be a big part of the “American Dream.”<sup>8</sup> Self-employment provides a way out of poverty and is an alternative to unemployment, especially for women and minorities who may be subject to discrimination in labor markets.

Minorities on average are less likely to participate in self-employment. The causes may be their lower wealth/asset holdings, historically lower success rate running a business (with implications of the higher risk factor), and a possibility that financial intermediaries either charge higher interest rates or completely ration credit to minorities.<sup>9</sup> This has been the topic of emerging theoretical literature (see for example Coate and Tennyson (1992), Atkeson (1991), Evans and Jovanovic (1989), Petrova (2004), and Buera (2003)).

Fairlie and Meyer (2000) study trends in self-employment formation for white and black men during the twentieth century. They find that the gap between black and white self-employment participation rate is due to lower self-employment rates of blacks in all industries (i.e., it is not due to the concentration of blacks in low self-employment rate industries, such as manufacturing for example).

In spite of many government programs intended to promote minority business ownership,<sup>10</sup> there are still far fewer black self-employed than white self-employed. Not only are

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<sup>8</sup>The Roper Organization conducted a national telephone interview in 1987 for the Wall Street Journal to discover the views of the population on the “American Dream.” Fifty-eight percent of the adults replied that business ownership is an “excellent or good way to get ahead.” For more information see Balkin (1989).

<sup>9</sup>However, Bauman (1987) finds the self-employment rate for poor persons who worked full time is twice that for the entire full-time working population. Most of the time self-employment is seen as a refuge from unemployment and/or low-wage work (Becker (1984) and Evans and Leighton (1987)).

<sup>10</sup>The government directly supports disadvantaged and minority-owned businesses in the United States. During the late 1970s and 1980s, there was an increased growth in the value of federal, state, and local

African-American men three times less likely to become entrepreneurs, but the transition out of self-employment is twice as high for blacks compared to whites.<sup>11</sup>

## 4 Self-Employment Financing and Discrimination

In 1974, U.S. Congress enacted the Equal Credit Opportunity Act (ECOA) to eliminate discrimination in granting credit on the basis of sex and marital status. Two years after that, an ECOA amendment outlawed discrimination on the basis of race and color, religion and age. However, there is no direct evidence found in earlier literature that shows that non-economic discrimination existed before the mid-1970s or that the ECOA actually improved credit opportunities for anyone.<sup>12</sup>

On the basis of a growing body of research, though, it is hard to conclude that taste-based discrimination is just a myth. Cavalluzzo, Cavalluzzo, and Wolken (2001), based on the 1993 NSSBF data set find that Hispanic-male owners were denied credit more than twice as often as white male owners, while African-American owners were denied credit almost three times as often. Gabriel and Rosenthal (1991) and Munnell, Browne, McEneaney, and Tootell (1996) find that minorities are less likely to obtain a loan than white applicants even after controlling for the default risk, suggesting that taste-based discrimination against minorities may be taking place.

In addition to the ECOA, with the similar goal, the Community Reinvestment Act (CRA) was enacted in 1977. The intention of the Act was to encourage depository institutions to invest in the communities they operate in, and in particular, in communities with the low-income and minority neighborhoods. The CRA ratings, that result from periodic evaluations by federal agencies, are taken into account in considering applications for mergers and acquisitions, among others. Any discriminatory practices by institutions will lower both the CRA ratings and, as a consequence, the chances to have an application approved.

Economics research shows that in more competitive environment CRA provides *local* financial institutions with fewer incentives to invest in *local* communities as the definition 

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government contracts reserved for minority owned businesses. Chay and Fairlie (1998) document that self-employment rates for black men rose dramatically in the 1980s especially in cities in which set-aside programs were implemented, while the self-employment rates of white men were relatively stable at the same time. Following the Public Works Employment Act of 1977, set-aside programs propagated nationwide, so that by the 1980s there were about 36 states involved. There are also many programs that provide educational assistance for minorities, where they can cheaply learn the basics of business operation.

<sup>11</sup>See Fairlie (1999), Fairlie and Robb (2003a), and Fairlie and Robb (2003b) for more details.

<sup>12</sup>In earlier studies, no taste discrimination against females or non-whites is found even before the ECOA was enacted (Peterson (1981)). Elliehausen and Durkin (1989) also find that “ECOA would not have a substantial impact in changing acceptance probabilities unless tastes for discrimination are widespread and markets are slow to react.” For more empirical evidence see Durkin and Elliehausen (1978) and Elliehausen and Lawrence (1988).



of ‘local’ fades out.<sup>13</sup> In more competitive banking sector there would be fewer unexploited lending opportunities, i.e., less underserved individuals or businesses (or even entire communities).

According to Becker (1957), non-economic discrimination would be more pronounced in more concentrated markets than in competitive markets. Indeed, Cavalluzzo and Cavalluzzo (1998), based on the 1988–1989 National Survey of Small Business Finance (NSSBF), find that businesses owned by white males are more likely to hold loans than all other groups if they are operating in more concentrated markets. These differences are driven by higher credit denial rates and not by differences in demand for credit. The differences in loan-holdings among different demographic groups remain present even after controlling for information included in standard application forms, credit reports, and lenders’ worksheets. Such evidence again suggests that there is at least some discrimination present in the U.S. financial market.

It may be the case that females and minorities are just riskier (on average) entrepreneurs and the fact they get rejected more often is not due to discriminatory practices. Cavalluzzo, Cavalluzzo, and Wolken (2001) show that minority-owned firms indeed have been much riskier than others. It is especially true for African-Americans.

Jappelli (1990) finds a higher proportion of women and non-whites among the rejected applicants. He also points out that the level of current income, *ceteris paribus*, seems to matter the most (not counting for the complete absence of credit history and bankruptcy) in successful loan application. Small loans are usually short-term and the main requirement of a lender to initiate this kind of loan is a steady job and sufficient income of the borrower. Low-income borrowers are denied credit more often than relatively high-income borrowers (Fairlie (2001)). For this kind of individuals any possible (further) discrimination plays a crucial role.

Peterson (1981) proposes a formal formulation of a bank’s decisions on whether to issue a loan: Supposedly, banks that discriminate against some particular group of borrowers, consider the *adjusted* present value (APV) of a loan instead of a regular present value. APV is calculated as a sum of three terms: expected present value of a gain on a loan times the probability of no default, expected present value of a loss on a loan times the probability of default, and the discrimination coefficient. The latter term is negative for the group of potential borrowers against which a lender is discriminating. Any economically justified discrimination—based on risk—would be reflected in the probability of default and the size of a possible loss.

