The Impact of Bank Expansion on Self-Employed Business Owners: Evidence from US States

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Abstract

We use state-level bank branch deregulations to study the impact of changes in credit on entrepreneurship at the individual-owner level. We classify self-employed individuals into incorporated and unincorporated business owners. Exploiting the variation in the staggered timing of banking deregulations, we find that branching reforms affected the entry and exit rates of the incorporated self-employed. Further, the branching reforms encouraged unincorporated businesses to incorporate. Finally, the effects of reforms are different across groups based on gender, race, and age. We find stronger effects on incorporated business creation among minorities, and higher exit rates among the young and minorities.

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1 Introduction

Entrepreneurship has long been considered a key determinant of growth and economic prosperity through its effects on technological progress, market competition, and job creation. Recent empirical studies show that growth in labor productivity can be often attributed to replacement of lower productivity firms by higher productivity entrants.[1] They also document that expansions of start-ups are major sources of gross job creation in the US. Because of its importance to other economic activities, understanding the determinants of entrepreneurship has been a subject of considerable interest for economists and policy makers alike.

Many scholars have argued that the limited access to credit is one of the major factors behind the low level of entrepreneurship in many economies (Buera et al. 2015). According to the Small Business Credit Survey (2015), nearly 40 percent of respondents said that they sought credit primarily to expand their business. The majority of small firms (under $1 million in annual revenues) and startups (under 5 years in business) were unable to obtain any credit. In another survey, conducted by the World Bank (2015), a significant fraction of business owners (especially those in developing countries) chose credit constraints as the main obstacle for expanding their production.[2] In the light of these surveys, one can reasonably conclude that individuals wishing to create their own businesses are more likely to face tougher credit constraints.

In this paper, we study the causal impact of changes in credit availability due to US banking deregulations on individual entrepreneurship over the 1980–2007 period. Starting from the 1970s to the early 1990s, US states deregulated commercial banks by allowing them to expand bank branches within and across states. We exploit the variation in the timing of intrastate and interstate banking deregulations to study the effects of the resulting credit change. A main advantage of our approach is that the timing of branching deregulations are unlikely to be related to factors such as wealth, education, attitudes to risk; as a result, these regulatory changes

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[1]Important contributions are Foster et al. (2006), Haltiwanger et al. (2013), Fairlie (2014) among many others. Decker et al. (2014) provides a comprehensive review of the role of entrepreneurship in US job creation and economic dynamism.

[2]Small Business Credit Survey is conducted by the Federal Reserve Banks of New York, Atlanta, Cleveland, and Philadelphia, and available at https://www.newyorkfed.org/smallbusiness/Spring2014/index.html. The World Bank's (2015) entrepreneurship survey can be found at http://databank.worldbank.org/data/reports.aspx?source=enterprise-surveys#.

provide a natural setting for identifying the causal effects of credit constraints on an individual's decision to become an entrepreneur. Using the Current Population Survey Outgoing Rotation Group (CPS-ORG) files, we consider self-employed individuals (overwhelmingly small business owners), and classify them into incorporated and unincorporated. Our analysis distinguishes between the incorporated self-employed and unincorporated individuals, as key differences between these two groups were highlighted in a recent study by Levine and Rubinstein (2017).[3]

Using this classification, we identify business creation and closure at individual-owner level exploiting the rotating nature of the CPS data. We also identify newly incorporated self-employed individuals who were previously unincorporated, which allows us to study whether changes in credit encourage the unincorporated to become incorporated.[4] An advantage of our data is that we are also able to explore heterogeneity across individuals as several studies have found discrimination in credit markets based on gender or race (Asiedu et al. 2012).

Our main findings can be summarized as follows. First, access to credit is a determinant of entrepreneurship, affecting both business creation and closure at the individual owner-level. Entry and exit rates of the incorporated self-employed increased by 35 percent and 16 percent, respectively, after branching deregulations. However, we do not find any effects on the entry into unincorporated self-employment. Second, we find that the reforms increased incorporation among previously unincorporated self-employed individuals. Specifically, the likelihood of an unincorporated business incorporates increased by 40 percent five years after the reforms. This is an interesting finding because it shows that changes in credit are a determinant of firms' organizational structure. Finally, banking deregulations had heterogeneous effects on different groups, especially on those who are likely to face binding credit constraints. For example, deregulations had a stronger impact on entry and exit rates of minorities into business ownership.

This paper relates to a growing literature that investigates why individuals engage in en-

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[3]Previous studies identify *all* self-employed individuals as entrepreneurs (Borjas and Bronas 1989, Fairlie 2014, among many others). However, Levine and Rubinstein (2017) argue that incorporated self-employed is a better proxy for entrepreneurship, because their cognitive and non-cognitive traits are more consistent with what one expects from an entrepreneur (see Section 3 for more details).

[4]When a business becomes incorporated, it will have a separate legal identity and limited liability (i.e. the firm can enter into contracts and own property independently of its owners, and its owners are not fully responsible for the firm's debts). However, becoming an incorporated business involves both direct and indirect costs such as annual fees, higher tax rates, and organizational costs.

trepreneurship given its risky nature (Moskowitz and Vissing-Jørgensen 2002). One view is that entrepreneurs are different from wage and salary workers by having different attitudes towards risk (Hall and Woodward 2010) and/or placing a greater value on non-pecuniary benefits (Hurst and Pugsley 2011). A second, and not mutually exclusive, viewpoint is that individuals' likelihood of engaging in entrepreneurship would change had they faced different economic conditions. Previous studies found factors such as entry regulations (Dajkov et al. 2002, Branstetter et al. 2014), macroeconomic conditions (Fairlie 2013, Klapper et al. 2014), taxes (Gentry and Hubbard 2000, Cullen and Gordon 2007), family background and race (Hout and Rosen 2000) can affect entrepreneurship. Our paper relates to studies that have investigated whether financial constraints impede entrepreneurship. Evans and Javanovic (1989) develop an occupational choice model where individuals can become entrepreneurs, and show that liquidity constraints hinder individuals with insufficient funds from starting their businesses. Holtz-Eakin et al. (1994) show that entrepreneurs who received large inheritances are more likely to stay in business (see also Blanchflower and Oswald 1998, Cagetti and De Nardi 2006). Hurst and Lusardi (2004) show that wealth increases the propensity to become a business owner only at the top of wealth distribution, otherwise it has no effect.

Using changes in wealth to draw inferences about liquidity constraints may potentially suffer from endogeneity as wealth itself may be linked to unobserved attributes such as talent, ability, and work ethic. Further, individuals' occupational decisions resulting from a change in wealth do not necessarily reflect their behavior when there is a change in credit access. When individuals use their own assets to engage in entrepreneurship, they undertake all of the risk associated with the venture. In contrast, when they are able to use a credit agreement, the lender shares the underlying risk with the borrower. An advantage of our approach is that the timing of branching deregulations are unlikely to be related to an individual's characteristics, which may affect her decision to become a business owner.

This paper also relates to a large literature on US branching deregulations. These reforms constituted a major change in financial policy, and have generated a considerable interest among academics. Jayarante and Strahan (1996) provides evidence that branching increased personal income and output (see also Jerzmanowski 2017). Morgan et al. (2004) study how bank in-

tegration across states has affected economic volatility, and find that reforms made business cycles smaller. Black and Strahan (2001) investigates how reforms affected the wage gap between male and female bank executives, and Beck et al. (2010) study the impact on income distribution. Demyanyk (2008) shows that the growth rate of self-employment income increased after intrastate deregulations. Tewari (2014) shows that following US bank branch deregulation the flow of mortgage lending and the stock of homeownership increased for lower-middle income groups, young, and also black households. Sun and Yannelis (2016) find that lifting banking restrictions raises college enrollment. Finally, Kandilov et al. (2016) show that interstate banking boosted overall investment by foreign multinationals.

In this literature, our paper relates to Black and Strahan (2002) and Kerr and Nanda (2009 & 2010), who investigate the impact of US banking deregulations on entrepreneurial activity. Black and Strahan (2002), using data on new business incorporations compiled by Dun and Bradstreet over the 1976–1994, find that the rate of new incorporations increased following deregulation of branching restrictions. Kerr and Nanda (2009) use US Census Bureau data on establishments between 1977 and 1998, and investigate the impact of bank deregulations on entrepreneurship rates and business closure. They find that upon deregulations the greatest increase in entry occurred among small start-ups, and most of business closures occurred among small, young firms.

Our paper differs from the above studies in the following key aspects. To the best of our knowledge, this is the first paper that examines the impact of bank deregulations on an individual's choice to engage in entrepreneurship.[5] In contrast, Black and Strahan (2002) use the number of new incorporation per capita as a measure of entrepreneurship, and Kerr and Nanda (2009 & 2010) use the number of new establishments created by the payroll firms. Thus, these studies exclude the majority of self-employed (which constitutes over 60 percent of US businesses).[6] Further, the nature of our data allow us to distinguishes between different organizational types (incorporated vs unincorporated) and demographics (gender, race, age). We show that the deregulations have different effects on each of these different groups.

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[5] Our individual-level analysis is also more consistent with the above literature on occupational choice and entrepreneurship.

[6] This statistics is based on the Federal Reserve's 2015 Small Business Credit Survey (see also Fairlie 2014).

The rest of the paper is organized as follows. The next section reviews deregulations of banking practice in the US and summarizes how they have affected financial markets. Section 3 discusses the data and explains the construction of the data on entrepreneurial activity. Section 4 describes the details of the econometric methodology that we employ. Section 5 presents our results, and Section 6 concludes.

