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Essays on Small Business Lending Policies in the U.S., 2010-2016

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ABSTRACT

ESSAYS ON SMALL BUSINESS LENDING POLICIES IN THE U.S., 2010-2016

By

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The three essays in this dissertation all focus on small business lending policies in the U.S. and make several unique contributions to the literature. The first essay provides a national overview of the small business sector; it focuses on establishment and employment trends, contributions to the national and local economy, major obstacles to small businesses (access to capital, in particular), and various governmental programs for small business lending.

With a focus on the Small Business Administration (SBA)'s lending programs, the second essay examines whether SBA lending has a larger impact on counties with lower-income communities and/or those where the proportion of the black or Hispanic population is higher. Using a first-differenced two-stage least squares approach, this study finds consistent evidence that an increase in SBA loans has a positive effect on employment in lower-income counties, particularly where the proportion of the black population is higher. The findings support the credit-rationing argument that less developed financial markets such as those in lower-income or

minority-concentrated communities should receive relatively higher benefits from governmental interventions in small business credit markets.

The final essay links two different but closely related policies—the Community Reinvestment Act (CRA) and SBA lending programs—and evaluates how the CRA influences SBA lending activity across and within the U.S. seven metropolitan areas. The CRA is a 1977 federal law that encourages depository institutions to meet the credit needs of low- to moderate-income (LMI) neighborhoods whose median family income is less than 80% of the area's median family income. By taking advantage of this 80% or less income threshold, this study uses a regression discontinuity design. The overall results suggest that the CRA has an insignificant or (at best) a modest impact on SBA lending in LMI neighborhood, although there were some variations across central city, inner-ring suburbs and outer-ring suburbs in the metropolitan areas.

Taken together, the three essays in this collection provide a comprehensive and nuanced understanding of small business lending programs in the U.S. Also, they provide important insights that may assist policy makers in tailoring SBA programs based on communities' characteristics in a changing financial landscape.

INDEX WORDS: Small business lending, Small business administration, Community reinvestment act, Low- and moderate-income, Minority, Intrametropolitan

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by

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ACCEPTANCE

This dissertation was prepared under the direction of Joowon Jeong's Dissertation Committee. It has been approved and accepted by all members of that committee, and it has been accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Public Policy in the Andrew Young School of Policy Studies of Georgia State University

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DEDICATION

To my parents, who give me unconditional love,

thank you for everything

To my dear husband Hakyeon,

thank you for always being there for me

To my loving and caring daughter Serin,

you bring me so much joy and happiness, always

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1   INTRODUCTION

Access to credit is crucial for small business startup, expansion, and survival because it enables small business to bring dynamic ideas, innovative services, and new products to the market (Cole & Sokolyk, 2016). However, small business owners often face considerably more difficulty obtaining credit than large business owners because they are relatively young and have little or no credit history (Craig, Jackson, & Thomson, 2009). In addition, limited access to credit for low-income and minority communities has been an ongoing concern in the U.S. for several decades (Avery, Bostic, & Canner, 2005; Bates & Robb, 2015, 2016; Cole & Sokolyk, 2016; Ding, Lee, & Bostic, 2018; Immergluck, 2002).

The Community Reinvestment Act (CRA) was established in 1977 to address the credit needs of low- and moderate-income areas, including traditionally excluded minority communities (Bostic & Robinson, 2003). Federal loan guarantees, provided by the Small Business Administration (SBA), were created to encourage lenders to provide loans to small businesses that might otherwise not obtain financing with reasonable terms and conditions (Small Business Administration, 2018). Despite the relatively long history and substantial budgets of these programs, full knowledge of either their contributions to the economy or their problems and public policy concerns is lacking.

In addition, during the Great Recession, the credit market in the U.S. and around the world collapsed, and small businesses that relied upon banks for credit were significantly impacted by the ensuing financial crisis (Wiersch & Shane, 2013). In response to this crisis, several laws were enacted to boost the availability of capital to small businesses. For example, the U.S. Recovery and Reinvestment Act of 2009 was enacted to provide the SBA with additional funding to subsidize SBA fees and increase the maximum loan guarantee of the loan

guarantee program to 90% (Cole, 2012). However, little is known about whether these government programs have contributed to the recovery of the small business sector.

Accordingly, this dissertation examines whether government-guaranteed loan programs and federal policies for small business lending contributed to the expansion of economic opportunities to disadvantaged communities during recovery. In three separate but interrelated essays, this study analyzes how these policies have addressed the credit needs of small businesses. By using different methodological approaches and data sources for each essay, a comprehensive evaluation is provided of the small business sector and related programs and policies at three different administrative levels.

The first essay provides a national overview of the small business sector; it focuses on establishment and employment trends, contributions to the national and local economy, major obstacles to small businesses (access to capital, in particular), and various governmental programs for small business lending. This essay does not contain an in-depth empirical analysis; instead, it aims to establish a context for further discussion on small business lending through the provision of background information on the small business sector and governmental lending programs.

The second essay begins with an assumption that small businesses in low-income communities and/or communities with a high proportion of minorities are more likely to face credit rationing in the financial market. The SBA established loan programs to alleviate the financial constraints experienced by small businesses, particularly those in underserved communities, and to foster economic development and job creation. Therefore, using data from the SBA's 7(a) and 504 lending programs and seven year-by-year county-level cohorts between 2010 and 2016, the second essay examines whether SBA lending had a greater impact on

counties with low-income communities and/or those where the proportion of black and Hispanic populations is higher.

The final essay links two different but closely related policies—the CRA and SBA lending programs—and evaluates how the CRA influences SBA lending activity in low- and moderate-income neighborhoods, with a special focus on geographic distribution. Specifically, using seven metropolitan statistical areas (MSAs) that are representative of U.S. urban areas, this essay examines whether CRA-eligible neighborhoods have experienced higher SBA lending activity than CRA-ineligible neighborhoods and further analyzes how SBA lending activity has differed within and across MSAs.

2 AN OVERVIEW OF SMALL BUSINESS, ACCESS TO CREDIT, AND LENDING POLICIES

Small businesses occupy an iconic place in policy debates in the U.S. Numerous and diverse public policies subsidize small businesses, and the political leaders of both parties voice their support for the sector. Part of this support is based on consensus that a healthy small business sector contributes to the local economy by bringing innovation, jobs, and growth to the communities in which the businesses are established. It is reasonable to expect then that shrinking or unsuccessful businesses threaten the stability of a community. However, recognition of this was slow to manifest in the world of public policies. Less than 50 years ago, little or no attention was paid to government statistical gathering or policy-making for small businesses (Ackermann, 2012). In 1976, using the Public Law 94-305, the U.S. Congress created an Office of Advocacy within the U.S. SBA (Small Business Administration, 2018). Among other things, it was asked to "examine the role of small business in the American economy and the contribution [that] small business [could] make in improving competition, encouraging economic and social mobility for all citizens, restraining inflation, spurring production, expanding employment opportunities, increasing productivity, promoting exports, stimulating innovation and entrepreneurship, and providing an avenue through which new and untested products and services can be brought to the marketplace" (U.S. SBA Office of Advocacy, 2018).

Since then, the significance of small businesses to the U.S. economy, as well as their challenges and policy-related concerns, have been examined and documented. In particular, policy interest in the issue of access by small businesses to capital has increased owing to concerns that small businesses might be prevented from obtaining adequate credit to enable them to start, continue, expand, and create jobs (Ackermann, 2012). Although it has been argued that

the government should provide additional resources to assist small businesses, little is known about the effects of governmental lending programs in this regard. Information on the conditions of small business financing is scarce, which leaves important gaps in knowledge for policy-makers. Therefore, this dissertation aims to address this gap by analyzing the impact of government policies on small business lending. Before discussing these issues in depth in Chapters 3 and 4, background information on the small business sector, access to credit, and lending policies is provided in Chapter 2.

2.1   The size of a small business

According to the SBA, a small business is a privately owned corporation, partnership, or sole proprietorship that has fewer employees and/or less annual revenue than a regular-sized business or corporation. However, it is not entirely clear how the size of a small business should be determined. The U.S. SBA provides guidance on the standards to use to gauge small business size; these are used to determine whether or not a firm is eligible for inclusion in an SBA business program and for financial assistance, as well as consideration in other governmental programs reserved for small business concerns. The SBA defines a business to be mostly small based on two widely used standards, which are either the number of employees over the past 12 months or the average annual receipts over the past three years. A business (i.e., primarily in the manufacturing or mining industries) is considered small if it has 500 or fewer employees. A business in the non-manufacturing industry is considered small if it has average annual receipts of $7.5 million or less.

Although there are many exceptions to these standards as they vary by industry, generally, using the North American Industry Classification System, the typical standard used to

determine the size of a small business for the purpose of research and statistics gathering is 500

employees or less. According to the SBA definition, small businesses account for at least 80% of

all U.S. businesses (Table 2.1). However, upon analyzing U.S. businesses by the size of their

employees, it was established that half of all businesses have less than four employees. The

number of establishments with fewer than 20 employees accounted for approximately 70% of all

U.S. businesses.

Table 2.1 Number of establishments by firm size

Number of employees	2010		2015	
	Number of establishments	%	Number of establishments	%
0–4	3,582,826	48	3,649,989	48
5–9	982,019	13	1,016,287	13
10–19	652,662	9	648,694	8
20–99	648,386	9	697,870	9
100–499	354,313	5	367,335	5
500+	1,176,422	16	1,283,763	17
Total	**7,396,628**	**100**	**7,663,938**	**100**

Source: The author's calculations were based on the County Business Patterns Database (2010 and 2015)

2.2 The importance of small businesses to the U.S. economy

It is well-established that the small business sector is the largest source of job creation and

wealth generation in the U.S. economy. Jane Jacobs (1961) famously argued that local small

businesses are not only good for services and access to jobs but are also critical to the vitality of

community life. According to Harvard Business Publishing's 2014 report on small business

lending, the small business sector employed half of the nation's private sector workforce and

created approximately two-thirds of net new jobs in the U.S between 2007 and 2012 (Mills &

McCarthy, 2014). In addition, the SBA data demonstrated that small businesses created $5.9

trillion, accounting for 44% of the non-farm U.S. economy in 2014 (Kobe & Schwinn, 2018).

Small businesses include employer firms and non-employer firms. According to the 2017 Small Business Credit Survey, the majority of all business establishments in the U.S. are non-employer firms, comprising 81% of all small businesses and employing 17% of the U.S. workforce (Federal Researve Banks, 2018). These firms generated $1.2 trillion in annual sales although this figure accounted for less than 4% of all sales and receipts nationally (Federal Researve Banks, 2018). Conversely, employer-led firms constituted about 20% of all small businesses but accounted for the remaining 96% of annual sales and receipts (Federal Researve Banks, 2018).

2.3   Racial disparity in small business ownership

As much as 99% of all minority-owned businesses are small firms with fewer than 500 employees, but they accounted for 29% of all U.S. firms, according to the 2012 Survey of Business Owners (SBO). Specifically, there were 8.0 million minority-owned businesses in 2012, up from 5.8 million in 2007, according to the findings of the 2007 and 2012 SBOs. This included a 35% increase in the number of black-owned firms, from 1.9 million to 2.6 million, and a 47% increase in the number of Hispanic-owned firms, from 2.3 million to 3.3 million, over this period.

However, despite this growth, racial inequality has been identified regarding the allocation of business ownership. In 2012, the white population accounted for approximately 63% of the U.S. population but owned 78% of all U.S. businesses, according to the SBO. By contrast, the black population represented roughly 13% of the U.S. population, but just 9% of all the U.S. businesses were black-owned in 2012. In addition, although Hispanic-owned businesses comprised 12% of all U.S. firms, the Hispanic population accounted for 15% of the U.S.

population in 2012. These statistics suggest that black or Hispanic populations across the country are disproportionately underrepresented as business owners compared to white populations.

In addition to racial inequality in small business ownership, variations in geographical location have been identified between minority- and majority-owned businesses. Table 2.2 shows the top 10 MSAs in terms of the number of establishments categorized according to the race/ethnicity of the owners. New York led the MSAs with approximately 1.5 million white-owned businesses in 2012, followed by Los Angeles (904,320), Miami (700,609), Chicago (651,628), and Dallas (457,372). For black-owned businesses, New York had the largest number of establishments (250,890), followed by Atlanta (176,245), Chicago (134.564), Miami (125,451), and Washington (115,039). Miami led the MSAs with 423,163 Hispanic-owned businesses in 2012, followed by Los Angeles (393,051), New York (339,415), Houston (164,923), and Riverside (122,233).

Table 2.2 The top 10 U.S. metropolitan statistical areas according to the race/ethnicity of small business owners in 2012

All	Top 10 MSAs	Number of establishments
1	New York-Newark-Jersey City, NY-NJ-PA Metro Area	2,202,062
2	Los Angeles-Long Beach-Anaheim, CA Metro Area	1,484,137
3	Chicago-Naperville-Elgin, IL-IN-WI Metro Area	904,056
4	Miami-Fort Lauderdale-West Palm Beach, FL Metro Area	901,027
5	Dallas-Fort Worth-Arlington, TX Metro Area	642,289
6	Houston-The Woodlands-Sugar Land, TX Metro Area	606,867
7	Atlanta-Sandy Springs-Roswell, GA Metro Area	590,218
8	Washington-Arlington-Alexandria, DC-VA-MD-WV Metro Area	567,153
9	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD Metro Area	482,165
10	San Francisco-Oakland-Hayward, CA Metro Area	472,141
White-owned	Top 10 MSAs	Number of establishments
1	New York-Newark-Jersey City, NY-NJ-PA Metro Area	1,476,006
2	Los Angeles-Long Beach-Anaheim, CA Metro Area	904,320
3	Miami-Fort Lauderdale-West Palm Beach, FL Metro Area	700,609
4	Chicago-Naperville-Elgin, IL-IN-WI Metro Area	651,628
5	Dallas-Fort Worth-Arlington, TX Metro Area	457,372
6	Houston-The Woodlands-Sugar Land, TX Metro Area	386,277
7	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD Metro Area	376,045
8	Boston-Cambridge-Newton, MA-NH Metro Area	374,771
9	Washington-Arlington-Alexandria, DC-VA-MD-WV Metro Area	347,520
10	Atlanta-Sandy Springs-Roswell, GA Metro Area	343,931
Black-owned	Top 10 MSAs	Number of establishments
1	New York-Newark-Jersey City, NY-NJ-PA Metro Area	250,890
2	Atlanta-Sandy Springs-Roswell, GA Metro Area	176,245
3	Chicago-Naperville-Elgin, IL-IN-WI Metro Area	134,564
4	Miami-Fort Lauderdale-West Palm Beach, FL Metro Area	125,451
5	Washington-Arlington-Alexandria, DC-VA-MD-WV Metro Area	115,039
6	Houston-The Woodlands-Sugar Land, TX Metro Area	91,589
7	Los Angeles-Long Beach-Anaheim, CA Metro Area	86,722
8	Dallas-Fort Worth-Arlington, TX Metro Area	80,944
9	Detroit-Warren-Dearborn, MI Metro Area	80,210
10	Memphis, TN-MS-AR Metro Area	55,159
Hispanic-owned	Top 10 MSAs	Number of establishments
1	Miami-Fort Lauderdale-West Palm Beach, FL Metro Area	423,163
2	Los Angeles-Long Beach-Anaheim, CA Metro Area	393,051
3	New York-Newark-Jersey City, NY-NJ-PA Metro Area	339,415
4	Houston-The Woodlands-Sugar Land, TX Metro Area	164,923
5	Riverside-San Bernardino-Ontario, CA Metro Area	122,233
6	Dallas-Fort Worth-Arlington, TX Metro Area	117,582
7	Chicago-Naperville-Elgin, IL-IN-WI Metro Area	89,523
8	San Antonio-New Braunfels, TX Metro Area	81,126
9	Washington-Arlington-Alexandria, DC-VA-MD-WV Metro Area	65,997
10	San Diego-Carlsbad, CA Metro Area	62,753

Note: MSA: metropolitan statistical area
Source: 2012 Survey of Business Owners

2.4   Racial disparity in access to capital

Despite the substantial number of small businesses and their considerable contribution to the economy, the risk of these businesses failing is surprisingly high. According to data from the 2017 U.S. Bureau of Labor Statistics, roughly 20% of all small businesses fail within their first year. By the end of their fifth year, 50% of small businesses have to liquidate. After 10 years, the survival rate drops to 35%. While there are a variety of reasons for the failure of small businesses, one of the most important reasons is financial constraint (Bates, 2010; Porter, 2015). Based on the findings of the 2017 Small Business Credit Survey, 64% of employer firms experienced financial challenges in the prior 12 months (Federal Researve Banks, 2017). Non-employer firms reported less financial stability than employer firms. Having to meet operating expenses and access credit were cited as top financial challenges (Federal Researve Banks, 2017).