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<sup>13</sup>Bostic and Robinson (2003a) show that CRA leads to increased competition in lending; as a consequence, small community banks decrease CRA and minority lending, while Bostic and Robinson (2003b) find an overall increase in lending to minorities and to the CRA-targeted communities.

## 5 Financial Development and Self-Employment

Insufficiency of credit is the major problem for small business formation. It is shown in the literature that relaxation of credit constraints is translated into increased probability that individuals start their own businesses. For example, Evans and Jovanovic (1989) find that, in the United States, individuals holding more assets/wealth are more likely to become self-employed. Schäfer and Talavera (2005) find that in several European countries, individuals receiving windfall gains are more likely to become self-employed. Holtz-Eakin, Joulfaian, and Rosen (1994a) and Holtz-Eakin, Joulfaian, and Rosen (1994b) find that small business owners who received large inheritances are more likely to succeed in their self-employment endeavors. Among different ways to finance their businesses, individuals mainly rely on bank financing. Cavalluzzo, Cavalluzzo, and Wolken (2001) find over 80% of the most recent small business loans<sup>14</sup> came from commercial banks, and 96% came more generally from financial institutions. The vast majority of even the smallest businesses in the U.S. use banking services. Cole and Wolken (1995) show that 81% of firms with 0–1 employees use some commercial banking service, and the percentage is even larger for the larger (small) firms. At the same time, small business loans tend to be personally guaranteed (Avery, Bostic, and Samolyk (1999)). New business, however, also rely heavily on informal sources of financing, such as family savings or borrowing from friends (Huck, Rhine, Bond, and Townsend (1999)).

It is not clear a priori whether increased competition would benefit or harm small businesses and self-employment in particular. On the one hand, consolidation and competition enhances efficiency in banking operations. Greater efficiency may result in greater credit availability for all borrowers with positive NPV projects, and especially for previously discriminated against borrowers among them. On the other hand, small businesses are known to be financed mostly by small (and local) banks and, moreover, to establish long-term relationships with them. Petersen and Rajan (1994) find that borrowers benefit from establishing strong ties (called relationships) with a lender as it increases financing availability. Lenders who participate in such relationships invest in costly information about the borrower in the early stages of relationships and extract rent later on. With “relationship-lending”, lenders collect “soft”,<sup>15</sup> non-transferrable, non-quantifiable information, such as the loan officer’s first-hand knowledge of the borrower’s managerial abilities and business prospects. In more competitive markets, it may be more difficult for both lenders and borrowers to commit to any long-term relationships (Petersen and Rajan (1995)). With fewer small banks and fewer relationship-lending practices, credit opportunities for small

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<sup>14</sup>Based on the 1993 NSSBF data set.

<sup>15</sup>This term was used by DeYoung, Glennon, and Nigro (2004) among others.

and young firms may go down.

As intrastate branching and interstate banking were allowed, mergers and acquisitions did lead to a decrease in the number of banks.<sup>16</sup> At the same time, the distance between banks and their small business borrowers increased substantially making it more costly for banks to collect “soft” information about borrowers. DeYoung, Glennon, and Nigro (2004), however, point out that recent changes in technology (such as the internet, fax machines, etc.) and greater information availability (e.g., credit bureaus) have allowed banks to rely more on “hard” information—such as the borrower’s quantifiable financial condition—reducing costs or gathering and transferring the information about borrowers, and making small businesses less opaque.

Black and Strahan (2002) also suggest that consolidation and increased competition in the banking industry does not have to lead to decreased small business lending. They argue that competition would foster innovations and drive loan prices closer to marginal costs. Increased bank size can lower overall lending costs due to several reasons. First, bigger banks need to hold less capital than several small banks together. Second, delegated monitoring costs go down as banks become more diversified (Diamond (1984)).

Indeed, Black and Strahan find that there have been more small businesses emerging (measured by new business incorporations) in the economies of states which removed restrictions on banking. They further find that, in the regulated environment, states with more concentrated banking markets had lower rates of incorporations, and these rates rose after banking reforms. In particular, new incorporations started appearing more as the share of large banks in a state increased.<sup>17</sup>

More generally, individuals and firms can access external funds easier in more developed financial markets. Guiso, Sapienza, and Zingales (2004) find that financial development increases the probability that an individual starts his or her own business. It also leads to entry of new firms, increases competition, and promotes growth. They used data from Italy where there were no difference in regulation across regions and interregional lending was permitted. In my study, financial development differs across U.S. states making it possible to track the evolution of how financial structure affects the health of local economies.

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<sup>16</sup>For example, in 1985 there were about 14,500 banks, and there were about 8,300 banks in the year 2000. More information is available at [www.fdic.gov](http://www.fdic.gov)

<sup>17</sup>There is a working paper, however, that casts doubt on the results obtained by Black and Strahan (2002). Wall (2004) points out that there might be some factors that simultaneously determine both deregulation and the rate of entrepreneurship (see also Kroszner and Strahan (1999) for the factors that drive U.S. deregulation).

## 6 Theoretical Model

In this section, I modify a model developed by Evans and Jovanovic (1989). In their model an individual can borrow for investment purposes up to a certain parameter ( $\lambda$ ) times the individual's personal asset holdings ( $z$ ). If an individual's investment needs are smaller than  $\lambda z$  he is financially unconstrained. Choosing entrepreneurship stems purely from the wealth (asset holdings) constraint on investment. The model does not allow for a time dimension and has the parameter  $\lambda \geq 1$  being the same for everyone.

Let  $\lambda z$  be the borrowing capacity of an individual. Unlike in the Evans-Jovanovic model,  $\lambda$  is not treated as a parameter. A general form of the borrowing capacity allows for heterogeneity of borrowers not only with respect to their asset holdings (as in Evans and Jovanovic) but also with respect to their personal characteristics, based on which, banks may discriminate against borrowers. If banks employ any form of discrimination, these factors would decrease the borrowing capacity of a discriminated group. The borrowing capacity also depends on a parameter which captures the ability of banks to grant credit. A more formal description of the model is provided below.