2 The Regulation/Deregulation of Bank Expansion in the U.S.

2.1 History

Until the early 1970s, creation and expansion of commercial banks were heavily restricted in the U.S. The McFadden Act which was passed in 1927 gave states the ability to regulate creation of bank branches within their state borders. The Bank Holding Act of 1956 barred bank holding companies from acquiring banks across state lines unless the target state had a law explicitly allowing interstate acquisitions. In 1970, for example, none of the states allowed bank chartered outside their state to open branches within the state (interstate branching) and 12 states prohibited the expansion of branches within their state (intrastate branching). Bank expansion largely occurred through multi-bank holding companies (MBHC) which operated individual commercial bank branches as separate institutions. Strong branching regulations were maintained in part because they lead to creation of local bank monopolies who lobbied to maintain restrictions.

Starting in the mid-1970s, advances in technology (e.g., introduction of ATMs) and finance altered the importance of personal relationships in banks. This led to a decrease in monopoly power, and many banks lobbied for laws allowing greater bank expansion.[7] Deregulation generally involved three types of reforms. The first reform allowed MHBC chartered in a state to merge or acquire existing branches, and thus MHBCs could consolidate their existing branches into a single network and purchase branches from other MHBC. The second reform allowed full intrastate branching through which MHBCs can operate new branches within their own state. The final reform was to allow out-of-state banks to purchase branches within home states.

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[7]Krozner and Strahan (1999) discuss in several financial and political factors possibly leading to the elimination of restrictions on branching. Strahan (2003) provides a comprehensive review of the elimination of restrictions on bank branching.

Table A.1 in the appendix shows the years when each U.S state deregulated intrastate branching, intrastate branching through mergers and acquisitions, and interstate banking. Prior to 1980, the only state that allowed interstate banking was Maine, by 1990 only 5 states had not deregulated interstate banking. In 1994 the federal government passed the Interstate Banking and Branching Efficiency Act (IBBEA) which allowed interstate banking in all states as of 1997. Furthermore, it encouraged states to actively allow interstate branching, though this activity is regulated to varying degrees at the state level. As shown in Table A.1, in most states unrestricted branching deregulation was implemented soon after or simultaneously branching by M&A was allowed, and thus it is hard to estimate the impact of these two deregulations separately. Following many other researchers, in our empirical analysis we only use the year a state allowed branching by M&A.

2.2 The Effects of Branching Deregulation on Financial Markets

The impact of branching deregulations on credit markets have been studied extensively (Strahan 2003). Branch deregulation led to profound structural changes in the banking sector, which led to increases in efficiency and integration. Prior to 1970, each U.S. state largely possessed an independent banking network. By the late 1990s, the banking sector had heavily integrated with 35.5 percent of the nation's assets held by the eight largest banks and the number of distinct banking organization fell by 30 percent from 1988 to 1997 (Berger et al. 1999). Despite this rapid consolidation of the banking sector, deregulation decreased local market concentration through rapid expansion of new bank branches. Deregulation allowed new banks to open branches in previously restricted markets as well (Strahan 2003). Branch deregulation increased efficiency in the banking sector by reducing costs. Jiyatne and Strahan (1998) find that non-interest costs such as salaries and loan losses fell after deregulation. Furthermore, it also provided more productive banks to consolidate operations. Stiroh and Strahan (2003) show that branch deregulation caused banks with higher returns on equity to consolidate.

Deregulation of branch expansion likely increased the availability of credit. The period following the deregulation of both intrastate and interstate mergers saw increases in loan origination, credit cards, chapter 7 personal bankruptcies, and a reduction in bank charge-offs (Dick

and Lehnert 2010). Furthermore, empirical studies such as Tewari (2014) and Favara and Imbs (2015), exploiting the Home Mortgage Disclosure Act which requires that financial institutions make mortgage data public, show that any increased lending occurred solely in commercial banks affected by deregulations. Favara and Imbs show that the degree to which states deregulated interstate banking after the passage of the IBBEA, expanded the availability of the number of mortgage loans, dollar amounts of mortgage lending and value of mortgages. Sun and Yannelis (2016) show that expansion of credit after reforms increased college enrollment rates.

3   Data

The data used in this paper are drawn from several sources covering the period between 1980–2007. Entrepreneurial activity is measured by business creation and closure at individual-owner level. Using the Current Population Survey Outgoing Rotation Group (CPS-ORG) files from Unicon Research Corporation (2015), we identify self-employed workers (who are predominantly small business owners).[8] The CPS-ORG is a monthly household survey where each household is interviewed for four consecutive months in one year, followed by four consecutive months one year later (after which they leave the sample permanently). In order to identify entry and exit of entrepreneurs in each state and year, we use this rotating feature of the data. The CPS-ORG files start in 1979, so we can identify entry and exit cohorts from 1980 onward. Our sample ends in 2007, because we do not want our estimates to be influenced by financial regulations passed during the Great Recession.[9]

Self-employed individuals in the CPS files are classified into two categories: incorporated and unincorporated. Previous studies used all self-employed individuals as a measure for entrepreneurship (Borjas and Bronars 1989, Fairlie 2014, among many others). However, this measure generates some puzzling outcomes in the sense that entrepreneurship does not appear to offer economic rewards. For example, studies have documented that the median self-employed

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[8]Unicon Corporation cleaned up the problems in the raw CPS files provided by the Census Bureau and recorded variables so that the surveys became more comparable across years. In addition, as we shall discuss shortly, it also provides (publicly unavailable) variables that we exploit in our analysis.

[9]In 1994, the Census Bureau redesigned the CPS to improve the quality and quantity of the data collected, which led to changes in the population shares of some variables (Hipple 2010). As a robustness check, we conduct analysis using only data prior to 1994. Our results qualitatively remain the same.

worker has lower initial earnings and slower earning growth than wage and salary workers (Hamilton 2000, Hurst and Pugsley 2011). Levine and Rubinstein (2017) show that these two groups have significantly different traits and earning profiles: the incorporated self-employed generally are more educated, work more hours, and earn much more per hour than salaried and unincorporated ones.[10] Therefore, our analysis separate these two groups, but mainly focuses on the incorporated who are more entrepreneurial.

Our sample includes all individuals between the ages of 25 and 55, but excludes those with imputed/missing worker class and inconsistent reports (Levine and Rubinstein 2017).[11] Prior to 1994, in the publicly available CPS files all incorporated self-employed individuals were classified as wage and salary workers. However, the CPS-ORG files from Unicon Research Corporation include an unedited and unallocated worker-class variable through which we are able to identify incorporated self-employed correctly for the years prior to 1994. The CPS provides information on individuals' age, gender, race, marital status, and education level as well as their employment status, worker class, industry worked, and weekly hours worked.[12]

Table 1.A reports summary statistics on key variables for self-employed and wage & salary workers, which are mainly in line with Levine and Rubinstein (2017).[13] Compared to wage & salary workers, most of self-employed individuals are male, white, and work longer hours. The percent of individuals who have at least some college education is very comparable across both groups. The percent of individuals who work in manufacturing is substantially higher for wage & salary workers, whereas the share of self-employed working in the private service sector is very similar to that of wage & salary workers in this sector. However, a comparison

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[10]Levine and Rubinstein use the March CPS files for years between 1995 and 2012. We do not use the March CPS, because the data do not distinguish incorporated self-employed from the unincorporated in the survey years prior to 1988.

[11]Following Levine and Rubinstein (2017), we also exclude individuals who work in public administration sector, because almost no entrepreneurial activity takes place in this sector.

[12]Industry classification over the sample period has changed three times, and thus we aggregate industries under the following 11 broad sectors: Agriculture & Mining, Construction, Manufacturing, Transportation/Utility/Information, Wholesale, Retail, Finance & Insurance, Professional, Repair, and Personal & Entertainment, and Public Administration. Analysis based on a detailed classification with 22 sectors yields very similar results. As we mentioned above, our final sample excludes Public Administration.

[13]Statistics in Table 1.A are based on the final dataset that we used in our regressions. Our original data have about 3.8 million observations on two rotating groups, each having about 1.9 million observations. After matching process described below, we have about 1.1 million observations (see the last row in Table 1.A). However, statistics based on the original sample yields very similar results to those in Table 1.A.

of incorporated self-employed with other groups reveals that this group is mostly white, male, who are significantly more educated, and work longer hours.[14]

Upon this classification, we can easily determine entry to and exit from entrepreneurship. New entrepreneurs in year t are individuals who *changed* their worker class to self-employed from time $t-1$ to t. Similarly, *exiting* entrepreneurs in year t are self-employed individuals who *changed* their worker class to non-business owners from time $t-1$ to t.[15] We also identify *switchers* in year t as those unincorporated self-employed individuals who changed their worker class to incorporated self-employed from time $t-1$ to t.

This process clearly requires tracking of individuals over time. However, the CPS is a household survey, and does not have individual identifiers. Following Madrian and Lefgren (2000) and Ziliak et al. (2011), we uniquely match pairs using identical household ID, household number, record lines, sex, survey month, and race. We only consider individuals with age and schooling difference in two successive years less than two, and dropped all unmatched individuals from the sample.[16]

Table 1.B reports summary statistics on the average entry and exit rates of each group as well as the average rate of switching from unincorporated to incorporated for different groups. The average annual entry (exit) rate is 1.4 (33.3) percent for incorporated self-employed, whereas it is 2.5 (26.2) percent for the unincorporated. About 7.3 percent of the unincorporated self-employed became incorporated. A comparison of the first row with rows 2–4 indicates that the average entry and switching rates are higher among white, male, and college educated individuals. Similarly, the average exit rate is generally smaller among white, male, and college educated individuals. Finally, the entry, exit, and switching rates are significantly higher in the private service sector than those in manufacturing.