The survival and growth of small businesses depends on access to credit because appropriate levels of working capital investment ensures that businesses are able to grow more rapidly, hire more workers, and make more investments than those without it (Alon, Berger, Dent, & Pugsley, 2018). According to the 2018 SBCS, 87% of small employer firms applied for a loan or line of credit in 2017. Of these applications, business loans, lines of credit, and SBA loans/lines of credit equated to 47%, 43%, and 26%, respectively. The 60% of all small businesses needed credit at some point in 2017 but did not apply for it for a variety of reasons. Particularly, 20% of the respondents were discouraged from applying for a loan because they thought that the lender would not approve their application. Also, of the small businesses that applied, 23% did not obtain any financing, and 54% applicants received less than the amount requested. This indicates that obtaining bank credit is difficult, though not necessarily

impossible, for many small businesses. Other surveys have demonstrated that being granted access to credit is difficult for small business. For example, the Kauffman Firm Survey, which is the largest longitudinal study of new businesses ever embarked upon, tracked access to credit by a number of businesses that began operating in 2004 and found that approximately 30% of them did not obtain all or any of the amount requested as capital (Galope, 2016).

However, it has been demonstrated that racial groups rely on different sources of financial capital. Specifically, white-owned small businesses mostly depend on business loans from banks, whereas black- and Hispanic-owned businesses rely on personal and family savings as a source of startup capital, despite the fact that the wealth levels of blacks and Hispanics are less than one tenth those of non-Hispanic whites (Robb, 2018). The most feasible explanation is that black and Hispanic businesses are less likely than white businesses to receive approval for a business loan, while the loans that are approved and extended by financial institutions are much smaller than those offered to white business owners (Bates, Bradford, & Jackson, 2018). For example, according to the findings of the 2016 Annual Survey of Entrepreneurs, nearly 60% of black-owned businesses and 53% of Hispanic-owned businesses did not apply for a loan because they thought that the lender would not approve their application, compared to fewer than 10% of white-owned businesses. This indicates that black- and Hispanic-owned businesses have more limited access to capital relative to their white counterparts.

Lack of access to credit by small businesses is problematic because if credit is unavailable, small businesses may be unable to meet the current demands of their business or take advantage of opportunities for growth. In particular, historic racial bias and discrimination impacts nearly every step of the process of obtaining a loan, and this inequality negatively and significantly influences the amount and type of financial capital that minority-owned business

typically seek and are awarded (Bates et al., 2018). Minority-owned businesses are often forced to rely heavily on personal funds to finance a business (U.S. SBA Office of Advocacy, 2018). Consequently, this can deplete their assets even further by damaging their credit scores and inhibiting their business prospects (U.S. SBA Office of Advocacy, 2018). While there is no comprehensive and conclusive solution to identifying ways to promote the success of small businesses (minority-owned businesses, in particular), one thing is certain—addressing the financial needs of small businesses is critical to the successful development of the small business sector.

2.5 Government programs that expedite access to credit by small businesses

To increase access to credit by small businesses, the creation and implementation of governmental programs is essential because the risk of allowing market dynamics to determine the fate of the entrepreneurial economy is substantial, and there is too much at stake (Craig, Jackson, & Thomson, 2008). In particular, small businesses in minority and low-income communities require special attention because they have experienced historical exclusion from important sectors of the economy (Bates & Robb, 2013). Many governmental initiatives are available; however, the focus of the current study is on the small business lending programs offered by the CRA and the SBA.

2.5.1 Lending Programs Offered by the Community Reinvestment Act

As a result of the neighborhood movement of the 1970s and 1980s, when community groups rallied against the historical practices of housing and banking discrimination in low-income urban neighborhoods, the CRA was enacted to encourage depository financial

institutions to help meet the credit needs of communities (Getter, 2020). The CRA was asked to address a discriminatory practice called "redlining," which had been used to deny or increase the cost of loans to low-income and minority borrowers in the market for housing credit (Immergluck, 2002). Since its introduction in 1977, the legislation has undergone several amendments. In 1989, Congress passed the Financial Institution Reform and Recovery Act, which required the public disclosure of banks' CRA ratings and performance evaluations to ensure that the CRA was more transparent (Laderman & Reid, 2010). In 1995, the CRA was asked to revise and expand its coverage to include small business lending, clarify performance standards, and reduce the compliance burden of banks (Getter, 2020). In 2005, it was revised once more again with a view to encouraging banks to meet the needs of community development outside MSAs (Getter, 2020).

The CRA requires commercial banks and savings institutions with total assets of $1 billion or more to collect and report data on their small business and community development lending (Department of the Treasury, Federal Research System, & Federal Deposit Insurance Corporation, 2016). The small business lending data reported by the CRA provide useful information, such as the loans originated or purchased, even though they are less comprehensive than the data reported on home mortgage lending. According to the Federal Financial Institutions Examination Council, the number of applicants awarded loans and the small business loan amounts awarded by the CRA between 2010 and 2016 increased substantially (Table 2.3). Specifically, the total number of small business loans extended increased by approximately 45% from 4,215,201 in 2010 to 6,106,355 in 2016. Over the same period, the total monetary value of the loans awarded increased by 31% from $175 billion to $229 billion. Table 2.3 also shows that, on average, small loans under $100,000 accounted for 90% or more of the total number of small

business loans. This result is consistent with the findings of the 2017 SBCS, which demonstrated

that 55% of the respondents in the survey/applicants sought a loan for less than $100,000.

Table 2.3 Trends regarding small business loans originating from the CRA, by size of loan, 2010–2016

	Size of loan (dollars)				Loans to firms with revenues of 1 million or less
	Number of loans				
	All loans	$100,000 or less	$100,001 to $250,000	More than $250,000	
FY 2010	4,215,201	3,884,656	162,220	168,325	1,489,952
FY 2011	4,975,397	4,619,301	173,692	182,404	2,228,573
FY 2012	5,073,468	4,701,118	177,806	194,544	2,232,045
FY 2013	4,868,494	4,485,831	182,192	200,471	2,364,710
FY 2014	5,435,934	5,056,712	185,224	193,998	2,539,316
FY 2015	5,854,272	5,465,172	189,393	199,707	3,063,951
FY 2016	6,106,355	5,698,559	202,118	205,678	3,052,400
	Amount of loans (thousands of dollars)				
	All loans	$100,000 or less	$100,001 to $250,000	More than $250,000	Loans to firms with revenues of 1 million or less
FY 2010	174,817,839	55,626,585	28,578,781	90,612,473	64,579,050
FY 2011	192,451,093	63,611,315	30,579,422	98,260,356	72,665,454
FY 2012	198,636,959	62,461,481	31,192,989	104,982,489	73,476,902
FY 2013	204,129,141	63,514,996	31,989,670	108,624,475	74,496,089
FY 2014	208,009,395	70,335,717	32,392,447	105,281,231	73,146,672
FY 2015	219,703,482	77,918,057	33,149,498	108,635,927	80,607,743
FY 2016	229,278,587	82,581,474	35,116,408	111,580,705	81,274,583

Note: Small business loans are defined as those whose original amounts are $1 million or less *and* were reported to be either loans secured by nonfarm or nonresidential real estate or commercial and industrial loans in Part I of the Consolidated Reports of Condition and Income (Schedule RC-C, Part II).
Source: 2018 Federal Financial Institutions Examination Council

2.5.2   *Lending Programs Offered by the Small Business Administration*

The SBA, established in 1953, has provided support to entrepreneurs and small businesses in

various forms, such as the provision of assistance to small businesses seeking to obtain a loan

(U.S. SBA Office of Advocacy, 2018). The SBA does not lend money directly to small business

owners but works with lenders to provide loans to them by setting guidelines for loans made from

partnering with lenders, community development organizations, and micro-lending institutions (U.S.

SBA Office of Advocacy, 2018). In particular, by providing lenders with a guarantee that the SBA will

pay off the federally guaranteed portion of the loan balance in the event of the borrower defaulting on

the loan, the SBA reduces the risk to lenders and makes it easier for small businesses to acquire loans

(U.S. SBA Office of Advocacy, 2018). In addition, the SBA's loan programs are generally

characterized by lower rates and fees, lower down payments, and more flexible overhead

requirements compared to non-guaranteed loans (U.S. SBA Office of Advocacy, 2018).

While the SBA offers several lending programs to small businesses who cannot otherwise obtain

credit on reasonable terms and who do not have other sources of financing, the 7(a) Loan Program is its

flagship program because it provides invaluable assistance on how to finance working capital,

refinance debt, or buy a business, real estate, or equipment (U.S. Small Business Administration, 2016).

The SBA 504 Loan Program is another prominent program that covers long-term financing and can be

used to acquire and improve major fixed assets, such as owner-occupied real estate or heavy equipment

(U.S. Small Business Administration, 2016). Compared to the 7(a) Loan Program, the 504 Loan

Program places a greater emphasis on community development because it requires that the small

businesses uses its funds to create or retain at least one job for every $65,000 that is guaranteed by the

SBA (Congressional Research Service, 2018). In addition, under the 504 Loan Program, the relevant

bank partners with a certified development company (CDC), which is a specialized SBA-

certified nonprofit corporation, to finance the small business (Congressional Research Service,

2018). Each partner extends a loan to the qualifying small business, and typically, the CDC loan

is backed by a 100% SBA-guaranteed debenture (Congressional Research Service, 2018).

The details of the SBA lending program have changed several times over the last few

decades, but a notable change was made during the 111th congress. Several pieces of legislation

governing small businesses were passed to revive these firms during the recession. For example,

the American Recovery and Reinvestment Act of 2009 extended an additional $730 million to the SBA to temporarily subsidize the latter's fees and increase the maximum loan guarantee percentage of the 7(a) Loan Program to 90% (Congressional Research Service, 2019). The following year, the Small Business Jobs Act approved a $1.5 billion State Small Business Credit Initiative to provide funding to extend the SBA's fee subsidies and the 7(a) Loan Program's offer of a maximum loan guarantee up to 90% until December 31, 2010 (Congressional Research Service, 2019). This initiative was extended again until March 4, 2011, by the Continuing Appropriations and Surface Transportation Extensions Act of 2011 (Congressional Research Service, 2019)

Table 2.4 shows a trend that reflects an increase in the number of loans extended or in the monetary value of the loans obtained through the 7(a) loan program between 2010 and 2016, although a decline in both these areas was observed in 2012. Specifically, from 2010 through to 2016, the number of loans acquired through the 7(a) loans program increased by 36%, and the gross amount approved nearly doubled.

Table 2.4 The number of loans extended and the monetary value of SBA-guaranteed loans, 2010–2016

	7(a) Loan Program				504 Loan Program			
	Number of approved loans		Gross amount approved (in US$, billions)		Number of approved loans		Gross amount approved (in US$, billions)	
FY 2010	46,922	---	12.4	---	7,833	---	4.5	---
FY 2011	53,688	14.4%	19.7	58.9%	7,676	-2.0%	4.6	2.2%
FY 2012	44,358	-17.4%	14.3	-27.4%	7,047	-8.2%	4.5	-2.2%
FY 2013	46,389	4.6%	18.1	26.6%	7,708	9.4%	5.3	17.8%
FY 2014	52,044	12.2%	19.4	7.2%	5,885	-23.7%	4.3	-18.9%
FY 2015	63,460	21.9%	23.9	23.2%	5,787	-1.7%	4.4	2.3%
FY 2016	64,074	1.0%	24.5	2.5%	5,893	1.8%	4.8	9.1%

Source: Small Business Administration (2018)

By contrast, the number of loans extended through the 504 loan program was demonstrated to decrease between 2010 and 2015. In 2016, the figures bounced back slightly but did not recover to the 2010 levels. While there were fluctuations in the gross amount approved for loans obtained through the 504 loan program, an increase in this regard of approximately 7% was observed between 2010 and 2016. Compared to the number of loans acquired through the 504 loans program, the number of loans obtained through the 7(a) loans program grew substantially, both in terms of the number of loans extended and their monetary value. This may be explained, in part, by the revised legislations governing the SBA's fees and the increase in the maximum loan guarantee percentage (i.e., up to 90%) under the 7(a) loan program.

2.6   Discussion

Small businesses make a vital contribution to economic competitiveness in the U.S. Not only do they employ half of the nation's workforce in the private sector, they have also created two-thirds of net new jobs in the country. However, as demonstrated by the findings of recent surveys, many small businesses fail, and this is primarily due to financial constraints. In

particular, minority-owned businesses are disproportionally and negatively impacted by a lack of access to credit, without which it is difficult for businesses to stabilize their income streams and take advantage of growth opportunities. This has considerable negative consequences for the entire U.S. economy. Therefore, from a policy perspective, it is important to address barriers to the entry and expansion faced by many small businesses. To increase access to credit by small businesses, the government has implemented various small business lending policies. This dissertation focuses on the lending programs of the CRA and the SBA. These are discussed in detail in the chapters that follow.

3   THE EMPLOYMENT EFFECTS OF GOVERNMENT-GUARANTEED SMALL BUSINESS LENDING

Abstract

Small businesses in lower-income communities and/or communities with a higher proportion of minorities are more likely to face credit rationing in the financial market. The Small Business Administration (SBA) established loan programs to alleviate the financial constraints experienced by small businesses, particularly those in underserved communities, and to foster economic development and job creation. Using data from the SBA's 7(a) and 504 lending programs and the seven-year county panels from 2010 to 2016, this study therefore sought to determine whether SBA lending had a larger impact on counties with lower-income communities and/or those where the proportion of the black or Hispanic population was higher. Overall, the study provides consistent evidence that an increase in SBA loans had a positive effect on employment in lower-income counties, particularly where the proportion of the black population was higher. Furthermore, the study finds that the effects of SBA 504 loans on employment were larger than those of SBA 7(a) loans. The findings support the credit-rationing argument that less developed financial markets such as those in lower-income or minority-concentrated communities should receive relatively higher benefits from governmental interventions in small business credit markets.

3.1 Introduction

Access to credit is crucial for the initiation, expansion, and survival of small businesses and enables them to bring dynamic ideas, innovative services, and new products to the market (Bates & Robb, 2013; R. Cole & Sokolyk, 2016). However, small businesses often face greater difficulty securing credit than large businesses because they are relatively young and have little or no credit history (Craig et al., 2009; Robb, 2018). Moreover, small businesses in underserved communities where income levels are lower and/or the proportion of minority populations is higher have traditionally been considered unattractive customers by risk-averse financial institutions (Bates & Robb, 2016). The literature suggests that the problems associated with asymmetrical information between financial institutions and small businesses may be one of the mechanisms behind the failure of the financial market to allocate sufficient credit to these communities (Bates et al., 2018; Higgins, Lacombe, Stenard, & Young, 2020). To alleviate the issue of information asymmetry and foster economic development and job creation, the Small Business Administration (SBA) established loan programs. It is therefore reasonable to expect that there should be a relationship between SBA-guaranteed lending and economic growth and development, particularly in lower-income and minority communities (Craig et al., 2009).

Federal loan guarantees provided by the SBA encourage lenders to provide loans to small businesses that might not otherwise be able to obtain financing with reasonable terms and conditions. The two largest SBA programs are the 7(a) and 504 loan programs. The SBA's 7(a) loans are the more common of the two; they can extend up to $5 million and are used to finance working capital, pay debts, or refinance/purchase businesses, real estate, or equipment (U.S. SBA, 2018), while the SBA's 504 loans are used to finance commercial real estate or large equipment used in business operations, with funding ranging from $125,000 to $20 million (U.S.

SBA, 2018). Another difference between the 504 and 7(a) programs is that the 504 programs are more focused on economic development via job creation and retention than the 7(a) programs (Immergluck & Mullen, 1998).

The SBA's guaranteed lending programs, particularly the 7(a) program, have grown in terms of both the number of loans and the total loan value. According to the 2018 SBA loan program performance report for the fiscal years 2010 and 2016, while the dollar value of 504 loans increased by approximately 4 percent from $4.5 billion to $4.7 billion, the number of 504 loans decreased. By way of contrast, in the fiscal year 2016, the dollar value of 7(a) loans approved by the SBA was $24.5 billion, which constituted a 108 percent increase over the $12.4 billion for the fiscal year 2010, and the number of 7(a) loans increased by 37 percent from 46,922 to 64,074 over the same period. This growth in the SBA loan programs raises questions as to whether the benefits of the programs exceed their costs and whether society's decision to subsidize credit to support small businesses is good for society as well as business owners (Craig, Jackson, & Thomson, 2007; Higgins et al., 2020; Y. S. Lee, 2018; Ramsey, 2018).

The literature on small business lending is sparser than that on mortgage lending (Bostic & Lee, 2017) and has, for the most part, developed into two lines of study. The first relates discriminatory practices that limit access to bank loans based on individual characteristics, including race or class, and redlining, which refers to discrimination on the basis of geographic location (Bates, 2010; Bates et al., 2018; Bates & Robb, 2016; Immergluck, 2002; Immergluck & Mullen, 1998). Previous studies offer consistent evidence on this matter—in particular, showing that minority business owners face higher loan denial rates, higher interest rates, and a higher likelihood of being discouraged from applying for loans than white-owned businesses

(Mijid & Bernasek, 2013). Additionally, firms located in minority or low-income neighborhoods are penalized for their locations when seeking loans (Bates et al., 2018).