An individual lives for  $t=0, 1, 2, \dots$ . He or she divides total available time for working (normalized to 1) between his/her own business activity  $L_t$ , and time of working for somebody else,  $(1 - L_t)$ .<sup>18</sup> His/her utility is a linear function of consumption,  $C_t$ , and work. An individual maximizes the life-time expected utility:<sup>19</sup>

$$\max_{C_t, L_t} E_0 \sum_{t=0}^{\infty} \beta^t (C_t - \eta_1 L_t - \eta_2 (1 - L_t)), \quad (1)$$

where  $E_0$  is the expectations operator conditional on time  $t_0$  information set  $\Omega_0$ .  $\eta_1$  and  $\eta_2$  are disutility coefficients of being self-employed or working for somebody else respectively.  $\beta$  is the discount factor ( $0 < \beta < 1$ ). At each time  $t$ , an individual is able to invest in his or her own business. Working for a wage, individual earns  $w_t(1 - L_t)$ , where  $w_t$  is wage rate if the person is employed by somebody else. Working for himself/herself, he/she earns an income (profit)  $Y_t$ , where<sup>20</sup>

$$Y_t = \theta L_t^\alpha I_{t-1}^\gamma \xi_t. \quad (2)$$

$\theta$  is a measure of "entrepreneurial abilities." I assume an individual knows the level of

<sup>18</sup>For simplicity I assume that total hours of work are constant for every period. Unemployment is not an option.

<sup>19</sup>For use of a similar function see for example Schäfer and Talavera (2005).

<sup>20</sup>Evans and Jovanovic (1989) does not allow entrepreneurial income to depend on hours worked.

his/her  $\theta$  prior to making a business decision.  $\theta$  remains fixed over time for simplicity.<sup>21</sup> If an individual realizes that he/she does not have any entrepreneurial abilities, he/she does not become self-employed, spends the entire time working for somebody else and receives  $Y_t = 0$  (his/her wage income will be  $w_t$ ). For an individual with at least some positive  $\theta$ ,  $I_{t-1}$  is the amount invested into the business in the period t-1, marginal returns to business-labor and investment are  $0 < \alpha < 1$  and  $0 < \gamma < 1$  respectively, and  $\xi$  is a log-normal disturbance whose logarithm has a mean of one and variance  $\sigma_\xi^2$ . At the time when the investment decision is made, the risk-neutral person does not know the realization of  $\xi_t$ .

An individual chooses  $(C_t, L_t)$  to maximize his/her utility function (1) subject to the budget constraint

$$C_t + I_t = (Y_t + w_t(1 - L_t)) + (1 + r_t)(S_{t-1} - I_{t-1}) + (I_t - S_t), \quad (3)$$

where  $(Y_t + w_t(1 - L_t))$  is the total income earned at time  $t$ , and  $r_t$  is gross interest rate.<sup>22</sup> I allow an individual to have either one or both types of jobs (working for somebody else and himself/herself) at the same time.  $S_t$  is the amount saved before the investment is made at time  $t$ ,  $I_t$  is investment prepared for the next period.  $(S_{t-1} - I_{t-1})$  and  $(I_t - S_t)$  are the amounts of net borrowing in the previous and current period respectively. Assume default is not an option. The amount of expenses in period  $t$ ,  $(C_t + I_t)$ , equalizes the amount of inflow coming from the return on entrepreneurship, wage income, and net assets.

If an individual can borrow “unlimited” funds for his investment projects, he is financially *unconstrained*. For some upper limit of available funds ( $F$ ) for a particular investment project, such an entrepreneur would always face  $(I_t - S_t) < F$ . I denote  $F$  the “borrowing capacity.”<sup>23</sup> In this model it depends on the total assets (wealth/savings) that an entrepreneur possesses (for collateral purposes)  $S_t$ , level of screening a financial intermediary can perform to identify *good* projects, ability and willingness to finance riskier projects, and the overall lending capacity in the “local” economy ( $\phi$ ). If financial intermediaries are discriminating against any group(s) of borrowers with some particular characteristics, the borrowing capacity would depend on these also. If the borrowing plans of an entrepreneur exceed his borrowing capacity, he is financially constrained. More formally, for both (constrained and unconstrained) cases, the net borrowing is limited by the following:

$$(I_t - S_t) \leq F, \quad (4)$$

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<sup>21</sup>There are models that allow individuals to learn their entrepreneurial abilities with time (see for example Jovanovic (1982)).

<sup>22</sup>For simplicity, I assume that lending and borrowing interest rates are equal. When  $(S_{t-1} - I_{t-1})$  is negative, an individual lends this funds at time  $t - 1$ .

<sup>23</sup>The function  $F$  here is a direct analog of  $\lambda z$  in Jovanovic (1982).

where  $F = \frac{1}{D} S_t \Phi(\phi)$ ,  $D$  is a factor that “measures” discrimination. If financial institutions (banks) employ any taste-based discrimination strategies, the parameter  $D$  will be greater than one and it will *reduce* the borrowing capacity of a borrower. In summary, borrowing capacity  $F$  increases with the level of assets  $S_t$  and the banking parameter  $\phi$ , and decreases with the discrimination parameter  $D$ . More formally,  $\frac{\partial F}{\partial S_t} > 0$ ,  $\frac{\partial F}{\partial D} < 0$ ,  $\frac{\partial F}{\partial \phi} > 0$ , and  $\frac{d\Phi}{d\phi} > 0$ .

An individual maximizes his/her utility function (1) with respect to the level of current consumption and labor hours subject to three constraints (equations 2, 3, and 4), when the transversality condition (which prevents the person from borrowing an infinite amount and consuming it), equation (5), holds.

$$\lim_{T \rightarrow \infty} \left[ \prod_{j=t}^{T-1} \beta^j \right] (I_T - S_T) = 0 \quad (5)$$

When solving the optimization problem, the first-order conditions are the following:

$$\alpha \theta L_t^{\alpha-1} I_{t-1}^\gamma = w_t + \eta_1 - \eta_2 \quad (6)$$

$$\gamma \theta L_{t+1}^\alpha I_t^{\gamma-1} = \lambda_t / \beta + r_{t+1} \quad (7)$$

$$\lambda_t = \frac{1 - \beta r_{t+1}}{\frac{1}{D} \Phi(\phi) + 1} \quad (8)$$

The optimal values of invested capital and hours spent in self-employment for the financially *constrained* person is:

$$I_t^* = \left[ \frac{r_{t+1} + \frac{1}{\beta} \frac{1 - \beta r_{t+1}}{\frac{1}{D} \Phi(\phi)}}{\theta \gamma L_{t+1}^\alpha} \right]^{\frac{1}{\gamma-1}} \quad (9)$$

$$L_t^* = \left[ \frac{w_t + \eta_1 - \eta_2}{\alpha (\theta \gamma)^{\frac{1}{1-\gamma}} \left[ r_t + \frac{1}{\beta} \frac{1 - r_t}{\frac{1}{D} \Phi(\phi)} \right]^{\frac{\gamma}{\gamma-1}}} \right]^{-\frac{1-\gamma}{1-\gamma-\alpha}} \quad (10)$$