Data on the timing of bank deregulation comes from Amel (2008). As noted by Strahan and

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[14]As noted by many others (e.g., Acemoglu and Autor 2011), the reported earnings of self-employed in the CPS files are not reliable. A significant portion of self-employed individuals reported zero weekly earnings.

[15]We find that about 57 percent of exiting entrepreneurs become wage & salary workers, 41 percent unincorporated self-employed, and the remaining 2 percent unemployed.

[16]Consistent with Ziliak et al. (2011), this process usually yields 60 percent matching success, which leaves us about 1.1 million observations. Household IDs assigned in 1985 are problematic and the CPS had a major design change in 1994, and thus matching rates in these years were around 30-40 percent. Excluding these years in the analysis does not have any appreciable effects on our results.

Black (2002), banking activities in Delaware and South Dakota are skewed by the presence of credit card banks. Therefore, our analysis covers 48 states over the 1980–2007 period.

4   Econometric Specifications

We use a difference-in-difference model to investigate the effects of banking deregulations on entrepreneurship. We begin our analysis by estimating the following linear probability model:

$$Y_{isjt} = \alpha \text{Intra}_{st} + \beta \text{Inter}_{st} + \gamma X_{ist} + \eta_s + \eta_j + \eta_t + \eta_s t + \eta_j t + \varepsilon_{st}, \tag{1}$$

where Intra_{st} (Inter_{st}) is a dummy variable that identifies whether intrastate (interstate) banking deregulation is in effect in state s and year t. Each dummy variable equals zero up to the year of deregulation and one afterward. The dependent variable Y measures either entry or exit of entrepreneurs at individual level. Y_{isjt} is a dummy variable, which equals one if individual i in state s and industry j becomes an entrepreneur in year t and zero otherwise; or equals one if an *entrepreneur* i in year t becomes non-entrepreneur and zero otherwise. Our coefficients of interest are α and β.

The variable X_{ist} is the set of observed covariates including dummies for gender, marital status, three race dummies (white, black, other), four education dummies (less than high school, high school, some college, college and above), and a quadratic for age. This set also includes the lagged value of the number of entrepreneurs (normalized by the prime age population) in each state to control for persistence in entrepreneurial activity.[17]

We include state and industry fixed effects (η_s and η_j) to control for any time invariant state- and industry-specific factors that can affect entrepreneurship, and year fixed effects (η_t) to control for common shocks to economies. Finally, state-specific and industry-specific time trends ($\eta_s t$ and $\eta_j t$) are included to account for other trending factors that can influence entrepreneurship. We use heteroskedasticity robust standard errors clustered at the state level to mitigate the potential serial correlation in the error term (Bertrand et al. 2004). All regressions are weighted by the CPS individual-level weights.

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[17] We do not include variables such as unemployment rate, corporate tax rate, real personal income, growth rate of gross state product, etc. in our controls. These are potential outcome variables, and thus considered bad controls (Agrist and Pischke 2009). However, including them in our specification does not have a significant impact on our estimates (results are available upon request).

The validity of results obtained from equation (1) depends on our assumption that there are no pre-treatment trends in the outcome variables. Including state-specific and industry-specific time trends is intended to control for this problem. In order to further test whether the identification assumption is satisfied, we conduct a test similar to a Granger causality test, which we estimate the following dynamic equation:

$$Y_{isjt} = \sum_{\tau=-8}^{15} \alpha_\tau \text{Intra}_{st}^\tau + \sum_{\tau=-8}^{15} \beta_\tau \text{Inter}_{st}^\tau + \gamma X_{ist} + \eta_s + \eta_j + \eta_t + \varepsilon_{st}. \qquad (2)$$

We extend equation (1) by including a set of dummies that take a value of one in the τth year before or after the banking deregulation and zero otherwise, and the end points include all earlier and later years.[18] We exclude the year of deregulation, and thus the coefficients measure yearly performance of entrepreneurial activity relative to reform years. If our identification assumption is valid, the estimated coefficients on α_v and β_v for $v < 0$ should not be statistically different from zero. This dynamic approach also allows us to see if there are any lagged effects of the banking reforms on entrepreneurship.

5 Results

5.1 Effects on Incorporated Self-employed

Table 2.A reports the effects of banking reforms on entry and exit of the incorporated self-employed based on equation (1). All regressions include state, industry, and year fixed effects. Columns 1 and 2 report the impact of deregulations on the likelihood that a non-business owner (i.e., wage and salary workers) subsequently enters into incorporated self-employment. Columns 3 and 4 shows the effects on the likelihood that an unincorporated self-employed worker incorporates. The estimated coefficients imply that the reforms did not have any significant effect on their entry. Consistent with the summary statistics reported in Table 1.B, the estimated coefficients on the control variables in these regressions imply that educated, married males are

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[18]Our dynamic equation is similar to Beck et al. (2010). As shown in Table A.1 in the appendix, most of the banking deregulations happened during the 1980s, and in our data the first entry cohort is 1980; as a result, we include only 8 years before the deregulation. Kerr and Nanda (2009) and Beck et al. (2010) estimate their dynamic models without any control variables. Excluding X from equation (2), however, yields very similar results.

more likely to become an entrepreneur. Similarly, compared to whites, blacks are less likely to enter into self-employment.

Columns 5–8 report the impact on the likelihood of exit from incorporated-self employment. An incorporated business owners may become a wage and salary worker (columns 5 and 6) or may simply become unincorporated (columns 7 and 8). Notice that interstate banking reforms increased the likelihood that an incorporated self-employed individual becomes an unincorporated business owner by 4.4 percentage points, which is substantial given that the exit rate among this group prior to the reforms was about 18.5 percent. Observe that exit rates are higher among females, non-whites, young, and the less-educated.

The validity of these results depends on our assumption that there are no pre-treatment trends in the outcome variables. Figures 1 and 2 show the estimated coefficients on lag and lead variables in equation (2) along with their 95-percent confidence intervals. Observe that the pre-treatment effect is usually small and statistically insignificant, which suggests that the identification assumption is not violated. There is a jump in estimates on the lagged values of the interstate deregulation for non-business owners (Figure 1.a.2), and the estimates for the first four years are statistically significant at the 5-percent level. Further, Figure 1.b.2 shows an upward trend in estimates in post-reform years. These effects can not be captured by the static equation (1); as a result, we extend equation (1) by including three dummy variables for each reform:

$$
\begin{aligned}
Y_{isjt} = {} & \alpha_1 \text{Intra}_{\{1,2\}} + \alpha_2 \text{Intra}_{\{3,4\}} + \alpha_3 \text{Intra}_{\{5+\}} + \beta_1 \text{Inter}_{\{1,2\}} + \beta_2 \text{Inter}_{\{3,4\}} + \beta_3 \text{Inter}_{\{5+\}} \\
& + \gamma X_{ist} + \eta_s + \eta_j + \eta_t + \eta_s t + \eta_j t + \varepsilon_{st},
\end{aligned}
\tag{3}
$$

where, for notational clarity, we dropped state and time indices in reform variables. Here, for example, $\text{Intra}_{\{1,2\}}$ equals one for the first two years of the intrastate reform and zero otherwise, $\text{Intra}_{\{3,4\}}$ equals one for the third and fourth years of the reform, and $\text{Inter}_{\{5+\}}$ equals one for the fifth year after the reform or later.

Table 2.B represent the results based on equation (3). For brevity, we do not report estimates on controls, but they are similar to those reported in Table 2.A. Note that the estimates are now more precise, and the interstate deregulation now has positive and highly significant effects on the likelihood that a non-business owner enters into incorporated self-employment. Since the entry rate prior to the interstate reform was about 0.63 percent, results reported in column 2 imply

that deregulation increased the entry rate by 35 percent. The interstate reform also increased the likelihood that the unincorporated self-employed incorporates. According to column 4, the entry rate among this group increased by 40 percent 5 years after the reform (the pre-reform entry rate was 7.1 percent).

Table 2.B column 5–8 show the effects of reforms on the probability of exit from incorporated self-employment. Notice that the effects are stronger on those who become unincorporated. For example, the exit rate among this groups increased by 20 percent in the first two post-reform years (the exit rate was about 18.5 percent prior to the interstate reform). Increased competition in the market after banking reforms increase failure rates among the incorporated self-employed, but the fact that deregulations have an impact on those who became unincorporated self-employed indicates that there is more to the story. In the subsequent section, we shall explore heterogeneity across different groups. We find that the branching reforms increased the likelihood of exit from business ownership among incorporated minorities and the young.[19]

Our findings are largely consistent with previous studies that have used different data and measured entrepreneurship by the number of firms/establishments created. Black and Strahan (2002), using state-level Dun and Bradstreet incorporation data over the 1976–1994 period, find that the rate of new incorporations increased following banking deregulations. Specifically, they find that the number of new incorporations per capita rose about four percent and eight percent following intrastate and interstate deregulations, respectively. Similarly, Kerr and Nanda (2009) use data from the Longitudinal Business Database (LBD) of US Census Bureau over 1977–1998 to examine entrepreneurship and creative destruction following banking deregulations.[20] They find that interstate bank deregulation has a positive and significant impact on small start-ups, while intrastate deregulation has no effect on firm entry. They also find that interstate deregulation increases business closures significantly among small start-ups.

