Credit elasticity of job creation: Does small business credit spur local employment?

Abstract: This study investigates whether an increase in the supply of credit for small firms in a local economy impacts job growth. Using county-level data on small business loan originations between 1996 and 2004 and employing three instrumental variables for the new loans (foreclosure laws, housing supply elasticity, and regulatory barriers to interstate branching) to ensure that this is a loan supply effect, I estimate credit elasticity of job creation of 0.16, and interpret this as evidence that small firms' access to bank finance generates a positive externality of local job creation. This job-creating impact of increased bank lending to small businesses is 1.8-5.8 times greater than the job-creating impact of increased business formation. Further, my results suggest that small-firm financial constraints can stifle economic growth: (1) the estimated elasticity is larger in the presence of exogenous local growth opportunities and (2) the economic magnitude of credit elasticity decreases with respect to firm size.

JEL Classification: G21, G28

Key words: small business loans, job creation, credit elasticity, local lenders

1. Introduction

It is now a stylized fact that new small business formation is an important source of job creation (Birch 1979; Baldwin and Picot 1995; Broersma and Gautier 1997; Kirchhoff 1998; Voulgaris, Papadogonas, and Agiomirgianakis 2005; Newmark, Wall, and Zhang 2011; Haltiwanger, Jarmin, and Miranda 2013). However, without gaining access to external capital, it might be difficult for entrepreneurs to start businesses and make them prosperous. Especially given that it is small firms who take the biggest hit *in the presence of* financial constraints arising from asymmetric information, whether capital smoothly flows into those small firms with profitable investment opportunities has been the main interest of policymakers. Petersen and Rajan (1994) also argue that the extent to which small firms are nurtured and have access to the credit necessary for growth is an important measure of the efficiency of a financial system. A key question is whether opaque small businesses *with* better access to bank credit do contribute to economic growth and job opportunities.

This study tests whether an increase in the supply of credit for small firms in a given county spurs job growth. The classic and widely-held theory of credit rationing, proposed by Stiglitz and Weiss (1981), suggests that small firms are more subject to under-investment because of the asymmetric information problem: if small borrowers with good projects are left as "unsatisfied" agents that obtain less financing than they want (at the prevailing interest rate) in the credit markets, an exogenous increase in the supply of credit could lead to more investment that is socially efficient, generating positive externalities such as job creation and economic growth. However, as suggested by De Meza and Webb (1987, 2000), the asymmetric information might not necessarily constrain small firms' ability to fund investment plans. Rather, it may be possible that too much participation in entrepreneurship or socially excessive level of investment (i.e., over-investment) is being undertaken. Especially if constrained small business owners are more likely to be of low quality (Andersen and Nielsen 2012) rather than randomly selected loan applicants are denied credit access, the effect of easing access to bank finance could be marginal or muted at the aggregate level and thus job creation and economic growth are less likely to materialize.

Along with the lack of conceptual consensus on how the information asymmetries affect small firms' chance to fund their investments in the credit markets, which makes it less straightforward to predict the effect of small business credit growth on job growth, it is empirically challenging to establish the causal link because of endogeneity issues. First, there is a reverse causality problem: on-the-one-hand, increased small business lending can affect the local economy when less financially-constrained firms thanks to better access to capital take on more growth opportunities; on-the-other-hand, as credit responds endogenously to current and expected economic conditions (Favara and Imbs 2015), improvements in local economic conditions might attract more capital from banking firms and result in credit booms, which is particularly plausible in the era of financial integration. Second, there could be unobservable factors which might affect job creation but are correlated to credit growth (e.g., borrowers' investment opportunities, small firms' innovation, or natural disasters). In order to address the endogeneity concerns and ensure that this is a loan-supply effect, I use three instruments for the new small business loans. The first instrument exploits the difference in state laws for the foreclosure process. Laws governing the foreclosure process can have important implications to the process of liquidating the collateral after a loan default, and thus the difference in foreclosure laws may have direct consequences on the costs and risks of banks' lending decisions (Dagher and Sun 2016). Especially given that the majority of small business loans are secured by some type of assets (i.e., real estate, equipment, or accounts receivable), this instrument should be relevant. The second instrument is the housing supply elasticity developed by Saiz (2010). This measure, which has been extensively employed in many studies, uses exogenous geographic and regulatory constraints to housing supply to differentiate areas where an increase in housing demand translates into higher house prices and more collateral value (i.e., areas with low housing supply elasticity because it is hard to build) from those where the demand for housing results in higher volume of houses built (Adelino, Schoar, and Severino 2015). Why can this instrument be valid in investigating the effect of new small business loans on local economic output? The years 2001-2006 leading up to the financial crisis had been described by significant asset price booms – especially real estate price increases, and increased collateral value can be associated with loan supply since collateral performs as a device for screening heterogeneous borrowers. Third, I use

differences in regulatory barriers to interstate branching as an instrument. While relaxation of geographical restrictions on bank expansion was completed in 1997 with the Interstate Banking and Branching Efficiency Act (hereafter, IBBEA), IBBEA at the same time granted states the right to erect roadblocks (Rice and Strahan 2010), so some states have tighter restrictions on out-of-state entries, which exogenously affects the competition among banks in the credit markets.

In the instrumental approach, I find that during the period of years 1996-2004, the shift in the supply of small business credit substantially spurs local employment, providing evidence that facilitating broad access to bank finance affects local economic growth. I estimate credit elasticity of job creation of 0.16 during the test period. In stricter economic terms, moving from the 25^{th} to the 50^{th} percentile of the distribution of the credit growth rate increases the job growth rate by 1.85 percentage points, or 42 percent of the standard deviation of job growth rate. The observed large magnitude of credit elasticity seems to come from two effects: (1) the direct effects of firms' obtaining necessary credit and (2) the spillover effects that occur through economic interactions to non-recipient firms. At a minimum, 12 percent of job creation generates from the spillover effects. Moreover, my estimates indicate that increased bank credit provision for small businesses is 1.8-5.8 times more important for job creation than increased small business formation. Taken together, these empirical findings indirectly rule out one possible phenomenon: (socially inefficient) over-investment. If an increase in the aggregate credit supply for a given local economy draws in more bad projects than good ones, positive externalities such as job creation are less likely to be generated. While my study is conducted from the macro level of analysis where only the aggregate amount of bank credit supplied to a given economy is taken into account, lacking the finest data of small firm-level financial constraints, I find several results which strongly support that financing constraints on small firms can stifle economic growth. First, when I probe into whether an increase in the credit supply affects firm entry-to-exit and/or expansion-to-contraction ratios, I find both are positively impacted. Second, I document the increased aggregate credit for small businesses creates more jobs in the presence of strong local growth opportunities. Further, this study finds evidence that the economic magnitude of credit elasticity almost

monotonically decreases with respect to firm size. If information problems abound in the credit markets, smaller-sized firms are more likely to be forced to drop good projects due to lack of financing. Thus, finding an inverse relation between firm size and credit elasticity is sympathetic to the view that smaller entrepreneurs are possibly credit-constrained.

This paper also finds the role of monitoring and relationship banking in creating value for borrowing firms – that is, banks' screening and/or monitoring small borrowers' projects can have real consequences on the positive externalities small business credit produces. As widely known, banks have an instrumental part to play in managing some of the problems resulting from imperfect information on small borrowers (Freixas and Rochet 2008). They have technologies to screen small firms and to monitor their projects, and this screening and monitoring activity mitigates to some extent the effects of (*ex ante*) adverse selection and/or (*interim*) moral hazard. According to Mayer (1988), these roles of monitoring and information processing help banks develop relationship, from which the value of a bank loan generates. All else equal, loans prudently made in accordance with relationships between firms and banks which can assess the creditworthiness of these borrowing firms are more likely to facilitate the successful realization of projects and therefore create jobs. Consistent with this prediction, an increase in the credit extended by local banks is in general more significantly associated with local job growth. Overall, my study supports that the smooth flow of capital to firms without a substantial risk of loss through moral hazard or adverse selection is an essential catalyst of economic growth as suggested by Rajan and Zingales (1998).

This paper has eight sections: section 2 discusses the theoretical background and reviews related literature, and section 3 briefly explains small business loans. In section 4, I introduce my identification strategy, the empirical methodology, and the data. Section 5 discusses the main findings and section 6 presents the results of several robustness checks I conduct. In section 7, I discuss a fixed-effect specification and the study concludes in section 8.

2. Theoretical background and related literature

Stiglitz and Weiss (1981) argue that in the credit markets with imperfect information, there seems to be an excess demand for credit *in the equilibrium*, so only some randomly selected applicants may obtain loans they demand. The key leading to this explanation is that adverse selection and/or moral hazard problems result in a backward-bending credit supply function for high-levels of interest rates: that is, as the direct effect of an increase in the interest rate raising a bank's return could be offset by (1) the adverse-selection effect (i.e., the mix of loan applicants being worse) and (2) the incentive effect (i.e., firms undertaking projects with lower probabilities of success but higher payoffs when successful), banks might deny loans to borrowers who are observationally indistinguishable from those who receive loans. However, De Meza and Webb (1987, 2000) stand in contrast to this position, arguing that the inability of banks to discover all of the relevant characteristics of borrowers may lead to more investment than is socially efficient. One of the reasons that SW (1981) and DW (1987, 2000) have conflicting results is a different assumption in their theoretical model setup. SW (1981) assume that borrowers have a reservation level of their expected profits[1] and they differ by a risk parameter, which is only privately observable, so when an increase in the interest rate decreases the demand for loans, it is the less risky firms that drop out of the market. But DW (1987, 2000) consider a possibility that entrepreneurs differ in their intrinsic quality – that is, the return distribution of a better-entrepreneur type first-order stochastically dominates that of a low-quality group. Consequently, for the marginal entrant, who potentially has the highest insolvency risk and thus is the least profitable to a bank, the pooling interest rate is below the rate that this entrepreneur would be charged under full information. Hence, there is a possibility of excess entry. In this case, credit rationing may not occur since, as interest rates rise, it is unambiguously the lowest-quality types that exit, thereby improving the composition of banks' lending portfolio and profitability.

[1] It means that below that reservation level, borrowers will not be interested in developing the project financed by the bank loan.

While there seems to be less conceptual agreement on whether asymmetric information gives rise to under-investment or over-investment (or which case is dominant), it is well understood that imperfect financial markets could have macroeconomic consequences (e.g., an amplification of business cycles or monetary policy transmissions), and therefore the role of banks that can foster borrower-lender relationships transcending the information asymmetries should be taken into consideration. Evidence seems to exist in favor of a high correlation between credit supply and economic activity, which dates back to Bernanke's study (1983) on the Great Depression. More recently, Brown and Earle (2013) use Small Business Administration (SBA) loan data to investigate the effect of SBA loans on employment at the firm level, and Fracassi, Garmaise, Kogan, and Natividad (2016) conduct this line of inquiry using business microloan application data of U.S. subprime minority borrowers. Both find a positive relation, suggesting the possibility that financial constraints may limit economic growth[2]. In the wake of the Great Recession, Chodorow-Reich (2014) finds the real effects of credit market frictions on the employment at 2,000 nonfinancial firms[3], but Greenstone, Mas, and Nguyen (2014) conclude the 2007-09 banks' small business lending disruptions accounted for *economically trivial* declines in small firm and overall employment[4].

This study is also broadly related to the literature on how the financial development affects the real sectors. Since the seminal study of King and Levine (1993), which empirically proves Schumpeter's argument that the roles of financial intermediaries are fundamental for economic growth, there has been a line of literature finding well-developed financial markets causally impact the future economic growth (among others, see Rajan and Zingales 1998; Guiso, Sapienza, and Zinglaes 2004). Also, a large literature specifically examines the effects of financial integration or banking deregulation in the U.S. on the numerous dimensions of economic outcomes (for most related studies, see Black and Strahan 2002; Kerr

[2] However, it is important to note that these studies have not been executed at the *aggregate* level of a given economy; rather, they focus on a specific type of small business loans.
[3] This study focuses on the syndicated loan supply to large firms during the recent financial crisis.
[4] The study of Greenstone, Mas, and Nguyen (2014) also provide evidence that the lending disruptions are not associated with changes in economic activity during the 1997-2007 period, concluding that the credit channel is *not* empirically important in normal times.

and Nanda 2009; Rice and Strahan 2010; Krishnan, Nandy, and Puri 2015; Subramanian and Subramanian 2015) and most of it finds a positive relation[5].

Finally, the previous literature on the importance of lenders' ability in financial contracting to collect soft information on borrowers and markets has provided a useful guidance. Agarwal and Hauswald (2010) reveal that a lender's proximity to small firms is an excellent proxy for the lender's informational advantage, facilitating the collection of soft information, and Loutskina and Strahan (2011) find that local lenders invest more in information-sensitive, risky mortgage loans, which results in better risk management for their own good and less credit rationing for borrowers. Focusing on rural community banks, DeYoung, Glennon, Nigro, and Spong (2012) find that intra-community information contributes to smaller loan default rate. They conclude that large amounts of inexpensive soft information and a high level of personal knowledge about customers play a critical role. Cortés (2015) also shows that banks with a physical branch near the properties of mortgage loans they make have better information about home-price fundamentals, all else equal.

3. Small business loans

While small firms are believed to be a crucial segment of our economy, there are only two publicly available data sources on small business lending activities of each commercial bank. The first source is the CALL reports, which have provided the information about small business loans every 2nd quarter since 1993. CALL reports define business loans with amount of $1 million or less as "small business loans" and distinguish small business loans secured by commercial properties (hereafter, SB CRE loans) from other small business loans (hereafter, SB C&I loans). SB CRE loans are secured by nonfarm, nonresidential properties such as business and industrial properties, but exclude those loans for commercial and industrial

[5] One notable exception would be Kerr and Nanda's study (2009), which documents a massive increase in churning among new entrants.

property construction and land development. SB C&I loans include both unsecured loans and loans secured by other types of collateral such as accounts receivable or equipment. While all FDIC-insured banks are required to report the information on small business lending, the geographic location of borrowers of these loans is not available. The second source is the CRA database. The Community Reinvestment Act (hereafter, CRA) was designed to encourage banks to meet the credit needs of the local communities from which they obtain deposits. While this database provides the loan origination data with geographical information of borrowing firms and even separately reports loans made to businesses with annual revenues less than or equal to $ 1 million (i.e., micro business loans), it does not distinguish SB CRE loan originations from SB C&I loan originations. More importantly, only larger banks are required to report CRA data: before 2005 banks with assets more than $ 250 million were subject to CRA data collection. But in 2005, the cutoff was raised to $ 1 billion and the new one, adjusted for annual inflation, has since been announced each year.