Intuition suggests that the individual would change the hours devoted to his/her business when the degree of financial constraints changes. As shown in equation (11) below, when the level of financial constraints decreases ( $\phi$  and, as a consequence,  $F(\cdot)$  increases), the person is more likely to spend more time in his/her own business.

$$\frac{\partial L_t^*}{\partial \phi} = A \cdot \left[ r_t + \frac{1}{\beta} \frac{1 - r_t}{\frac{1}{D} \Phi(\phi)} \right]^{-\frac{1+\alpha}{1-\gamma-\alpha}} \frac{\frac{1}{\beta} (1 - r_t)}{\left( \frac{1}{D} \Phi(\phi) + 1 \right)^2} \frac{1}{D} \frac{d\Phi}{d\phi} > 0 \quad (11)$$

$$A = \frac{1 - \gamma}{(1 - \gamma - \alpha)} \left[ \frac{w_t + \eta_1 - \eta_2}{\alpha(\theta\gamma)^{\frac{1}{1-\gamma}}} \right]^{-\frac{1-\gamma}{1-\gamma-\alpha}}$$

To the extent that the borrowing capacity  $F$  is an increasing function of  $\phi$ ,  $(\gamma + \alpha) < 1$ , and  $(w_t + \eta_1) > \eta_2$ , an individual will always find it optimal to increase his/her self-employment labor input after banking system consolidation.

## 7 Empirical Analysis

### 7.1 Data

I use a panel of variables for the 50 U.S. states minus Delaware and South Dakota for the period 1980–2000.<sup>24</sup> Below, I describe the main sources of data and the methodology used to construct the variables used in the analysis.

*Income (total and components):* I use the March Supplement of the Consumer Population Survey (CPS) for the years 1980–2001 to construct the growth rates for the total income and various income components of states. I restrict the age range of individuals to 18–63 years, which corresponds to 1–40 years of potential experience of workers. The resulting sample size is over two million individuals. Income variables in the CPS in the current year  $t$  corresponds to the previous year’s income. *Wage* Income is the total (aggregated) wage earned by all individuals residing in state  $i$  at time  $t$ . *Self-employment* income is defined similarly using the self-employment component of income earned by individuals working in state  $i$  at time  $t$ . Self-employment income is the amount received from his/her own business *after expenses* (therefore, this causes some observations to be either near zero or even negative). Individuals are allowed to have both types of jobs (wage and business). State-level *Earnings* is defined as the sum of wage and self-employment income components for state  $i$ , year  $t$ . March supplemental weights are used to make the individual-level data set representative for each state.

*Individual Characteristics:* Individuals’ level of education, type of employment, age, gender, and race are taken from the March Supplement of the Consumer population Survey (CPS) for the years 1980–2001.

*State Gross Domestic Product:* I use the Bureau of Economic Analysis (BEA) data for gross state domestic product which is defined as the “value added” of the industries of a

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<sup>24</sup>I exclude Delaware and South Dakota from the sample due to laws that provide tax incentives for credit card banks to operate there. As a result, the banking industry in these states grew much faster than other states in the 1980s. I start my sample in 1980 as the number of self-employed individuals interviewed in CPS by states is much smaller for years before 1980. In addition, the CPS definitions of the self-employment income component changed starting the year 1980.

state deflated by the consumer price index to obtain real per capital state gross domestic product (gross state product).

*Intrastate Branching Restrictions:* I measure the direct effect of deregulation as an indicator variable which equals zero in states/years where intrastate branching restrictions were in place. I follow the practice of Jayaratne and Strahan (1996) and Kroszner and Strahan (1999), and focus on branching deregulation through mergers and acquisitions allowing multi-bank holding companies to convert subsidiaries into branches. Dates for deregulation reform are taken from Kroszner and Strahan.

*Small Business Administration (SBA) Guaranteed Loans:* I use the amount of loans issued by commercial banks that were guaranteed by the SBA. Such guarantees—according to the section 7(a) of the Small Business Act—are called “7(a) Loan Guarantees.” They help qualified small businesses obtain financing when they might not be eligible for business loans through normal lending channels. Loan proceeds can be used for most sound business purposes including working capital, machinery and equipment, furniture and fixtures, land and building. Loan maturity is up to 10 years for working capital and up to 25 years for fixed assets. Data source: the Small Business Administration ([www.sba.gov](http://www.sba.gov))

## 7.2 Descriptive Statistics

As shown in Table and 1, 10 percent of the entire labor force is self-employed. Among them, almost 70 percent are males and about 30 percent are females. Among all self-employed about 90 percent are whites and almost 10 percent are non-whites. Thirty six percent of self-employed have both types of income: income from self-employment and wage income. Sixty four percent of self-employed have self-employment income only (and zero wage income).

The share of self-employed non-white minorities in the labor force is very small (1 percent). In addition to the problems associated with the small sample size for this group, there is a substantial number of missing state/year observations for self-employment income. Twenty-eight states had more than 2 missing observations from 1980 to 2000 making it impossible to calculate self-employment income growth rates. I drop these states, whenever I analyze self-employment income of non-whites (and of whites to make the results comparable). The remaining partial sample consists of the following (20) states: Alabama, Alaska, California, Florida, Georgia, Hawaii, Illinois, Louisiana, Maryland, Montana, New Jersey, New Mexico, New York, North Carolina, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Washington. Seven states in this list deregulated before 1980 (the beginning



of my sample) and 13 states deregulated after the year 1980. These 20 states constitute 64% of the U.S. economy.

As reported in Table 2 (column one), average self-employment income for men (\$13,786) is almost twice as large as average self-employment income for women (\$7,129). The average self-employment income of whites (\$12,571) is also almost twice as large as that of non-whites (\$6,860). Average incomes are expressed in terms of 1984 dollars. The numbers reported are similar to those calculated earlier by Becker (1984) and Bearse (1984).