The second line of research focuses on the impacts of small business lending on local economic growth (Cortes, 2010; Craig et al., 2007, 2008, 2009; Doctors & Wokutch, 1979; Y. S. Lee, 2018; Rupasingha, Crown, & Pender, 2018). However, the economic effects of small business loans delineated in the literature are ambiguous. Some studies maintain that SBA-guaranteed lending programs bring positive social benefits, including growth in per capita income and in employment at a local market level (Brown & Earle, 2017; Cortes, 2010; Craig et al., 2007, 2008). In contrast, others argue that SBA-guaranteed lending programs have little effect in terms of improving income or employment in the areas that receive these loans (De Rugy, 2007; Higgins et al., 2020; Y. S. Lee, 2018; Rupasingha et al., 2018).

While prior literature provides some insights into the economic effects of SBA loans, it has limitations. First, although the SBA's 7(a) and 504 programs differ in many ways, most previous studies examined the aggregate effects of SBA programs instead of estimating the effects separately by program (Brown & Earle, 2017; Higgins et al., 2020; Y. S. Lee, 2018). The aggregate estimates may therefore mask the effects of SBA 504 loans by overrepresenting SBA 7(a) loans because SBA 504 loans account for only a small proportion (approximately 10%) of total SBA loans. Second, although economic conditions in communities have changed rapidly over the decades, the literature mostly focuses on examining the effects of SBA loans during the 1990s and 2000s, even in recent research (Brown & Earle, 2017; Eesley & Lee, 2019; Higgins et al., 2020). This study therefore investigates whether counties with a greater volume of small business loans, which is indicative of more financial capital flowing to small businesses in communities, had higher levels of employment between 2010 and 2016. In particular, by

separately estimating the effects of SBA loans by program, this study tests whether counties with a greater volume of SBA 504 loans, which place greater emphasis on employment growth and job retention, had better economic outcomes during this period.

Third, although some studies examine the effects of SBA lending by community characteristics, the scope has been limited to the low–high-income continuum (Cortes, 2010; Craig et al., 2007). To the best of my knowledge, no study has investigated the effects of SBA lending on minority communities. Accordingly, this study examines whether SBA lending has had a greater impact on counties with lower-income communities or a higher proportion of minority populations, particularly blacks and Hispanics. Furthermore, since low-income and minority communities often intersect, giving rise to compounded or double discrimination, this study further examines the employment effects of SBA loans on low-income minority communities.

The remainder of this paper is organized as follows: Section 3.2 reviews the economic rationale provided for government interventions in the small business credit market, briefly discusses the two largest SBA-guaranteed lending programs (the 7[a] and 504), and reviews the literature on the effects of SBA-guaranteed lending on local economic performance. Section 3.3 describes the data and methods used in the study, while Section 3.4 discusses the findings on the effects of SBA lending on employment. A summary of the major findings, potential policy implications, and limitations of this study are offered in Section 3.5.

3.2   Background and Literature Review

3.2.1   *Economics of Government Interventions in the Small Business Credit Market*

In a complete capital market, firms should be able to borrow enough capital as long as they pay reasonable interest rates. In practice, however, small business owners often complain of not being able to secure sufficient credit, even if they are willing to pay higher interest rates. Economic theorists have suggested several mechanisms to explain the failure of the private sector to allocate loans efficiently. In their 1981 article, Stiglitz and Weiss argued that difficulties in obtaining adequate information about the parties involved in a transaction may explain the inefficient allocation of small business loans. Specifically, lenders are concerned about the interest rates they receive on loans and the risks associated with those loans. Lenders who raise their interest rates may suffer from adverse selection because higher interest rates increase the loan risk by either discouraging safer borrowers or inducing borrowers to invest in high-risk projects. Accordingly, lenders may choose not to raise interest rates in order to eliminate excess demand, resulting in the possibility of credit rationing. Higher interest rates tend to change the behavior of borrowers because they decrease the return on the project but increase payoffs, even if the project succeeds, resulting in moral hazards. In that sense, SBA loan guarantees may alleviate the adverse selection problem by providing lower interest rates, which in turn increase the share of safer borrowers, thus increasing the lender's expected return and reducing expected losses when borrowers default on loan repayments (Craig et al., 2009). Additionally, to the extent that SBA loans guarantee lower interest rates, they help mitigate the moral hazard problem by making the loans more affordable and thus reducing the likelihood of defaults (Craig et al., 2009). The existence of credit rationing in small business credit markets therefore justifies

the existence of government-sponsored programs aimed at improving small businesses access to credit.

In a similar vein, there is substantial literature on discriminatory lending practices, particularly those based on racial and geographic characteristics (Bates et al., 2018; Bates, Lofstrom, & Servon, 2011; Bates & Robb, 2014; Immergluck, 2002). These studies contended that minority business owners are more likely to be turned down for a loan than white business owners, and banks tend to give smaller loans to businesses located in certain communities. One line of research provided a theory of race-based discrimination using the concept of cultural proximity (Aaronson, Bostic, Huck, & Townsend, 2004; Fisman, Paravisini, & Vig, 2017). The theory emphasizes the importance of shared codes, languages, religions, and/or cultures between potential transactional parties. In particular, the theory describes how commonalities in ethnic origin increase the likelihood that a transaction will take place and its outcome. Due to this cultural proximity, lenders, who are predominately white, may be reluctant to provide loans to minority business owners. On the other hand, Lang and Nakamura (1993) provide a theory of redlining based on incomplete information, explaining that there is a higher loan denial rate in lower-income areas because lenders receive few applications from lower-income neighborhoods, and they have little information about how to evaluate applications from these areas. Such redlining and discrimination based on race also justifies the government-guaranteed loan programs in that SBA lending aims to provide loans to small businesses that might not otherwise be able to obtain financing with reasonable terms and conditions.

3.2.2   *The Small Business Administration Loan Program*

The SBA, established in 1953, provides support to entrepreneurs and small businesses in various forms, which can be summarized as the "3 Cs" of capital, contracts, and counseling (U.S. SBA, 2020). SBA loans account for a significant proportion of the SBA's activities. SBA loans are made through banks, credit unions, and other lenders that partner with the SBA and provide lenders with a guarantee that the agency will pay off the federally guaranteed portion of the remaining loan balance if a borrower defaults on the loan. As the SBA's flagship program, the 7(a) loans program aims to help small businesses that cannot obtain bank credit with reasonable terms and do not have other sources of financing. The funds can be used as working capital, to refinance debt, or to buy a business, real estate, or equipment. The interest rate on 7(a) loans can be adjustable based on negotiations between the lender and the borrower. Collateral is required, but the SBA guarantee cannot be a substitute for collateral.

As another prominent program, the SBA 504 loan program aims to promote economic development by creating and retaining jobs in communities. The program provides small businesses with long-term financing to acquire and improve major fixed assets such as owner-occupied real estate or heavy equipment. However, unlike 7(a) loans, 504 loans cannot be used as working capital or for inventory; the interest rate is fixed, and no outside collateral is required. In most cases, a business must create or retain one job for every $65,000 guaranteed by the SBA ($100,000 per job for small manufacturers). Borrowers must also include projections for meeting these requirements during the loan application process.

3.2.3   *Economic Impacts of Small Business Administration Programs*

As discussed, the primary goal of SBA lending programs is to mitigate market incompleteness by improving entrepreneurs' access to credit and to promote local economic growth by helping establish viable small businesses. It is therefore reasonable to expect that if SBA lending programs have performed as planned, there should a positive relationship between the programs and economic growth. However, the evidence in the literature is not conclusive because some studies find that SBA programs are positively associated with local economic growth whereas others find that the programs failed to deliver positive outcomes. Indeed, that there is mixed evidence in the literature is not surprising. As Brown and Earle (2017) asserted, the relationship between SBA loans and the labor market is theoretically ambiguous because easier access to capital may enable expansion, thereby increasing employment and income levels, if they are gross complements. However, increased capital may also reduce employment if capital and labor are gross substitutes.

In an earlier study, Doctors and Wokutch (1979) investigated the geographical patterns of SBA lending activity in nine metropolitan areas, namely, Pittsburgh, Miami, Chicago, Boston, St. Louis, Cleveland, Cincinnati, Houston, and Seattle. Comparing the number and value of SBA loans issued in these metropolitan areas between 1968 and 1976 in a descriptive way, they found that there was higher lending activity in areas with a higher share of small businesses and argued that the findings were contrary to the SBA's purpose of providing credit to regions with the most need. However, I disagree with Doctors and Wokutch (1979)'s assertion that their findings conflict with the SBA's purpose because more small businesses in a community may represent a greater demand for credit and more government-guaranteed small business loans (Y. S. Lee, 2018).

Using more rigorous empirical strategies, recent studies have examined the effects of SBA lending programs on local and regional economic performance (Brown & Earle, 2017; Cortes, 2010; Craig, Jackson, & Thomson, 2006; Craig et al., 2007, 2008, 2009; Higgins et al., 2020; Y. S. Lee, 2018). Some studies analyzed the total SBA lending, including the 7(a) and 504 programs, but others only focused on estimating the effects of the 504 programs on local economic performance because the 504 program is more directly tied to local economic development. As Table 1 shows, some studies find that SBA lending is positively associated with local economic performance, mostly measured as per capita income or employment, while others find no significant growth in income or employment as a result of the programs. For example, a series of articles by Craig, Jackson, and Thomson (2006, 2007, 2008) used 1991–2002 SBA loans data to determine whether SBA programs produced net social benefits. The overall findings indicate that SBA lending activity levels were positively associated with employment growth or per capita income at a local market level during the study period, while the effects of SBA programs varied depending on community characteristics, such as location, size, industrial composition, and economic conditions. More specifically, the studies show that SBA lending activity levels are positively associated with the employment rate, and the relationship was observed more strongly in low-income neighborhoods than in high-income neighborhoods. These findings infer that SBA loan guarantees indeed provide benefits to small business owners in low-income neighborhoods by alleviating market imperfections.

Cortes (2010) examines the relationship between SBA 504 lending activity levels and economic performance, such as income growth, small firm growth, and employment growth, using state-level data for the 1986–2008 period. The study findings show that SBA loans had a positive impact on the growth of small businesses and the number of workers employed in small

firms during this period. Brown and Earle (2017) also observed the positive impact of increased

capital access on employment and affirmed that capital and labor are gross complements rather

than substitutes.

Table 3.1 Summary of key literature on SBA lending

Author (year)	Economic Performance	Time period	Unit of analysis	Analytic Method	Does SBA lending lead to greater economic performance?
Craig et al., (2006, 2007)	Per capita income	1991-2002	MSA	OLS fixed effects model with instrumental variable	Yes, but effects vary by community characteristics
Craig et al., (2008)	Employment rate	1991-2002	MSA	Arellano-Bond panel model with instrumental variable	Yes, greater impact in low income area
Cortes (2010)	Per capita income; Employment rate; Small business growth	1986-2008	State	OLS fixed effects model with instrumental variable	Mixed – the effects on income are negative, but the effects on employment are positive. Fails to find a greater impact in low income area
Lee (2018)	Log employment; Log wage; Log payroll	1993-2002	MSA	First difference model with instrumental variable	No significant employment or income growth effects from small business loans
Brown & Earl (2017)	Employment rate	1990-2009	County	Matching and regression	Yes, significant employment effects of increasing dollar amount of SBA loans
Higgins et al. (2020)	Income growth	1980-2009	County	Spatial Durbin model	No, SBA lending is negatively associated with per capita income growth

Notwithstanding, some studies provide evidence that SBA lending has failed to achieve

its intended policy goals. For example, Cortes (2010) finds no significant impact on income

growth although a positive impact was apparent on some economic performance indicators, such

as employment. Lee (2018) also investigated whether SBA lending increased employment rates,

payroll, and wages between 1993 and 2002 across 316 metropolitan areas in the U.S. While Lee (2018) finds a positive relationship between SBA lending and economic performance using a standard growth regression analysis, the application of first-difference and instrumental variable regressions to mitigate endogeneity reveals no significant employment or income growth effects resulting from small business loans. More recently, Higgins et al. (2020) find that SBA lending was negatively associated with income growth in U.S. counties between 1980 and 2009. The summary of the key literature on SBA lending discussed in this section is presented in Table 3.1.

3.3   Data and Methodology

3.3.1   Data

The data on SBA-guaranteed 7(a) and 504 loans obtained from the SBA included borrower and lender information on all SBA-guaranteed 7(a) and 504 loans from 2010 to 2016, while the data on socioeconomic conditions were derived from various sources, including the U.S. Decennial Census, American Community Survey, County Business Pattern, and Federal Deposit Insurance Corporation. Detailed descriptions of all the variables are presented in Table 3.2. Although most extant studies employed metropolitan statistical areas (MSAs) or states as units of analysis, more disaggregated data, such as county- or firm-level data, may be more appropriate to reflect local market conditions in the lending process (Brown & Earle, 2017; Higgins et al., 2020). In this study, therefore, the data were aggregated at a county level.

Table 3.2 Variable description

Variables	Description	Source
Dependent Variable		
Employment rate	The number of employees as a percentage of the civilian labor force in each county	Decennial Census; ACS 2011-2016
Key Independent Variables		
SBA	The number of SBA loans per 1,000 businesses or the dollar amount (in thousands) of SBA loans per business in each county	SBA
Low- and Moderate-Income (LMI)	An indicator variable equal to one if median household income in a county is less than 80% of the national median household income, zero otherwise	Decennial Census; ACS 2011-2016
Low-income (Low)	An indicator variable equal to one if median household income in a county is less than 50% of the national median household income, zero otherwise	
Black	The share of Black population in a county	
Hispanic	The share of Hispanic	
SBA × LMI	SBA loans × Low- and Moderate-Income	
SBA × Black	SBA loans × Black	
SBA × Hispanic	SBA loans × Hispanic	
SBA × LMI× Black	SBA loans × Low- and Moderate-Income × Black	
SBA × LMI× Hispanic	SBA loans × Low- and Moderate-Income × Hispanic	
Other Variables		
Population	Total population in each county (log)	Decennial Census; ACS 2011-2016
Education	A share of population over the age of 25 with at least four years of college education	
Manufacturers	Location quotient for manufacturing – share of manufacturing employment in county employment to the share of overall manufacturing in US employment	
Retailers	Location quotient for retailers – share of retail employment in county employment to the share of overall retailers in US employment	
Wholesalers	Location quotient for wholesalers – share of wholesale employment in county employment to the share of overall wholesaler in US employment	
Services	Location quotient for personal services including hair/nail salon, full-service restaurant, etc. – share of service employment in county employment to the share of overall service workers in US employment	
Small Businesses	The number of small businesses in each county	County Business Pattern
Firm Size	The share of small businesses with 20 employees or less	
Deposit	The total deposit of the commercial banks in a county (log)	FDIC's Summary of Deposit database

3.3.2 *Methodology*

First-difference estimate

The empirical tests conducted for this study estimated the effects of SBA small business lending on employment using seven-year county panel data from 2010 to 2016. Most previous studies used fixed-effect estimation, which requires a strict exogeneity assumption, to control for time-constant unobserved heterogeneity (Cortes, 2010; Craig et al., 2007). However, the strict exogeneity assumption does not hold when the dependent variable (e.g., annual employment rate) is observed over time, and the value of the dependent variable depends in part on its values in the previous period (Wooldridge, 2013). In this study, first-difference estimation is therefore used because it assumes considerably weaker exogeneity by allowing the future values of the regressors to be correlated with the error. This estimation strategy yields the following reduced-form estimation model:

(1) $\Delta \text{Emp}_{i,t} = \Delta \text{SBA}_{i,t-1} \beta_1 + \Delta \text{LMI}_{i,t-1} \beta_2 + \Delta \text{Black}_{i,t-1} \beta_3 + \Delta \text{Hispanic}_{i,t-1} \beta_4 + \Delta X_{i,t-1} \gamma +$

$\Delta \mu_t + \Delta \varepsilon_{it}$

In Equation (1), $\text{Emp}_{i,t}$ is the annual employment rate for county i at time t. The primary variable of interest on the right side of the equation is $\text{SBA}_{i,t-1}$, which is the lagged SBA loans, measured as the number of loans per 1,000 businesses[1]. Moreover, the variable SBA loans is categorized into two groups—7(a) loans and 504 loans—to determine whether the effects of SBA loans on local employment vary based on the type of SBA program. $\text{LMI}_{i,t-1}$ equals one if the median household income in a county is less than 80% of the national median household income; otherwise, it is zero. The 80% cutoff corresponds to the definition of LMI geographies by the U.S. Census Bureau and the U.S. Department of Housing and Urban Development (HUD,

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[1] This study used the total dollar value of SBA loans as an alternative measure of SBA loans to check the robustness of the findings later.

2020)[2]. Black $_{i, t-1}$ represents the proportion of the black population in a county, and Hispanic $_{i, t-1}$ represents the proportion of the Hispanic population in a county. A series of a county's economic characteristics are included in $X_{i, t-1}$ as the set of lagged control variables. Based on prior literature, this study included population size, the proportion of the population with a bachelor's degree or higher, the number of small businesses, and the proportion of small businesses with 20 employees or less to measure each county's basic demographic and economic profile. The variables of location quotient for manufacturers, retailers, wholesalers, and services are included to measure how concentrated a particular industry was in a county compared to the national average because local industrial composition is an important determinant of local employment (Cortes, 2010; Ramsey, 2018). The commercial banks' deposits in a county are used to measure the competitiveness of the local banking market.