While neither the CALL reports nor the CRA data provide complete information on small business loans, my study uses the CRA data for the following reasons. First, as my research focuses on the effect of small business loans on the local economy, the geographic location of small businesses which are bank-loan financed is essential. Many studies use deposit-taking branch-based data as a proxy for banks' geographical lending activities. But this is not necessarily a good proxy especially because the widespread information technology removed much of the geographical barrier between borrowers and lenders. Figure 1 shows that for each year during the period 1996-2013, the annual percentage of new small business loans made by banks with no local branches is not trivial. On average, more than a quarter of small business loans were made by branchless banks in a given county, which doubts the use of deposits-based location as a proxy for geographic distribution of small business loans[6]. Second, even though only larger banks are required to report the CRA data, Figure 2 shows these CRA-reporting banks cover about 70 percent of small

[6] It also suggests that banks would not extend small business credit in proportion to deposit shares in the counties with a branch.

business loans posted on CALL reports during the main test period of 1996-2004. Further, this figure indicates that even after the cutoff for reporting was raised in 2005, a majority of small business loans have been made by these larger banks. Third, some folks raise an issue that CALL reports define small business loans by the size of a business loan, not by the size of a business. However, as CRA data separately reports loans made to businesses with annual revenues less than or equal to $ 1 million (i.e., micro business loans), I can test whether micro business loans are different from small business loans in making contributions to job growth. Table 2 shows the aggregate amount of small business loan originations and the aggregate amount of small business loan stock, respectively, and about 57-77 percent of small business loan stock in any given year is captured by new small business loans during the period of 1996-2004.

4. Empirical methodology and data

4.1. Identification strategy

As the identification of an exogenous shift in the supply of credit is of the essence to estimate a meaningful elasticity, I use three instruments for the new loans. First, I exploit the heterogeneity in laws governing the foreclosure process across the states. There are two types of foreclosures: judicial and non-judicial. Judicial foreclosure states require a foreclosed sale to go through court while there is no court intervention in non-judicial foreclosure states. As a consequence, judicial foreclosure process provides extensive protection to borrowers, but on the flip side, the protection can impose substantial costs and risks upon lenders (Pence 2006). Consistent with this, Dagher and Sun (2016) find that judicial requirements reduce the supply of mortgage credit – but only nonconforming, jumbo-sized loans that cannot be sold to GSEs. Due to the development in the securitization market, commercial mortgage loans and even C&I loans could be securitized or sold, but the majority of these loans are still kept on the banks' book. For instance, at the end of 2009, approximately 25 percent of commercial mortgage loans and 10 percent of C&I loans were securitized (Loutskina 2011). While there is no data on how many small business loans are

sold or securitized, considering that SB CRE loans and SB C&I loans are more subject to information problems, it is safe to assume that most of those loans are quite illiquid and would be retained on the balance sheets of banks (i.e., portfolio loans). Then, this foreclosure law governing the process through which banks can take possession of collateral after the loan default might affect commercial banks' lending decisions. In particular, before the recent financial crisis there was a larger increase in SB CRE loans than in SB C&I loans. Figure 3A shows the ratio of aggregate SB CRE loans to aggregate SB loans: in 1996 about 48 percent of SB loans were business loans secured by real estate, but SB CRE loans reached 53 percent in 2004. Consistent with this, Figure 3B indicates that during the period 1996-2004 there was substantial annual growth in SB CRE loans while SB C&I loans had a relatively smaller increase[7]. So this instrument should be especially relevant during this period. Furthermore, according to "*Survey of Terms of Business Lending*" provided by Board of Governors of the Federal Reserve System, more than 80 percent of C&I loans with amount less than $100,000 are collateralized, and even larger-size loans are usually backed by some type of collateral (See Figure 4). One concern with this instrument is that the difference in state foreclosure laws might be correlated with state-level attributes which can affect the local economic outcomes. But the previous literature finds that there are no significant differences between judicial and non-judicial states in many dimensions of economic outcomes. For instance, Ghent (2012) conducts a thorough analysis on the history of state foreclosure laws and concludes that there are no clear economic reasons for the difference. Mian, Sufi, and Trebbi (2015) also find state foreclosure laws orthogonal to a wide range of state-specific economic attributes.

Second, I employ a land topology-based measure of housing supply elasticity developed by Saiz (2010). This measure is constructed using geographical and local regulatory constraints to new construction. The basic idea behind the measure is that areas with elastic housing supply experience only small increase in house prices in response to high demand because housing supply can be expanded with relative ease,

[7] The 8-year growth rates between 1996 and 2004 for SB CRE loans and SB C&I loans were 73 percent and 45 percent, respectively.

while inelastic housing supply areas should experience higher house price changes in response to the positive housing demand shock (Glaeser, Gyourko, and Saiz 2008; Mian and Sufi 2011). Consistent with this, previous studies document that low-elasticity areas correlate strongly with steeper house price growth in the years leading up to the financial crisis, but this instrument is orthogonal to fundamental drivers of local economic growth. As collateral performs as a device for screening heterogeneous borrowers, this instrument should be relevant to small business credit supply.

Finally, I use differences in regulatory barriers to interstate branching. While IBBEA relaxed geographical restrictions on interstate banking and branching, it permitted states the right to build some barriers based on the following four dimensions (Johnson and Rice 2008; Rice and Strahan 2010; Krishnan, Nandy, and Puri 2015): (1) age restriction: states are allowed to set their own minimum age requirements (with a maximum restriction of 5 years) with respect to how long a bank has been in existence prior to its interstate bank merger, (2) de novo interstate branching restriction: states could disallow de novo interstate bank branching, (3) individual branch acquisition restriction: states could make interstate acquisition of banks more difficult by requiring that all branches of an in-state target bank be acquired by an out-of-state bidder bank, and (4) statewide deposit cap restriction: states could restrict the fraction of deposits an out-of-state bank could collect in that state. Using the four dimensions, Rice and Strahan (2010) develop a simple index of interstate branching restrictions. The index ranges from zero (least restricted) to four (most restricted) and serves a good instrument for the competition in a credit market. The extent of competition in credit markets is relevant for small business credit supply: Petersen and Rajan (1995) theoretically and empirically show that banks are more likely to finance capital-constrained small firms when credit markets are concentrated because it is easier for banks to internalize the benefits of assisting small and informationally opaque firms[8]. However, Kroszner and Strahan (1999) or Rice and Strahan (2010) show

[8] Meanwhile, Rice and Strahan (2010) employ this index to investigate how credit competition affects small firm financing using the data from the Survey of Small Business Finance and provide evidence that small firms are more likely to borrow from banks at lower rates in less restricted states but fail to find any significant difference in the amount that small firms borrow.

that state-level banking deregulation in the U.S. is an outcome of the lobbying power of small banks relative to large banks, and it is not correlated with contemporaneous economic conditions. Further, Favara and Imbs (2015) confirm that this instrument constitutes a credit supply shock as only those lenders that are affected by IBBEA change their mortgage originations[9].

4.2. Data

I use county-level data on small business loans originated by each commercial bank, which is obtained from CRA reports. While this data is available from 1996 onward, I specifically focus on the years 1996-2004 for the following reasons. First, as the CRA-reporting cutoff was raised in 2005, there were many banks which discontinued to report their small business loan originations. Also, from 2005 the reporting cutoff adjusts every year, so I cannot mix the pre-2005 loan origination data with that of post-2005 in the tests. Second, to avoid the concern that the peak of credit booms or crisis-specific factors might drive the results, I would not like to extend my sample period beyond 2004.

The County Business Patterns (hereafter, CBP) data, which is obtained from the U.S. Census Bureau, provides county-level employment information such as the number of establishments by employment-size classes and by industry as well as the number of total employment[10]. To count the number of firm births, deaths, expansions, and contractions at one-year interval for each county, I use the Census Statistics of U.S. Businesses (SUSB), which is available from 1998-99.

To measure employment-weighted operating and profit margins of a manufacturing sector for each county as a proxy for investment opportunities, I use the Census Quarterly Financial Report (hereafter, QFR). For each quarter, the QFR program collects and publishes estimated aggregate income statements and balance sheets for mining, manufacturing, wholesale trade, retail trade, and some selected service industries. Especially for the manufacturing sectors, it puts out the income statements and balance sheets

[9] While Favara and Imbs (2015) show that this instrument identifies a credit supply shock, they find *mortgage credit expansion* in less restrictive areas.
[10] This data is measured in the week of March 12th every year, and employment consists of full- and part-time paid employees.

at NAICS 3-digit subsectors for firms with total assets under $ 25 million, which are considered to be small and medium-sized enterprises.

I follow Fannie Mae to identify whether a state has judicial foreclosure process or not[11]. From the U.S. Census Bureau, I gather the population data of each county and similarly from the Bureau of Labor Statistics, I collect the data of unemployment rate and total labor force. The county-level adjusted gross income data comes from the IRS Statistics of Income. Finally, I get the housing price data from the Federal Housing Finance Agency (hereafter, FHFA). FHFA provides the MSA-level Home Price Index (HPI), which is a weighted, repeat-sales index. The main sample contains 5,821 county-year observations and the summary statistics of variables are displayed in Table 1.

4.3. Main regression framework

To find evidence that small firms' better access to bank finance generates positive externalities, I test whether an increase in the aggregate small business credit affects job growth in the local economy. As a way to establish a causal link from the growth in small business loans to job creation, I employ three instruments discussed above. Specifically, I estimate the following specification:

$$\Delta\, total\ SB\ loans_{c,t} = a + bJudicial_c + cSaiz\ elasticity_c$$
$$+dRestrictiveness_{c,t} + \boldsymbol{eX_{c,t}} + year\ dummies + \epsilon_{c,t}\ (1)$$
$$\Delta\, job_{c,t} = \alpha + \beta\Delta\, \widehat{total\ SB}\ loans_{c,t} + \boldsymbol{\gamma X_{c,t}} + year\ dummies + \varepsilon_{c,t}\ (2).$$

Equation (1) is the reduced form, and counties are indexed by *c* and years are numbered by *t*. $\Delta\, total\ SB\ loans_{c,t}$ is the annual percent change in total small business loan originations at county *c* in year *t*, and similarly $\Delta\, job_{c,t}$ is the annual percent change in total employment at county *c* in year *t*. $Judicial_c$ is a dummy variable that equals one for states with judicial foreclosure requirements and equals zero otherwise. $Saiz\ elasticity_c$ is the measure of MSA-level housing supply elasticity developed by Saiz

[11] https://www.fanniemae.com/content/guide_exhibit/foreclosure-timeframes-compensatory-fees-allowable-delays.pdf As a cross-check, I also refer to RealtyTrac.com (http://www.realtytrac.com/real-estate-guides/foreclosure-laws) following Mian, Sufi, and Trebbi (2015) and the results do not change.

(2010) and does not vary over time. $Restrictiveness_{c,t}$ is the state-level restrictiveness index constructed by Rice and Strahan (2010). This index is time-varying for 13 states during the test period.

$\boldsymbol{X_{c,t}}$ is a vector of county-level control variables which may be associated with local employment rates and has two different sets. The first set of control variables accounts for the dynamics of small firms. Certainly, job growth is an externality of firms' profit-maximizing activities, and without being bank debt-financed, these firms, regardless of whether small or new, might still pursue their investment plans and can add more jobs. So to control for the direct effect of small firms on local jobs, I include three variables: *% small firms* (the percentage of small firms with less than 50 employees), *Net change in EST* (the net change in establishments), and *Log Establishments* (the logarithm of total establishments)[12]. The variable *% small firms* measures the small-firm intensiveness of each county, while the variable *Net change in EST* captures the degree of survival and creation of local businesses. On average, 95 percent of establishments in a county are those with less than 50 employees, and the distribution of small businesses across different sizes (1-4 employees, 5-9 employees, 20-49 employees, etc) has been very stable over time as shown in Table 3. Also, about 78 firms are created on net annually. The second set of control variables is employed to take into consideration the economic size and condition of a given county and accounts for local demand conditions as well. I include the variables *Log Population* (the logarithm of population), *Unemployment* (the unemployment rate), *Log Laborforce* (the logarithm of labor force), and *Log Income* (the logarithm of adjusted gross income in thousands of dollars).

Meanwhile, as the CRA data separately reports loans made to firms with annual revenues less than or equal to $ 1 million (i.e., micro business loans), I calculate the annual percent change in micro business loan originations at county *c* in year *t*, $\Delta\, micro\ biz\ loans_{c,t}$ as an alternative measure of an increase in the credit supply in a given county and estimate the same model to see whether there is any different impact. On average, 50 percent of total small business credit is extended to these small-revenue firms. In addition,

[12] Another way of controlling for the dynamics of small firms is to directly measure the growth rate of establishments, and section 6.3. *Robustness check II: Different measure for the dynamics of small firms* discusses it.

I alternatively measure job growth without including the employment from agriculture and construction sectors (*Δ job'*) because (1) the CRA data exclude small farm loans and construction/land development loans, (2) I would like to see the job market outcomes after purging the effect of housing booms on the employment of construction industry, and (3) I can separately assess the spillover effects.

5. Results

5.1. Main results

I first run the OLS regressions without instrumenting the variables *Δ total SB loans* or *Δ micro biz loans* for the purpose of comparison, and Panel A of Table 4 displays the results: small business credit growth is not associated with local job growth as neither the variable *Δ total SB loans* nor the variable *Δ micro biz loans* becomes significant. As the OLS regressions might bias the effect of small business loans because of the endogeneity problem as discussed earlier, I turn to the IV-2SLS technique.

Panel B of Table 4 reports the regression results from estimating equations (1) and (2). The first-stage regression results shown in columns [1] and [2] confirm that the instrumental variables are statistically significant and economically sensible. As expected, the coefficients on the variable *Judicial* are negative, so the foreclosure process in fact affects banks' lending decisions for small businesses: all else equal, counties with judicial foreclosure process (i.e., more borrower protection) have 2.89 percentage point less growth in small business credit. The variable *Saiz Elasticity* is negatively associated, which means higher collateral value caused by an exogenous increase in the real estate prices is positively associated with a shift in small business credit. The coefficients of the variable *Restrictiveness* carry a positive sign[13], which implies that lenders can increase small business credit more in concentrated markets than in competitive markets, in line with the theoretical model and empirical findings of Petersen and Rajan (1995). Meanwhile,

[13] But it is worth noting that this restrictiveness index is negatively associated with residential mortgage loan originations as shown in Favara and Imbs (2015).

the variable *Saiz Elasticity* is (both statistically and economically) more significantly associated with credit growth for micro businesses: one-standard deviation increase in the variable *Saiz Elasticity* is associated with 9.43 percent increase in the credit for micro businesses, but with 6.65 percent increase in total small business loans, which implies that housing price run-up is more likely to help smaller-revenue firms mitigate financing constraints. The restrictiveness index is also more strongly associated with a credit increase for these small-revenue firms: one-standard deviation increase in the variable *Restrictiveness* is associated with 12.9 percent increase in the growth rate of micro business loans, but with 10.6 percent increase in the growth of total small business loans. So this result suggests that the credit market competition matters more when banks lend to smaller and probably younger firms, which might have larger hold-up problems.

To diagnose my instruments, I use the conventional three statistics: (1) Wu-Hausman statistic, (2) first-stage F-statistic, and (3) Sargan χ^2. First, Wu-Hausman statistics are significant at 1 percent level so the variables *Δ total SB loans* or *Δ micro biz loans* should be treated as endogenous. Second, the first-stage F statistics are about 35.59 and 32.68, respectively, which means my instruments are not weak. Finally, neither of Sargan χ^2 is statistically significant so I meet the exclusion restrictions for valid instruments.