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[19]One may also argue that individuals wishing to have unincorporated businesses might first become incorporated to get loans after the reforms. But once they obtained them, they may switch back to unincorporated self-employed to avoid costs associated with being incorporated. However, this explanation is not entirely convincing because we do not observe such a pattern among different groups as we will show below.

[20]LBD database covers only establishments with payroll, and thus excludes most of the businesses operated by self-employed individuals.

5.2 Effects on the Unincorporated Self-Employed

This section investigates the effects of banking deregulations on the business dynamics of the unincorporated self-employed. Table 3.A reports the regression results based on equation (1), and Figure 3 plots the estimated coefficients on lag and lead variables in equation (2) along with their 95-percent confidence intervals.[21] According to Table 3.A, the interstate banking reforms had a negative and significant effect on the entry of non-business owners into unincorporated self-employment, but we do not observe such an effect from Figure 3. The negative impact disappears once we estimate the more flexible model (3). According to Table 3.B, the reforms had no effect on the entry or exit of unincorporated self-employed.

Our analysis indicates that branching has different effects on the entry and exit rates of incorporated versus unincorporated self-employed. Thus, consistent with Levine and Rubinstein (2017), distinguishing between these two groups is important. Using all self-employed as a measure of entrepreneurship may miss important insights stem from the differences between these two groups.

5.3 Effects by Gender, Race and Age

Several studies have shown that certain groups (e.g., women and minorities) face higher barriers in credit markets to get loans. Using data from the Survey of Small Business Finances, Asiedu et al. (2012) find that the denial rate in a sample of loan applications in 2003 is about 30 percent higher for minority-owned firms compared to white males (see also Blanchard et al. 2008). Branching deregulations may alleviate the discrimination against these groups in two ways. First, increased competition in credit markets may induce banks to extend credits to previously excluded individuals. For example, Sun and Yannelis (2016) show that lifting intrastate banking restrictions raised college enrollment by about 2.6 percentage points. Second, banking reforms couple with technological innovations may induce banks to develop a more standard screening process where face-to-face communications will be minimum. Tewari (2014), for example, finds that following the branching deregulation mortgage access increased for lower-middle income

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[21]We only consider the effects on non-business owners and also exclude all individuals becoming an incorporated self-employed.

groups, young, and black households; and she argues that banks' new screening technologies may have been responsible for this expansion.

We investigate how branching reforms have affected entrepreneurship among different groups, and exploit the detailed nature of the CPS data in order to address this problem. We explore heterogeneity by gender, race, and age. Table 4 reports the effects of deregulations on entrepreneurship among females and males.[22] Regressions include controls, fixed effects, state-specific and industry-specific time trends. There are three findings to note: first, the effects of interstate deregulation on the entry among non-business owners are stronger for males. Second, the likelihood that the unincorporated self-employed becomes an incorporated business owner increased among males, but not females. Third, the exit rate of the incorporated self-employed is higher among females.

Next, we investigate the impact of banking reforms on entrepreneurship among racial minorities relative to whites, and the results are reported in Table 5. First, according to column 1, the likelihood that a non-business owner enters into incorporated self-employment is higher among non-whites. Since non-whites generally have lower initial wealth (Fairlie and Robb 2008), the marginal value of an increase in credit is higher for them. Consequently, relaxing credit constraints have stronger effects for minorities. For whites, we observe that there is an increase in the incorporation rate among previously unincorporated businesses (see column 2). Second, the reforms increased business closure rate substantially among incorporated non-white entrepreneurs, while having no such effects on whites. However, following reforms, incorporated whites are more likely to become unincorporated. Finally, we observe higher exit rates among unincorporated non-whites (column 6).

Higher exit rates after the deregulations can be explained by the increased competition created by these reforms. Why do minorities choose to exit the business entirely, while whites typically become unincorporated? One can think that whites might be doing business in sectors where becoming an unincorporated self-employed is relatively easier. Although distributions of these groups across sectors are not the same, the differences are not large enough to support this

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[22]In this section, results based on the standard model (1) are reported in the appendix. See Tables A.2, A.3, and A.4.

15

view.[23] A more plausible explanation is that whites run businesses with more assets that can induce them to stay in business. According to the 2012 Small Business Owners (SBO) survey, white owned firms have average sales of about $500,000 compared with $365,000 for those owned by Asians and $58,000 for those owned by blacks. Relatedly, Fairlie and Robb (2008) find that black-owned businesses start with substantially lower level of capital than white-owned firms. They also show that the white/non-white disparity in start-up capital is the major factor to racial disparities in closure rates and profits.

Finally, we explore heterogeneity across different age groups, and the results are reported in Table 6. We define young as individuals who are less than forty years old, the rest as old. The reforms had positive and significant effects on the entry of non-business owners into incorporated self-employment, although effects were somewhat stronger for the old. The impact on the exit from the incorporated is different across these groups. The reforms had a positive and significant effects on the exit rate of the young incorporated self-employed, but had no appreciably significant effect on that among those who are old. The intuition behind these findings is similar to that for whites versus minorities. For life-cycle reasons, the young will be generally less wealthy, and thus less able to sustain unproductive businesses.

6 Conclusion

Why people engage in entrepreneurship is a puzzle for researchers. Entrepreneurship is a risky activity with low expected return, and only a small number of people choose to engage in entrepreneurship. Researchers have argued that access to credit is a major factor that can explain low rates of entrepreneurship. This paper assesses if there is a causal link between credit and entrepreneurship. We focus on the effects of a major change in financial policy, the ability of banks to own and operate multiple branches in multiple jurisdictions in the US. Using the micro-level data from the Current Population Surveys (CPS) over the 1980–2007 period, we investigated how branching reforms affected entrepreneurship at individual owner-level.

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[23]For example, among whites exiting from incorporated self-employment, 23 percent were doing business in wholesale and retail sectors and 9 percent in finance, insurance, and real estate sectors. The corresponding statistics for non-whites are 31 percent and 5 percent, respectively.

Our analysis yields several interesting findings. First, changes in credit affects entrepreneurship. We find that entry and exit rates of the incorporated self-employed increased after bank expansions. Second, we find that branching reforms encouraged unincorporated self-employed individuals to incorporate. Finally, the effects of banking deregulations are different across groups. Particularly, we find stronger effects on incorporated business creation among minorities, and higher exit rates among the young and minorities –two groups likely to face binding credit constraints.

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Table 1.A. Summary Statistics on Self-employed and Wage Workers, 1980–2007

	Self-employed			Salary
	All	Incorporated	Unincorporated	Workers
Female (%)	29.9	23.1	33.0	46.8
	(45.8)	(42.2)	(47.0)	(49.9)
Age	41.6	42.4	41.2	39.6
	(7.8)	(7.4)	(7.9)	(8.2)
White (%)	92.2	92.9	91.9	85.4
	(26.8)	(25.7)	(27.3)	(35.3)
Some College (%)	58.3	70.9	52.7	53.8
	(49.3)	(45.4)	(49.9)	(49.9)
Hours Worked	44.7	48.0	43.2	40.6
	(17.5)	(15.7)	(18.1)	(11.3)
Manufacturing (%)	15.3	12.5	16.5	24.0
	(36.0)	(33.1)	(37.1)	(42.7)
Service (%)	68.6	72.9	66.7	69.9
	(46.4)	(44.4)	(47.1)	(45.8)
Sample Size	147,903	43,925	103,978	960,624

Notes: The data draw on the CPS-ORG Files from Unicon Corporation (2015). Some College represents fraction of individuals who have at least some college education, and Hours Worked represents total hours worked last week. Numbers in parentheses are standard deviations, and the CPS weights are used in all calculations.

Table 1.B. Entrepreneurial Activity at Individual-Owner Level, 1980–2007

	Entry Rate (%)		Exit Rate (%)		Switching
	Incorp.	Unincorp.	Incorp.	Unincorp.	Rate (%)
All Sample	1.4	2.5	33.3	26.2	7.3
	(11.8)	(15.6)	(47.1)	(44.0)	(26.0)
Female	0.8	1.9	39.1	28.9	5.1
	(9.2)	(13.8)	(48.8)	(45.3)	(21.9)
White	1.5	2.6	32.5	25.4	7.2
	(12.1)	(15.9)	(46.9)	(43.5)	(25.8)
Some College	1.8	2.6	32.7	28.1	9.0
	(13.3)	(15.8)	(46.9)	(45.0)	(28.7)
Manufacturing	0.5	0.5	31.6	43.0	8.8
	(7.2)	(6.8)	(46.5)	(49.5)	(28.3)
Service	1.5	2.6	34.3	28.7	8.1
	(12.2)	(15.8)	(47.5)	(45.2)	(27.2)

Notes: The data draw on the CPS-ORG Files from Unicon Corporation (2015). Some College represents individuals who have at least some college education. Numbers in parentheses are standard deviations, and the CPS weights are used in all calculations.