I then extend the analysis by estimating Equation (2) to determine whether SBA lending has a larger impact on counties with lower- and moderate-incomes (LMI). As discussed earlier, for small businesses, LMI black or Hispanic counties may be more vulnerable locations in terms of securing bank credit than upper- or middle-income white counties because they are often discriminated against twice: first, because of their minority status, and second, because of geography (i.e., redlining) (Bates, 2010; Bates et al., 2018; Bates & Robb, 2016; Immergluck, 2002; Immergluck & Mullen, 1998). As previously noted, if an SBA lending program alleviates market failure such as credit rationing, adverse selection, or moral hazard (Stiglitz & Weiss, 1981), then SBA lending will have a greater impact on LMI black or Hispanic counties. This study therefore also assesses whether the positive effects of SBA lending programs were greater

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[2] The 50% cutoff was also used to check for sensitivity. The results are reported in the section on robustness checks on page XX.

in LMI minority counties, particularly those where the proportion of the black or Hispanic population was higher:

(2) $\Delta \text{Emp}_{i, t} = \Delta \text{SBA}_{i, t-1}\beta_1 + \Delta \text{LMI}_{i, t-1}\beta_2 + \Delta \text{Black}_{i, t-1}\beta_3 + \Delta \text{Hispanic}_{i, t-1}\beta_4 + \Delta \text{SBA} \times \text{LMI}_{i, t-1}\beta_5 + \Delta \text{SBA} \times \text{LMI} \times \text{Black}_{i, t-1}\beta_6 + \Delta \text{SBA} \times \text{LMI} \times \text{Hispanic}_{i, t-1}\beta_7 + \Delta X_{i, t-1}\gamma + \Delta \mu_t + \Delta \varepsilon_{i t}$

where the variable SBA × LMI$_{i, t-1}$ is an interaction term that is equal to SBA lending times, and the dummy variables indicate the LMI counties. A positive and significant coefficient of SBA × LMI$_{i, t-1}$ indicates that SBA lending has a larger impact in LMI counties. The variable SBA × LMI × Black $_{i, t-1}$ is an interaction term that is equal to SBA lending times, with dummy variables indicating LMI county times and the proportion of the black population in a county. The variable SBA × LMI × Hispanic $_{i, t-1}$ indicates an interaction term that is equal to SBA lending times, with dummy variables indicating LMI county times and the proportion of Hispanic population in a county. A positive and significant coefficient of SBA× LMI × Black $_{i, t-1}$ or SBA × LMI × Hispanic $_{i, t-1}$ suggests that SBA lending has a larger impact in LMI counties with a higher proportion of black or Hispanic populations.

The instrumental variable and two-stage least squares estimates

The variable SBA may be influenced by local characteristics that are also associated with employment growth, and therefore endogeneity may be a concern when estimating the effects of SBA on employment (Cortes, 2010; Craig et al., 2007, 2008; Y. S. Lee, 2018). To address potential endogeneity in this study, I use the first-difference estimator to control for time-invariant characteristics that may have affected the outcome variables. The lagged variables are also used because past SBA loans may be more responsible for present employment than present

levels of SBA loans (Rupasingha & Wang, 2017). However, these strategies may not be sufficient to rule out a risk of endogeneity. For instance, the estimated effects of SBA loans on employment may be biased upward if prosperous counties see higher levels of entrepreneurial activity and more SBA loans. Conversely, if struggling counties see higher levels of SBA loans, then the estimated effects may be biased downward. Additionally, if the lagged SBA loans are correlated with the current SBA loans, a relationship between current employment and the lagged SBA lending activity can not be completely ruled out. Therefore, to further alleviate the endogeneity, this study uses a first-differenced two-stage least squares (2SLS) specification with years since interstate banking deregulation as the instrumental variable[3] (Y. S. Lee, 2018).

Banks in the U.S. were prohibited from establishing branches across state borders until the 1970s, and only decades have passed since states started to permit interstate banking, which allows banks to own and operate branches in more than one state (Davis & Katchova, 2020). This deregulation has provided more opportunities for commercial lending (Kroszner & Strahan, 1999). The areas that deregulated banking earlier therefore have more options for commercial lending, and this in turn could reduce the need to go through the bureaucracy of the SBA to secure government-guaranteed loans (Y. S. Lee, 2018).

Robustness Analysis

The results of two alternative empirical specifications are reported to check the robustness of the findings. First, this study uses the dollar value of SBA loans per business as another measure of SBA loans and tests whether an increasing dollar value of SBA loans per

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[3] This study also tested past SBA loans as an alternative instrumental variable. However, the results of the F-statistics on the estimators of the instrument were mostly less than 10. This means that past SBA loans were not valid as the instrumental variable because the F-statistics should be larger than 10 to ensure that the maximum bias in the instrumental variable estimators is less than 10% (Staiger & Stock, 1997).

business was positively associated with employment. Second, the effects of SBA loans on employment may differ between LMI and low-income counties. Therefore, the results using the 50% cutoff of median household income are also reported

3.4   Results

3.4.1   Descriptive Statistics

Table 3.3 presents the descriptive statistics for all the variables used in the study. The first column indicates the full sample, and the second and third columns represent the 2010 and 2016 samples, respectively. The last column shows the change in each variable between 2010 and 2016. Figures 3.1, 3.2, and 3.3 illustrate the trend in annual employment and the size of the SBA programs for all, LMI, and low-income counties, respectively.

The average employment rate in U.S. counties declined continuously from 56.3 percent in 2010 to 54.3 percent in 2014 but has shown signs of recovery since 2015. Despite a resilient economy in recent years, the employment rate of 54.5 percent in 2016 did not reach the 2010 level. As Figure 3.3 shows, LMI and low-income counties followed the national trends overall. However, their employment rates were much lower than the national average. The average employment rates for LMI counties were 51.2 percent in 2010 and 48.4 percent in 2016, a decrease of 2.8 percentage points. It is worth noting that annual employment rates for low-income counties were below 40% between 2010 and 2016. Low-income counties also experienced a 1.5 percentage point decline in their annual employment rates from 39.6 percent to 38.1 percent over the same period.

Table 3.3 shows that the total number of SBA loans decreased from 6.86 to 6.65 per 1,000 businesses between 2010 and 2016, while the total loan dollar value per business increased

over the same period. These figures suggest that the average dollar value per loan that small businesses borrowed through SBA programs, particularly the 7(a) program, increased. This increased dollar value per loan may be attributed to economic expansion during the post-recession era but is more likely to be the result of the new law, the Small Business Jobs Act of 2010[4], which increased the SBA's maximum loan guarantee to 90 percent for most 7(a) programs from $2 million to $5 million (Pub. L. 111-240).

As shown in Figures 3.2 and 3.3, between 2010 and 2016, the SBA lending activity for LMI counties was lower than the national average. Meanwhile, compared to LMI counties, low-income counties had substantially lower SBA loan volumes in terms of both the number of approved loans and their dollar value. Notably, the gap between LMI and low-income counties was most apparent in 2015, with 5.7 loans per 1,000 businesses for LMI counties compared to 2.8 per 1,000 businesses for low-income counties. The loan dollar value per business for LMI counties increased from $1,805 in 2010 to $2,671 in 2011 but experienced a decline in the years that followed before rebounding in 2015. Low-income counties followed a similar pattern except that they experienced a further decline in loan values in 2015 (see Figure 3.3).

Table 3.3 also shows the descriptive statistics for the other control variables. Between 2010 and 2016, the average proportion of LMI counties in the U.S. was 44 percent, and low-income counties accounted for 2 percent. Over the same period, the proportions of black and Hispanic populations increased slightly. In 2016, counties had, on average, 110 more small businesses than in 2010. However, the proportion of small businesses with 20 employees or less decreased slightly from 90 percent in 2010 to 89 percent in 2016.

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[4] On September 27, 2010, President Obama signed into law the Small Business Jobs Act to help small businesses continue to drive economic recovery and create jobs.

Table 3.3 Descriptive statistics

Variable	Mean (Std. Dev)			Change 2010-2016
	All Samples	2010 Samples	2016 Samples	
Employment (%)	55.16	56.29	54.52	-1.77
	(8.18)	(7.95)	(8.39)	
Number of SBA per 1,000 businesses	6.38	6.86	6.65	-0.21
	(10.35)	(9.78)	(9.56)	
Number of SBA 7(a) per 1,000 businesses	5.73	6.05	6.19	0.14
	(10.15)	(9.56)	(9.41)	
Number of SBA 504 per 1,000 businesses	0.65	0.81	0.45	-0.36
	(1.52)	(1.65)	(1.03)	
Dollar amount of SBA loans per business (in thousands)	2.42	1.99	2.99	1.00
	(6.29)	(3.25)	(11.73)	
Dollar amount of SBA 7(a) loans per business (in thousands)	2.04	1.61	2.68	1.07
	(6.12)	(3.04)	(11.68)	
Dollar amount of SBA 504 loans per business (in thousands)	3.84	0.39	0.31	-0.08
	(1.15)	(1.10)	(0.94)	
Low- and moderate- income (LMI)	0.44	0.46	0.42	-0.04
	(0.50)	(0.50)	(0.49)	
Black (%)	8.86	8.85	8.89	0.04
	(14.46)	(14.60)	(14.45)	
Hispanic (%)	8.33	7.83	8.95	1.12
	(13.23)	(12.87)	(13.60)	
Education	0.21	0.20	0.22	0.02
	(0.09)	(0.09)	(0.10)	
Population (log)	10.27	10.27	10.27	0.00
	(1.46)	(1.45)	(1.48)	
Location quotient for manufacturing	1.13	1.15	0.92	-0.23
	(0.66)	(0.68)	(0.50)	
Location quotient for retailers	0.94	0.99	0.58	-0.41
	(0.24)	(0.22)	(0.14)	
Location quotient for wholesales	1.11	0.86	2.84	1.98
	(0.79)	(0.39)	(0.65)	
Location quotient for service	0.82	0.87	0.48	-0.39
	(0.39)	(0.39)	(0.13)	
Firm size	0.89	0.90	0.89	-0.01
	(0.04)	(0.04)	(0.04)	
Small businesses (in thousands)	2.38	2.35	2.46	0.11
	(8.17)	(7.93)	(8.57)	
Deposit	12.39	12.36	12.40	0.04
	(3.22)	(3.16)	(3.40)	
Observations	25,109	3,136	3,140	-

Note: Employment is the average annual employment rate over our sample period, 2010-2016, in a county. LMI is a dummy variable equal to one, zero otherwise, if median household income in a county is less than 80% of the national median household income. Black (or Hispanic) represents the share of Black (or Hispanic) population in a county. Education is the share of population with a bachelor's degree or higher. A set of location quotient variables indicate how concentrated a particular industry in the local market. Firm size is the share of small businesses with 20 employees or less. Deposit is the log of the commercial banks' total deposit in a county.

Average Employment Rate of U.S. Counties, 2010-2016
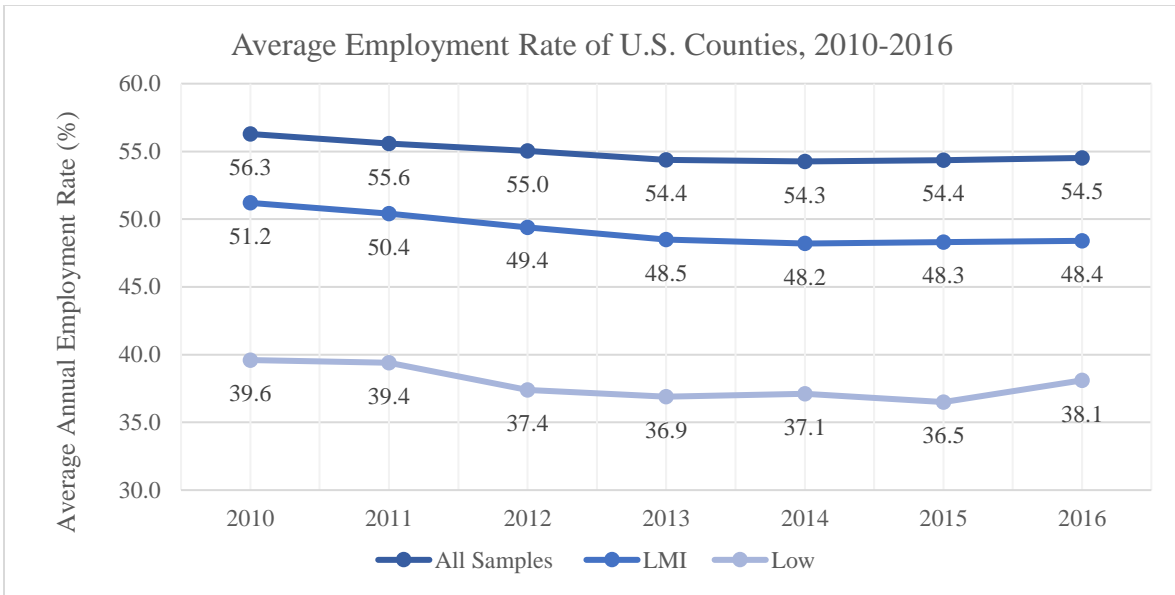
Source: Author's calculation derived from the 2010 Decennial Census and ACS 2011–2016

Figure 3.1 Average employment rate in U.S. counties, 2010–2016

The Number of Total SBA Loans per 1,000 Businesses
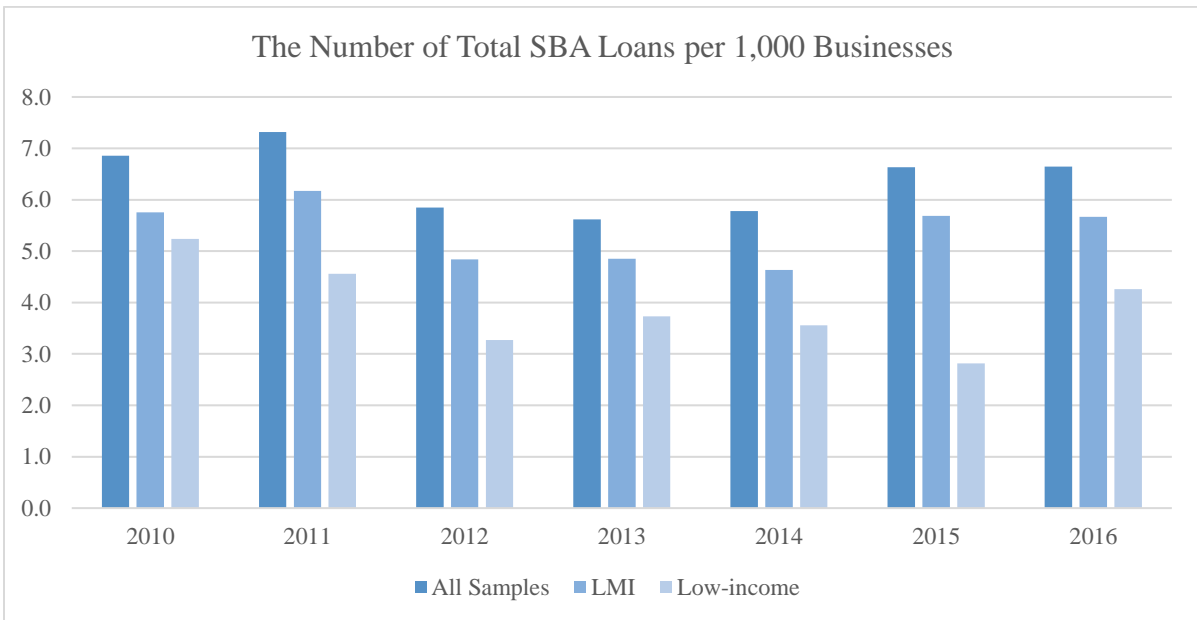
Source: Author's calculation derived from the Small Business Administration's database

Figure 3.2 Average number of SBA loans for LMI and low-income counties, 2010–2016

Figure 3.3 Dollar value of SBA loans for LMI and low-income counties, 2010–2016

3.4.2 Empirical Results

Table 3.4 presents the results of the effects of an increase in the number of SBA loans on employment, and Tables 3.5 and 3.6 indicate the results of the SBA 7(a) and 504 programs, respectively. In the tables, the first and third columns denote the OLS results, and the second and fourth column show the IV estimations. Because of space limitations, this study only reports the coefficients of the instrumental variable and the F-values for the first-stage regressions. As shown, the coefficients of the instrumental variable of years since interstate banking deregulation were negative and significant across all the models, suggesting that small businesses are less likely to go through the bureaucracy required to secure SBA loans if they have other commercial lending options. Furthermore, the F-values for the first stage pass the rule of thumb F > 10 very well, indicating that the IV is strong enough in terms of predictive power. All the models shared

control variables that measured the counties' socioeconomic characteristics, and the year-fixed effects were included.

The results of the total SBA loans (Table 3.4) were similar to those for the SBA 7(a) loans (Table 3.5) because the number of SBA 7(a) loans accounted for nearly 90% of the total SBA loans, and their dollar value constituted at least 80% of the total dollar value of the SBA loans over the study period. When discussing the results, this study therefore focused on SBA 7(a) and 504 loans. The results of the robustness checks on a number of different specifications are also reported in Tables 3.7, 3.8, 3.9, and 3.10.