After ensuring that the instruments are economically and statistically credible, I see whether growth in the small business credit causally impacts job growth. In contrast to statistically insignificant coefficients on *Δ total SB loans* or *Δ micro biz loans* in the OLS regressions, the coefficients of the instrumented variables $\Delta \widehat{total\ SB}\ loans$ or $\Delta \widehat{micro\ biz}\ loans$ are now statistically significant. The economic magnitude is also non-trivial: moving from the 25th to the 50th percentile of the distribution of the variable *Δ total SB loans* is associated with 1.85 percentage point more job growth, or 42 percent of the standard deviation of the variable *Δ job*. When I employ non-agriculture, non-construction sector job growth, *Δ job'*, as a dependent variable, I obtain a very similar result shown in column [4], which means these sectors do not drive the main results. The movement from the 25th to the 50th percentile of the distribution of the variable *Δ total SB loans* is associated with 1.71 percentage point more non-agriculture, non-construction

sector job growth, or 37 percent of the standard deviation of the variable *Δ job'*. The economic magnitude is smaller than that of all-sector job growth, which suggests that there are some spillover effects – this empirical test implies that *at least* 12 percent of job growth comes from spillover effects[14]: the recipients of bank debt may purchase more goods and services from non-recipient firms or they can extend larger trade credit to their customers, which may partially relax the financial constraints of some non-recipient firms.

Among the variables to control for the dynamics of small firms, only the variable *Net change in EST* gets significant, which is consistent with the previous finding that net firm creation generates jobs. But the economic magnitude is comparatively small in my data: moving from the 25th to the 50th percentile of the distribution of the variable *Net change in EST* leads to 0.11 percentage point more job growth, or 2.43 percent of the standard deviation of the variable *Δ job*.

Columns [5] and [6] show the results of the regressions with the variable *Δ micro biz loans* as a measure of increased small business credit. The coefficients are all positive and statistically significant and indicate that moving from the 25th to the 50th percentile of the distribution of the variable *Δ micro biz loans* results in 1.91 percentage point more job growth, which is 43 percent of the standard deviation of the variable *Δ job*.

In short, consistent with a well-established fact that small or young firms create jobs (Birch 1979; Baldwin and Picot 1995; Broersma and Gautier 1997; Kirchhoff 1998; Voulgaris, Papadogonas, and Agiomirgianakis 2005; Newmark, Wall, and Zhang 2011; Haltiwanger, Jarmin, and Miranda 2013), my tests show that net firm creation plays a role. However, after controlling for that effect, an increase in the credit supply for small businesses generates a substantial positive externality of job creation. As a matter of fact, the economic magnitude of credit growth is much bigger than that of net firm creation.

5.2. Interaction between small firms and small business credit

[14] (0.42-0.37)/0.42=0.119

The findings displayed in Panel B of Table 4 raise an important follow-up question: without growth in small business credit, local economies with the net increase of small establishments can sustain larger job growth? That is, those counties tend to create more jobs regardless of the rate of credit growth? Or the relationship is more dramatic with higher credit growth? To address this question, I augment the baseline regression framework by including an interaction term between the variables $\Delta\ \widehat{total\ SB}\ loans$ (or $\Delta\ \widehat{micro\ biz}\ loans$) and *Net change in EST*, and the estimation results are shown in Table 5.

A growth in the aggregate small business credit seems to spur job growth by raising the survival probability of the incumbent firms and/or promoting the creation of new firms. The interaction terms $\Delta\ \widehat{total\ SB}\ loans * Net\ change\ in\ EST$ and $\Delta\ \widehat{micro\ biz}\ loans * Net\ change\ in\ EST$ are all statistically significant. More interestingly, in a county with no change in small business credit growth, a net change in the number of establishments does not seem to add jobs since the coefficients of the variable *Net change in EST* are now insignificant. Overall, these results suggest that net firm creation can add jobs only when the local economy is backed by a shift in credit for small establishments, which is *indicative* of small firms' being credit constrained.

5.3. Firm births-deaths and expansions-contractions

While I show in section 5.2 that credit growth raises the survival probability of small firms and/or facilitates the number of business start-ups, it is worth wondering about precisely how small business credit interacts with the local business dynamics. So I measure birth-to-death and expansion-to-contraction ratios using Statistics of U.S. Businesses from the Census and investigate how they are associated with a change in the small business loan supply. If the birth-to-death ratio is greater than 1, it implies start-ups outnumber business failures, and similarly the expansion-to-contraction ratio bigger than 1 means that business expansions outpace contractions[15]. While the average birth-to-death ratio is about 1.12, one quarter of the county-year observations have more firm deaths than firm births. The estimation results shown in Table 6

[15] Expansions (contractions) are defined as establishments increasing (decreasing) employment during the given time period.

indicate that exogenously increased small business credit positively impacts both birth-to-death and expansion-to-contraction ratios[16]. The economic magnitude is bigger for firm birth-to-death ratios: moving from 25th percentile to 50th percentile of the distribution of the variable *Δ total SB loans* is associated with 18 percent increase in birth-to-death ratios, but with only 10 percent increase in expansion-to-contraction ratios. Above all, the study of this section corroborates the finding that the larger amount of local credit generates a positive externality of job creation by increasing business turnover ratio and assisting firm expansions.

5.4. Exogenous investment opportunities and the increase in small business credit

My tests thus far document that improving access to credit in a given local economy is a crucial ingredient of job creation after controlling for the dynamics of small firms. All else equal, the credit elasticity of job creation should be stronger in the presence of more opportunities to grow and succeed, since the increased credit for small businesses might spur local employment by boosting the probability of their implementing valuable growth opportunities. So I hypothesize that a given amount of loans can have a larger potential effect on job creation for counties with strong exogenous investment opportunities as mitigating financial constraints is especially important for those local economies.

Measuring investment opportunities is challenging: as a way to ascertain investment opportunities for each county, I focus on shocks to local income (*Inv Opp* and *Inv Opp'*). Using the Census QFR data, I first calculate operating and profit margins of each subsector (i.e., NAICS 3-digit) of the manufacturing industry and get the dot product of two vectors: the vector of aggregate operating margins (or profit margins) and the vector of sector-specific employment weights in a county (i.e., the pre-existing composition of a county's manufacturing industry). Then, I examine job creation in *the non-tradable industries* as an identification[17]. As the sales and earnings of a manufacturing industry are more likely to be driven by the

[16] As the county-level Statistics of U.S. Business data is available from 1998-99, I lose 737 observations in this test.
[17] This empirical strategy is similar to that of Adelino, Ma, and Robinson (forthcoming) in which to identify shocks to local income, they use regional structure and national changes in manufacturing employment.

overall industry-specific growth/technology, the import penetration etc., they must be a *relatively* exogenous shock to non-tradable sectors. Following Mian and Sufi (2014), I classify retail trade and accommodation/food services (NAICS 44, 45, and 72 sectors) as non-tradable industries and measure the annual employment growth rate (*Δ job_nontradable*)[18]. That is, I run the following regression:

$$\Delta job\_nontradable_{c,t} = \alpha + \beta_1 \Delta \widehat{total\ SB\ loans}_{c,t} + \beta_2 Inv\ Opp_{c,t}$$
$$+\beta_3 (\widehat{total\ SB\ loans} * Inv\ Opp)_{c,t} + \boldsymbol{\gamma X_{c,t}} + year\ dummies + \varepsilon_{c,t} \quad (3).$$

As shown in Table 1 (summary statistics), a county's average operating and profit margins of the manufacturing industry are 2.2% and 0.5%[19], and about 12 percent and 63 percent of county-year observations have negative operating and profit margins, respectively. Columns [1] and [3] in Table 7[20], which display the results from estimating the equation (3) without the interaction term, show that the coefficients of the variables *Inv Opp* or *Inv Opp'* are positive but insignificant. However, in columns [2] and [4], which show the interaction effect between increased small business credit and exogenous investment opportunities, the coefficients of the interaction terms are positive and statistically significant. Column [2] indicates that compared to counties with no investment opportunity (i.e., zero operating margin of the manufacturing industry), counties with an average level of investment opportunity (i.e., 2.2 percent of operating margin) have 26 percent higher effect of increased credit on job growth in the non-tradable sectors[21]. This result provides evidence that larger credit supply is more conducive to job creation when there exists positive local demand shock to these sectors.

5.5. Screening & monitoring channel

[18] CBP data occasionally suppresses the exact employment number at the industry level for confidentiality purpose and instead provides an employment flag of the range within which the employment number lies. In this case, I take the midpoint of the range as a proxy for the missing employment number.
[19] Apparently, financing costs are non-trivial for small businesses.
[20] I lose 3 observations as the county of Chattahoochee, Georgia has no manufacturing sector during the period of years 2001-2003.
[21] The calculation is the following: (1.5233*0.0221)/0.1288=0.2614.

In a frictionless market where there exist no adverse selection or moral hazard problems, relaxed financial constraints through increased aggregate supply of credit should precisely facilitate the chances of small firms' taking on positive-NPV investment opportunities, which in turn creates more jobs in the local economy. However, market imperfections resulting from the contracting problems more often than not generate allocative inefficiency. While commercial banks as a whole are expert in contracting with opaque small firms, previous studies find that some banks have better informational advantage in identifying the credit risk of new and struggling businesses and closely monitoring them after lending. To assess whether these screening/monitoring abilities are one channel through which small business credit creates a positive externality of job creation, I distinguish local banks from distant banks using the geographical proximity between lenders and borrowers. As proximity facilitates monitoring and access to information (Giroud 2013), closeness to borrowers makes it easier for lenders to monitor and acquire soft information about borrowers and their projects. One the other hand, distant banks would be less informed about local credit market conditions since banks' costs of gathering and processing site-specific information about (potential) borrowers and their business environment increase with distance (Petersen and Rajan 2002; Jiménez, Salas, and Saurina 2009). Thus, to define local lenders vs. distant lenders based on their physical location, I focus on the presence of a branch office and regard as local lenders banks with at least one branch in the MSA a county belongs to, for whom the monitoring of borrowing firms would be more frequent and less costly[22].

Specifically, I measure an increase in the credit supply by a local group (i.e., local lenders) and by a nonlocal group (i.e., nonlocal lenders), respectively, and test whether they have differential impact on job creation. About 18 percent of credit is extended by nonlocal, distant lenders with 30 counties having no presence of nonlocal banks. Table 8 shows that growth in credit extended by local banks is in general more statistically significant. In economic terms, based on the estimates in column [1], moving from the 25th to the 50th percentile of the distribution of the variable $\Delta\, \widehat{local\ SB}\ loans$ leads to 1.88 percentage point

[22] As the distance between borrowers and lenders becomes longer and a group of counties are inter-connected erasing the boundary of each county, I focus on whether a bank has a physical branch within an MSA rather than within a county.

increase in job growth, or 42 percent of the standard deviation of the variable $\Delta\, job$. While the same movement of the distribution of the variable $\Delta\, \widehat{nonlocal\ SB\ loans}$ explains about 44 percent of the standard deviation of the variable $\Delta\, job$, the statistical power is a lot weaker. Especially when I put both variables $\Delta\, \widehat{local\ SB\ loans}$ and $\Delta\, \widehat{nonlocal\ SB\ loans}$, the statistical significance disappears for the credit extended by nonlocal lenders as shown in columns [5] and [6].

6. Robustness checks

6.1. Robustness check I: Labor-intensive economy

Some industries such as restaurants, hotels, agriculture, or constructions are more labor-intensive than others and thus counties with high labor intensity are, by definition, more likely to hire. That is, there could be an effect of demand for jobs. For instance, as illustrated in Figure 5, if bolts and nuts businesses are replaced by lodging businesses, which are more labor-intensive, this local economy might show higher employment growth rate. As a way to mitigate the concern that I simply pick up the effect of labor demand driven by a transition to the labor-intensive economy, I add in the equations (1) and (2) the variable *Labor-intensive dummy*, which equals one for county-year observations with above-median employment at labor-intensive industries and zero otherwise, and re-estimate the model[23]. Panel A of Table 9 shows that labor-intensive economies indeed have about 1.69-1.96 percentage point higher job growth. But even after controlling for the labor-intensive characteristic, the variables $\Delta\, \widehat{total\ SB\ loans}$ or $\Delta\, \widehat{micro\ biz\ loans}$ are still significant, although the estimated elasticities are smaller by 37-49 percent.

Further, I address an important question: is the credit elasticity of job creation stronger in labor-intensive economies? The crucial nature of capital-labor substitution might attenuate bank loans' positive

[23] Retail trade, accommodation & food services, agriculture, and constructions are coded as labor-intensive industries, and labor intensity is employment from labor-intensive industries as percentage of total employment. And the median point is defined based on the annual distribution of labor intensity.

externalities, which are plainly measured as job growth in this study, *if* small firms invest more in fixed assets (i.e., building new plants or buying machinery) rather than hiring more employees as an outcome of successful realization of their projects. So I augment the model to include the interaction term, $\Delta \widehat{total\ SB\ loans} * Labor\text{-}intensive\ dummy$ or $\Delta\ \widehat{micro\ biz\ loans} * Labor\text{-}intesnvie\ dummy$ in order to test whether a local economy's dependence on labor makes a differential in the estimated credit elasticity of job creation, and the results displayed in Panel B of Table 9 provide affirmative answers. The coefficients of the interaction term are all positive and statistically significant, and at the same time the magnitude of the coefficients for the variable *Labor-intensive dummy* reduces by 49-67 percent. Finally, as shown in the bottom row, estimated credit elasticities for labor-intensive counties range from 0.09 to 0.15.

A differential in credit elasticity between non-tradable sectors and tradable sectors is also confirmed. Panel C displays the results of estimating the same regression model as in Panel B for dependent variables, *Δ job_nontradable* and *Δ job_tradable*, respectively. The estimated credit elasticity of tradable sectors is just half as large as that of non-tradable sectors.

6.2. Robustness check II: Inclusion of house price growth

My test period covers the recent real estate booms, and previous studies find that a surge in the house prices can explain low unemployment mainly through two channels. First, there could exist a demand channel: as consumers use their houses as "ATMs", a huge increase in the housing net worth drives up the aggregate demand and subsequently creates more jobs (Mian and Sufi 2014). Second, the collateral channel is documented: improvements in collateral values mitigate credit constraints for households and firms, so the real estate price run-up can have positive impact on economic growth (Bernanke and Gertler 1989; Kiyotaki and Moore 1997; Chaney, Sraer, Thesmar 2012; Adelino, Schoar, and Severino 2015). While the instrumental variable approach is known to mitigate the problem of omitted variables, as a change in the real estate price can be proxied by the MSA-level HPI index, I additionally control for a change in the house price and see whether my results hold or not.