Table 2.A. Impact of Banking Deregulations on Incorporated Self-employed, 1980–2007

| | Entry to Incorporated from | | | | Exit from Incorporated to | | | |
| | Non-Business | | Unincorporated | | Non-Business | | Unincorporated | |
Variable	1	2	3	4	5	6	7	8
Intra	0.0011	0.0010*	0.0085	−0.0043	0.0121	−0.0045	0.0070	0.0044
	(0.0007)	(0.0006)	(0.0064)	(0.0056)	(0.0095)	(0.0115)	(0.0112)	(0.0127)
Inter	0.0015*	0.0012	0.0023	0.0006	0.0176	0.0195	0.0426***	0.0446***
	(0.0008)	(0.0009)	(0.0054)	(0.0057)	(0.0115)	(0.0137)	(0.0136)	(0.0153)
Female		−0.0033***		−0.0455***		0.0761***		0.0135**
		(0.0003)		(0.0034)		(0.0059)		(0.0064)
Black		−0.0038***		0.0106		0.1027***		0.0970***
		(0.0004)		(0.0086)		(0.0307)		(0.0179)
Other		0.0015		0.0330***		0.0675***		0.0431***
		(0.0010)		(0.0120)		(0.0131)		(0.0161)
Married		0.0040***		0.0236***		−0.0260***		−0.0550***
		(0.0003)		(0.0036)		(0.0079)		(0.0070)
Age		0.0009***		0.0008		−0.0251***		−0.0167***
		(0.0001)		(0.0015)		(0.0032)		(0.0040)
Age^2		−0.0000***		−0.0000		0.0002***		0.0002***
		(0.0000)		(0.0000)		(0.0000)		(0.0000)
High School		0.0038***		0.0301***		−0.0192*		−0.0907***
		(0.0004)		(0.0037)		(0.0100)		(0.0163)
Some College		0.0070***		0.0418***		−0.0290***		−0.1250***
		(0.0004)		(0.0051)		(0.0107)		(0.0179)
College		0.0137***		0.0837***		−0.0194		−0.1386***
		(0.0007)		(0.0062)		(0.0117)		(0.0188)
Entrp$_{t-1}$		0.0408***		0.1936		0.0758		0.0774
		(0.0127)		(0.1585)		(0.3898)		(0.3271)
Time Trends	No	Yes	No	Yes	No	Yes	No	Yes
Observations	945,438	930,165	85,252	84,180	36,475	36,074	34,783	34,390

Notes: All regressions include state, industry, and year fixed effects; and regressions are weighted by the CPS weights. Numbers in parentheses are the robust standard errors clustered at the state level, and ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

22

Table 2.B. Impact of Banking Deregulations on Incorporated Self-employed, 1980–2007

| | Entry to Incorporated from | | | | Exit from Incorporated to | | | |
| | Non-Business | | Unincorporated | | Non-Business | | Unincorporated | |
Variable	1	2	3	4	5	6	7	8
Intra$_{\{1,2\}}$	0.0003	0.0005	0.0087	0.0031	0.0175	0.0172	0.0185	0.0239*
	(0.0006)	(0.0006)	(0.0059)	(0.0059)	(0.0125)	(0.0133)	(0.0148)	(0.0141)
Intra$_{\{3,4\}}$	0.0008	0.0009*	0.0082	−0.0025	−0.0042	−0.0026	−0.0007	0.0062
	(0.0007)	(0.0005)	(0.0058)	(0.0064)	(0.0112)	(0.0128)	(0.0157)	(0.0181)
Intra$_{\{5+\}}$	0.0013	0.0013*	0.0123	−0.0027	0.0223**	0.0199	0.0194	0.0207
	(0.0009)	(0.0008)	(0.0088)	(0.0070)	(0.0101)	(0.0166)	(0.0133)	(0.0214)
Inter$_{\{1,2\}}$	0.0021***	0.0023***	0.0018	0.0029	−0.0048	−0.0011	0.0332**	0.0383**
	(0.0007)	(0.0007)	(0.0064)	(0.0060)	(0.0124)	(0.0133)	(0.0135)	(0.0150)
Inter$_{\{3,4\}}$	0.0022***	0.0025***	0.0075	0.0120	0.0248*	0.0307*	0.0374**	0.0453*
	(0.0008)	(0.0007)	(0.0087)	(0.0079)	(0.0148)	(0.0162)	(0.0185)	(0.0226)
Inter$_{\{5+\}}$	0.0022*	0.0023**	0.0252*	0.0293**	0.0218	0.0275	0.0329*	0.0413*
	(0.0012)	(0.0010)	(0.0143)	(0.0128)	(0.0137)	(0.0186)	(0.0182)	(0.0233)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Time Trends	No	Yes	No	Yes	No	Yes	No	Yes
Observations	945,438	930,165	85,252	84,180	36,475	36,074	34,783	34,390

Notes: All regressions include all fixed effects and controls specified in equation (3); and regressions are weighted by the CPS weights. Numbers in parentheses are the robust standard errors clustered at the state level, and ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

Table 3.A. Impact of Bank Deregulations on Unincorporated Self-employed, 1980–2007

Variable	Entry			Exit	
	1	2		3	4
Intra	−0.0016*	−0.0007		−0.0082	−0.0061
	(0.0008)	(0.0010)		(0.0069)	(0.0061)
Inter	−0.0022***	−0.0022***		−0.0013	0.0057
	(0.0006)	(0.0007)		(0.0093)	(0.0110)
Female		−0.0017***			0.0703***
		(0.0005)			(0.0049)
Black		−0.0048***			0.1008***
		(0.0008)			(0.0093)
Other		0.0020			0.0459***
		(0.0021)			(0.0100)
Married		0.0018***			−0.0301***
		(0.0005)			(0.0035)
Age		0.0012***			−0.0214***
		(0.0002)			(0.0027)
Age^2		−0.0000			0.0002***
		(0.0000)			(0.0000)
High School		0.0007			−0.0291***
		(0.0013)			(0.0067)
Some College		0.0024*			−0.0305***
		(0.0013)			(0.0075)
College		0.0039**			−0.0374***
		(0.0019)			(0.0089)
$Entrp_{t-1}$		0.0025			−0.0184
		(0.0168)			(0.1573)
Time Trends	No	Yes		No	Yes
Observations	957,274	941,813		96,325	95,030

Notes: All regressions include state, industry, and year fixed effects; and regressions are weighted by the CPS weights. Numbers in parentheses are the robust standard errors clustered at the state level, and ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

Table 3.B. Impact of Banking Deregulations on Unincorporated Self-employed, 1980–2007

Variable	Entry		Exit	
	1	2	3	4
Intra$_{\{1,2\}}$	−0.0003	0.0009	−0.0064	−0.0034
	(0.0010)	(0.0010)	(0.0080)	(0.0078)
Intra$_{\{3,4\}}$	−0.0015	−0.0001	−0.0069	−0.0017
	(0.0010)	(0.0013)	(0.0076)	(0.0076)
Intra$_{\{5+\}}$	−0.0011	0.0012	−0.0064	−0.0072
	(0.0007)	(0.0013)	(0.0096)	(0.0085)
Inter$_{\{1,2\}}$	−0.0010	−0.0007	−0.0065	0.0006
	(0.0009)	(0.0010)	(0.0073)	(0.0073)
Inter$_{\{3,4\}}$	−0.0008	−0.0007	−0.0165**	−0.0076
	(0.0012)	(0.0014)	(0.0068)	(0.0075)
Inter$_{\{5+\}}$	0.0011	0.0013	−0.0101	0.0006
	(0.0015)	(0.0020)	(0.0097)	(0.0095)
Controls	No	Yes	No	Yes
Time Trends	No	Yes	No	Yes
Observations	957,274	941,813	96,325	95,030

Notes: All regressions include all fixed effects and controls specified in equation (3); and regressions are weighted by the CPS weights. Numbers in parentheses are the robust standard errors clustered at the state level, and ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

Table 4. Impact of Bank Deregulations on Entrepreneurship (1980–2007), by Gender

	Incorporated				Unincorporated	
	Entry from		Exit to			
	Non-Bus.	Uninc.	Non-Bus.	Uninc.	Entry	Exit
Variable	1	2	3	4	5	6
Panel A. Females						
Intra$_{\{1,2\}}$	0.0001	−0.0076	0.0043	0.0181	0.0005	−0.0003
	(0.0005)	(0.0087)	(0.0320)	(0.0364)	(0.0012)	(0.0137)
Intra$_{\{3,4\}}$	0.0005	−0.0069	−0.0298	−0.0240	−0.0014	−0.0031
	(0.0006)	(0.0107)	(0.0321)	(0.0401)	(0.0017)	(0.0158)
Intra$_{\{5+\}}$	0.0009	−0.0050	0.0362	−0.0235	0.0003	0.0095
	(0.0007)	(0.0125)	(0.0357)	(0.0460)	(0.0017)	(0.0191)
Inter$_{\{1,2\}}$	0.0010	0.0009	−0.0256	0.0589	−0.0006	0.0058
	(0.0006)	(0.0064)	(0.0380)	(0.0402)	(0.0017)	(0.0144)
Inter$_{\{3,4\}}$	0.0016**	0.0140	0.0403	0.0927**	−0.0023	−0.0201
	(0.0006)	(0.0117)	(0.0382)	(0.0433)	(0.0018)	(0.0193)
Inter$_{\{5+\}}$	0.0014**	0.0167	0.0332	0.0918*	−0.0002	−0.0104
	(0.0006)	(0.0150)	(0.0407)	(0.0440)	(0.0024)	(0.0219)
Obs.	445,537	26,168	8,319	7,329	450,977	32,371
Panel B. Males						
Inter$_{\{1,2\}}$	0.0008	0.0081	0.0178	0.0256*	0.0012	−0.0042
	(0.0010)	(0.0070)	(0.0147)	(0.0133)	(0.0015)	(0.0084)
Inter$_{\{3,4\}}$	0.0011	0.0001	−0.0007	0.0106	0.0011	0.0006
	(0.0080)	(0.0074)	(0.0136)	(0.0187)	(0.0015)	(0.0110)
Inter$_{\{5+\}}$	0.0016	−0.0013	0.0116	0.0282	0.0020	−0.0138
	(0.0011)	(0.0086)	(0.0184)	(0.0218)	(0.0015)	(0.0112)
Inter$_{\{1,2\}}$	0.0034***	0.0038	0.0036	0.0317**	−0.0007	−0.0002
	(0.0011)	(0.0071)	(0.0157)	(0.0130)	(0.0013)	(0.0080)
Inter$_{\{3,4\}}$	0.0032**	0.0105	0.0254	0.0339	0.0008	−0.0002
	(0.0013)	(0.0078)	(0.0189)	(0.0219)	(0.0020)	(0.0088)
Inter$_{\{5+\}}$	0.0031*	0.0338**	0.0241	0.0305	0.0027	0.0076
	(0.0017)	(0.0129)	(0.0218)	(0.0237)	(0.0021)	(0.0100)
Obs.	484,628	58,012	27,755	27,061	490,836	62,659