Column two of Table 2 shows that there is almost no discernable difference between average self-employment incomes earned by different demographic groups at the lower end of the (total) income distribution: Females earn on average about \$1000 more than men and non-whites earn about \$700 less than whites. However, as reported in column three of Table 2, males earn almost twice as much as females at the upper end of the income distribution; whites earn on average almost 1.5 times that of non-whites at the upper end of the income distribution.

### 7.3 Empirical Strategy

For the empirical analysis I concentrate on the possible effects of the *intrastate* bank branching reform via mergers and acquisitions (as opposed to interstate banking via bank holding companies). As noted in the literature, it is intrastate branching reform that led to the most sizable changes in market structure (McLaughlin (1995)). At the same time, Jayaratne and Strahan (1996) show that both total states' income and GSP per capita grew faster following intrastate branching reform.

The borrowing capacity of a potential entrepreneur (Equation (4) in Section 6 above), among other factors, depends on a the discrimination parameter. If banks discriminate against (or in favor of) a certain group of borrowers based on some non-economic factors, these factors would determine the size and the sign of the discrimination parameter.

As mentioned in the Section 4 above, banks tend to discriminate on the basis of race, gender, and current income of (potential) borrowers.<sup>25</sup>

I hypothesize that females, non-whites, and individuals earning "insufficient" current income were constrained in terms of their borrowing abilities before banking deregulation. This hypothesis would not be rejected if removal of the restrictions on banking improves banking ability to grant a credit and loosens the borrowing limit constraint for this groups of

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<sup>25</sup>There seem to be two more candidates for the possible discrimination criteria: age and education. Perhaps younger and/or less educated individuals would seem less reliable business owners in the eyes of lenders. I limit my analysis to analyzing individuals older than 18, and younger than 64—so that age becomes less of an issue. Moreover, based on a study of credit-constrained consumers (Perraudin and Sorensen (1992)), decisions of banks on whether to grant a loan seem to be independent of the level of education of applicants.

individuals. Unconstrained individuals will be either unaffected by deregulation or they will also face more “freedom” in terms of their borrowing plans. If improvements in the post-reform banking sector had an impact on borrowing capacity, we will be able to empirically observe it by looking at the constrained group (not at the unconstrained group, since unconstrained individuals were such even before deregulation).

I use the median of the overall income distribution as a threshold for measuring “sufficiency” of current income. For each state/year I rank the entire population of individuals by their total income and then split the sample by the median (and by quartiles for robustness). To obtain a unit of observations for the lower end of the income distribution, for example, for each state  $i$ , year  $t$ , I sum up corresponding income components of all individuals in the labor force from age 18 to 63 if they received total incomes less than the 50<sup>th</sup> percentile, divide by the corresponding CPI and scale by the total labor force in that state/year. I further split my sample by gender and race. Individuals receiving total income below (above) the median income are labelled as “Lower 50%” (“Upper 50%”) in the tables discussed in Section 7.4 below.

## 7.4 Results and Discussion

### Deregulation and Self-Employment Income

The bench-mark regressions I run for the empirical analysis are the following:

$$INC_{it} = \alpha const + \beta_i + \beta_t + \beta DERE_{it} + \varepsilon_{it}, \quad (12)$$

where  $INC_{it}$  is the *growth rate* of either total income or income components for state  $i$  and year  $t$ .  $DERE_{it}$  is an indicator variable which equals zero in state/years where banking restrictions were in place. I weight all observations by the square roots of the number of individual-level observations. I also control for autocorrelation by the Prais-Winsten procedure, and allow for time heteroscedasticity. Inclusion of both cross-sectional and time fixed effects is crucial for the analysis. I investigate the effect of bank branching reform on the state-specific income growth rates excluding such effects as general (U.S. wide) rise in female- and minority-participation in the labor force, and business cycle.

Table 3 (column one) shows that income growth rates of states increased by slightly more than one-half of one percent following bank branching deregulation. This finding is consistent with the results of Jayaratne and Strahan (1996). By comparing the impact of branching deregulation on different income components (columns two through four), an interesting finding emerges. Income from self-employment increased more than three times

as much as total income, earnings, and wages.<sup>26</sup> This finding indicates that branching deregulation had a substantially larger effect on average self-employed than on the average wage-worker.

Comparing income from self-employment for different groups of individuals, I run regressions (12) substituting  $INC_{it}$  with the growth rates of (real, per capita) income from self-employment for corresponding sub-samples.

As shown in Table 4, only the lower half of the distribution of discriminated groups is affected by the removal of banking restrictions. The growth rate of female self-employment income in the lower half of the distribution increased by almost 16%. This result is very large in economic terms, but the lower bound of the confidence interval seems reasonable. The growth rate of non-white self-employment income component in the lower half of the distribution increased by more than 2%.<sup>27</sup> At the same time, the effect of reform on the different portions of income distribution among males and among whites is not substantial.

This finding is consistent with the hypothesis that pre-reform relatively poor females and non-white minorities were the most constrained in terms of their borrowing ability. It may indicate that discrimination in lending against them was taking place. Consolidation in the banking industry following branching deregulation appears to have mitigated the discrimination to some degree.

Personal income may not be a perfect measure of how poor individuals are. For lenders, what may matter more is the household income to determine whether a borrower is able to repay his or her debt. It is especially true for females who should not be considered poor if they have zero or very small income but are married to a person whose income is not small. To make sure the previous result was not capturing the effect of deregulation on rich housewives (females with zero personal income and high household income), I perform the analysis summarized in the Table 4 above, splitting the sample by household income (instead of personal income). Similarly to the previous analysis, I use a median of household income as a threshold.

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<sup>26</sup>The effect of banking reform on dividends, interest, and rental income is beyond the scope of the current paper.

<sup>27</sup>The result is based on the partial sample of 20 states. See Section 7.2 for more detailed description. In order to examine if the results are robust, I test for the effect of deregulation on the self-employment income component in three complementary ways. I modify my sub-samples of data as follows. For the first method, I keep all the missing observations and assign a small number to each missing point. If there are no non-white self-employed interviewed in some state/year I assign that state to have \$100 (in current dollars) as a self-employment income component (it's \$100 for the entire state). For the second method, I drop the state/year observations that have a self-employment income component equal to zero and use the resulting unbalanced panel. For the method three, I simply drop the states with missing observations completely. Based on these three modified data sets I run the regressions (12). In all cases I smooth observations using the Kernel Smoother (with  $\sigma = 2$ ). All three methods produce quantitatively similar results. Method three, however, produces the most qualitatively meaningful results. Therefore, only the results based on the latter method are reported.