Importantly, an increase in the real estate price is not exogenous since higher price can be the result of improvements in economic conditions (Iacoviello 2005). So I employ the IV-2SLS regressions by instrumenting two endogenous variables *Δ total SB loans* (or *Δ micro biz loans*) and *HPI growth*. Specifically, I estimate the following equations (4)-(6):

$$\Delta\, total\ SB\ loans_{c,t} = a + bJudicial_c + cSaiz\ elasticity_c$$
$$+dRestrictiveness_{c,t} + \boldsymbol{eX_{c,t}} + year\ dummies + \epsilon_{c,t} \quad (4)$$
$$\Delta\, HPI\ growth_{c,t} = a' + b'Judicial_c + c'Saiz\ elasticity_c$$
$$+d'Restrictiveness_{c,t} + \boldsymbol{e'X_{c,t}} + year\ dummies + \epsilon'_{c,t} \quad (5)$$
$$\Delta\, job_{c,t} = \alpha + \beta_1\, \Delta\widehat{total\ SB}\ loans_{c,t} + \beta_2\, \widehat{HPI\ growth}_{c,t} + \boldsymbol{\gamma X_{c,t}} + year\ dummies + \varepsilon_{c,t} \quad (6)$$

where $HPI\ growth_{c,t}$ is the annual percent change in FHFA's HPI index. As FHFA does not provide this index at county-level, I use the MSA-level index.

The estimation results are reported in Table 10. Consistent with previous studies which use the housing supply elasticity as an instrument, I find a negative association between the variables *HPI growth* and *Saiz elasticity*. The variable *Judicial* is also negatively associated with the growth in house price: other things equal, states with a foreclosure process have 0.51 percentage point lower housing price growth. The columns [2]-[5], which are the second-stage results from the IV-2SLS, show statistically significant and positive coefficients on the variable $\Delta\, \widehat{total\ SB}\ loans$ (or $\Delta\, \widehat{micro\ biz}\ loans$) and insignificant coefficients on the variable $\widehat{HPI\ growth}$. The economic magnitude of the variables $\Delta\, \widehat{total\ SB}\ loans$ or $\Delta\, \widehat{micro\ biz}\ loans$ are remarkably similar to that of Table 4 Panel B.

To summarize, my data shows that the inclusion of a change in the house price does not make any difference in the effect of increased small business credit on job growth. While Adelino, Schoar, and Severino (2015) argue that areas with higher house price growth can take out more home equity line of credit or cash out refinancing to start a business (i.e., the collateral channel for small business creation), my tests show that the effect of a rise in the house price is dominated by the effect of the increased small

business credit. That is, a majority of job growth was driven by an increase in new small business loans, some of which might have been backed by the increased collateral value, during the period of years 1996-2004 since only the variable *Δ total SB loans* (or *Δ micro biz loans*) is statistically significant in my data.

6.3. Robustness check III: Different measure for the dynamics of small firms

As a way to control for the role of dynamics of small firms in local employment, I choose three variables: *% small firms*, *Net change in EST*, and *Log Establishments*. In fact, there is another (and probably more direct) way to measure the effect of small firms on job creation – that is, controlling the annual growth rate of establishments (*EST grow*). While this measure might be more simple and straightforward, one concern is that since job growth is in some extent a byproduct of establishment growth in a county, a strong *mechanical* relationship between growth in the net number of firms and simultaneous job growth can dominate the effect of increased credit, making it difficult to tease out the role of small business credit. With this caveat in mind, I re-estimate the model and the results are shown in Panel A of Table 11. While the coefficients of the variable $\Delta\, \widehat{total\ SB}\ loans$ (or $\Delta\, \widehat{micro\ biz}\ loans$) are still significant, both the economic magnitude and statistical significance become a bit weaker as expected. Moving from the 25th to the 50th percentile of the distribution of the variable *Δ total SB loans* is now associated with 18 percent of the standard deviation of the variable *Δ job*. A growth rate of establishments is also strongly associated with job growth rate: based on the estimates in column [1], the same movement of the distribution of the variable *EST grow* is associated with 0.83 percentage point increase in job growth, or 19 percent of the standard deviation of the variable *Δ job*.

A higher growth rate of firms in a given county might depend on the extent to which banks extend loans for small borrowers: incumbents are more likely to survive with the necessary credit in hand (decreasing firm deaths or expediting firm expansions), and similarly more entrepreneurs can start a business if they obtain bank financing (increasing firm births) as shown in Table 6. Hence, I include an interaction term between establishment growth rate and credit growth rate ($\Delta\, \widehat{total\ SB}\ loans * EST\ grow$

or $\Delta \widehat{micro\ biz}\ loans * EST\ grow$) to re-estimate the regression model. Panel B of Table 11 displays the estimation results, from which two things bear special mention. First, the magnitude of coefficients of the variable *EST grow* dramatically falls – by 42-56 percent whereas that of the variables $\Delta \widehat{total\ SB}\ loans$ or $\Delta \widehat{micro\ biz}\ loans$ virtually does not change. Second, the coefficients of the interaction term are all positive and statistically significant at 1 percent level. That is, in the presence of an average increase in credit (i.e., about 13 percent), the effect of a growth in establishments on job creation surges by about 68 percent[24]. Taken together, this robustness check confirms that without a small business credit increase, the effect of net establishment growth could be quite limited.

6.4. Robustness check IV: Winsorization of loan origination data at the 5th and 95th percentiles

As the small business loan origination data is very positively skewed even after winsorizing the data at 1st and 99th percentiles, I now winsorize at 5th and 95th percentiles to address the concern that the influence of outliers might drive my findings. The results are displayed in Table 12: except that the F-statistic for the first-stage regression becomes a bit bigger, the findings are very similar.

6.5. Robustness check V: Using lagged small business credit

Finally, I use a lagged variable specification where I lag the test variable, *Δ total SB loans* (or *Δ micro biz loans*) and other control variables by one year as it might take time for small business loans to create a job. A little smaller magnitude of credit elasticities are shown in Table 13, but the results are qualitatively very similar.

7. Fixed-effect specification

As the instruments, *Judicial* and *Saiz Elasticity* do not vary over time, I do not use county dummies in estimating my regression models. To mitigate any concern that I pick up a general trend in the rates of

[24] The calculation is the following: (1.6995*0.1345)/0.3372=0.6779.

firm creation or survival caused by different industry, firm-size, or firm-age compositions across counties, I control for the dynamics of small firms for each county-year observation throughout the tests. Furthermore, the outcome variable is defined in differences (i.e., percent change) and therefore controls for any such time-invariant characteristics that might affect the outcome variables (Almeida, Fos, and Kronlund 2016). Also, note that robust standard errors are clustered by county in all specifications (Petersen 2009).

However, I further explore a fixed-effect specification in this section by employing one instrument, *Restrictiveness*, which has some time-variation for 13 states. The results are displayed in Panel A of Table 14. While the coefficient of the variable $\Delta\ \widehat{total\ SB}\ loans$ in column [2] is not significant, the magnitude of the variable *EST grow* dramatically falls - by 57 percent when I include the interaction term, $\Delta\ \widehat{total\ SB}\ loans$*EST grow* in column [3]. Further, compared to when there is no increase in the small business credit, the effect of increased business formation on job creation surges by 97 percent when there is an average increase in small business loan supply. This supports my main argument that without better access to bank finance, it is difficult for small businesses to form/proper and to make a unique contribution to job growth. Column [6] also confirms the previous findings as the interaction term between the variable $\Delta\ \widehat{total\ SB}\ loans$ and the variable *EST grow* or the interaction term between the variable $\Delta\ \widehat{total\ SB}\ loans$ and the variable *Inv Opp* are all statistically significant[25].

Panel B of Table 14 further shows how the increased bank credit interacts with small firms across different size. When the information problems pose challenges to lenders' ascertaining the creditworthiness of firms and prevent these firms from accessing credit markets, they are likely to be the greatest in the case of newer businesses and/or smallest businesses, all else equal (DeYoung, Glennon, Nigro, and Spong 2012). To investigate the heterogeneity in credit elasticity of job creation by firm size, I use the number of

[25] Additionally, I estimate the cross-sectional specification and the findings do not change. Also, following Adelino, Ma, and Robinson (forthcoming), I estimate a census division fixed-effect specification and I obtain very similar findings. Another argument I can make with the county fixed effects is that the OLS specifications with and without the fixed effects do not make a difference. That is, if time-invariant or unobservable characteristics are the main driving forces for a significant credit elasticity, the OLSs with and without the fixed effects should not be the same. The results are not tabulated but available upon request.

establishments by employment-size classes in CBP data, which provides the number of establishments with 1-4, 5-9, 10-19, 20-49 employees etc., respectively. Column [2] in Panel B shows that firms with more than 4 but less than 50 employees (i.e., *Δ EST5-9*, *Δ EST10-19*, and *Δ EST20-49*) are the most efficient at translating an increase in the aggregate bank credit into local jobs. Further, column [3] clearly shows the extent to which the magnitude of firm creation elasticity of job creation falls when the interaction terms are included in the regression model: except for firms with 1-4 employees (*Δ EST1-4*), the magnitude of firm creation elasticity of job creation monotonically decreases with respect to firm size (i.e., from 74 percent to 5 percent) when there is no change in small business credit supply, which means that smaller firms are more sensitive to improved access to credit in a given local economy.

8. Conclusion

As an important component of the economy, small businesses contribute to stimulating economic growth in the U.S. They employ half of the work force and create about two-thirds of net new private sector jobs annually (Small Business Administration). As they are more opaque and younger, small borrowers find it hard to raise capital from the public markets – instead, banks with a comparative advantage as delegated monitors are the main source of external funds for small businesses and we *expect* the credit supplied by commercial banks for local businesses and establishments to increase job, income, or GDP growth of the economy in the belief that "prudent" bank finance can help small firms undertake good investment opportunities and grow. However, we have limited understanding on whether and (if so) to what extent the aggregate amount of small business credit provided by commercial banks affects the local economy.

Using public data from CRA reports on county-level small business loan originations made by commercial banks between 1996 and 2004 and employing three instruments (i.e., judicial foreclosure process, housing supply elasticity, and regulatory barriers to interstate branching) for the new loans, this

study finds evidence that an increase in the aggregate credit supply substantially adds more jobs to the local economy. This job-generating effect of increased bank lending to small businesses is much greater than the job-generating effect of increased small business formation. Further, by finding evidence that local banks, which are closer to borrowers, are better at underwriting and monitoring credit to small, informationally opaque firms, I offer an explanation about why bank credit facilitates the chance of generating positive externalities in the local economy.

The primary findings in this research suggest a *possibility* of underinvestment by small firms due to imperfect information and other "frictions" in the credit markets. While this study employs the aggregate credit supply data and lacks the micro information about how each firm is financially constrained, additional findings support this explanation: (1) an exogenous increase in the credit supply positively affects firm entry-to-exit and expansion-to-contraction ratios, (2) the credit elasticity is more pronounced in the presence of exogenous investment opportunities, and (3) the economic magnitude of credit elasticity almost monotonically decreases with respect to firm size. Thus, economic policymakers aiming at efficient funneling of resources to investments may find important implications from this study.

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Figure 1. Annual percentage of small business loan originations made by banks with no branches in a county

This figure shows the annual percentage of small business loan originations made by banks with no branches in a given county between 1996 and 2013. The annual percentage is measured as branchless originations divided by total originations using the CRA data.

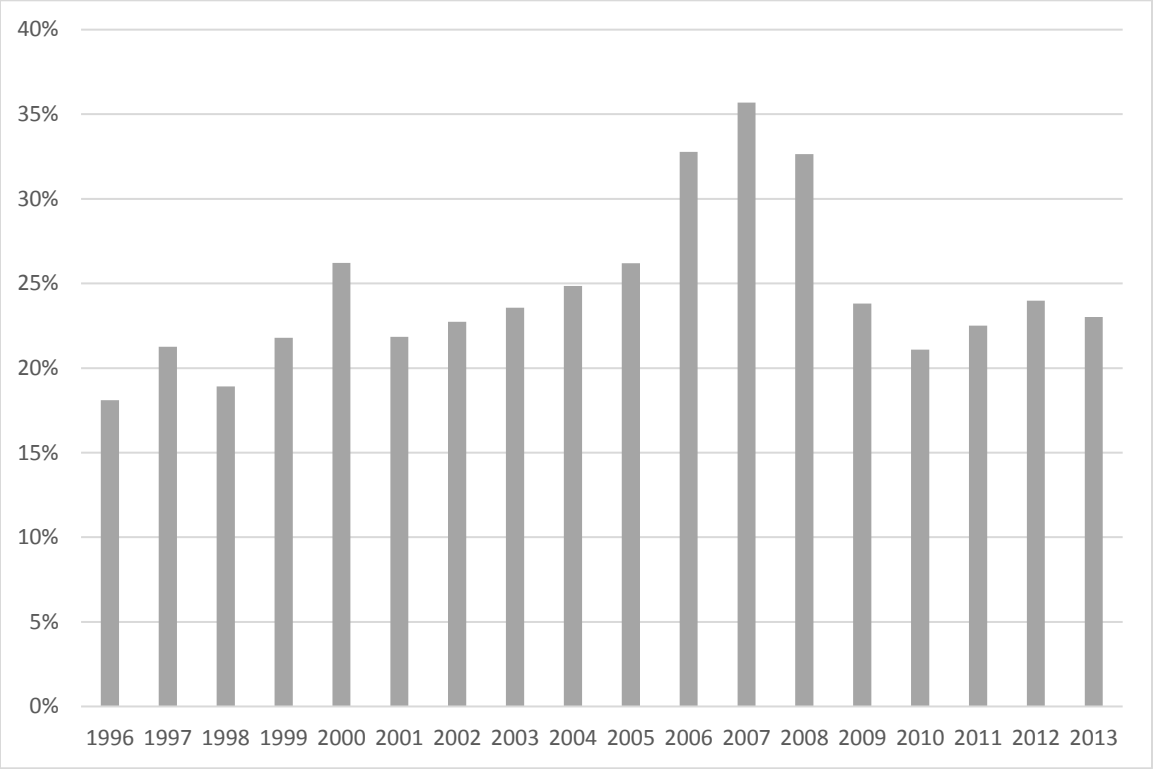


Figure 2. Annual percentage of small business loans made by CRA-reporting banks

This figure shows the annual percentage of small business loans made by CRA-reporting banks between 1996 and 2013. The annual percentage is measured as small business loans made by CRA-reporting banks divided by aggregate small business loans of all U.S. domestic banks using the CALL report's small business loan data. Small business loans are reported every 2nd quarter on CALL reports.