Notes: All regressions include all fixed effects and controls specified in equation (3); and regressions are weighted by the CPS weights. Numbers in parentheses are the robust standard errors clustered at the state level, and ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

Table 5. Impact of Bank Deregulations on Entrepreneurship (1980–2007), by Race

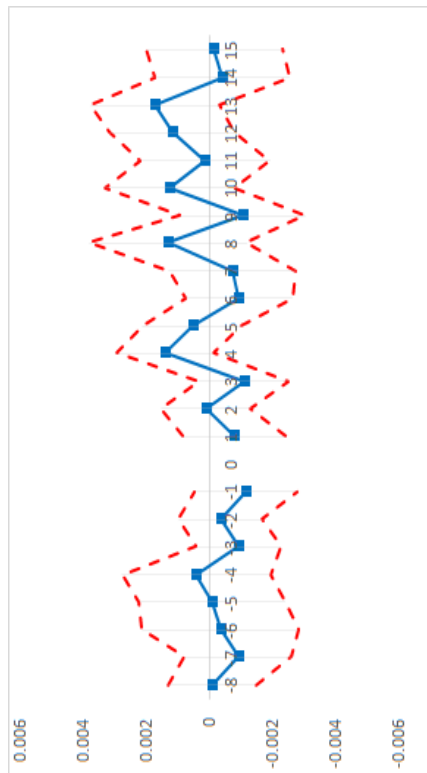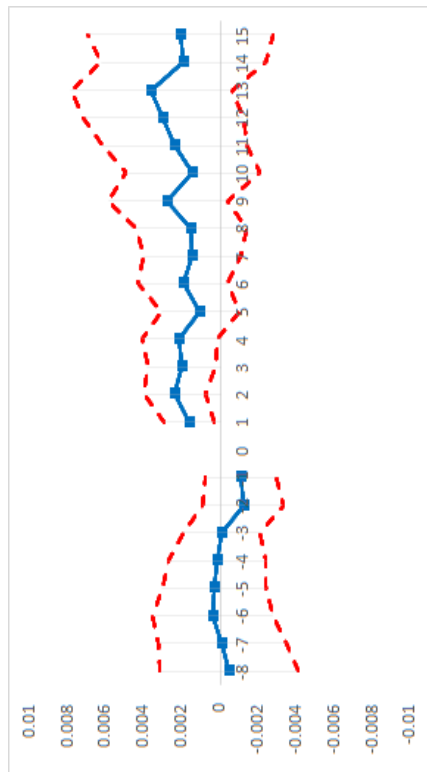| | Incorporated | | | | Unincorporated | |
| | Entry from | | Exit to | | | |
| | Non-Bus. | Uninc. | Non-Bus. | Uninc. | Entry | Exit |
Variable	1	2	3	4	5	6
Panel A. Non-whites						
Intra$_{\{1,2\}}$	−0.0004	0.0596*	0.1100	0.0087	−0.0032	0.0895**
	(0.0012)	(0.0337)	(0.0890)	(0.0703)	(0.0020)	(0.0158)
Intra$_{\{3,4\}}$	0.0013	−0.0054	0.2182**	0.0144	−0.0040	0.0770*
	(0.0012)	(0.0291)	(0.0986)	(0.0848)	(0.0026)	(0.0387)
Intra$_{\{5+\}}$	0.0003	−0.0070	0.1447*	0.0373	−0.0031	0.0442
	(0.0014)	(0.0331)	(0.0830)	(0.1025)	(0.0030)	(0.0378)
Inter$_{\{1,2\}}$	0.0039**	−0.0373	0.0921	−0.0116	0.0040	0.0341*
	(0.0015)	(0.0275)	(0.0698)	(0.0822)	(0.0025)	(0.0203)
Inter$_{\{3,4\}}$	0.0027***	−0.0147	0.1743***	−0.0157	0.0016	0.0911**
	(0.0010)	(0.0295)	(0.0595)	(0.0997)	(0.0023)	(0.0353)
Inter$_{\{5+\}}$	0.0035**	−0.0131	0.2048***	0.0739	0.0045	0.1268***
	(0.0014)	(0.0258)	(0.0639)	(0.1133)	(0.0031)	(0.0284)
Obs.	117,595	5,179	2,121	1,973	118,891	6,321
Panel B. Whites						
Intra$_{\{1,2\}}$	0.0007	0.0004	0.0138	0.0239*	0.0014	−0.0083
	(0.0007)	(0.0061)	(0.0121)	(0.0142)	(0.0011)	(0.0081)
Intra$_{\{3,4\}}$	0.0009	−0.0022	−0.0101	0.0043	0.0004	−0.0062
	(0.0006)	(0.0067)	(0.0138)	(0.0177)	(0.0014)	(0.0079)
Intra$_{\{5+\}}$	0.0015*	−0.0026	0.0161	0.0183	0.0017	−0.0095
	(0.0008)	(0.0078)	(0.0177)	(0.0202)	(0.0015)	(0.0082)
Inter$_{\{1,2\}}$	0.0021**	0.0055	−0.0051	0.0413***	−0.0015	−0.0019
	(0.0008)	(0.0058)	(0.0135)	(0.0137)	(0.0013)	(0.0073)
Inter$_{\{3,4\}}$	0.0025***	0.0131*	0.0225	0.0470**	−0.0012	−0.0144**
	(0.0009)	(0.0077)	(0.0174)	(0.0207)	(0.0016)	(0.0066)
Inter$_{\{5+\}}$	0.0021*	0.0316**	0.0162	0.0386*	0.0007	−0.0082
	(0.0011)	(0.0133)	(0.0205)	(0.0211)	(0.0023)	(0.0088)
Obs.	812,570	79,001	33,953	32,417	822,922	88,709

Notes: Regressions include all fixed effects, time trends, and controls as specified in equation (3), and are weighted by the CPS weights. Numbers in parentheses are the robust standard errors clustered at the state level, and ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

Table 6. Impact of Bank Deregulations on Entrepreneurship (1980–2007), by Age

	Incorporated				Unincorporated	
	Entry from		Exit to			
	Non-Bus.	Uninc.	Non-Bus.	Uninc.	Entry	Exit
Variable	1	2	3	4	5	6
Panel A. Young (Age < 40)						
Intra$_{\{1,2\}}$	−0.0008	0.0086	0.0396	0.0314	0.0003	0.0078
	(0.0008)	(0.0090)	(0.0291)	(0.0257)	(0.0016)	(0.0132)
Intra$_{\{3,4\}}$	−0.0007	−0.0014	0.0240	0.0069	−0.0004	0.0126
	(0.0008)	(0.0071)	(0.0261)	(0.0299)	(0.0019)	(0.0101)
Intra$_{\{5+\}}$	−0.0006	−0.0084	0.0448	0.0255	0.0003	0.0111
	(0.0007)	(0.0076)	(0.0270)	(0.0409)	(0.0019)	(0.0128)
Inter$_{\{1,2\}}$	0.0024***	0.0048	0.0084	0.0646**	−0.0019	0.0082
	(0.0008)	(0.0080)	(0.0209)	(0.0265)	(0.0013)	(0.0101)
Inter$_{\{3,4\}}$	0.0026**	0.0249*	0.0672***	0.0790***	−0.0022	−0.090
	(0.0011)	(0.0110)	(0.0256)	(0.0269)	(0.0018)	(0.0114)
Inter$_{\{5+\}}$	0.0032**	0.0377*	0.0648**	0.0964***	−0.0000	−0.0091
	(0.0013)	(0.0183)	(0.0307)	(0.0339)	(0.0024)	(0.0105)
Obs.	481,673	35,390	12,853	12,039	488,462	41,490
Panel B. Old (Age ⩾ 40)						
Intra$_{\{1,2\}}$	0.0024**	−0.0020	0.0025	0.0218	0.0017	−0.0130
	(0.0010)	(0.0072)	(0.0179)	(0.0170)	(0.0010)	(0.0073)
Intra$_{\{3,4\}}$	0.0029***	−0.0036	−0.0210	0.0087	0.0002	−0.0138
	(0.0010)	(0.0102)	(0.0179)	(0.0231)	(0.0014)	(0.0104)
Intra$_{\{5+\}}$	0.0039***	−0.0007	0.0017	0.0218	0.0022*	−0.0228*
	(0.0013)	(0.0106)	(0.0229)	(0.0235)	(0.0012)	(0.0117)
Inter$_{\{1,2\}}$	0.0022**	0.0004	−0.0041	0.0229*	0.0010	−0.0083
	(0.0010)	(0.0076)	(0.0157)	(0.0136)	(0.0014)	(0.0119)
Inter$_{\{3,4\}}$	0.0024**	0.0003	0.0068	0.0224	0.0011	−0.0087
	(0.0011)	(0.0091)	(0.0184)	(0.0265)	(0.0017)	(0.0111)
Inter$_{\{5+\}}$	0.0012	0.0214*	0.0059	0.0070	0.0029	0.0060
	(0.0014)	(0.0127)	(0.0191)	(0.0214)	(0.0021)	(0.0154)
Obs.	448,493	48,789	23,222	22,352	453,169	53,538