Main results: The effects of SBA loans on employment

The results of the IV analysis in Tables 3.4 and 3.5 clearly indicate that the estimated coefficients of the SBA loans were negative and statistically significant. This implies that an increase in SBA loans, particularly 7(a) loans, in non-LMI counties, was negatively associated with employment. While there may be various reasons for the association of a decrease in employment with an increase in SBA loans, capital–labor substitution is one possible mechanism behind these findings (Higgins et al., 2020). In other words, if capital and labor are substitutes, small businesses that can substitute capital for labor may increase their capital and lower employment. Notwithstanding, even if small businesses that receive SBA loans expand their businesses and increase employment, the aggregate employment effect at a county level may be attenuated or even negative if there are negative spillover effects on competing small businesses (Brown & Earle, 2017). It is also possible that SBA loans may crowd out commercial lending. If so, there would be little capital addition in the area. In that case, even if SBA loans have positive

effects on employment, these effects may be attenuated or turn out to be negative at a county aggregate level.

This study finds some evidence that employment growth was negatively associated with LMI, black, and Hispanic counties, which is not surprising because lower employment has been an issue in these communities for a long time. For example, column 4 in Table 3.5 shows that the employment rate for LMI counties was 0.4 percentage points lower than that for non-LMI counties. However, the positive and significant coefficient of SBA7a × LMI indicates that SBA 7(a) loans had a positive effect on employment in LMI counties, with one increase in SBA 7(a) loans per 1,000 businesses increasing the employment rate by 0.09 percentage points. The difference in employment rates between LMI and non-LMI counties was therefore narrowed down to 0.31 percentage points. The results also reveal that LMI counties where the proportion of the black population was higher had an additional employment gain of 0.02 percentage points. These findings are consistent with the credit-rationing argument that less developed financial markets, such as minority-concentrated neighborhoods, receive relatively higher benefits as a result of governmental interventions in small business credit markets (Stiglitz & Weiss, 1981).

Nevertheless, the results of the effects of SBA 504 loans on employment were somewhat different from those of SBA 7(a) loans. While the employment effects of SBA 7(a) loans (shown in Table 3.5) were negative in non-LMI counties, columns 2 and 4 in Table 3.6 demonstrate that the employment rate increased by 0.25–0.26 percentage points with one increase in the number of SBA 504 loans per 1,000 businesses in these counties. Furthermore, column 4 in Table 3.6 shows that the employment rate in LMI counties was 0.18 percentage points lower than that in non-LMI counties, but SBA loans reduced the gap by increasing the employment rate by 0.24 percentage points for every 504 loan per 1,000 businesses in LMI counties. The positive

employment effects of the SBA 504 loan program may be due to its emphasis on community development through employment. Indeed, the 504 program requires small businesses that use 504 funds to create or retain at least one job for every $65,000 guaranteed by the SBA. However, the results indicate that the SBA 504 loans did not have an additional employment effect in LMI black or Hispanic counties.

Table 3.4 Changes in U.S. counties' employment rate associated with the number of SBA loans per 1,000 businesses

VARIABLES	(1) OLS	(2) IV	(3) OLS	(4) IV
Number of total SBA loans per 1,000 businesses (SBA)	-0.00**	-0.15***	-0.00	-0.16***
	(0.00)	(0.02)	(0.00)	(0.02)
Black (%)	-0.04	-0.06*	-0.04	0.01
	(0.03)	(0.03)	(0.03)	(0.02)
Hispanic (%)	-0.08***	-0.01	-0.08***	0.04
	(0.03)	(0.07)	(0.03)	(0.04)
Low moderate income (LMI)	0.04	-0.04	0.05	-0.78***
	(0.05)	(0.08)	(0.06)	(0.11)
SBA × LMI			-0.00	0.15***
			(0.01)	(0.01)
SBA × LMI × Black			0.01	0.02**
			(0.01)	(0.01)
SBA × LMI × Hispanic			-0.01	0.01
			(0.01)	(0.02)
Education	-1.22	-0.11	-1.23	0.70
	(1.45)	(2.45)	(1.45)	(2.47)
Population (log)	-3.64**	1.46	-3.60**	0.46
	(1.36)	(2.26)	(1.35)	(1.65)
Manufacturing	0.26**	0.16	0.26**	0.29
	(0.12)	(0.36)	(0.12)	(0.38)
Retailers	-0.06	0.26	-0.06	0.24
	(0.19)	(0.32)	(0.19)	(0.30)
Wholesales	-0.01	-0.08	-0.01	-0.12
	(0.09)	(0.12)	(0.08)	(0.11)
Services	0.11	-0.13	0.11	-0.11
	(0.11)	(0.16)	(0.11)	(0.13)
Number of small businesses (in thousands)	0.43***	0.32***	0.43***	0.33***
	(0.11)	(0.08)	(0.11)	(0.08)
Firm size	-3.95	0.41	-3.92	-1.40
	(2.72)	(2.71)	(2.71)	(2.69)
Bank deposit (log)	0.01	-0.01	0.01	-0.01
	(0.01)	(0.02)	(0.01)	(0.02)
Year-fixed effects	Y	Y	Y	Y
Observations	18,821	18,821	18,821	18,821
R-squared	0.39	–	0.39	–
Instrumental variable – log years of interstate banking deregulation				
First-stage coefficient		-3.42***		-3.22***
		(0.27)		(0.25)
First-stage F statistic		164.30		161.78

Note: The table reports first-difference estimates in columns (1) and (3), and first-differenced 2SLS estimates in columns (2) and (4). Dependent variable is the number of SBA loans per 1,000 businesses. Black (or Hispanic) represents the share of Black (or Hispanic) population in a county. LMI is a dummy variable equal to one, zero otherwise, if median household income in a county is less than 80% of the national median household income, and the variables of interests are a set of interaction variables. Robust standard errors clustered at the state level are shown in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 3.5 Changes in U.S. counties' employment rate associated with the number of SBA 7(a) loans per 1,000 businesses

VARIABLES	(1) OLS	(2) IV	(3) OLS	(4) IV
Number of SBA 7(a) loans per 1,000 businesses (SBA7a)	-0.00**	-0.10***	-0.00	-0.10***
	(0.00)	(0.01)	(0.00)	(0.01)
Black (%)	-0.04	-0.04	-0.04	0.00
	(0.03)	(0.03)	(0.03)	(0.02)
Hispanic (%)	-0.08***	-0.03	-0.08***	0.01
	(0.03)	(0.04)	(0.03)	(0.03)
Low moderate income (LMI)	0.04	-0.01	0.05	-0.40***
	(0.05)	(0.07)	(0.05)	(0.07)
SBA7a × LMI			-0.00	0.09***
			(0.01)	(0.01)
SBA7a × LMI × Black			0.01	0.02**
			(0.01)	(0.01)
SBA7a × LMI × Hispanic			-0.00	0.00
			(0.01)	(0.01)
Education	-1.21	0.24	-1.22	0.57
	(1.45)	(1.96)	(1.45)	(1.95)
Population (log)	-3.64***	0.69	-3.61**	0.08
	(1.36)	(1.55)	(1.36)	(1.21)
Manufacturing	0.26**	0.16	0.26**	0.25
	(0.12)	(0.26)	(0.12)	(0.26)
Retailers	-0.06	0.16	-0.06	0.15
	(0.19)	(0.24)	(0.19)	(0.24)
Wholesales	-0.01	-0.05	-0.01	-0.06
	(0.09)	(0.10)	(0.09)	(0.09)
Services	0.11	-0.03	0.11	-0.01
	(0.11)	(0.12)	(0.11)	(0.11)
Number of small businesses (in thousands)	0.43***	0.32***	0.43***	0.33***
	(0.11)	(0.08)	(0.11)	(0.08)
Firm size	-3.95	-0.65	-3.92	-1.68
	(2.71)	(2.29)	(2.70)	(2.30)
Bank deposit (log)	0.01	-0.01	0.01	-0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Year-fixed effects	Y	Y	Y	Y
Observations	18,821	18,821	18,821	18,821
R-squared	0.39	–	0.39	–
Instrumental variable – log years of interstate banking deregulation				
First-stage coefficient		-5.45***		-5.29***
		(0.27)		(0.25)
First-stage F statistic		359.75		440.79

Note: The table reports first-difference estimates in columns (1) and (3), and first-differenced 2SLS estimates in columns (2) and (4). Dependent variable is the number of SBA 7(a) loans per 1,000 businesses. Black (or Hispanic) represents the share of Black (or Hispanic) population in a county. LMI is a dummy variable equal to one, zero otherwise, if median household income in a county is less than 80% of the national median household income, and the variables of interests are a set of interaction variables. Robust standard errors clustered at the state level are shown in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 3.6 *Changes in U.S. counties' employment rate associated with the number of SBA 504 loans per 1,000 businesses*

VARIABLES	(1) OLS	(2) IV	(3) OLS	(4) IV
Number of SBA 504 loans per 1,000 businesses (SBA504)	0.00	0.26***	-0.01	0.25***
	(0.01)	(0.01)	(0.01)	(0.01)
Black (%)	-0.04	-0.01	-0.04	-0.01
	(0.03)	(0.02)	(0.03)	(0.02)
Hispanic (%)	-0.08***	-0.04	-0.08***	-0.04
	(0.03)	(0.03)	(0.03)	(0.03)
Low moderate income (LMI)	-0.04	-0.03	-0.04	-0.18***
	(0.05)	(0.06)	(0.06)	(0.06)
SBA504 × LMI			0.01	0.24***
			(0.02)	(0.02)
SBA504 × LMI × Black			0.08	0.08
			(0.06)	(0.06)
SBA504 × LMI × Hispanic			-0.04	-0.05
			(0.04)	(0.04)
Education	-1.21	0.83	-1.20	0.39
	(1.44)	(1.54)	(1.45)	(1.61)
Population (log)	-3.69***	-0.62	-3.69***	-0.61
	(1.36)	(1.00)	(1.37)	(0.99)
Manufacturing	0.26**	0.17	0.26**	0.19
	(0.12)	(0.13)	(0.12)	(0.13)
Retailers	-0.07	-0.01	-0.08	-0.01
	(0.19)	(0.19)	(0.19)	(0.19)
Wholesales	-0.00	0.01	-0.01	0.03
	(0.09)	(0.09)	(0.09)	(0.09)
Services	0.11	0.15	0.11	0.15
	(0.11)	(0.14)	(0.11)	(0.12)
Number of small businesses (in thousands)	0.43***	0.34***	0.43***	0.34***
	(0.11)	(0.08)	(0.11)	(0.09)
Firm size	-4.03	-2.43	-4.03	-2.21
	(2.71)	(2.15)	(2.75)	(2.24)
Bank deposit (log)	0.01	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Year-fixed effects	Y	Y	Y	Y
Observations	18,821	18,821	18,821	18,821
R-squared	0.39	–	0.39	–
Instrumental variable – log years of interstate banking deregulation				
First-stage coefficient		-2.03***		-2.06***
		(0.03)		(0.03)
First-stage F statistic		460.44		517.89

Note: The table reports first-difference estimates in columns (1) and (3), and first-differenced 2SLS estimates in columns (2) and (4). Dependent variable is the number of SBA 504 loans per 1,000 businesses. Black (or Hispanic) represents the share of Black (or Hispanic) population in a county. LMI is a dummy variable equal to one, zero otherwise, if median household income in a county is less than 80% of the national median household income, and the variables of interests are a set of interaction variables. Robust standard errors clustered at the state level are shown in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Alternative empirical specification and Small Business Administration lending measures

This section delineates robustness checks undertaken in this study. First, using the dollar value of SBA loans as another measure of SBA loans, Tables 3.7 and 3.8 present the results of whether an increasing dollar value of SBA loans per business is positively associated with employment. As shown in the tables, this study finds consistent evidence of the effects of SBA loans measured either as the number of loans or the loan dollar value. All the control variables and year-fixed effects were included but not reported. Overall, this study finds consistent evidence across all the different model specifications.

Table 3.7 shows that employment rates decreased as the dollar value of SBA 7(a) loans per business increased in non-LMI counties. The results also reveal that while the employment rates for LMI counties were 0.41 percentage points lower than those for non-LMI counties, a $1,000 increase in per business SBA 7(a) loans increased employment rates by 0.27 percentage points. The gap between LMI and non-LMI counties was therefore reduced to 0.14 percentage points. This study further finds that LMI black counties had additional employment effects as the dollar value of SBA 7(a) loans increased. However, the coefficient of SBA7a × LMI × Hispanic is negative and significant, which indicates a decrease in the employment effects for LMI counties with a higher proportion of Hispanics.

Similar to the results of the number of SBA 504 loans measure, Table 3.8 shows that SBA 504 loan value had a positive effect on employment in both LMI and non-LMI counties. Specifically, a $1,000 increase per business SBA 504 loan increased employment rates by 0.34 percentage points in non-LMI counties and 0.36 percentage points in LMI counties. However, the findings also revealed that an increase in SBA 504 loans had no additional effect on employment in LMI counties with a higher proportion of black or Hispanic populations.

Table 3.7 Changes in U.S. counties' employment rate associated with the dollar value of SBA 7(a) loans

VARIABLES	(1) OLS	(2) IV	(3) OLS	(4) IV
Dollar amount (in thousands) of SBA7a loans per businesses (SBA7a)	-0.00	-0.26***	0.01	-0.28***
	(0.00)	(0.03)	(0.01)	(0.02)
Black (%)	-0.04	-0.05	-0.04	-0.02
	(0.03)	(0.03)	(0.03)	(0.03)
Hispanic (%)	-0.08***	-0.07*	-0.08***	-0.02
	(0.03)	(0.04)	(0.03)	(0.03)
Low moderate income (LMI)	0.04	0.01	0.08	-0.41***
	(0.05)	(0.07)	(0.06)	(0.07)
SBA7a × LMI			-0.02*	0.27***
			(0.01)	(0.02)
SBA7a × LMI × Black			0.01***	0.01***
			(0.00)	(0.00)
SBA7a × LMI × Hispanic			-0.01***	-0.01***
			(0.00)	(0.00)
Controls	Y	Y	Y	Y
Year-fixed effects	Y	Y	Y	Y
Observations	18,821	18,821	18,821	18,821
R-squared	0.38	–	0.39	–
Instrumental variable – log years of interstate banking deregulation				
First-stage coefficient		-2.03***		-1.86***
		(0.17)		(0.12)
First-stage F statistic		135.43		256.44

Note: The table reports first-difference estimates in columns (1) and (3), and first-differenced 2SLS estimates in columns (2) and (4). Dependent variable is the dollar value of the SBA 7(a) loans per business. Black (or Hispanic) represents the share of Black (or Hispanic) population in a county. Low is a dummy variable equal to one, zero otherwise, if median household income in a county is less than 50% of the national median household income, and the variables of interests are a set of interaction variables. Control variables include education, population, location quotients for manufacturing, retailers and wholesalers, firm size, number of small businesses and commercial banks' deposit. Robust standard errors clustered at the state level are shown in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 3.8 Changes in U.S. counties' employment rate associated with the dollar value of SBA 504 loans

VARIABLES	(1) OLS	(2) IV	(3) OLS	(4) IV
Dollar amount (in thousands) of SBA504 loans per businesses (SBA504)	-0.00	0.35***	0.00	0.34***
	(0.01)	(0.02)	(0.01)	(0.01)
Black (%)	-0.04	-0.01	-0.04	-0.01
	(0.03)	(0.02)	(0.03)	(0.02)
Hispanic (%)	-0.08***	-0.05	-0.08***	-0.04
	(0.03)	(0.03)	(0.03)	(0.03)
Low moderate income (LMI)	-0.04	-0.02	-0.05	-0.13**
	(0.05)	(0.06)	(0.06)	(0.06)
SBA504 × LMI			-0.02	0.36***
			(0.02)	(0.03)
SBA504 × LMI × Black			0.00	0.00
			(0.00)	(0.00)
SBA504 × LMI × Hispanic			0.00	0.00
			(0.00)	(0.00)
Controls	Y	Y	Y	Y
Year-fixed effects	Y	Y	Y	Y
Observations	18,821	18,821	18,821	18,821
R-squared	0.38	–	0.39	–
Instrumental variable – log years of interstate banking deregulation				
First-stage coefficient		-1.51***		-1.53***
		(0.03)		(0.02)
First-stage F statistic		339.52		531.13

Note: The table reports first-difference estimates in columns (1) and (3), and first-differenced 2SLS estimates in columns (2) and (4). Dependent variable is the dollar amount of SBA 504 loans per business. Black (or Hispanic) represents the share of Black (or Hispanic) population in a county. Low is a dummy variable equal to one, zero otherwise, if median household income in a county is less than 50% of the national median household income, and the variables of interests are a set of interaction variables. Control variables include education, population, location quotients for manufacturing, retailers and wholesalers, firm size, number of small businesses and commercial banks' deposit. Robust standard errors clustered at the state level are shown in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Second, the economic conditions in LMI counties may differ from those in low-income counties. In accordance with the HUD definition, this study defined low-income communities as those with 50% or less of the median household income for the area. Tables 3.9 and 3.10 show the results of the employment effects of SBA loans measured as the number of SBA loans per 1,000 businesses and the dollar value of loans per business in low-income counties, respectively. In both tables, the first two columns represent SBA 7(a) loans, and the third and fourth columns indicate SBA 504 loans.