As shown in Table 5, consistent with the previous finding, the personal self-employment income of females whose household income is below the median household income were affected the most following removal of banking restrictions. According to the point estimate, following deregulation self-employment income growth rate increased by 5.17%. The economic magnitude of this result is realistic, and the coefficient is statistically significant at the 1% level. The coefficients for other sub-groups of labor force are not statistically different from zero.

As another robustness check, I include the amount of SBA-guaranteed loans<sup>28</sup> as a dependent variable into regressions (12). As shown in Table 6, the main result of the paper—the positive effect of reform on relatively poor women and minorities—remains even after controlling for the subsidized SBA-loans.

I compare the effect of banking reform on self-employment income with the effects on wages and total income. As reported in Table 7, there is no substantial difference in the effects of bank branching deregulation on wage-income of the different portions of the income distribution. There are also no differences by race and gender. Even though there is a positive effect from deregulation on the average wage income component (as shown in Table 3), there is no *differential* impact on any specific groups of the labor force under consideration. As a robustness check, I performed the same analysis based on the sample split by the quartiles of the income distribution (instead of a median). The general pattern of the results is preserved (the results are not reported).

The results for females and non-white minorities based on total income are similar to those based on self-employment income. As reported in Table 8, following banking reform, the total income growth rate for the lower portion of income distribution is increased for both females and non-whites, and those of the upper part of the distribution were not affected significantly.<sup>29</sup>

## Deregulation and Self-Employment Rate

As mentioned in Section 3, the self-employment participation rate has been trending upwards since 1970. In addition to the positive trend, I find that following banking deregulation the share of non-farm (incorporated and unincorporated together) self-employed in

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<sup>28</sup>See Section 7.1 for the variable definition.

<sup>29</sup>There is, however, an additional finding that emerges from the results reported in the Table 8. According to the point estimates, total income growth (for all individuals in the labor force) of both the lower *and* the upper halves of the income distribution increased following banking reform. The effect on the lower portion is almost twice as large as on the upper portion but the difference between the two coefficients is not statistically significant. The same pattern is observed for all white individuals. Since the total income includes many components besides wage- and self-employment income, the mechanisms through which banking reform might have affected the overall income growth rates for whites and/or males is beyond the scope of the current paper.

the labor force increased even further.<sup>30</sup> Table 9 shows the results of the following GLS regressions

$$\left(\frac{\text{self employed}}{\text{labor force}}\right)_{it} = \text{const} + \text{trend} + \beta_i + \beta_i \text{trend} + \beta \text{DEREG}_{it} + \varepsilon_{it},$$

where  $\left(\frac{\text{self employed}}{\text{labor force}}\right)_{it}$  is either a fraction of all self-employed or of a specific sub-group of all self-employed (males, females, whites, and non-whites) in the labor force. I control for a regular (U.S. wide) trend, state specific trends, and state-specific fixed effects, following a practice of Black and Strahan (2001). Shares of self-employed in the labor force might be strongly trending, and these trends may vary across the states.<sup>31</sup> Column one of the Table 9 summarizes the results. According to the point estimate (row one), the share of all (non-farm) self-employed in the labor force increased after reform by a quarter of one percent. A similar result is found for the proportion of white self-employed. The share of non-white self-employed in the labor force is also positively affected by reform (row five), but the impact is not significant. Comparing the changes in male- and female self-employment participation rates (rows two and three) we observe an increase only in the ratio of female self-employed (the share of male self-employed did not change substantially following reform).

For robustness, column two of the Table 9 shows results based on the shares of particular group self-employed relative to the same group of labor force participation (not total labor force). For example, in row two the coefficient shows that share of male self-employed relative to the male labor force increased by 0.16%. The coefficient is not statistically significant, as in the column one. The only statistically significant effect is observed for female and white portions of corresponding parts of the labor force (the same pattern as in column one). According to the point estimates, the share of self-employed females in the female labor force increased by 0.31% and the share of white self-employed in the white portion of the labor force increased by 0.26 %.

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<sup>30</sup>Black and Strahan (2002) for example find that there are more new incorporations emerging following banking reforms.

<sup>31</sup>Controlling for time and state-by-time fixed effects instead of trend and state-specific trends produces similar results.

## 8 Conclusions

This paper shows that interstate bank branching deregulation had a positive impact on self-employment for relatively poor women and minorities.

There are on average fewer self-employed women and minorities—and they earn on average much less—than, correspondingly, men and white individuals possibly due to discrimination in the both labor and credit markets. Banking reform seems to have mitigated discrimination in lending and increased credit availability for the previously-discriminated groups. As a result, the growth rate of self-employment income for these groups increased.

Importantly, this paper shows that it is deregulation, and not direct government subsidies to banks for financing small businesses, that positively influenced self-employment of previously discriminated women and minorities.

The obtained results demonstrate that the state-specific changes in the banking structure after removing branching restrictions had a positive impact on historically underserved groups of individuals. This impact should be taken into consideration when analyzing direct effects of country-wide laws (such as ECOA and CRA).

The findings of this paper may have important implications for other countries besides the United States as many economies are now committed to removing barriers across banking sectors.

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Table 1: Descriptive Statistics: Shares of the Self-Employed by Demographic Groups

$\frac{\textit{Self-}Employed}{\textit{labor force}}$	0.10		
$\frac{\textit{Male Self-}Employed}{\textit{Male Labor Force}}$	0.13	$\frac{\textit{Male Self-}Employed}{\textit{Self-}Employed}$	0.68
$\frac{\textit{Female Self-}Employed}{\textit{Female Labor Force}}$	0.07	$\frac{\textit{Female Self-}Employed}{\textit{Self-}Employed}$	0.32
$\frac{\textit{White Self-}Employed}{\textit{White Labor Force}}$	0.11	$\frac{\textit{White Self-}Employed}{\textit{Self-}Employed}$	0.93
$\frac{\textit{Non-White Self-}Employed}{\textit{Non-White Labor Force}}$	0.05	$\frac{\textit{Non-White Self-}Employed}{\textit{Self-}Employed}$	0.07

*Note:* “Self-employed” individuals are defined as either incorporated or non-incorporated, non-farm self-employed. Data sample consists of U.S. states (District of Columbia, Delaware, and South Dakota are excluded) for the years 1980–2000. Data Source: March Supplement of the Consumer Population Survey. Individual-level data is aggregated to the state/year level using the March Supplement weights. Age of the labor force is restricted to 18–63 years. See Section 7.1 above for detailed variable definitions.