Notes: Regressions include all fixed effects, time trends, and controls as specified in equation (3), and are weighted by the CPS weights. Numbers in parentheses are the robust standard errors clustered at the state level, and ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.
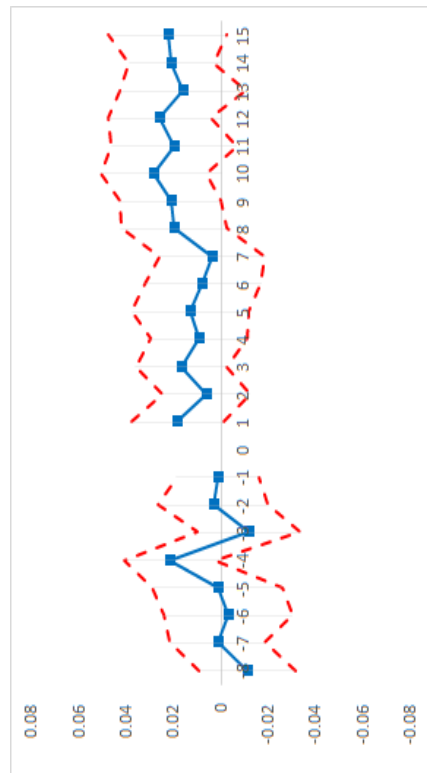
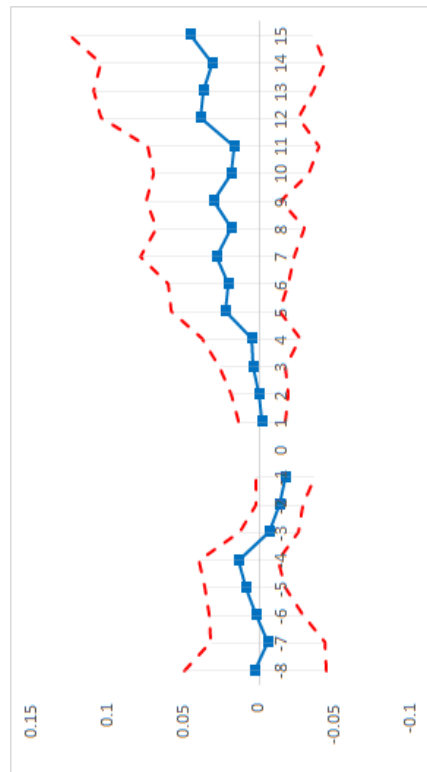Figure 1: Estimated Coefficients from Equation (2) for Entry into Incorporated Self-employed.

a.1. Intrastate: Entry from Non-Business Owners

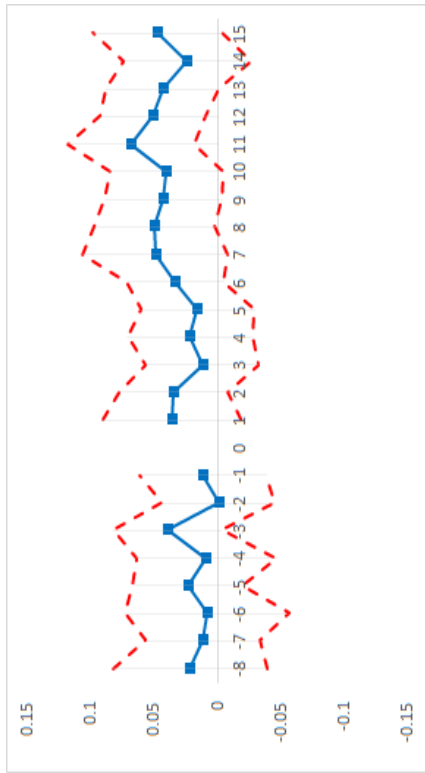a.2. Interstate: Entry from Non-Business Owners

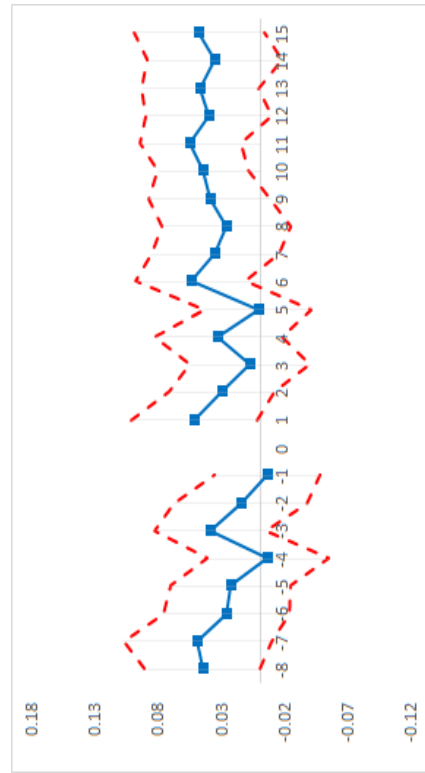b.1. Intrastate: Entry from Unincorporated Self-employed
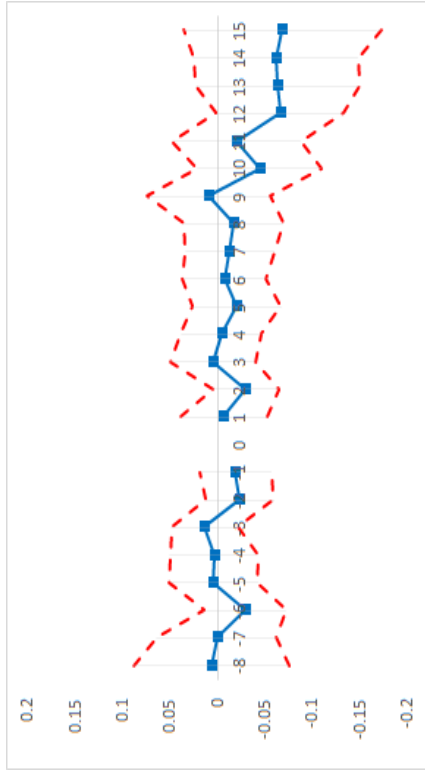
b.2. Interstate: Entry from Unincorporated Self-employed

Figure 2: Estimated Coefficients from Equation (2) for Exit from Incorporated Self-employed.
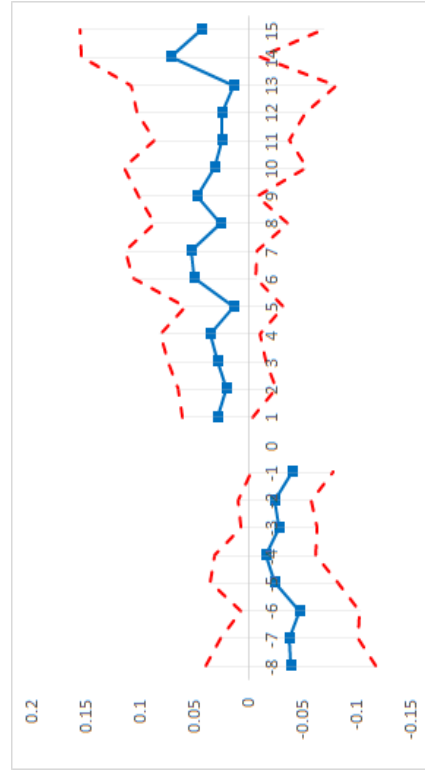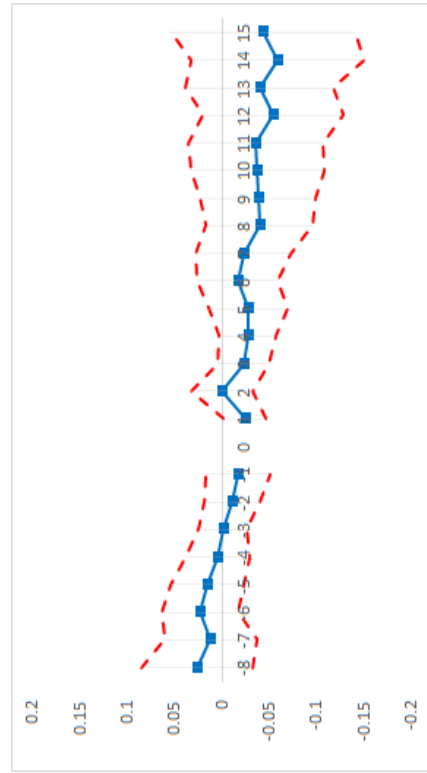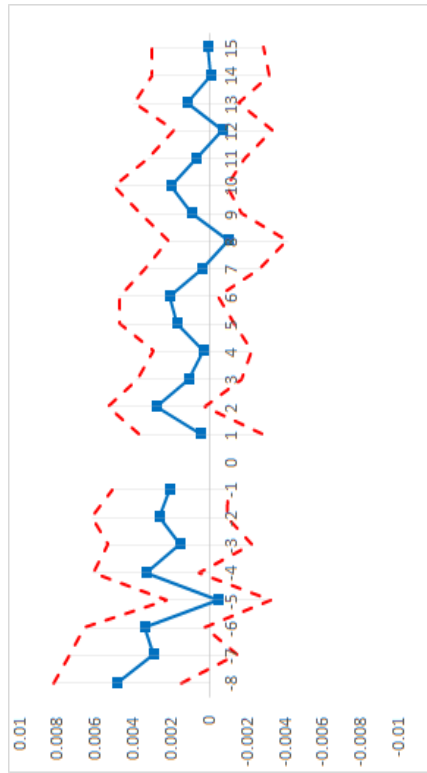
a.1. Intrastate: Exit to Non-Business Owners