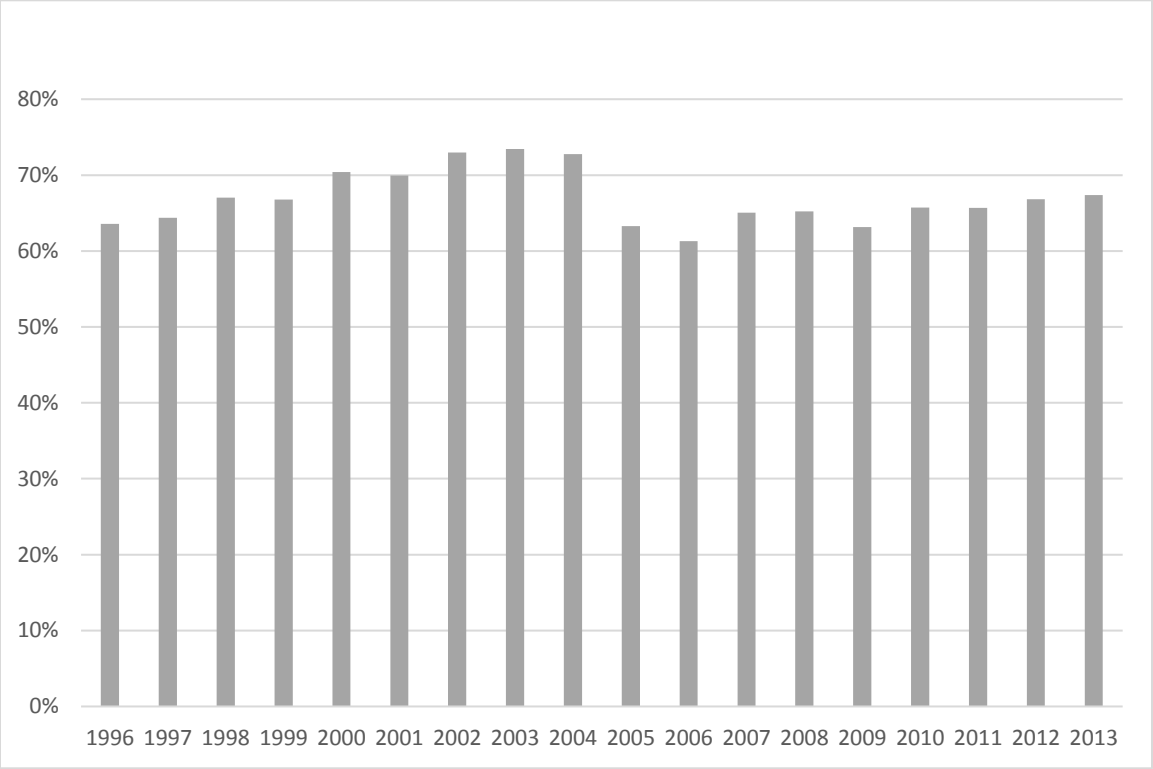
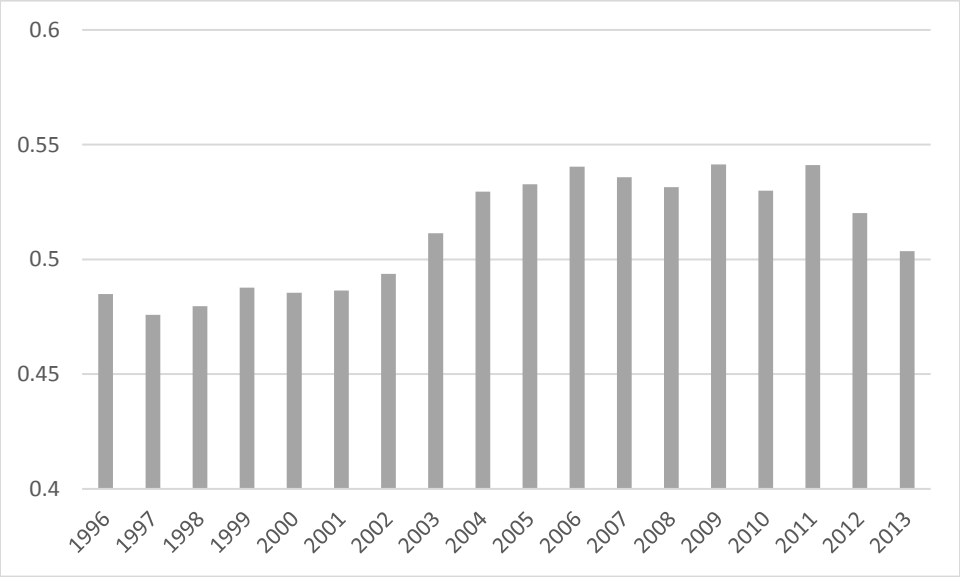


Figure 3. SB CRE loans and SB C&I loans

A. Annual ratio of aggregate SB CRE loans to aggregate SB loans

This figure shows the annual ratio of aggregate SB CRE loans to aggregate SB loans between 1996 and 2013. The calculation is based on the CALL reports' small business loan data.



B. Annual aggregate growth rate of SB CRE loans and SB C&I loans

This figure shows the annual aggregate growth rate of SB CRE loans and SB C&I loans, respectively, between 1996 and 2013. The solid line represents the SB CRE loan growth and the dotted line represents the SB C&I loan growth. SB CRE loans are small business loans secured by commercial properties, and SB C&I loans are other small business loans, which are unsecured or secured by collateral other than real estate. The calculation is based on the CALL reports' small business loan data.

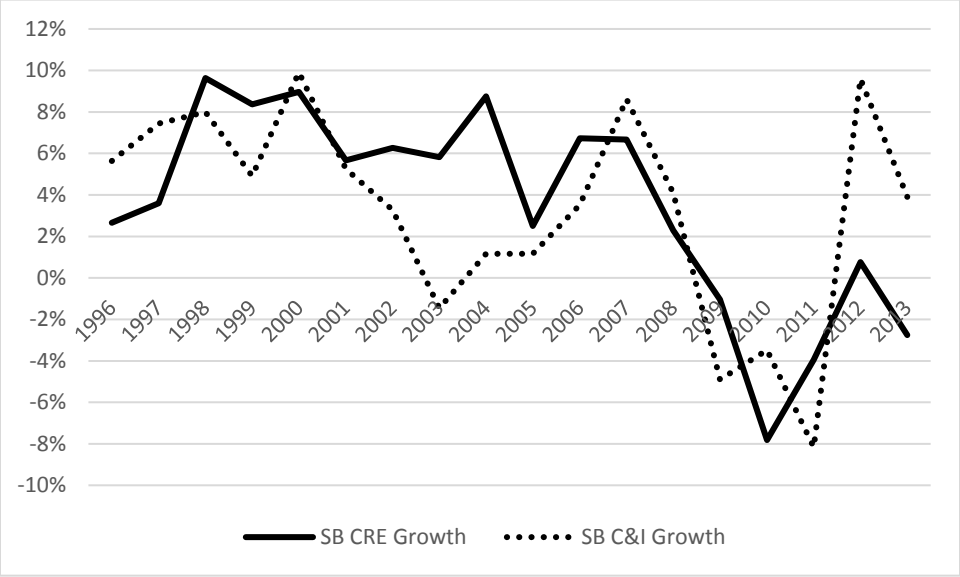
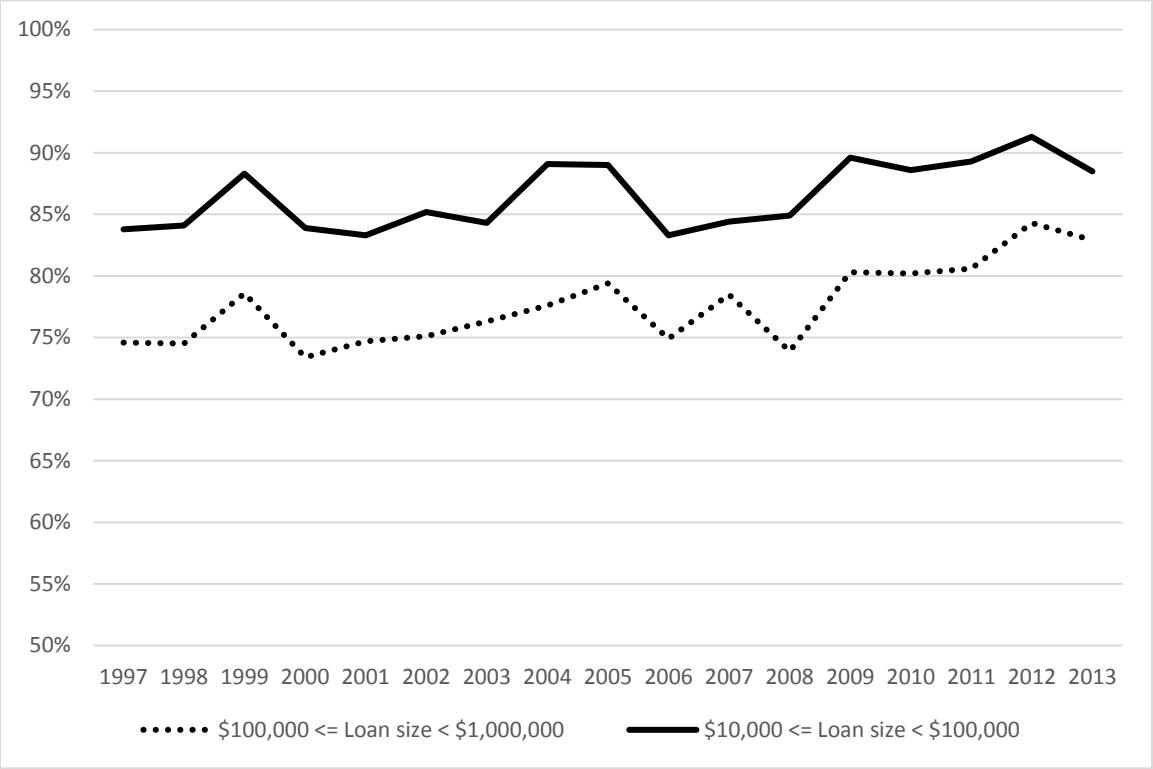


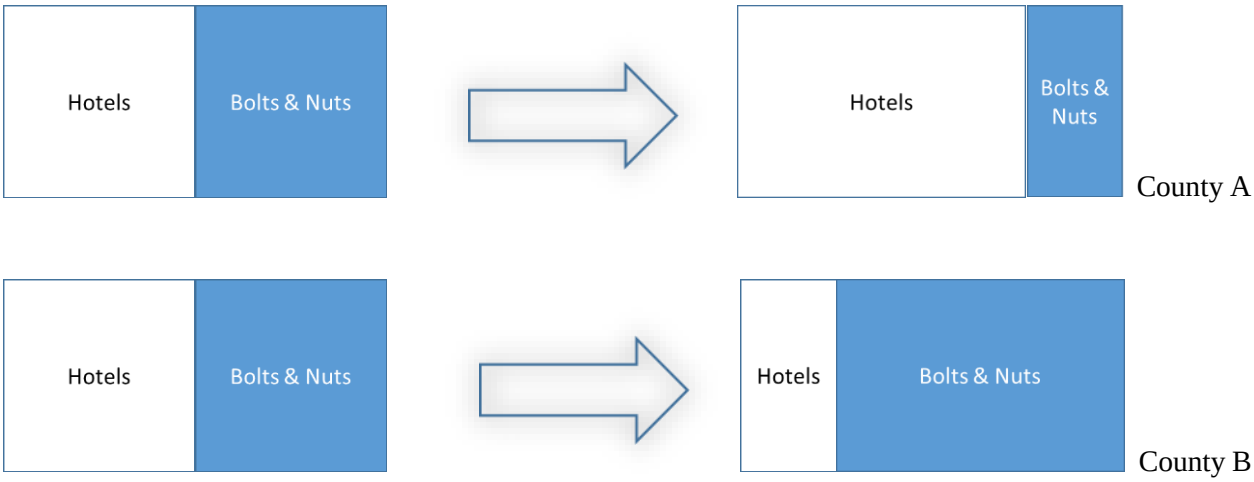
Figure 4. Annual percentage of collateralized C&I loans

This figure shows the annual percentage of collateralized C&I loans between 1997 and 2013. The solid line represents loans with amount greater than or equal to $100,000 but less than $1,000,000, and the dotted line represents loans with amount greater than or equal to $10,000 but less than $100,000. The calculation is based on the Survey of Terms of Business Lending[26].



[26] The earliest year it provides the data is 1997.

Figure 5. An illustration of labor intensity



County A becomes more labor-intensive, while County B may turn less dependent on labor.

Table 1. Summary statistics

This table shows the summary statistics of variables and all the variables are defined in Appendix 1. All variable means and standard deviations are calculated after winsorizing the data at the 1st and 99th percentiles of their sample distributions.

Variable	obs.	mean	std. dev.	5th	25th	50th	75th	95th
Variables for job growth								
Δ job	5,821	0.0161	0.0445	-0.0534	-0.0077	0.0155	0.0392	0.0883
Δ job'	5,821	0.0153	0.0466	-0.0563	-0.0087	0.0142	0.0385	0.0895
Δ job_nontradable	5,821	0.0191	0.0554	-0.0657	-0.0107	0.0155	0.0445	0.1144
Δ job_tradable	5,821	0.0160	0.0562	-0.0692	-0.0121	0.0147	0.0427	0.1037
Variables for credit growth								
Δ total SB loans	5,821	0.1345	0.2718	-0.2132	-0.0279	0.0888	0.2395	0.6538
Δ micro biz loans	5,821	0.1580	0.3645	-0.2827	-0.0632	0.0920	0.2832	0.8342
Δ local SB loans	5,821	0.1443	0.3658	-0.2930	-0.0705	0.0725	0.2659	0.8258
Δ nonlocal SB loans	5,581	0.3613	0.8233	-0.5111	-0.0774	0.1695	0.5518	1.8817
Variables for dynamics of firm entry, growth, and exit								
Births-to-deaths	5,084	1.1217	0.1877	0.8484	1.0000	1.1023	1.2189	1.4643
Expansions-to-contractions	5,084	1.0855	0.1361	0.8769	0.9903	1.0760	1.1699	1.3232
Variables for growth opportunities								
Inv Opp	5,818	0.0221	0.0181	-0.0091	0.0113	0.0239	0.0356	0.0471
Inv Opp'	5,818	0.0051	0.0188	-0.0266	-0.0076	0.0072	0.0204	0.0301
Control variables for small business dynamics								
% smallest firms	5,821	0.9504	0.0142	0.9277	0.9400	0.9502	0.9608	0.9741
Net change in EST	5,821	77.892	185.40	-67.000	-2.0000	25.000	93.000	413.00
Log Establishments	5,821	8.0403	1.2727	6.0355	7.0639	8.0366	8.9269	10.171
EST grow	5,821	0.0138	0.0248	-0.0196	-0.0014	0.0105	0.0248	0.0595
Δ EST1-4	5,821	0.0133	0.0368	-0.0432	-0.0077	0.0111	0.0315	0.0788
Δ EST5-9	5,821	0.0114	0.0525	-0.0638	-0.0168	0.0067	0.0346	0.1103
Δ EST10-19	5,821	0.0201	0.0691	-0.0845	-0.0156	0.0140	0.0494	0.1393
Δ EST20-49	5,821	0.0215	0.0778	-0.0932	-0.0162	0.0165	0.0538	0.1509
Δ EST50-99	5,801	0.0310	0.1444	-0.1818	-0.0339	0.0188	0.0820	0.2778
Δ EST100-249	5,758	0.0249	0.1682	-0.2143	-0.0492	0.0060	0.0833	0.3125
Δ EST250-499	5,515	0.0392	0.3006	-0.3750	-0.0968	0.0000	0.1429	0.6000
Other control variables								
Log Population	5,821	11.810	1.1582	9.9590	10.990	11.781	12.582	13.729
Unemployment	5,821	0.0454	0.0169	0.0221	0.0334	0.0435	0.0545	0.0751
Log Laborforce	5,821	11.136	1.1706	9.2440	10.294	11.122	11.931	13.087
Log Income	5,821	14.703	1.2730	12.634	13.784	14.666	15.585	16.886
Labor-intensive dummy	5,821	0.5004	0.5000	0.0000	0.0000	1.0000	1.0000	1.0000
HPI growth	5,821	0.0574	0.0379	0.0165	0.0349	0.0475	0.0659	0.1347
Instrument variables								
Saiz Elasticity	5,821	2.3473	1.2414	0.8114	1.4474	2.2260	3.0016	4.5898
Judicial	5,821	0.4285	0.4949	0.0000	0.0000	0.0000	1.0000	1.0000
Restrictiveness	5,821	1.9370	1.4640	0.0000	0.0000	2.0000	3.0000	4.0000

Table 2. CRA Loan flow data vs. CALL reports loan stock data

This table shows the aggregate amount of small business loan origination data, the aggregate amount of small business loan stock data, and the ratio of loan flow-to-loan stock for each year during the period 1996-2013. The annual amount of loan flow is calculated as of Dec 31st using the CRA data and the annual amount of loan stock is calculated as of Jun 30th using the CALL reports data. Both are dollar amounts in thousands.