Based on the IV estimates in column 2, Table 3.9 shows that increasing the number of SBA 7(a) loans had a negative effect in non-low-income counties but a positive effect in low-income counties. As indicated in Table 3.5, this study finds that the employment effect of SBA 7(a) loans was positive for black LMI counties. However, column 2 in Table 3.9 confirms that SBA 7(a) loans did not have an effect on black low-income counties. In terms of the effects of SBA 504, contrary to the findings in Table 3.6, column 4 in Table 3.9 shows that an increasing number of SBA 504 loans in black or Hispanic low-income counties had a positive effect on employment.

Table 3.9 Changes in U.S. counties' employment rate associated with the number of SBA loans

VARIABLES	SBA 7(a)		SBA 504	
	(1) OLS	(2) IV	(3) OLS	(4) IV
Number of SBA loans per 1,000 businesses (SBA)	-0.01**	-0.09***	0.00	0.26***
	(0.00)	(0.01)	(0.01)	(0.01)
Black (%)	-0.04	-0.02	-0.04	-0.01
	(0.03)	(0.03)	(0.03)	(0.02)
Hispanic (%)	-0.08***	-0.02	-0.08***	-0.04
	(0.03)	(0.04)	(0.03)	(0.03)
Low income (Low)	-0.03	-0.43	-0.05	-0.02
	(0.29)	(0.27)	(0.32)	(0.31)
SBA*Low	-0.00	0.09***	0.13**	-0.06
	(0.02)	(0.02)	(0.05)	(0.06)
SBA*Low*Black	0.00	0.00	0.00*	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)
SBA*Low*Hispanic	-0.00	-0.00	0.02***	0.01***
	(0.00)	(0.00)	(0.00)	(0.00)
Controls	Y	Y	Y	Y
Year-fixed effects	Y	Y	Y	Y
Observations	18,821	18,821	18,821	18,821
R-squared	0.09	–	0.09	–
Instrumental variable – log years of interstate banking deregulation				
First-stage coefficient		-5.54***		-2.03***
		(0.28)		(0.03)
First-stage F statistic		379.83		467.25

Note: The table reports first-difference estimates in columns (1) and (3), and first-differenced 2SLS estimates in columns (2) and (4). Dependent variable is the number of SBA 7(a) loans per 1,000 businesses in columns (1) and (2), and the number of SBA 504 loans per 1,000 businesses in columns (3) and (4). Black (or Hispanic) represents the share of Black (or Hispanic) population in a county. Low is a dummy variable equal to one, zero otherwise, if median household income in a county is less than 50% of the national median household income, and the variables of interests are a set of interaction variables. Control variables include education, population, location quotients for manufacturing, retailers and wholesalers, firm size, number of small businesses and commercial banks' deposit. Robust standard errors clustered at the state level are shown in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 3.10 illustrates the effects of the increasing dollar value of SBA loans per business on employment. Similar to the findings in Table 3.9, the employment effects of SBA 7(a) loans were positive for low-income counties, particularly where the proportion of the black population was higher, as indicated in column 2. The results also suggest that employment increased with every $1,000 increase in SBA 504 loans per business in low-income counties where the proportion of the Hispanic population was higher, which is consistent with the findings in Table 3.9.

Table 3.10 Changes in U.S. counties' employment rate associated with the dollar value of SBA loans

	SBA 7(a)		SBA 504	
	(1)	(2)	(3)	(4)
VARIABLES	OLS	IV	OLS	IV
Dollar amount (in thousands) of SBA loans per	-0.00	-0.26***	-0.00	0.35***
business	(0.00)	(0.03)	(0.01)	(0.02)
Black (%)	-0.04	-0.05	-0.04	-0.01
	(0.03)	(0.03)	(0.03)	(0.02)
Hispanic (%)	-0.08***	-0.06*	-0.08***	-0.05
	(0.03)	(0.04)	(0.03)	(0.03)
Low income (Low)	0.02	-0.53**	-0.06	0.04
	(0.30)	(0.23)	(0.32)	(0.33)
SBA*Low	-0.01*	0.25***	0.06***	0.24***
	(0.01)	(0.03)	(0.01)	(0.02)
SBA*Low*Black	0.01***	0.01**	0.01*	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
SBA*Low*Hispanic	-0.01**	-0.01***	0.01***	0.01***
	(0.00)	(0.00)	(0.00)	(0.00)
Controls	Y	Y	Y	Y
Year-fixed effects	Y	Y	Y	Y
Observations	18,821	18,821	18,821	18,821
R-squared	0.09	–	0.09	–
Instrumental variable – log years of interstate banking deregulation				
First-stage coefficient		-2.03***		-1.51***
		(0.17)		(0.03)
First-stage F statistic		141.02		343.21

Note: The table reports first-difference estimates in columns (1) and (3), and first-differenced 2SLS estimates in columns (2) and (4). Dependent variable is the dollar value of the SBA 7(a) loans per business in columns (1) and (2), and the dollar value of the SBA 504 loans per business in columns (3) and (4). Black (or Hispanic) represents the share of Black (or Hispanic) population in a county. Low is a dummy variable equal to one, zero otherwise, if median household income in a county is less than 50% of the national median household income, and the variables of interests are a set of interaction variables. Control variables include education, population, location quotients for manufacturing, retailers and wholesalers, firm size, number of small businesses and commercial banks' deposit. Robust standard errors clustered at the state level are shown in parentheses, *** p<0.01, ** p<0.05, * p<0.1

3.5   Discussion

There is a general consensus that gaps exist with respect to access to financial capital for small businesses in different communities. In particular, small businesses in lower-income communities and/or those with a higher proportion of minorities are more likely to face credit rationing in the financial market, which justifies the existence of government-guaranteed lending programs such as SBA loans. Accordingly, using data from the SBA's small business lending programs and the seven-year county panels from 2010 to 2016, this study tests whether SBA lending had a larger impact on counties with lower incomes and/or where the proportion of the black or Hispanic population was higher.

Overall, this study finds that an increase in SBA loans had a positive effect on employment in underserved communities, which suggests that capital and labor are gross complements rather than substitutes. However, when examining the effects of SBA lending by program and counties' race and income demographics, there is some heterogeneity across counties. Specifically, the effects of an increase in SBA 7(a) loans are negative for non-LMI counties but positive for LMI counties, particularly where the proportion of the black population is higher. There is no effect on LMI counties where the proportion of the Hispanic population was higher. However, unlike with SBA 7(a) loans, an increase in SBA 504 loans has a positive effect on employment in both LMI and non-LMI counties although the findings show no additional employment gains from SBA loans in LMI counties where the proportion of the black or Hispanic population was higher.

This study also investigates whether counties with a greater volume of SBA 504 loans, which place emphasis on employment growth and job retention, experience better economic outcomes. The analysis indicates that there were larger employment effects as a result of SBA

504 loans than SBA 7(a) loans. For example, in LMI counties, the employment rate increased by 0.24 percentage points for every 504 loan per 1,000 businesses and by 0.09 percentage points for every 7(a) loan per 1,000 businesses. Moreover, a $1,000 increase in SBA 504 loan value per business increased employment rates by 0.36 percentage points, while the same value increase in SBA 7(a) loans increased the employment rate by 0.27 percentage points in LMI counties. Given that SBA 504 loans are used to finance commercial real estate and large equipment, and SBA 7(a) loans are intended to finance working capital, from a policy perspective, the findings indicate that loans for larger items such as machinery and plants are more likely to influence employment. Furthermore, the evidence regarding the effects of SBA loans is mostly consistent across the different model specifications for the various robustness checks.

This study contributes to the literature by (1) adding more community characteristic dimensions such as race, (2) providing a richer assessment of SBA lending by separately estimating the effects of SBA loans by program, and (3) updating the previous results in the literature that focused on the 1990s and 2000s. However, the results presented herein should be interpreted with some caution due to several limitations. First, this study reveals that the responses of communities to capital inflow were heterogeneous but did not test the mechanism underlying these findings. For example, why does the SBA 7(a) program have a positive effect on LMI counties but not non-LMI counties? Why does the SBA 504 program have a positive effect on employment for both LMI and non-LMI counties? Moreover, why do LMI black counties see positive impacts but LMI Hispanic counties do not? The answers to these questions remain unknown or are inconclusive although they are important for policymakers to better design guaranteed loan policies. Future research should therefore aim to provide more insights into this issue by examining the mechanisms underlying the different community responses to

SBA loans. Second, the empirical strategy of this study assumes that the effects of increasing

SBA lending would be linear. However, communities may not respond to capital inflows until

they reach a certain level. It is also possible that there may be diminishing returns on the amount

of capital flowing into counties (Patrick, 2016), suggesting that the effects may be nonlinear.

From a policy perspective, therefore, understanding this mechanism may help determine the

most efficient allocation of scarce government resources. Third, this study did not investigate the

effects of SBA loans by industry. This was primarily due to data constraints and the difficulty

with constructing a balanced region–industry-level SBA loan panel. However, the impact of

SBA loans on employment could differ by industry. It would therefore be valuable to identify

which industries derive greater benefit from SBA loans and thus contribute to local economic

growth. Lastly, the study results present county-level findings. However, if the impact of SBA

loans is examined at an individual firm level, the results may change (Y. S. Lee, 2018). I hope

this study offers a clearer understanding of the effects of SBA programs on different

communities and assists policy makers in tailoring SBA programs based on communities'

characteristics.

4 INTRAMETROPOLITAN PATTERNS OF SMALL BUSINESS LENDING UNDER THE COMMUNITY REINVESTMENT ACT: A REGRESSION DISCONTINUITY DESIGN ANALYSIS

Abstract

The Community Reinvestment Act (CRA) is a 1977 federal law that encourages depository institutions to meet the credit needs of low- to moderate-income (LMI) neighborhoods whose median family income is less than 80% of the area's median family income. By taking advantage of this 80% or less income threshold, this study uses regression discontinuity design to examine how the CRA influences the Small Business Administration (SBA)'s lending activity in LMI neighborhoods, with a special focus on geographic distribution. Using seven metropolitan areas that represent America's urban areas in numerous ways, this study compares SBA lending activity between neighborhoods that are just below and just above the income threshold for CRA designation and finds little evidence that the CRA increases SBA lending in LMI neighborhoods. However, when exploring the effects of CRA coverage by metropolitan ring, the findings indicate the positive effects of the CRA for inner-ring suburbs but little effect for central city and outer-ring suburbs, while there were some variations across different metropolitan areas. Further distinguishing the effects by SBA program—SBA 504 vs. 7(a)—shows that the CRA has a positive effect on SBA 504 lending but not on 7(a) lending. Taken together, the overall results suggest that the CRA has insignificant or (at best) a modest impact on SBA lending in LMI neighborhoods.

Keywords: Community Reinvestment Act, low income, moderate income, central city, inner-ring suburbs, outer-ring suburbs

4.1 Introduction

The Community Reinvestment Act (CRA) was established in 1977 to address the credit needs of borrowers in low- and moderate-income (LMI) areas, including traditionally excluded minority communities. The legislation, although well intended, has been a source of contention since its enactment (Bates & Robb, 2015). Supporters of the Act note that the CRA has made wealth building more accessible for minority and LMI borrowers by increasing their access to credit and that it supports neighborhood revitalization in its intended communities (Avery & Brevoort, 2015; Ding et al., 2018). However, critics of the CRA argue that competition in credit markets, technological changes, and market restructuring have driven out discriminatory practices, and therefore the increased access to credit for minority and LMI borrowers cannot be solely attributed to the CRA (Getter, 2020).

A substantial volume of literature has sought to evaluate whether the CRA has adequately addressed the need for credit—mostly mortgage lending versus business lending—in LMI and minority communities. Notwithstanding, a limited number of studies focus on the effects of the CRA on small business lending, and this research has developed along three lines of study. The first group of studies, which examine whether the CRA has alleviated racial disparities in loan outcomes (Bates et al., 2018; Canner, 1999; Immergluck, 2002; Mijid & Bernasek, 2013), finds that, even though the CRA has positive impacts on the availability of loans, neighborhoods with a higher proportion of minorities receive, on average, fewer small business loans than white neighborhoods. The second line of study focuses on examining the geographic distribution of loans, particularly within metropolitan areas (Canner, 1999; Immergluck, 2002; Smith, 2003). These studies generally find substantial variations in small business lending with higher lending rates in central cities than in suburbs, in middle- and higher-income neighborhoods than in

lower-income areas, and in white neighborhoods versus minority neighborhoods. The third line of study investigates the broader impacts of the CRA on loan outcomes, such as the dollar value or number of small business loans in the market as a whole (Bostic & Lee, 2017; Ding et al., 2018; Zinman, 2002). Using more rigorous methodologies such as a regression discontinuity (RD) design or difference-in-difference analysis, these studies suggest that the effects of the CRA can vary slightly according to the conditions each community faces, with a generally positive effect on small business lending.

The current literature on this topic provides a number of insights into the overall effects of the CRA on small business loans in the market, but we still know little about how the CRA influences government-guaranteed small business lending even though there are reasons to believe it does. The 7(a) and 504 loan programs of the Small Business Administration (SBA) are the largest government-guaranteed small business lending programs and can be used to generate working capital, refinance debt, or buy a business, real estate, or equipment. Bank loans with SBA guarantees have the potential to receive CRA consideration either as loans to small businesses or as community development loans, and banks are incentivized to use SBA lending because the CRA statute requires federal banking regulators to consider a bank's CRA record when it applies for permission to expand. Furthermore, for banking institutions, SBA lending may be more attractive than other private loan products when making loans to small businesses with a higher risk of default because they can mitigate the risk at least for the guaranteed portion of the loan.

A few studies examine the geographic distribution of small business lending under the CRA, but they are relatively dated (Canner, 1999; Immergluck, 2002; Smith, 2003). Many neighborhoods in the U.S. have recently undergone large-scale urban redevelopment projects,

which have resulted in substantial economic and social changes (Meltzer, 2016). The demographic landscape has also changed as middle- and high-income households have returned to cities, and low-income groups have moved to suburban neighborhoods (Ehrenhalt, 2012; Frey, 2003; Hanlon, 2009; Singer, 2005). Given this context, it may be reasonable to expect that recent patterns in small business lending may differ from those observed more than a decade ago.

This study therefore investigates the effects of the CRA on SBA lending with a focus on geographic distribution. Using seven metropolitan areas that represent America's urban areas in numerous ways, this study specifically seeks to answer the following questions:

1) Do CRA-eligible neighborhoods have a higher number of SBA loans than CRA-ineligible neighborhoods?

2) How does SBA lending activity differ within and across metropolitan statistical areas (MSAs)?

From a methodological viewpoint, this study is most closely related to that of Bostic and Lee (2017), which examined the broader impact of the CRA on small business lending in the market by applying an RD design. Although this study uses a similar methodology, it differs in two important ways. First, this study only focuses on SBA-guaranteed loans rather than all loan products covered by the CRA. Since SBA-guaranteed loans differ from other private loans in many respects and only account for a small portion of the loans covered by the CRA, there is no reason to expect that the patterns observed in Bostic and Lee's (2017) research will hold in this study. Second, this study examines SBA lending activities within metropolitan areas instead of exploring the national pattern. While using a national sample has the advantage of providing an understanding of the broader picture of small business lending across the country, it does not help identify the trends at a neighborhood level. When there are substantial variations in

economic development levels within a metropolitan area, examining the intrametropolitan patterns of small business lending can offer potential implications for planners and policymakers.

The balance of the chapter is organized as follows: Section 4.2 explores how the CRA works with a focus on its mission, regulatory framework, and eligibility criteria, and further briefly reviews the literature on the effects of the CRA on small business lending. A discussion regarding how the CRA can influence SBA lending activity follows. Section 4.3 describes the study area, and Section 4.4 discusses data, and methodology used in this study. Section 4.5 then examines the study findings on whether the effects of the CRA on SBA-guaranteed small business lending vary across and within the selected sample metropolitan areas. A summary of the major findings, potential policy implications, and limitations of this study are delineated in Section 4.6.

4.2   Background and Literature

4.2.1   Community Reinvestment Act

This section briefly explores how the CRA works using information derived mostly from Bostic and Canner (1998). Historically, many commercials banks and thrifts were thought to accept deposits from households and firms in inner cities while primarily lending and investing them elsewhere. These disinvestment activities were thought to have contributed to the decline of many urban areas, and several scholars suggested alleviating financial capital barriers as a strategy for community revitalization (Bates, 2010; Porter, 1995). In 1977, the CRA was signed into law in response to concerns about the redlining of low-income areas and market failures in low-income communities. The legislation encourages federally insured banking institutions to help meet the credit needs of borrowers in all segments of the communities within their service

areas, particularly historically underserved lower-income communities. Although not explicitly covered by the CRA, minority communities have been the subject of considerable concern with regard to these issues because race/ethnicity intertwines with income in many cases.