a.2. Interstate: Exit to Non-Business Owners

b.1. Intrastate: Exit to Unincorporated Self-employed

b.2. Interstate: Exit to Unincorporated Self-employed

Figure 3: Estimated Coefficients from Equation (2) for Entry/Exit of Unincorporated Self-employed.
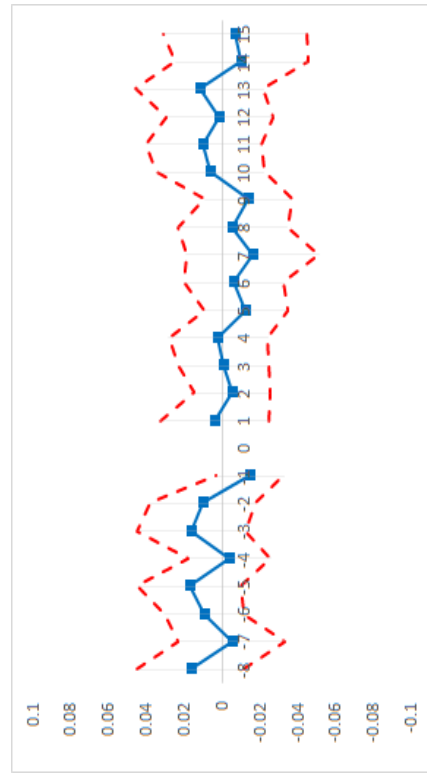
a.1. Intrastate: Entry from Non-Business Owners

a.2. Interstate: Entry from Non-Business Owners

b.1. Intrastate: Exit to Non-Business Owners

b.2. Interstate: Exit to Non-Business Owners

Table A.1. Intrastate and Interstate Deregulation Years

State	Intrastate Branching	Intrastate M&A	Interstate Banking
Alabama	1990	1981	1987
Alaska	1970	1970	1982
Arizona	1970	1970	1986
Arkansas	—	1994	1989
California	1970	1970	1987
Colorado	—	1991	1988
Connecticut	1988	1980	1983
Delaware	1970	1970	1988
Florida	1988	1988	1985
Georgia	—	1983	1985
Hawaii	1986	1986	1997
Idaho	1970	1970	1985
Illinois	1993	1988	1986
Indiana	1991	1989	1986
Iowa	—	1999	1991
Kansas	1990	1987	1992
Kentucky	—	1990	1984
Louisiana	1988	1988	1987
Maine	1975	1975	1978
Maryland	1970	1970	1985
Massachusetts	1984	1984	1983
Michigan	1988	1987	1986
Minnesota	—	1993	1986
Mississippi	1989	1986	1988
Missouri	1990	1990	1986
Montana	—	1990	1993
Nebraska	—	1985	1990
Nevada	1970	1970	1985
New Hampshire	1987	1987	1987
New Jersey	—	1977	1986
New Mexico	1991	1991	1989
New York	1976	1976	1982
North Carolina	1970	1970	1985
North Dakota	—	1987	1991

State	Intrastate Branching	Intrastate M&A	Interstate Banking
Ohio	1989	1979	1985
Oklahoma	—	1988	1987
Oregon	1985	1985	1986
Pennsylvania	1990	1982	1986
Rhode Island	1970	1970	1984
South Carolina	1970	1970	1986
South Dakota	1970	1970	1988
Tennessee	1990	1985	1985
Texas	1988	1988	1987
Utah	1981	1981	1984
Vermont	1970	1970	1988
Virginia	1987	1978	1985
Washington	1985	1985	1987
West Virginia	1987	1987	1988
Wisconsin	1990	1990	1987
Wyoming	—	1988	1987

Notes: — indicates deregulation has not been implemented. States deregulated before 1970 are listed as deregulated in 1970 (Source: Amel 2008).

Table A.2. Impact of Bank Deregulations on Entrepreneurship (1980–2007), by Gender

| | Incorporated | | | | | |
| | Entry from | | Exit to | | Unincorporated | |
Variable	Non-Bus.	Uninc.	Non-Bus.	Uninc.	Entry	Exit
Panel A. Females						
Intra	0.0011**	−0.0038	−0.0061	0.0106	−0.0017	0.0067
	(0.0005)	(0.0069)	(0.0312)	(0.0236)	(0.0014)	(0.0119)
Inter	0.0017**	−0.0023	0.0131	0.0754	−0.0026*	0.0086
	(0.0008)	(0.0066)	(0.0330)	(0.0456)	(0.0014)	(0.0178)
Obs.	445,537	26,168	8,319	7,329	450,977	32,371
Panel B. Males						
Intra	0.0009	−0.0042	−0.0063	0.0025	0.0002	−0.0110
	(0.0010)	(0.0066)	(0.0142)	(0.0127)	(0.0013)	(0.0073)
Inter	0.0008	−0.0001	0.0201	0.0378***	−0.0020*	0.0066
	(0.0013)	(0.0071)	(0.0149)	(0.0134)	(0.0011)	(0.0101)
Obs.	484,628	58,012	27,755	27,061	490,836	62,659

Notes: All regressions include all fixed effects and controls specified in equation (3); and regressions are weighted by the CPS weights. Numbers in parentheses are the robust standard errors clustered at the state level, and ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

Table A.3. Impact of Bank Deregulations on Entrepreneurship (1980–2007), by Race

| | Incorporated | | | | Unincorporated | |
| | Entry from | | Exit to | | | |
Variable	Non-Bus.	Uninc.	Non-Bus.	Uninc.	Entry	Exit
Panel A. Non-whites						
Intra	0.0015	−0.0021	0.0771	−0.0447	−0.0032	0.0382
	(0.0016)	(0.0276)	(0.0726)	(0.0505)	(0.0023)	(0.0296)
Inter	0.0022**	0.0122	0.0937*	0.0576	−0.0006	−0.0169
	(0.0010)	(0.0316)	(0.0535)	(0.0464)	(0.0021)	(0.0377)
Obs.	117,595	5,179	2,121	1,973	118,891	6,321
Panel B. Whites						
Intra	0.0010	−0.0039	−0.0094	0.0070	−0.0004	−0.0086
	(0.0007)	(0.0064)	(0.0118)	(0.0125)	(0.0015)	(0.0068)
Inter	0.0011	0.0006	0.0166	0.0434***	−0.0025***	0.0080
	(0.0010)	(0.0063)	(0.0136)	(0.0163)	(0.0008)	(0.0113)
Obs.	812,570	79,001	33,953	32,417	822,922	88,709

Notes: All regressions include all fixed effects and controls specified in equation (3); and regressions are weighted by the CPS weights. Numbers in parentheses are the robust standard errors clustered at the state level, and ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

Table A.4. Impact of Bank Deregulations on Entrepreneurship (1980–2007), by Age

| Variable | Incorporated | | | | Unincorporated | |
| | Entry from | | Exit to | | | |
	Non-Bus.	Uninc.	Non-Bus.	Uninc.	Entry	Exit
Panel A. Young (Age < 40)						
Intra	0.0003	0.0036	0.0003	0.0107	−0.0008	−0.0024
	(0.0007)	(0.0089)	(0.0247)	(0.0256)	(0.0015)	(0.0109)
Inter	0.0009	−0.0019	0.0084	0.0409	−0.0050***	−0.0019
	(0.0008)	(0.0081)	(0.0191)	(0.0254)	(0.0010)	(0.0146)
Obs.	447,994	32,193	11,432	10,688	454,541	37,907
Panel B. Old (Age ⩾ 40)						
Intra	0.0019**	−0.0104*	−0.0085	−0.0000	−0.0006	−0.0085
	(0.0009)	(0.0061)	(0.0166)	(0.0148)	(0.0014)	(0.0066)
Inter	0.0016	0.0030	0.0269	0.0519***	−0.0011	0.0122
	(0.0012)	(0.0064)	(0.0163)	(0.0173)	(0.0013)	(0.0103)
Obs.	482,171	51,987	24,642	23,702	487,272	57,123

Notes: All regressions include all fixed effects and controls specified in equation (3); and regressions are weighted by the CPS weights. Numbers in parentheses are the robust standard errors clustered at the state level, and ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.