Year	Loan Flow	Loan Stock	Flow-to-Stock ratio
1996	144,588,148	206,979,654	0.70
1997	157,548,233	221,261,316	0.71
1998	159,559,255	250,598,678	0.64
1999	172,041,675	266,020,532	0.65
2000	174,392,142	306,965,537	0.57
2001	220,861,009	321,717,969	0.69
2002	250,092,493	351,556,545	0.71
2003	272,313,660	361,361,115	0.75
2004	288,144,094	375,989,099	0.77
2005	269,612,174	333,190,370	0.81
2006	302,262,144	339,489,737	0.89
2007	327,781,999	387,603,478	0.85
2008	286,497,559	400,776,433	0.71
2009	191,615,735	376,852,893	0.51
2010	174,817,839	369,410,448	0.47
2011	192,451,093	347,413,001	0.55
2012	198,636,959	370,338,927	0.54
2013	204,129,141	374,916,382	0.54

Table 3. Distribution of small firms across different sizes over time

This table shows the distribution of small firms across different sizes over time (1996-2004).

Year	*EST1-4*	*EST5-9*	*EST10-19*	*EST20-49*	*EST50-99*	*EST100-249*	*EST250-499*
1996	0.5445	0.2024	0.1244	0.0813	0.0262	0.0151	0.0038
1997	0.5416	0.2022	0.1255	0.0821	0.0268	0.0154	0.0040
1998	0.5408	0.2005	0.1259	0.0831	0.0275	0.0157	0.0042
1999	0.5351	0.2000	0.1289	0.0850	0.0283	0.0161	0.0042
2000	0.5351	0.2000	0.1281	0.0859	0.0283	0.0160	0.0042
2001	0.5375	0.1996	0.1285	0.0855	0.0278	0.0152	0.0038
2002	0.5368	0.1993	0.1288	0.0858	0.0279	0.0153	0.0038
2003	0.5381	0.1976	0.1291	0.0856	0.0283	0.0152	0.0039
2004	0.5416	0.1968	0.1282	0.0842	0.0279	0.0153	0.0039

Table 4. The effect of increased small business credit on job creation

This table shows the regression results of estimating the effect of increased small business credit on job creation. Panel A estimates the equation (2) using OLS technique, and Panel B estimates the equations (1) and (2) using IV-2SLS technique. All the variables are defined in Appendix 1. Data are winsorized at the 1st and 99th percentiles. Year dummies are included. Robust standard errors clustered by county appear in parentheses. ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% levels, respectively.

Panel A. OLS

	[1]	[2]	[3]	[4]
Dependent Variable	*Δ job*	*Δ job'*	*Δ job*	*Δ job'*
Δ total SB loans	0.0015	0.0009		
	(0.0027)	(0.0029)		
Δ micro biz loans			0.0009	0.0002
			(0.0020)	(0.0021)
% small firms	0.2108***	0.1924***	0.2113***	0.1929***
	(0.0538)	(0.0581)	(0.0538)	(0.0582)
Net change in EST	0.00005***	0.00005***	0.00005***	0.00005***
	(0.000003)	(0.000004)	(0.000003)	(0.000004)
Log Establishments	-0.0039	-0.0035	-0.0040	-0.0036
	(0.0031)	(0.0034)	(0.0031)	(0.0034)
Log Population	-0.0033	-0.0064	-0.0032	-0.0063
	(0.0085)	(0.0089)	(0.0085)	(0.0089)
Unemployment	-0.3297***	-0.3305***	-0.3307***	-0.3312***
	(0.0482)	(0.0515)	(0.0482)	(0.0516)
Log Laborforce	-0.0062	-0.0042	-0.0063	-0.0043
	(0.0098)	(0.0103)	(0.0098)	(0.0103)
Log Income	0.0101***	0.0109***	0.0101***	0.0109***
	(0.0036)	(0.0039)	(0.0036)	(0.0039)
Constant	-0.1704***	-0.1553***	-0.1710***	-0.1558***
	(0.0523)	(0.0562)	(0.0523)	(0.0563)
Observations	5,821	5,821	5,821	5,821
R-squared	0.1344	0.1074	0.1343	0.1074

Panel B. IV-2SLS

Dependent Variable	[1] *Δ total SB loans*	[2] *Δ micro biz loans*	[3] *Δ job*	[4] *Δ job′*	[5] *Δ job*	[6] *Δ job′*
$\Delta \widehat{total\ SB\ loans}$			0.1585***	0.1467***		
			(0.0368)	(0.0364)		
$\Delta \widehat{micro\ biz\ loans}$					0.1233***	0.1118***
					(0.0306)	(0.0301)
Judicial	-0.0289***	-0.0245***				
	(0.0068)	(0.0091)				
Saiz Elasticity	-0.0072**	-0.0120***				
	(0.0033)	(0.0043)				
Restrictiveness	0.0097***	0.0139***				
	(0.0025)	(0.0033)				
% small firms	0.4118	0.2160	0.0998	0.0892	0.1327*	0.1212
	(0.3149)	(0.4368)	(0.0794)	(0.0805)	(0.0792)	(0.0793)
Net change in EST	0.00006***	0.00009***	0.00004***	0.00004***	0.00004***	0.00004***
	(0.00001)	(0.00002)	(0.000005)	(0.000005)	(0.000005)	(0.000005)
Log Establishments	-0.0587***	-0.0693***	0.0049	0.0047	0.0042	0.0039
	(0.0149)	(0.0203)	(0.0042)	(0.0043)	(0.0043)	(0.0044)
Log Population	0.1292**	0.1184	-0.0214*	-0.0232*	-0.0158	-0.0178
	(0.0543)	(0.0737)	(0.0121)	(0.0120)	(0.0120)	(0.0117)
Unemployment	-0.9921***	-0.6465	-0.1878**	-0.1986***	-0.2685***	-0.2745***
	(0.2984)	(0.4149)	(0.0736)	(0.0730)	(0.0729)	(0.0713)
Log Laborforce	-0.1232**	-0.1210	0.0090	0.0099	0.0051	0.0061
	(0.0627)	(0.0859)	(0.0137)	(0.0136)	(0.0136)	(0.0134)
Log Income	0.0286	0.0301	0.0075*	0.0085*	0.0078*	0.0088*
	(0.0201)	(0.0281)	(0.0045)	(0.0046)	(0.0046)	(0.0047)
Constant	-0.3219	0.0434	-0.0779	-0.0693	-0.1247	-0.1136
	(0.3220)	(0.4550)	(0.0760)	(0.0767)	(0.0764)	(0.0760)
Observations	5,821	5,821	5,821	5,821	5,821	5,821
Wu-Hausman statistic			35.271	26.870	31.703	23.245
(p-value)			(0.0000)	(0.0000)	(0.0000)	(0.0000)
First-stage F-statistic	35.590	32.680				
(p-value)	(0.0000)	(0.0000)				
Sagan χ^2			0.1371	0.3762	1.9220	2.5079
(p-value)			(0.9337)	(0.8285)	(0.3825)	(0.2854)

Table 5. The interaction between net firm creation and small business credit

This table shows the regression results of estimating the equation (2) with an interaction term $\Delta\ \widehat{total\ SB}\ loans$*Net change in EST* or $\Delta\ \widehat{micro\ biz}\ loans$*Net change in EST* using IV-2SLS technique. All the variables are defined in Appendix 1. Data are winsorized at the 1st and 99th percentiles. Year dummies are included. Robust standard errors clustered by county appear in parentheses. ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% levels, respectively.

	[1]	[2]	[3]	[4]
Dependent Variable	*Δ job*	*Δ job′*	*Δ job*	*Δ job′*
$\Delta\ \widehat{total\ SB}\ loans$	0.1492***	0.1371***		
	(0.0255)	(0.0268)		
$\Delta\ \widehat{micro\ biz}\ loans$			0.1147***	0.1026***
			(0.0213)	(0.0224)
Net change in EST	0.000005	0.000002	0.000007	0.000004
	(0.000006)	(0.000006)	(0.000005)	(0.000005)
*$\Delta\ \widehat{total\ SB}\ loans$*Net change in EST*	0.0002***	0.0003***		
	(0.00004)	(0.00005)		
*$\Delta\ \widehat{micro\ biz}\ loans$*Net change in EST*			0.0002***	0.0002***
			(0.00003)	(0.00004)
% small firms	0.1039*	0.0935	0.1363**	0.1251**
	(0.0586)	(0.0633)	(0.0570)	(0.0615)
Log Establishments	0.0057*	0.0055	0.0045	0.0042
	(0.0033)	(0.0035)	(0.0033)	(0.0035)
Log Population	-0.0235***	-0.0254***	-0.0171**	-0.0191**
	(0.0087)	(0.0091)	(0.0085)	(0.0089)
Unemployment	-0.1832***	-0.1938***	-0.2656***	-0.2714***
	(0.0524)	(0.0559)	(0.0487)	(0.0522)
Log Laborforce	0.0106	0.0116	0.0062	0.0073
	(0.0099)	(0.0105)	(0.0098)	(0.0104)
Log Income	0.0072**	0.0082**	0.0073**	0.0083**
	(0.0035)	(0.0038)	(0.0035)	(0.0038)
Constant	-0.0752	-0.0665	-0.1210**	-0.1097*
	(0.0556)	(0.0598)	(0.0535)	(0.0576)
Observations	5,821	5,821	5,821	5,821
$\partial\Delta job/\partial\Delta\ \widehat{total\ SB}\ loans$	0.1683***			
	(0.0253)			
$\partial\Delta job'/\partial\Delta\ \widehat{total\ SB}\ loans$		0.1570***		
		(0.0265)		
$\partial\Delta job/\partial\Delta\ \widehat{micro\ biz}\ loans$			0.1296***	
			(0.0211)	
$\partial\Delta job'/\partial\Delta\ \widehat{micro\ biz}\ loans$				0.1185***
				(0.0222)
$\partial\Delta job/\partial Net\ change\ in\ EST$	0.00004***		0.00004***	
	(0.000004)		(0.000004)	
$\partial\Delta job'/\partial Net\ change\ in\ EST$		0.00004***		0.00004***
		(0.000004)		(0.000005)

Table 6. The effect of increased small business credit on firm birth-to-death and firm expansion-to-contraction

This table shows the regression results of estimating the equations (1) and (2) for two dependent variables *Birth-to-Death* and *Expansion-to-Contraction*, after dropping three control variables *% small firms*, *Net change in EST*, and *Log Establishments*, using IV-2SLS technique. All the variables are defined in Appendix 1. Data are winsorized at the 1st and 99th percentiles. Year dummies are included. Robust standard errors clustered by county appear in parentheses. ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% levels, respectively.

	[1]	[2]	[3]	[4]
Dependent Variable	*Birth-to-Death*	*Expansion-to-Contraction*	*Birth-to-Death*	*Expansion-to-Contraction*
$\Delta\ \widehat{total\ SB\ loans}$	1.7590***	0.9455***		
	(0.2789)	(0.1534)		
$\Delta\ \widehat{micro\ biz\ loans}$			1.3492***	0.7248***
			(0.2138)	(0.1172)
Log Population	-0.1132	-0.0245	-0.1360	-0.0367
	(0.1001)	(0.0549)	(0.1087)	(0.0597)
Unemployment	-1.6902***	-0.8610**	-2.0269***	-1.0422***
	(0.6113)	(0.3413)	(0.6427)	(0.3540)
Log Laborforce	0.1211	0.0118	0.1386	0.0212
	(0.1155)	(0.0634)	(0.1260)	(0.0693)
Log Income	0.0288	0.0317	0.0377	0.0365*
	(0.0360)	(0.0195)	(0.0386)	(0.0206)
Constant	0.5878***	0.7788***	0.4262**	0.6923***
	(0.1732)	(0.0941)	(0.1949)	(0.1057)
Observations	5,084	5,084	5,084	5,084

Table 7. The interaction between exogenous investment opportunities and small business credit

This table shows the regression results of estimating the equation (3) using IV-2SLS technique. All the variables are defined in Appendix 1. Data are winsorized at the 1st and 99th percentiles. Year dummies are included. Robust standard errors clustered by county appear in parentheses. ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% levels, respectively.

Dependent Variable	[1] *Δ job_nontradable*	[2] *Δ job_nontradable*	[3] *Δ job_nontradable*	[4] *Δ job_nontradable*
$\Delta\ \widehat{total\ SB\ loans}$	0.1678***	0.1288***	0.1667***	0.1324***
	(0.0436)	(0.0377)	(0.0434)	(0.0385)
Inv Opp (Operating margin)	0.0423	-0.2413*		
	(0.0995)	(0.1338)		
Inv Opp' (Profit margin)			0.0266	-0.3976*
			(0.1862)	(0.2404)
$\Delta\ \widehat{total\ SB\ loans}$*Inv Opp*		1.5233**		
		(0.6806)		
$\Delta\ \widehat{total\ SB\ loans}$*Inv Opp'*				2.4999*
				(1.3671)
% small firms	0.0327	0.0337	0.0458	0.0324
	(0.0924)	(0.0753)	(0.0918)	(0.0754)
Net change in EST	0.00005***	0.00005***	0.00005***	0.00005***
	(0.000006)	(0.000005)	(0.000005)	(0.000005)
Log Establishments	0.0005	0.0002	0.0030	0.0002
	(0.0049)	(0.0040)	(0.0047)	(0.0040)
Log Population	-0.0064	-0.0070	-0.0069	-0.0069
	(0.0154)	(0.0125)	(0.0152)	(0.0125)
Unemployment	-0.0151	-0.0113	-0.0143	-0.0100
	(0.0704)	(0.0558)	(0.0703)	(0.0557)
Log Laborforce	-0.0081	-0.0073	-0.0094	-0.0072
	(0.0167)	(0.0136)	(0.0170)	(0.0136)
Log Income	0.0117**	0.0117***	0.0110**	0.0116***
	(0.0055)	(0.0045)	(0.0055)	(0.0045)
Constant	-0.0475	-0.0389	-0.0474	-0.0379
	(0.0915)	(0.0741)	(0.0909)	(0.0744)
Observations	5,818	5,818	5,818	5,818
$\partial \Delta job\_nontradable / \partial\ \Delta\ \widehat{total\ SB\ loans}$		0.1625***		0.1640***
		(0.0337)		(0.0337)
$\partial \Delta job\_nontradable / \partial Inv\ Opp$		-0.0368		
		(0.0800)		
$\partial \Delta job\_nontradable / \partial Inv\ Opp'$				-0.0619
				(0.1465)

Table 8. The effect of increased credit extended by local lenders vs. nonlocal lenders on job creation

This table shows the regression results of estimating equations (1) and (2) using IV-2SLS technique by dropping $\Delta\ \widehat{total\ SB}\ loans$ and instead employing the variable $\Delta\ \widehat{local\ SB}\ loans$ or $\Delta\ \widehat{nonlocal\ SB}\ loans$. All the variables are defined in Appendix 1. Data are winsorized at the 1st and 99th percentiles. Year dummies are included. Robust standard errors clustered by county appear in parentheses. ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% levels, respectively.