For the purpose of enforcement, all depository institutions except for credit unions, including banks and savings and loans, are regulated by three[5] (formerly four) federal agencies (i.e., the Office of the Comptroller of the Currency, Federal Reserve System, and the Federal Deposit Insurance Corporation) are periodically evaluated and receive CRA compliance ratings. However, finance companies and other nondepository small business lenders (including newer fintech lenders that are not regulated depositories) are not covered by CRA. The CRA requires federal banking regulators to consider a bank's CRA compliance rating when determining whether to approve the institution's application for the opening or closing of a bank branch and mergers with, or acquisitions of, other banks. This regulatory framework has provided incentives for banking institutions to expand their services to LMI and minority neighborhoods (Getter, 2020).

The CRA has traditionally focused on mortgage lending, but the regulatory reforms of 1995 expanded its coverage to small business lending because lending to small businesses was also thought to be critical for vital and viable communities. The CRA defines small business lending as loans of less than $1,000,000 granted for business purposes and/or loans made to businesses with less than $1,000,000 in revenue (Zinman, 2002), and LMI areas are defined at a census tract level. Accordingly, the CRA counts a loan as an LMI loan if it is to a business

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[5] After the foreclosure crisis, the Office of Thrift Supervision was folded into the Office of the Comptroller of the Currency via the Dodd Frank Act of 2010. It ceased operating in 2011.

located in a census tract where the median family income is less than 80 percent of the median family income in the surrounding MSA.

4.2.2   *The Impacts of the CRA on Small Business Lending*

There is considerably less literature on the CRA's impact on small business lending than on the legislation's impact on mortgage lending (Ding et al., 2018). Table 4.1 summarizes the key literature on small business lending discussed in this section. Existing studies on small business lending have, for the most part, developed into three lines of study. The first line of research examines whether the CRA has alleviated the need for credit in minority neighborhoods. Although the CRA does not explicitly target small businesses in minority neighborhoods, many studies argue that the disparate treatment of minorities in the financial market is intertwined with income (Bates et al., 2018; Canner, 1999; Immergluck, 2002; Mijid & Bernasek, 2013). The CRA has improved credit access in minority neighborhoods (Bates & Robb, 2015, 2016).

The second line of research investigates the geographic distribution of small business loans (Canner, 1999; Immergluck, 2002; Smith, 2003). In 1997, banks and thrifts reported approximately the same number of loans per small business in both central cities and suburbs (Canner, 1999). However, when the tracts were subdivided by income category, the low- and moderate-income neighborhoods in both cities and suburbs fared poorly. In central cities, the small business lending rate was 42 percent higher for upper-income neighborhoods than for low-income neighborhoods. Similarly, in the suburbs, upper-income neighborhoods had a 45 percent higher rate than lower-income neighborhoods. Canner (1999) also found that minority tracts received fewer loans than white tracts. Smith (2003) analyzed the distribution of Chicago area

small business finance using the 2001 CRA small business lending data. The findings showed significant variations in lending within the Chicago area. Overall, most business and small business loans were concentrated in the denser, older parts of the six-county area, while the highest levels of per business lending occurred in the rapidly growing suburban fringe. However, the loan availability and the sizes of the loans were far lower in the LMI and minority neighborhoods, particularly in the black tracts, than in the middle- and upper-income and predominately white areas. Immergluck (2002) found similar small business lending patterns in the Philadelphia area. The average number of loans per 100 businesses for predominately white census tracts was more than almost two times higher than for predominately Hispanic census tracts and 10 times higher than for black census tracts. This pattern was also confirmed in Immergluck's (2002) regression analysis after controlling for firm density, firm size, industrial mix, neighborhood income, and the credit quality of local firms.

The third line of research documents the causal effects of the CRA on small business lending outcomes for the market as a whole. Zinman (2002) employed a difference-in-difference analysis using the CRA reforms that took effect in 1996 as a policy shock. His findings indicated that banks facing binding CRA incentives increased their small business lending by approximately 12 to 15 percent, and the number of firms holding debt increased by around 15 percent in counties with affected banks. Additionally, he finds that this increased access to credit brought benefits to the affected counties with an increase in payroll and a significant decrease in bankruptcy. More recent attempts to evaluate the effectiveness of the CRA on small business lending are found in Bostic and Lee (2017) and Ding et al., (2018). While many studies have used an RD design to examine the effects of the CRA on mortgage lending (Avery, Calem, & Canner, 2003; Berry & Lee, 2007; Fitzgerald & Vitello, 2014; Gabriel & Rosenthal, 2008),

Bostic and Lee (2017)'s study is the first to apply this method to estimate the effects of the CRA on small business lending. Using the CRA data from 1996 to 2015, Bostic and Lee (2017) find that the CRA tends to increase small business loans in targeted areas. This was particularly notable during the times of economic growth from 1996 to 2002 and 2012 to 2015. However, the CRA also decreased small business lending during the economic downturn from 2003 to 2011. In addition to confirming that banking institutions responded strategically to the CRA, Bostic and Lee (2017)'s study indicates that macroeconomic condition can swamp the specific social incentives the CRA provides. Ding et al. (2018) also examined the effects of the CRA on small business lending. Significantly, taking advantage of the 2013 changes in the definition of MSAs that altered CRA eligibility for nearly 1,000 tracts across the county, the authors employ a difference-in-difference design to further investigate whether the effects differed between newly ineligible neighborhoods and newly eligible neighborhoods. Their findings suggest that the CRA generally increased credit to small business in lower-income areas, but the effects were greater in those tracts that had lost CRA eligibility than those that had newly become CRA-eligible.

Table 4.1 Summary of the key literature on the effects of the CRA on small business lending

Author (year)	Research Question	Data	Method	Results
Zinman (2002)	Does the CRA increase credit to small businesses?	CRA data (1993-1998) County-level	Difference-in-difference analysis	CRA increases credit to small businesses
Bostic & Lee (2017)	Does the CRA increase credit to small businesses?	CRA data (1996-2015)	Regression discontinuity design	CRA has positive effects, but macroeconomic market conditions swamp any incentives the CRA provides
Ding et al., (2018)	Does the CRA increase credit to small businesses?	CRA data	Difference-in-difference analysis	CRA increases the number of loans. Losing CRA eligibility status has a relatively larger effect on small business lending, while the effects of gaining CRA eligibility are less pronounced
Bates & Robb (2016)	Examines the impacts of owner race and geographic context on access to small business financing	Kauffman Firm Survey (2004-2011)	Logistic regression analysis	Firm location in a minority or inner-city neighborhood has no impact on loan availability or size. But, owner race/ethnicity is important.
Bates & Robb (2015)	Compares access to bank loans in minority neighborhoods to those in non-minority neighborhoods	Kauffman Firm Survey (2004-2011)	Logistic regression analysis	CRA has positive effects on loan availability, but racial disparity in loan outcome still exists.
Canner (1999)	Examines the distribution of small business lending by the degree of urbanization, income, and minority composition	CRA data (1996-1997)	OLS regression	Low- and moderate- income neighborhoods in both cities and suburbs fare poorly
Immergluck (2002)	Examines the geographic distribution of small business lending in the Philadelphia MSA	CRA data (1998)	Spatial lag model – IV estimation	African American tracts receive fewer loans than White tracts
Smith (2003)	Examines that the distribution of small business lending in Chicago area	CRA data (2001)	Explanatory study	Loan availability and the size of loans were far lower in LMI and minority neighborhoods, particularly African American tracts, than middle- and upper-income and predominately whites areas

4.2.3   *The CRA and SBA-guaranteed lending*

The literature discussed above provides some insights into the overall impact of the CRA on small business lending in the market (Bates & Robb, 2015; Bostic & Lee, 2017; Ding et al., 2018; Zinman, 2002). To the best of my knowledge, however, no study has been done on the effects of the CRA on government-guaranteed lending to date—although there are reasons to believe that the CRA may increase the reliance of banks' government-guaranteed lending because bank loans with SBA guarantees offer some benefits.

First, bank loans with SBA guarantees have the potential to receive CRA consideration as either loans to small businesses or community development loans. For example, under the large bank test, institutions receive CRA consideration for business loans less than $1,000,000 (Office of the Comptroller of the Currency [OCC], 2014). Loans exceeding $1,000,000 may also qualify as community development loans if the purpose of the loan meets the CRA definition of community development (OCC, 2014). Second, the SBA guarantee mitigates the risk of the borrower's default, at least for the guaranteed portion of the loan. The guarantee can therefore be attractive when making a loan to small businesses in LMI or minority neighborhoods where bankers are generally highly averse to lending. Moreover, the guaranteed portion of SBA loans can be sold into secondary markets, which allows banks to make additional profits depending on the rate and maturity of the loan and the market conditions at the time of sale (OCC, 2014).

4.3 Study Area Context

This study focuses on the seven metropolitan areas that were consistently ranked as the 10 largest metropolitan areas between 2010 and 2016 in terms of the number of establishments. The seven study areas included Atlanta–Sandy Springs–Roswell in the state of Georgia; Chicago–Naperville–Elgin in the states of Illinois–Indiana–Wisconsin; Los Angeles–Long Beach–Anaheim in California; Miami–Fort Lauderdale–West Palm Beach in Florida; New York–Newark–Jersey City in New York–New Jersey–Pennsylvania; Philadelphia–Camden–Wilmington in Pennsylvania–New Jersey–Delaware–Maryland; and Washington–Arlington–Alexandria in the District of Columbia–Victoria–Maryland–West Virginia. To examine the effects of the CRA on small business lending within, as well as across, the seven metropolitan areas, this study divides each metropolitan area into a central city, inner-ring suburbs, and outer-ring suburbs based on the divisions indicated in prior studies (Jeong & Liu, 2019; S. Lee & Leigh, 2007; Liu & Painter, 2012). A central city refers to the oldest neighborhoods in the region, inner-ring suburbs are defined as older suburbs or first-ring suburbs, and outer-ring suburbs denote relatively new suburbs (Leigh & Lee, 2005). As shown in Table 4.2, the median age of the housing stocks in the central cities in this study are the oldest, and the housing stocks in the inner-ring suburbs were built later than those in the central cities but earlier than those in the outer-ring suburbs. Specifically, this study designated the District of Columbia, the City of Chicago, the City of Atlanta, the City of Miami, New York City, the City of Philadelphia, and the City of Los Angeles as the central cities according to the principal city definition of the Office of Management (2015). The spatial boundaries of the inner-ring suburbs were delineated using the first suburb methodology based on the age of the housing stock, the location, and the population (Puentes & Warren, 2006). The outer-ring suburbs comprise the balance of the

metropolitan region. Figure 4.1 identifies the central cities, inner-ring suburbs, and outer-ring suburbs of the seven metropolitan areas.

Table 4.2 The median years houses were built in each metropolitan area

	Central city	Inner-ring	Outer-ring
Atlanta	1967	1979	1991
Chicago	1947	1960	1974
Los Angeles	1953	1960	1971
Miami	1965	1971	1980
New York	1948	1955	1965
Philadelphia	1947	1960	1973
Washington, DC	1951	1968	1984

Note: Author's calculation using the 2010 Decennial Census and the 2011–2016 American Community Survey data

These seven metropolitan areas represent America's urban areas in many ways, but they differ in terms of spatial structure, economic growth patterns, and business environments, including access to financial capital. First, the spatial structure of the metropolitan areas in the U.S. falls broadly into two categories: urban sprawl or compact city. Among the seven metropolitan areas, some are sprawled out, and some are built in compact ways. According to the *Measuring Sprawl 2014* report by Smart Growth America, New York is the most compact metropolitan area in the U.S., whereas Atlanta was the second most sprawling area (Ewing & Hamidi, 2014). The list of highly compact areas included Chicago and Los Angeles, while the modestly compact areas included Miami, Philadelphia, and Washington DC (Ewing & Hamidi, 2014).

Second, the growth patterns for cities and suburbs vary by each metropolitan area. In all the metropolitan areas except Miami, city growth exceeded suburban growth between 2011 and 2012 (Frey, 2019). However, there were only three metropolitan areas (i.e., Washington, Miami, and Los Angeles) where the cities grew faster than the suburbs between 2017 and 2018. Over the

same period, New York, Philadelphia, and Atlanta showed higher growth in the suburbs than in the cities, while Chicago reported negative growth in both the city and suburbs (Frey, 2019).

Third, the growth of SBA loans and CRA LMI tracts also varies across and within metropolitan areas. As Table 4.3 illustrates, the number of SBA loans per 1,000 businesses was higher in the central cities than the inner- or outer-ring suburbs in many metropolitan areas. In Chicago, for example, the central city had a higher number of SBA loans, both SBA 7(a) and SBA 504, per 1,000 businesses than the suburbs in 2010 and 2016, with the exception of SBA 504 loans in 2016. In the Atlanta and Los Angeles areas, the average number of SBA 7(a) loans per 1,000 businesses was also higher in the central cities, whereas the average number of SBA 504 loans per 1,000 businesses was lower in the central cities than in the suburbs. However, interestingly, in the Philadelphia and Washington, DC, areas, the outer-ring suburbs had the highest volume of SBA loans per 1,000 businesses, while in Miami, the inner-ring suburbs had the highest number of SBA 7(a) loans per 1,000 businesses.

While the volume of SBA 504 loans declined in most metropolitan areas, particularly in the suburbs, between 2010 and 2016, the volume of SBA 7(a) loans per 1,000 businesses increased in the outer-ring suburbs of the Atlanta, Chicago, Los Angeles, and Miami metropolitan areas. For example, the average number of SBA 7(a) loans per 1,000 businesses in the outer-ring suburbs doubled from 2.94 to 5.90 in Miami and increased by 91.67 percent, 74.71 percent, and 47.56 percent for the Atlanta, Los Angeles, and Chicago areas, respectively.

As shown in Table 4.3, across the seven metropolitan areas, the share of CRA-eligible census tracts was highest in the central cities, followed by the inner-ring suburbs, then the outer-ring suburbs. However, all central cities in the seven metropolitan areas experienced a decline in the proportion of CRA-eligible tracts. There was a 21.09 percent decline in Miami, an 18.89 percent

decline in Washington, DC, a 9.05 percent decline in Atlanta, an 8.66 percent decline in

Philadelphia, a 2.88 percent decline in New York and Los Angeles, and a 0.35 percent decline in

Chicago.

Table 4.3 The growth in SBA loans and CRA designations by area, 2010–2016

City	SBA Loan/ CRA	Central City			Inner-Ring suburbs			Outer-Ring Suburbs		
		2010	2016	%Change	2010	2016	%Change	2010	2016	% Change
Atlanta	Total SBA	0.77	1.16	50.65%	0.79	1.06	34.18%	0.61	1.07	75.41%
	SBA 7(a)	7.09	10.87	53.30%	6.84	9.91	44.88%	5.16	9.89	91.67%
	SBA 504	0.64	0.74	15.63%	1.05	0.71	-32.38%	0.98	0.77	-21.43%
	% of CRA	66.22	60.23	-9.05%	37.77	40.25	6.57%	27.63	19.82	-28.27%
Chicago	Total SBA	0.85	0.84	-1.18%	0.61	0.72	18.03%	0.59	0.79	33.90%
	SBA 7(a)	7.03	7.68	9.25%	6.29	6.29	0.00%	4.5	6.64	47.56%
	SBA 504	1.48	0.73	-50.68%	0.95	0.95	0.00%	1.44	1.27	-11.81%
	% of CRA	62.53	62.31	-0.35%	27.75	29.99	8.07%	22.86	21.09	-7.74%
Los Angeles	Total SBA	0.94	1.37	45.74%	0.93	1.28	37.63%	0.80	1.20	50.00%
	SBA 7(a)	8.12	12.43	53.08%	7.46	11.53	54.56%	6.09	10.64	74.71%
	SBA 504	1.28	1.30	1.56%	1.80	1.31	-27.22%	1.90	1.34	-29.47%
	% of CRA	55.89	54.28	-2.88%	34.46	34.67	0.61%	12.86	16.12	25.35%
Miami	Total SBA	0.51	0.58	13.73%	0.45	0.70	55.56%	0.40	0.66	65.00%
	SBA 7(a)	1.01	0.81	-19.80%	3.28	5.96	81.71%	2.94	5.90	100.68%
	SBA 504	4.06	4.97	22.41%	1.22	1.02	-16.39%	1.05	0.65	-38.10%
	% of CRA	85.71	67.65	-21.07%	41.92	38.50	-8.16%	27.42	27.53	0.40%
New York	Total SBA	0.49	0.55	12.24%	0.45	0.67	48.89%	0.48	0.67	39.58%
	SBA 7(a)	4.34	5.19	19.59%	4.14	6.43	55.31%	4.31	6.31	46.40%
	SBA 504	0.53	0.30	-43.40%	0.40	0.26	-35.00%	0.53	0.37	-30.19%
	% of CRA	49.60	48.17	-2.88%	32.89	32.80	-0.27%	10.54	15.13	43.55%
Philadelphia	Total SBA	0.48	0.91	89.58%	0.50	0.80	60.00%	0.68	0.91	33.82%
	SBA 7(a)	4.64	8.85	90.73%	4.55	7.69	69.01%	6.02	8.67	44.02%
	SBA 504	0.16	0.27	68.75%	0.41	0.35	-14.63%	0.82	0.44	-46.34%
	% of CRA	78.06	71.30	-8.66%	19.57	21.16	8.12%	11.01	9.69	-11.99%
District of Columbia	Total SBA	0.47	0.60	27.66%	0.50	0.58	16.00%	0.68	0.68	0.00%
	SBA 7(a)	3.96	5.54	39.90%	4.49	5.44	21.16%	5.69	6.31	10.90%
	SBA 504	0.71	0.48	-32.39%	0.55	0.35	-36.36%	1.09	0.47	-56.88%
	% of CRA	61.29	49.71	-18.89%	34.43	33.27	-3.37%	18.57	20.66	11.25%

Note: SBA statistics indicate that the average number of SBA loans per 1,000 businesses in a census tract, and the % of CRA represents the share of CRA eligible tract.