Table 2: Descriptive statistics: average self-employment income by demographic groups

	Total sample	Lower 50%	Upper 50%
Self-employment income of individuals	14,667	2,790	26,543
Self-employment income of men	13,786	2,182	25,391
Self-employment income of women	7,129	3,244	11,014
Self-employment income of whites <sup>a</sup>	12,571	2,149	22,993
Self-employment income of non-whites <sup>a</sup>	6,860	1,462	16,122

*Note:* Data source is the March Supplement of the Consumer Population Survey (CPS) for the years 1980–2000. The numbers correspond to average income from self-employment (in terms of 1984 dollars) for the corresponding groups of the labor force.

*a:* based on a limited number of states (Alabama, Alaska, California, Georgia, Hawaii, Illinois, Louisiana, Maryland, Montana, New Jersey, New Mexico, New York, North Carolina, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, and Washington). See Section 7.3 for discussion. See Section 7.1 above for more detailed variable definitions and discussion.

Table 3: The Effect of Intrastate Deregulation on the Growth Rates of *Income Components*

	income	earnings	self-empl. income	wage
Total Sample	0.65 (0.30)	0.69 (0.31)	2.39 (1.86)	0.61 (0.33)

*Note:* The results are based on the following Weighted Least Square regressions:  $INC_{it} = \alpha const + \beta_i + \beta_t + \beta DERE_{it} + \varepsilon_{it}$ , where  $DERE_{it}$  is a dummy variable. It equals zero if restrictions on mergers and acquisitions in the banking sector were in place (for state  $i$  in the year  $t$ ) and equals one after deregulation. Dates of deregulation are available in Kroszner and Strahan (1999).  $INC_{it}$  is the growth rate of a corresponding (real, per capita) income component. For example, the results in the first column are the estimates of the coefficient  $\beta$  based on the regression where the dependent variable is the total income growth. The estimate in the second column is based on the regression with the growth rate of earnings as the dependent variable. The estimates in the columns four and five are obtained similarly using the growth rates of self-employment and wage income components. Data sample consists of U.S. states (District of Columbia, Delaware, and South Dakota are excluded) for the years 1980–2000. Data source: March Supplement of the Consumer Population Survey. Age of the labor force is restricted to 18–63 years. Standard errors are in parentheses. All coefficients and standard errors are multiplied by 100.

Table 4: The Effect of Intrastate Deregulation on *Self-Employment Income* Growth Rates. Sample Split by the Median of Total *Personal* Income

Sub-sample	Lower 50%	Upper 50%
<i>Males</i>	2.52 (3.53)	3.55 (2.20)
<i>Females</i>	15.69 (6.98)	-4.57 (7.65)
<i>Whites<sup>a,b</sup></i>	1.02 (5.50)	4.40 (3.24)
<i>Non - whites<sup>a</sup></i>	2.38 (1.04)	-1.99 (1.50)

*Note:* The results are from the following Weighted Least Square regressions:

$SELFINC_{it} = \alpha \text{ const} + \alpha_i + \alpha_t + \beta \text{ DERE}_{it} + \varepsilon_{it}$ , where  $DERE_{it}$  is a dummy variable. It equals zero if restrictions on mergers and acquisitions in the banking sector were in place (for state  $i$  in the year  $t$ ) and equals one after deregulation. Dates of deregulation are available in Kroszner and Strahan (1999).  $SELFINC$  is the growth rate of the income from self-employment of a corresponding group of the labor force. Each cell reports  $\hat{\beta}$  from a separate regression. For example, in row one, column one, the group consists of relatively poor males in state  $i$  and year  $t$ ; in row one, column two—relatively rich males, etc. Data sample consists of U.S. states (District of Columbia, Delaware, and South Dakota are excluded) for the years 1980–2000. Data Source: March Supplement of the Consumer Population Survey. Standard errors are in parentheses.

$a$  - the coefficient is obtained using the partial sample of states. See section (7) for more details,

$b$  - for whites, the coefficients based on the total sample of states are similar to those reported.

Table 5: The Effect of Intrastate Deregulation on *Self-Employment Income* Growth Rates. Sample Split by the Median of Total *Household* Income

Sub-sample	Lower 50%	Upper 50%
<i>Males</i>	3.93 (3.07)	-1.89 (2.34)
<i>Females</i>	5.17 (1.44)	1.57 (0.93)

*Note:* The results are from the following Weighted Least Square regressions:  $SELFINC_{it} = \alpha \text{ const} + \alpha_i + \alpha_t + \beta \text{ DERE}_{it} + \varepsilon_{it}$ , where  $DERE_{it}$  is a dummy variable. It equals zero if restrictions on mergers and acquisitions in the banking sector were in place (for state  $i$  in the year  $t$ ) and equals one after deregulation. Dates of deregulation are available in Kroszner and Strahan (1999).  $SELFINC$  is the growth rate of the income from self-employment of a corresponding group of the labor force. Each cell reports  $\hat{\beta}$  from a separate regression. For example, in row one, column one, the group consists of relatively poor males in state  $i$  and year  $t$ ; in row one, column two—relatively rich males, etc. Data sample consists of U.S. states (District of Columbia, Delaware, and South Dakota are excluded) for the years 1980–2000. Data Source: March Supplement of the Consumer Population Survey. Standard errors are in parentheses.