	[1]	[2]	[3]	[4]	[5]	[6]
Dependent Variable	$\Delta\ job$	$\Delta\ job'$	$\Delta\ job$	$\Delta\ job'$	$\Delta\ job$	$\Delta\ job'$
$\Delta\ \widehat{local\ SB}\ loans$	0.1317***	0.1212***			0.1320***	0.1239***
	(0.0328)	(0.0324)			(0.0418)	(0.0416)
$\Delta\ \widehat{nonlocal\ SB}\ loans$			0.0800**	0.0745*	0.0067	0.0057
			(0.0399)	(0.0387)	(0.0389)	(0.0389)
% small firms	0.1274	0.1152	0.1806*	0.1577*	0.1470*	0.1262
	(0.0820)	(0.0823)	(0.0950)	(0.0937)	(0.0822)	(0.0831)
Net change in EST	0.00004***	0.00004***	0.00004***	0.00004***	0.00004***	0.00004***
	(0.000005)	(0.000005)	(0.000006)	(0.000006)	(0.000005)	(0.000005)
Log Establishments	0.0042	0.0040	0.0008	0.0011	0.0040	0.0041
	(0.0043)	(0.0044)	(0.0056)	(0.0056)	(0.0049)	(0.0051)
Log Population	-0.0201	-0.0219*	-0.0178	-0.0189	-0.0242*	-0.0249*
	(0.0133)	(0.0130)	(0.0157)	(0.0153)	(0.0140)	(0.0139)
Unemployment	-0.2255***	-0.2341***	-0.1471	-0.1667	-0.1838*	-0.2011**
	(0.0765)	(0.0751)	(0.1216)	(0.1184)	(0.1001)	(0.1002)
Log Laborforce	0.0084	0.0093	0.0070	0.0067	0.0155	0.0147
	(0.0149)	(0.0147)	(0.0176)	(0.0173)	(0.0160)	(0.0160)
Log Income	0.0085*	0.0094*	0.0117*	0.0124**	0.0070	0.0080
	(0.0047)	(0.0048)	(0.0060)	(0.0060)	(0.0053)	(0.0055)
Constant	-0.1108	-0.1002	-0.2494**	-0.2212**	-0.1441	-0.1223
	(0.0779)	(0.0778)	(0.0994)	(0.0981)	(0.0912)	(0.0917)
Observations	5,821	5,821	5,581	5,581	5,581	5,581

Table 9. Robustness check I: Labor-intensive economy

This table shows the regression results of estimating the effect of increase small business credit on job creation after controlling for labor intensiveness of a local economy. Panel A estimates the equation (2) using IV-2SLS techniques employing the variable *Labor-intensive dummy* and Panel B estimates the equation (2) using IV-2SLS techniques employing the variable *Labor-intensive dummy* and an interaction term, $\Delta\ \widehat{total\ SB}\ loans$*Labor-intensive dummy* or $\Delta\ \widehat{micro\ biz}\ loans$*Labor-intensive dummy*. Panel C estimates the same model as in Panel B for dependent variables, *Δ job_nontradable* and *Δ job_tradable*. All the variables are defined in Appendix 1. Data are winsorized at the 1st and 99th percentiles. Year dummies are included. Robust standard errors clustered by county appear in parentheses. ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% levels, respectively.

Panel A. Employing the variable *Labor-intensive dummy*

	[1]	[2]	[3]	[4]
Dependent Variable	*Δjob*	*Δjob'*	*Δjob*	*Δjob'*
$\Delta\ \widehat{total\ SB}\ loans$	0.1002***	0.0822***		
	(0.0311)	(0.0306)		
$\Delta\ \widehat{micro\ biz}\ loans$			0.0733***	0.0572**
			(0.0244)	(0.0240)
Labor-intensive dummy	0.0169***	0.0187***	0.0180***	0.0196***
	(0.0016)	(0.0016)	(0.0015)	(0.0015)
% small firms	-0.1643**	-0.2039***	-0.1613***	-0.1995***
	(0.0736)	(0.0752)	(0.0733)	(0.0745)
Net change in EST	0.00004***	0.00004***	0.00004***	0.00004***
	(0.000004)	(0.00004)	(0.000005)	(0.000005)
Log Establishments	0.0014	0.0008	0.0006	0.0000
	(0.0037)	(0.0038)	(0.0037)	(0.0038)
Log Population	-0.0170*	-0.0183*	-0.0132	-0.0148
	(0.0100)	(0.0099)	(0.0096)	(0.0094)
Unemployment	-0.2090***	-0.2226***	-0.2597***	-0.2656***
	(0.0605)	(0.0603)	(0.0576)	(0.0568)
Log Laborforce	0.0023	0.0025	-0.0006	-0.0001
	(0.0113)	(0.0113)	(0.0109)	(0.0108)
Log Income	0.0116***	0.0130***	0.0121***	0.0135***
	(0.0039)	(0.0041)	(0.0038)	(0.0040)
Constant	0.1631**	0.1981***	0.1505**	0.1865***
	(0.0696)	(0.0706)	(0.0691)	(0.0695)
Observations	5,821	5,821	5,821	5,821

Panel B. Differential in credit elasticity

	[1]	[2]	[3]	[4]
Dependent Variable	*Δjob*	*Δjob'*	*Δjob*	*Δjob'*
$\Delta\ \widehat{total\ SB}\ loans$	0.0673**	0.0461		
	(0.0271)	(0.0285)		
$\Delta\ \widehat{micro\ biz}\ loans$			0.0483**	0.0319
			(0.0219)	(0.0230)
Labor-intensive dummy	0.0055**	0.0062***	0.0084***	0.0099***
	(0.0021)	(0.0023)	(0.0020)	(0.0021)
$\Delta\ \widehat{total\ SB}\ loans$*Labor-intensive Dummy*	0.0834***	0.0913***		
	(0.0164)	(0.0176)		
$\Delta\ \widehat{micro\ biz}\ loans$*Labor-intensive Dummy*			0.0598***	0.0607***
			(0.0125)	(0.0135)
% small firms	-0.1723***	-0.2127***	-0.1702***	-0.2085***
	(0.0632)	(0.0686)	(0.0634)	(0.0688)
Net change in EST	0.00004***	0.00004***	0.00004***	0.00004***
	(0.000004)	(0.00004)	(0.000004)	(0.000004)
Log Establishments	0.0024	0.0019	0.0011	0.0005
	(0.0033)	(0.0036)	(0.0033)	(0.0036)
Log Population	-0.0186**	-0.0201**	-0.0146*	-0.0163*
	(0.0085)	(0.0089)	(0.0084)	(0.0088)
Unemployment	-0.1829***	-0.1941***	-0.2448***	-0.2505***
	(0.0513)	(0.0547)	(0.0477)	(0.0511)
Log Laborforce	0.0033	0.0036	0.0005	0.0010
	(0.0097)	(0.0103)	(0.0097)	(0.0102)
Log Income	0.0112***	0.0126***	0.0117***	0.0131***
	(0.0035)	(0.0038)	(0.0035)	(0.0038)
Constant	0.1808***	0.2174***	0.1683***	0.2046***
	(0.0594)	(0.0641)	(0.0589)	(0.0635)
Observations	5,821	5,821	5,821	5,821
Credit elasticity in labor-intensive counties	0.1507***	0.1374***	0.1081***	0.0926***

Panel C. Credit elasticity of non-tradable sectors vs. tradable sectors

Dependent Variable	[1] *Δjob_nontradable*	[2] *Δjob_nontradable*	[3] *Δjob_tradable*	[4] *Δjob_tradable*
$\Delta\ \widehat{total\ SB}\ loans$	0.1671***	0.1339***		
	(0.0438)	(0.0358)		
$\Delta\ \widehat{micro\ biz}\ loans$			0.0887**	0.0617**
			(0.0369)	(0.0289)
Labor-intensive dummy	0.0001	0.0020	0.0230***	0.0240***
	(0.0022)	(0.0022)	(0.0019)	(0.0018)
% small firms	0.0436	0.0405	-0.2803***	-0.2754***
	(0.0992)	(0.1044)	(0.0903)	(0.0907)
Net change in EST	0.00004***	0.00004***	0.00004***	0.00004***
	(0.000005)	(0.00006)	(0.000006)	(0.000006)
Log Establishments	0.0005	-0.0001	0.0016	0.0007
	(0.0050)	(0.0051)	(0.0046)	(0.0047)
Log Population	-0.0183	-0.0131	-0.0107	-0.0070
	(0.0136)	(0.0146)	(0.0124)	(0.0117)
Unemployment	-0.0083	-0.0869	-0.2603***	-0.3068***
	(0.0513)	(0.0839)	(0.0714)	(0.0669)
Log Laborforce	0.0029	-0.0009	-0.0070	-0.0098
	(0.0155)	(0.0164)	(0.0140)	(0.0134)
Log Income	0.0126**	0.0131**	0.0141***	0.0146***
	(0.0054)	(0.0054)	(0.0049)	(0.0048)
Constant	-0.0510	0.0020	0.2686***	0.2560***
	(0.0971)	(0.0022)	(0.0837)	(0.0830)
Observations	5,821	5,821	5,821	5,821

Table 10. Robustness check II: Inclusion of house price growth

This table shows the regression results of estimating the equations (4)-(6) using IV-2SLS technique. All the variables are defined in Appendix 1. Data are winsorized at the 1st and 99th percentiles. Year dummies are included. Robust standard errors clustered by county appear in parentheses. ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% levels, respectively.

	[1]	[2]	[3]	[4]	[5]
Dependent Variable	*Δ HPI growth*	*Δ job*	*Δ job′*	*Δ job*	*Δ job′*
$\Delta \widehat{total\ SB\ loans}$		0.1565***	0.1488***		
		(0.0476)	(0.0478)		
$\Delta \widehat{micro\ biz\ loans}$				0.1249***	0.1153***
				(0.0429)	(0.0425)
$\widehat{HPI\ growth}$		0.0079	-0.0084	-0.0072	-0.0157
		(0.1218)	(0.1215)	(0.1350)	(0.1327)
Judicial	-0.0051***				
	(0.0008)				
Saiz Elasticity	-0.0071***				
	(0.0004)				
Restrictiveness	0.0010***				
	(0.0003)				
% small firms	0.3328***	0.0975	0.0917	0.1350	0.1263
	(0.0367)	(0.0882)	(0.0896)	(0.0919)	(0.0917)
Net change in EST	0.00003***	0.00004***	0.00004***	0.00004***	0.00004***
	(0.000003)	(0.000005)	(0.000005)	(0.000005)	(0.000005)
Log Establishments	0.0114***	0.0047	0.0049	0.0044	0.0043
	(0.0021)	(0.0050)	(0.0051)	(0.0053)	(0.0053)
Log Population	0.0126**	-0.0213*	-0.0233*	-0.0159	-0.0179
	(0.0054)	(0.0121)	(0.0121)	(0.0121)	(0.0119)
Unemployment	-0.1548***	-0.1887**	-0.1976***	-0.2684***	-0.2744***
	(0.0430)	(0.0750)	(0.0754)	(0.0734)	(0.0724)
Log Laborforce	-0.0453***	0.0092	0.0096	0.0048	0.0055
	(0.0061)	(0.0142)	(0.0143)	(0.0145)	(0.0143)
Log Income	0.0235***	0.0073	0.0087	0.0080	0.0092
	(0.0025)	(0.0059)	(0.0060)	(0.0061)	(0.0061)
Constant	-0.3304***	-0.0750	-0.0725	-0.1279	-0.1207
	(0.0367)	(0.0932)	(0.0941)	(0.1014)	(0.1006)
Observations		5,821	5,821	5,821	5,821
Wu-Hausman statistic		15.750	13.273	14.101	11.456
(p-value)		(0.0000)	(0.0000)	(0.0000)	(0.0000)
First-stage F-statistic	108.62				
(p-value)					
Sagan χ^2		0.1340	0.3666	1.8931	2.4249
(p-value)		(0.7143)	(0.5449)	(0.1689)	(0.1194)

Table 11. Robustness check III: Different measure for the dynamics of small firms

This table shows the regression results of estimating the effect of increased small business credit on job creation using a different measure for the dynamics of small firms in a given county. Panel A estimates the equation (2) using IV-2SLS technique after dropping three control variables *% small firms*, *Net change in EST*, and *Log Establishments* and instead employing the variable *EST grow*. Panel B estimates the equation (2) using IV-2SLS after dropping three control variables *% small firms*, *Net change in EST*, and *Log Establishments* and instead employing the variable *EST grow* and an interaction term, $\Delta\ \widehat{total\ SB}\ loans$*EST grow* or $\Delta\ \widehat{micro\ biz}\ loans$*EST grow*. All the variables are defined in Appendix 1. Data are winsorized at the 1st and 99th percentiles. Year dummies are included. Robust standard errors clustered by county appear in parentheses. ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% levels, respectively.

Panel A. Employing the variable *EST grow*

	[1]	[2]	[3]	[4]
Dependent Variable	*Δ job*	*Δ job′*	*Δ job*	*Δ job′*
$\Delta\ \widehat{total\ SB}\ loans$	0.0688***	0.0578**		
	(0.0260)	(0.0267)		
$\Delta\ \widehat{micro\ biz}\ loans$			0.0498**	0.0387*
			(0.0216)	(0.0222)
EST grow	0.6952***	0.6770***	0.6939***	0.6789***
	(0.0410)	(0.0439)	(0.0421)	(0.0451)
Log Population	-0.0027	-0.0048	-0.00001	-0.0022
	(0.0090)	(0.0092)	(0.0086)	(0.0088)
Unemployment	-0.1101**	-0.1246**	-0.1451***	-0.1548***
	(0.0494)	(0.0510)	(0.0485)	(0.0499)
Log Laborforce	-0.0018	-0.0008	-0.0044	-0.0034
	(0.0104)	(0.0108)	(0.0100)	(0.0104)
Log Income	0.0057*	0.0066*	0.0058*	0.0068*
	(0.0033)	(0.0036)	(0.0033)	(0.0036)
Constant	-0.0138	-0.0136	-0.0159	-0.0140
	(0.0151)	(0.0156)	(0.0162)	(0.0167)
Observations	5,821	5,821	5,821	5,821

Panel B. The interaction between establishment growth and small business credit

	[1]	[2]	[3]	[4]
Dependent Variable	Δjob	$\Delta job'$	Δjob	$\Delta job'$
$\Delta \widehat{total\ SB\ loans}$	0.0682***	0.0570**		
	(0.0233)	(0.0248)		
$\Delta \widehat{micro\ biz\ loans}$			0.0489**	0.0379*
			(0.0198)	(0.0210)
EST grow	0.3372***	0.2925***	0.4044***	0.3788***
	(0.0623)	(0.0678)	(0.0653)	(0.0711)
$\Delta \widehat{total\ SB\ loans}$*EST grow*	1.6995***	1.8250***		
	(0.2860)	(0.3227)		
$\Delta \widehat{micro\ biz\ loans}$*EST grow*			1.1533***	1.1957***
			(0.2470)	(0.2812)
Log Population	-0.0067	-0.0091	-0.0031	-0.0054
	(0.0082)	(0.0087)	(0.0080)	(0.0086)
Unemployment	-0.1217***	-0.1371***	-0.1559***	-0.1660***
	(0.0452)	(0.0487)	(0.0436)	(0.0473)
Log Laborforce	0.0032	0.0047	-0.0007	0.0005
	(0.0095)	(0.0102)	(0.0094)	(0.0101)
Log Income	0.0054*	0.0064*	0.0059*	0.0068**
	(0.0031)	(0.0034)	(0.0031)	(0.0034)
Constant	-0.0178	-0.0179	-0.0212	-0.0195
	(0.0139)	(0.0148)	(0.0151)	(0.0161)
Observations	5,821	5,821	5,821	5,821
$\partial \Delta job / \partial \Delta\ \widehat{total\ SB\ loans}$	0.0916***			
	(0.0236)			
$\partial \Delta job' / \partial \Delta\ \widehat{total\ SB\ loans}$		0.0822***		
		(0.0250)		
$\partial \Delta job / \partial \Delta\ \widehat{micro\ biz\ loans}$			0.0649***	
			(0.0201)	
$\partial \Delta job' / \partial \Delta\ \widehat{micro\ biz\ loans}$				0.0544***
				(0.0213)
$\partial \Delta job / \partial EST\ grow$	0.5658***		0.5866***	
	(0.0372)		(0.0401)	
$\partial \Delta job' / \partial EST\ grow$		0.5381***		0.5678***
		(0.0402)		(0.0431)

Table 12. Robustness check IV: Winsorization of the loan origination data at 5th and 95th percentiles

This table shows the regression results of estimating the equations (1) and (2) using IV-2SLS technique with Census Division dummies. All the variables are defined in Appendix 1. Loan origination data are winsorized at the 5th and 95th percentiles and all other data are winsorized at the 1st and 99th percentiles. Year dummies are included. Robust standard errors clustered by county appear in parentheses. ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% levels, respectively.

	[1]	[2]	[3]	[4]	[5]	[6]
Dependent Variable	*Δ total SB loans*	*Δ micro biz loans*	*Δ job*	*Δ job'*	*Δ job*	*Δ job'*
$\Delta \widehat{total\ SB\ loans}$			0.1840***	0.1707***		
			(0.0410)	(0.0408)		
$\Delta \widehat{micro\ biz\ loans}$					0.1548***	0.1399***
					(0.0390)	(0.0383)
Judicial	-0.0258***	-0.0182**				
	(0.0055)	(0.0072)				
Saiz Elasticity	-0.0064**	-0.0101***				
	(0.0026)	(0.0035)				
Restrictiveness	0.0079***	0.0109***				
	(0.0020)	(0.0026)				
% small firms	0.2077	0.1300	0.1271*	0.1144	0.1385*	0.1267
	(0.2548)	(0.3394)	(0.0754)	(0.0768)	(0.0780)	(0.0782)
Net change in EST	0.00005***	0.00007***	0.00004***	0.00004***	0.00004***	0.00004***
	(0.00001)	(0.00002)	(0.000005)	(0.000005)	(0.000005)	(0.000006)
Log Establishments	-0.0482***	-0.0495***	0.0045	0.0043	0.0033	0.0031
	(0.0123)	(0.0164)	(0.0041)	(0.0043)	(0.0043)	(0.0044)
Log Population	0.0832**	0.0762	-0.0164	-0.0186*	-0.0132	-0.0154
	(0.0390)	(0.0520)	(0.0111)	(0.0110)	(0.0114)	(0.0111)
Unemployment	-0.7635***	-0.5982*	-0.2043***	-0.2136***	-0.2559***	-0.2633***
	(0.2396)	(0.3251)	(0.0699)	(0.0698)	(0.0725)	(0.0711)
Log Laborforce	-0.0781*	-0.0727	0.0041	0.0054	0.0017	0.0030
	(0.0445)	(0.0598)	(0.0125)	(0.0126)	(0.0128)	(0.0127)
Log Income	0.0248	0.0198	0.0073*	0.0083*	0.0082*	0.0092**
	(0.0159)	(0.0211)	(0.0044)	(0.0046)	(0.0045)	(0.0046)
Constant	-0.1325	0.0558	-0.1038	-0.0932	-0.1261*	-0.1150
	(0.2605)	(0.3561)	(0.0724)	(0.0735)	(0.0757)	(0.0760)
Observations	5,821	5,821	5,821	5,821	5,821	5,821
Wu-Hausman statistic			35.167	26.917	30.525	22.287
(p-value)			(0.0000)	(0.0000)	(0.0000)	(0.0000)
First-stage F-statistic	44.260	40.490				
(p-value)	(0.0000)	(0.0000)				
Sagan χ^2			0.0400	0.2440	2.3526	2.9741
(p-value)			(0.9802)	(0.8852)	(0.3084)	(0.2260)

Table 13. Robustness check V: Lagged-variable specification

This table shows the regression results of estimating the equations (1) and (2) using IV-2SLS technique with lagged left-hand side variables. All the variables are defined in Appendix 1. Data are winsorized at the 1st and 99th percentiles. Year dummies are included. Robust standard errors clustered by county appear in parentheses. ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% levels, respectively.

	[1]	[2]	[3]	[4]	[5]	[6]
Dependent Variable	*Δ total SB loans*	*Δ micro biz loans*	*Δ job*	*Δ job'*	*Δ job*	*Δ job'*
$\Delta \widehat{total\ SB\ loans}$			0.1476***	0.1343***		
			(0.0367)	(0.0358)		
$\Delta \widehat{micro\ biz\ loans}$					0.1165***	0.1003***
					(0.0320)	(0.0306)
Judicial	-0.0310***	-0.0244***				
	(0.0069)	(0.0093)				
Saiz Elasticity	-0.0055*	-0.0107**				
	(0.0034)	(0.0044)				
Restrictiveness	0.0085***	0.0127***				
	(0.0025)	(0.0033)				
% small firms	0.5434*	0.3158	0.4426***	0.4079***	0.4809***	0.4470***
	(0.3251)	(0.4505)	(0.0776)	(0.0775)	(0.0768)	(0.0749)
Net change in EST	0.00006***	0.00009***	0.00002***	0.00002***	0.00002***	0.00002***
	(0.00001)	(0.00002)	(0.000005)	(0.000005)	(0.000005)	(0.000005)
Log Establishments	-0.0560***	-0.0699***	-0.0024	-0.0034	-0.0026	-0.0040
	(0.0177)	(0.0235)	(0.0045)	(0.0045)	(0.0046)	(0.0045)
Log Population	0.1359**	0.1514**	-0.0225*	-0.0230**	-0.0206*	-0.0205*
	(0.0547)	(0.0744)	(0.0116)	(0.0111)	(0.0120)	(0.0112)
Unemployment	-0.9143***	-0.6151	-0.0706	-0.0834	-0.1377**	-0.1473**
	(0.3091)	(0.4262)	(0.0715)	(0.0699)	(0.0691)	(0.0651)
Log Laborforce	-0.1342**	-0.1639*	0.0202	0.0200	0.0207	0.0197
	(0.0633)	(0.0870)	(0.0130)	(0.0124)	(0.0140)	(0.0130)
Log Income	0.0304	0.0391	0.0080*	0.0092**	0.0072	0.0087*
	(0.0208)	(0.0285)	(0.0045)	(0.0045)	(0.0048)	(0.0047)
Constant	-0.3219	-0.0811	-0.4698***	-0.4388***	-0.5181***	-0.4858***
	(0.3220)	(0.4734)	(0.0763)	(0.0760)	(0.0749)	(0.0726)
Observations	5,821	5,821	5,821	5,821	5,821	5,821
Wu-Hausman statistic			29.830	22.647	25.625	17.678
(p-value)			(0.0000)	(0.0000)	(0.0000)	(0.0000)
First-stage F-statistic	35.050	32.690				
(p-value)	(0.0000)	(0.0000)				
Sagan χ^2			0.3014	0.8957	2.5355	4.1626
(p-value)			(0.8601)	(0.6390)	(0.2815)	(0.1248)

Table 14. Robustness check V: Fixed- effect specification

This table shows the regression results of estimating the equations (1) and (2) using IV-2SLS technique with county fixed effects. To control for the small business dynamics, Panel A uses a growth rate of total establishments and Panel B uses a growth rate of establishments by size. All the variables are defined in Appendix 1. Data are winsorized at the 1st and 99th percentiles. Year dummies and county dummies are included. Robust standard errors clustered by county appear in parentheses. ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% levels, respectively.

Panel A. Using the growth rate of total establishments

	[1]	[2]	[3]	[4]	[5]	[6]
Dependent Variable	*Δ total SB loans*	*Δ job*	*Δ job*	*Δ total SB loans*	*Δ job_nontradable*	*Δ job_nontradable*
$\Delta\ \widehat{total\ SB}\ loans$		-0.0398	-0.0643*		-0.0408	-0.1009***
		(0.0374)	(0.0369)		(0.0377)	(0.0391)
Restrictiveness	0.0357***			0.0354***		
	(0.0091)			(0.0091)		
EST grow	0.0845	0.6229***	0.2701***	0.0932	0.6137***	0.2490***
	(0.2470)	(0.0415)	(0.0735)	(0.2508)	(0.0416)	(0.0716)
$\Delta\ \widehat{total\ SB}\ loans$*EST grow*			1.9539***			2.0044***
			(0.3258)			(0.3187)
Inv Opp (Operating margin)				-0.1225	0.1310	-0.0765
				(0.4295)	(0.0798)	(0.0986)
$\Delta\ \widehat{total\ SB}\ loans$*Inv Opp*						1.0339**
						(0.4328)
Constant			0.0295***			0.0320***
			(0.0045)			(0.0060)
Observations	5,821	5,821	5,821	5,818	5,818	5,818
First-stage F-statistic	60.310	-	-	54.470	-	-
(p-value)	(0.0000)			(0.0000)		
Underidentification test	14.217	-	-	14.022	-	-
(p-value)	(0.0002)			(0.0002)		

Panel B. Using the growth rate of establishments by size

Dependent Variable	[1] *Δ job*	[2] *Δ job*	[3] *magnitude* ↓
$\Delta\ \widehat{total\ SB}\ loans$	-0.0024	-0.0207	
	(0.0339)	(0.0352)	
ΔEST1-4	0.0845***	0.0401	53% ↓
	(0.0233)	(0.0350)	
ΔEST1-4 *$\Delta\ \widehat{total\ SB}\ loans$		0.1128	
		(0.1936)	
ΔEST5-9	0.1053***	0.0272	74% ↓
	(0.0145)	(0.0236)	
ΔEST5-9 *$\Delta\ \widehat{total\ SB}\ loans$		0.4489***	
		(0.1496)	
ΔEST10-19	0.1317***	0.0678***	48% ↓
	(0.0138)	(0.0203)	
*ΔEST10-19**$\Delta\ \widehat{total\ SB}\ loans$		0.3443***	
		(0.1268)	
ΔEST20-49	0.1387***	0.0889***	36% ↓
	(0.0109)	(0.0173)	
*ΔEST20-49**$\Delta\ \widehat{total\ SB}\ loans$		0.2734***	
		(0.1008)	
ΔEST50-99	0.0840***	0.0678***	19% ↓
	(0.0064)	(0.0089)	
*ΔEST50-99**$\Delta\ \widehat{total\ SB}\ loans$		0.0851	
		(0.0526)	
ΔEST100-249	0.0773***	0.0700***	9% ↓
	(0.0051)	(0.0085)	
*ΔEST100-249**$\Delta\ \widehat{total\ SB}\ loans$		0.0353	
		(0.0585)	
ΔEST250-499	0.0326***	0.0309***	5% ↓
	(0.0026)	(0.0042)	
*ΔEST250-499**$\Delta\ \widehat{total\ SB}\ loans$		0.0099	
		(0.0256)	
Constant	0.0119***	0.0153***	
	(0.0041)	(0.0042)	
Observations	5,499	5,499	

Appendix 1. Definition of variables

Variable	Definition
Δ job	One-year percent change in employment
Δ job'	One-year percent change in employment excluding agriculture and construction sectors
Δ job_nontradable	One-year percent change in employment in non-tradable industries
Δ job_tradable	One-year percent change in employment in tradable industries
Δ EST1-4	One-year growth rate of firms with 1-4 employees
Δ EST5-9	One-year growth rate of firms with 5-9 employees
Δ EST10-19	One-year growth rate of firms with 10-19 employees
Δ EST20-49	One-year growth rate of firms with 20-49 employees
Δ EST50-99	One-year growth rate of firms with 50-99 employees
Δ EST100-249	One-year growth rate of firms with 100-249 employees
Δ EST250-499	One-year growth rate of firms with 250-499 employees
Δ total SB loans	One-year percent change in total small business loans
Δ micro business loans	One-year percent change in micro business loans
Δ local SB loans	One-year percent change in small business loans made by local banks
Δ nonlocal SB loans	One-year percent change in small business loans made by nonlocal banks
Births-to-Deaths	The ratio of number of firm births and number of firm deaths
Expansions-to-Contractions	The ratio of number of firm expansions and number of firm contractions
Inv Opp	The employment-weighted operating margin of a manufacturing sector
Inv Opp'	The employment-weighted profit margin of a manufacturing sector
% smallest firms	The percentage of small firms with less than 50 employees
Net change in EST	One-year net change in total establishments
Log Establishments	Logarithm of total number of establishments
Log Population	Logarithm of population
Unemployment	Unemployment rate
Log Laborforce	Logarithm of labor force
Log Income	Logarithm of adjusted gross income (in thousands of dollars)
Labor-intensive dummy	Dummy variable that equals 1 for counties where the fraction of employment from labor-intensive industries is above the median value and equals 0 otherwise
HPI growth	One-year percent change in HPI index constructed by FHFA
Saiz Elasticity	Housing supply elasticity measure developed by Saiz (2010)
Judicial	Dummy variable that equals 1 for states with judicial foreclosure process and equals 0 otherwise
Restrictiveness	State-level restrictiveness index ranging from 1 to 4 constructed by Rice and Strahan (2010)