Table 6: The Effect of Intrastate Deregulation via Mergers and Acquisitions on *Self-Employment Income* Growth Rates. Sample Split by the Median of Total Income. Control for the Level of SBA-Protected Loans

Sub-sample	Lower 50%	Upper 50%
<i>Males</i>	2.61 (3.55)	3.54 (2.21)
<i>Females</i>	15.57 (6.99)	-4.88 (7.67)
<i>Whites<sup>a,b</sup></i>	0.83 (5.51)	4.29 (3.25)
<i>Non – whites<sup>a</sup></i>	2.59 (1.08)	-1.99 (1.54)

*Note:* The results for columns one and three are from the following Weighted Least Square (WLS) regressions:  $SELFINC_{it} = \alpha \text{ const} + \alpha_i + \alpha_t + \beta \text{ DERE}_{it} + \gamma \text{ SBA} + \varepsilon_{it}$ , where  $DERE_{it}$  is a dummy variable. It equals zero if restrictions on mergers and acquisitions in the banking sector were in place (for state  $i$  in the year  $t$ ) and equals one after deregulation. Dates of deregulation are available in Kroszner and Strahan (1999).  $SBA$  is the level of Small Business Administration Guaranteed Loans and  $SELFINC$  is the growth rate of the income from self-employment of a corresponding group of the labor force. Each cell reports  $\hat{\beta}$  from a separate regression. For example, in row one, column one, the group consists of relatively poor males in state  $i$  and year  $t$ ; in row one, column two—relatively rich males, etc. Data sample consists of U.S. states (District of Columbia, Delaware, and South Dakota are excluded) for the years 1980–2000. Data Source: March Supplement of the Consumer Population Survey. Standard errors are in parentheses.

$a$  – the coefficient is obtained using the partial sample of states.  $b$  - for whites, the coefficients based on the total sample of states are similar to those reported.

Table 7: The Effect of Intrastate Deregulation on *Wage Income* Growth Rates. Sample Split by the Median of Total Income

Sub-sample	Lower 50%	Upper 50%
All Individuals	1.21 (0.85)	0.48 (0.40)
Males	1.35 (1.07)	0.61 (0.53)
Females	1.25 (0.98)	0.19 (0.61)
Whites	0.94 (0.91)	0.45 (0.48)
Non-whites	0.54 (4.93)	1.50 (2.48)

*Note:* The results are from the following Weighted Least Squares regressions:

$WAGE_{it} = \alpha \text{ const} + \alpha_i + \alpha_t + \beta \text{ DERE}_{it} + \varepsilon_{it}$ , where  $\text{DERE}_{it}$  is a dummy variable. It equals zero if restrictions on mergers and acquisitions in the banking sector were in place (for state  $i$  in the year  $t$ ) and equals one after deregulation. Dates of deregulation are available in Kroszner and Strahan (1999).  $WAGE$  is the growth rate of the income from working for a wage of a corresponding group of the labor force. Each cell reports  $\hat{\beta}$  from a separate regression. For example, in row one, column one, the group consists of relatively poor individuals (both males and females) in state  $i$  and year  $t$ ; in row one, column two—relatively rich individuals, etc. Data sample consists of U.S. states (District of Columbia, Delaware, and South Dakota are excluded) for the years 1980–2000. Data Source: March Supplement of the Consumer Population Survey. Standard errors are in parentheses.

Table 8: The Effect of Intrastate Deregulation on *Total Income* Growth Rates. Sample Split by the Median of Total Income

Sub-sample	Lower 50%	Upper 50%
All Individuals	1.29 (0.68)	0.76 (0.37)
Males	1.34 (0.87)	0.95 (0.49)
Females	1.30 (0.79)	0.28 (0.58)
Whites	1.20 (0.73)	0.83 (0.43)
Non-whites	11.27 (6.09)	0.39 (4.89)

*Note:* The results are from the following Weighted Least Square regressions:  $INC_{it} = \alpha \text{ const} + \alpha_i + \alpha_t + \beta \text{ DERE}_{it} + \varepsilon_{it}$ , where  $\text{DERE}_{it}$  is a dummy variable. It equals zero if restrictions on mergers and acquisitions in the banking sector were in place (for state  $i$  in the year  $t$ ) and equals one after deregulation. Dates of deregulation are available in Kroszner and Strahan (1999).  $INC$  is the growth rate of the (real per capita) personal (total) income of a corresponding group of the labor force. Each cell reports  $\hat{\beta}$  from a separate regression. For example, in row one, column one, the group consists of relatively poor individuals (both males and females) in state  $i$  and year  $t$ ; in row one, column two—relatively rich individuals, etc. Data sample consists of U.S. states (District of Columbia, Delaware, and South Dakota are excluded) for the years 1980–2000. Data Source: March Supplement of the Consumer Population Survey. Standard errors are in parentheses.

Table 9: The Effect of Intrastate Deregulation on the Share of Self-Employed in the Labor Force by Race and Gender

$\frac{\textit{Self-}Employed}{\textit{labor force}}$	0.24 (0.12)		
$\frac{\textit{Male Self-}Employed}{\textit{labor force}}$	0.10 (0.09)	$\frac{\textit{Male Self-}Employed}{\textit{Male labor force}}$	0.16 (0.15)
$\frac{\textit{Female Self-}Employed}{\textit{labor force}}$	0.15 (0.06)	$\frac{\textit{Female Self-}Employed}{\textit{Female labor force}}$	0.31 (0.12)
$\frac{\textit{White Self-}Employed}{\textit{labor force}}$	0.23 (0.12)	$\frac{\textit{White Self-}Employed}{\textit{White labor force}}$	0.26 (0.13)
$\frac{\textit{Non-White Self-}Employed}{\textit{labor force}}$	0.01 (0.02)	$\frac{\textit{Non-White Self-}Employed}{\textit{Non-White labor force}}$	0.08 (0.06)

Note: The results are from the following Weighted Least Square regressions:  $\left(\frac{\textit{self employed}}{\textit{labor force}}\right)_{it} = \textit{const} + \textit{trend} + \beta_i + \beta_i \textit{trend} + \beta \textit{DEREG}_{it} + \varepsilon_{it}$ , where  $\textit{DEREG}_{it}$  is a dummy variable. It equals zero if restrictions on mergers and acquisitions in the banking sector were in place (for state  $i$  in the year  $t$ ) and equals one after deregulation. Dates of deregulation are available in Kroszner and Strahan (1999).  $\left(\frac{\textit{self employed}}{\textit{labor force}}\right)_{it}$  is the fraction of a particular group of self-employed in either the entire labor force (column one) or in a corresponding part of the labor force (column two). Each cell reports  $\hat{\beta}$  from a separate regression. For example, in row one, the group consists of all self-employed individuals (both males and females) in state  $i$  and year  $t$ ; in row two—the group is females who earn self-employment income, etc. Data sample consists of U.S. states (District of Columbia, Delaware, and South Dakota are excluded) for the years 1980–2000. Data Source: March Supplement of the Consumer Population Survey. Standard errors are in parentheses.