Washington-Arlington-Alexandria, DC-VA-MD-WV

Chicago-Naperville-Elgin, IL-IN-WI

Atlanta-Sandy Springs-Roswell, GA

Miami-Fort Lauderdale-West Palm Beach, FL

Legend
- Central city
- Inner-ring suburbs
- Outer-ring suburbs
- County boundary
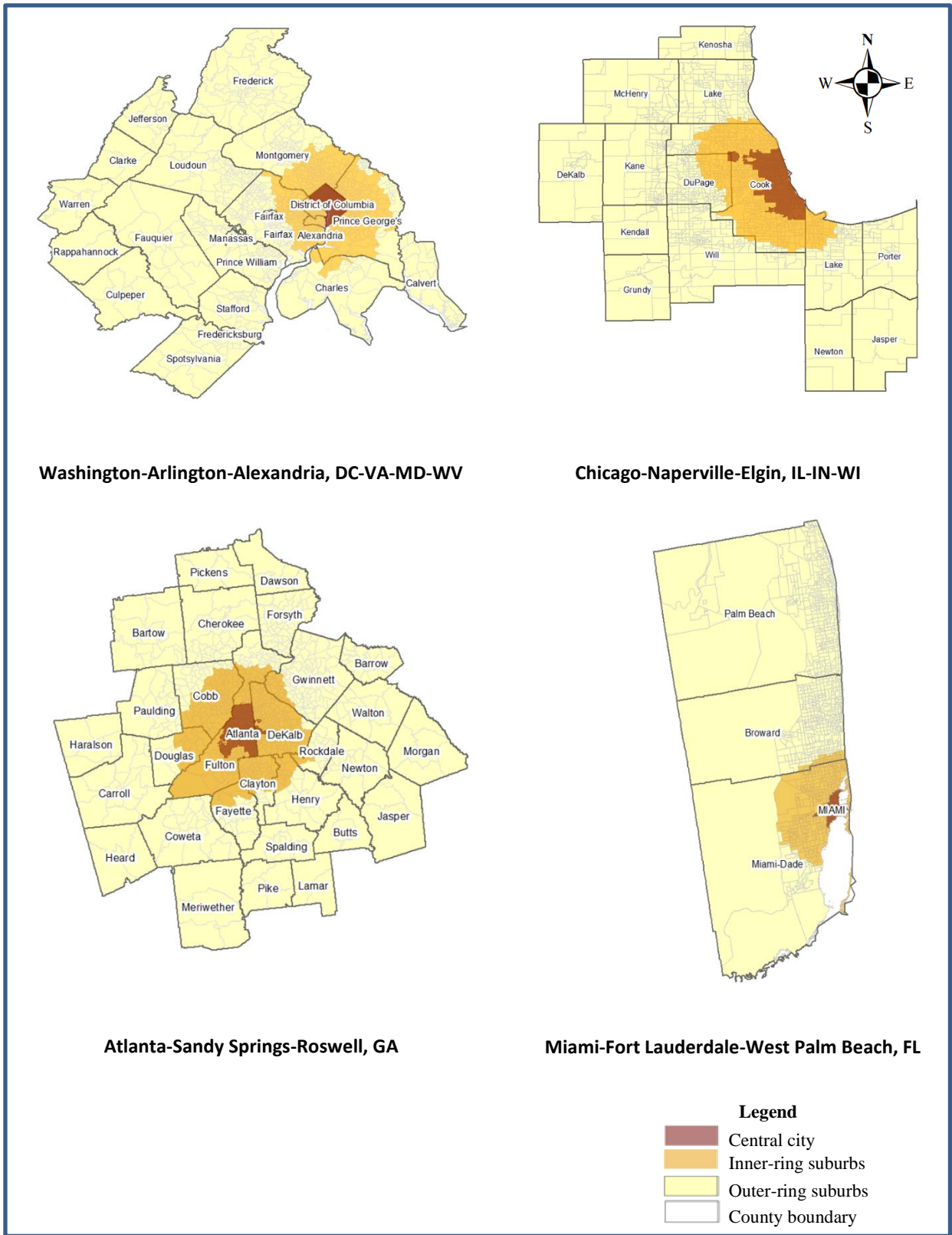
Figure 4.1 Ring delineation for the seven metropolitan statistical areas

New York-Newark-Jersey City, NY-NJ-PA

Legend
- Central city
- Inner-ring suburbs
- Outer-ring suburbs
- County boundary

Philadelphia-Camden-Wilmington, PA-NJ-DE-MD

Los Angeles-Long Beach-Anaheim, CA

Figure 4.1 (continued)

4.4   Data and Methodology

4.4.1   Data

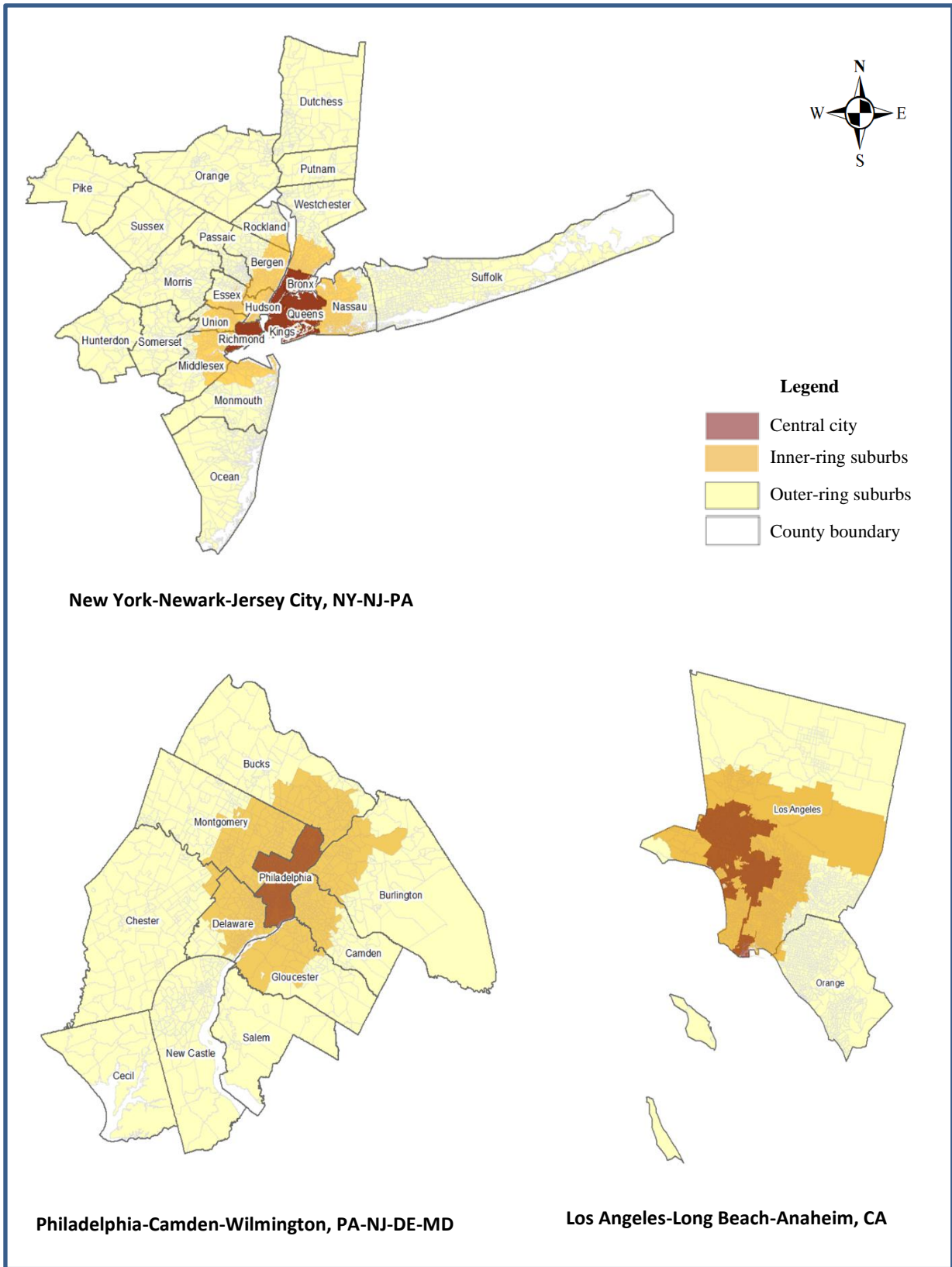This paper set up a panel data set for the years 2010 to 2016, where the main unit of observation is the census tract year. The data on SBA-guaranteed 7(a) and 504 loans were obtained from the SBA. The individual SBA loans data include a rich set of variables, such as the loan amount, loan date, North American Industry Classification System (NAICS) code, lender information, and the precise location of each business for Geographic Information System (GIS) analysis. Using the census geocoding service of "Address Batch," the individual loan data were aggregated at a census tract level. The market-level deposit and bank branch data are taken from the Federal Deposit Insurance Corporation (FDIC)'s Summary of Deposits database. Additionally, the data on neighborhood characteristics were obtained from various sources, including the U.S. Decennial Census, American Community Survey (ACS), and County Business Pattern (CBP).

4.4.2   Methodology

A regression discontinuity (RD) design is a quasi-experimental design that evaluates the impact of an intervention or a treatment by comparing observations just above and below the threshold. The RD design has the advantage of yielding an unbiased estimate of local treatment effect as good as a randomized experiment when properly implemented and analyzed (Cattaneo, Titiunik, & Vazquez-Bare, 2017; Lee & Lemieux, 2010). The CRA has a clear eligibility threshold: census tracts with a median family income less than 80 percent of the MSA median family income qualify as LMI areas and are targeted by banks. Therefore, to examine the effects of the CRA on SBA lending, this study uses an RD design in line with several papers in the

literature that used this approach to assess the CRA's impacts (Avery et al., 2003; Berry & Lee, 2007; Bostic & Lee, 2017; Fitzgerald & Vitello, 2014; Gabriel & Rosenthal, 2008).

The model is specified as follows:

$$y_{ijk} = \beta_1 \, CRA_{ijk} + \beta_2 \, \text{Central city}_{ij} + \beta_3 \, \text{Inner-ring}_{ij} + \beta_4 \, CRA \times \text{Central city}_{ijk} + \beta_5 \, CRA \times$$

$$\text{Inner-ring}_{ijk} + \gamma \, X_{ijk-1} + \alpha_j + \omega_k + \varepsilon_{ijk}$$

where y_{ijk} is the number of SBA-guaranteed loans per 1,000 businesses[6] and includes both the 7(a) and 504 loans in census tract i in the MSA j in year k. CRA_{ijk} is an indicator that is equal to 1 if a census tract i in the MSA j is a CRA-eligible neighborhood in year k, and the indicator is otherwise equal to 0. Central city$_{ij}$ equals to one if a census tract i is a central city of the MSA j. Inner-ring$_{ij}$ equals to one if a census tract i is inner-ring suburbs of the MSA j. The variable CRA $\times$ Central city$_{ijk}$ is an interaction term that is equal to CRA indicator times, and the dummy variables indicate the central city. The variable CRA $\times$ Inner-ring$_{ijk}$ is an interaction term that is equal to CRA indicator times, and the dummy variables indicate the inner-ring suburbs. All the covariates are included in X_{ijk-1}. The model also includes the MSA fixed effects (α_j) and the year fixed effects (ω_k) to control for any year- and location-specific heterogeneities.

The RD design assumes that observations just above and just below the thresholds are continuous in terms of all the characteristics, with the exception of CRA designation (Fitzgerald & Vitello, 2014). The threshold is the median family income ratio of the census tract to that of the MSA. For brevity, this study refers to this threshold as the median family income ratio (MFI). This suggests that any discontinuity between census tracts where the median household income is barely less than 80 percent of the MSA and census tracts where the median income is

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[6] Some studies employed the dollar value of SBA loans as a measure of SBA lending activities (Bostic & Lee, 2017). This study, however, prefers the number of SBA loans over the dollar amount because the aim of this study is to evaluate whether the CRA increased the availability of SBA loans.

barely higher than 80 percent of the MSA can be attributed to a causal effect of the CRA. The MFI was used to test several bandwidths[7] that measured the size of the sample interval around the prediction point (Berry & Lee, 2007; Bostic & Lee, 2017; Cattaneo et al., 2017; Fitzgerald & Vitello, 2014; Gabriel & Rosenthal, 2008). The treatment group consists of the census tracts designated as CRAs, and the control group is comprised of the non-CRA designated census tracts within the seven MSAs. The outcome of interest is government-guaranteed small business lending, which was calculated as the number of SBA-guaranteed small business loans per 1,000 businesses in a census tract.

In RD design, including variables other than the MFI is not necessary to obtain correct estimates under the continuity assumption (Lee & Lemieux, 2010). However, this study includes several predetermined covariates to help control for any observable differences between the census tracts, improve the precision of the estimations, and investigate the plausibility of the RD design (Berry & Lee, 2007; Cattaneo et al., 2017; Fitzgerald & Vitello, 2014; Lee & Lemieux, 2010). Therefore, in line with previous studies (Avery et al., 2003; Berry & Lee, 2007; Bostic & Lee, 2017; Fitzgerald & Vitello, 2014; Gabriel & Rosenthal, 2008), the covariates that the author includes in this study are the total number of businesses, the share of small businesses, and the sector composition to measure the size and structure of local businesses. The number of bank branches and market-level deposit data are also included because a higher number of bank branches or higher deposit values could increase access to financial capital in the local market. The neighborhood characteristics included education, black share, Hispanic share, vacancy rate, and homeownership rate. Detailed descriptions of all the variables are presented in Table 4.4.

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[7] In RD design, a larger bandwidth induced by including observations more distant from the thresholds increases bias but reduces variance because the number of observations is larger. On the other hand, a smaller bandwidth reduces bias but at the cost of precision (Cattaneo, Idrobo, & Titiunik, 2018). For this reason, the choice of bandwidth requires a "bias–variance" trade-off (Cattaneo et al., 2018, p. 45).

Table 4.4 Variable descriptions

Variable	Description	Source
Dependent variables		
Total SBA	The number of total SBA loans per 1,000 businesses in each census tract	Small Business Administration
SBA 7(a)	The number of SBA 7(a) loans per 1,000 businesses in each census tract	
SBA 504	The number of SBA 504 loans per 1,000 businesses in each census tract	
Key independent variable		
CRA	An indicator variable equal to 1 if a census tract is eligible for the CRA; otherwise, 0	
Central city	An indicator variable equal to 1 if a census tract is a central city of the MSA; otherwise, 0	
Inner-ring	An indicator variable equal to 1 if a census tract is inner-ring suburbs of the MSA; otherwise, 0	
Other controls		
Total businesses (log)	The total number of businesses in a census tract	County Business Pattern 2010-2016
Share of businesses with employees 20 or less	The share of firms with 20 employees or less	
Share of retail	The share of employees working in the retail/trade sector	2010 Decennial Census; 2011–2016 American Community Survey
Share of transportation	The share of employees working in the transportation and warehousing sectors	
Share of service	The share of employees working in the accommodation and food service sectors	
Share of bachelor's degree or above	The share of the population over the age of 25 with at least four years of college education	
Black share	The share of the black population	
Hispanic share	The share of the Hispanic population	
Ownership rate	The share of homeowners	
Vacancy rate	The share of vacant housing units	
Number of bank branches (log)	The total number of FDIC-insured bank branches	Federal Deposit Insurance Corporation
Total bank deposits (log)	The total dollar value of FDIC-insured bank deposits	

4.5   Results

4.5.1   Descriptive Statistics

Table 4.5 presents the descriptive statistics for SBA lending and the other covariate variables used in the analysis. The first column shows the mean value for all the census tracts in the seven metropolitan areas. The second and third columns represent the mean value for the census tracts just below (0.7–0.8) and just above (0.8–0.9) the LMI threshold, respectively.

The number of SBA loans per 1,000 businesses was higher in the census tracts just below the threshold than in those just above the threshold. This indicates that CRA-eligible tracts have a higher volume of SBA loans per 1,000 businesses than CRA-noneligible tracts, which suggests that the difference in loan outcomes may be attributable to the CRA. Moreover, it is worth noting that the number of SBA 7(a) loans per 1,000 businesses was approximately 7 times higher than the number of SBA 504 loans per 1,000 businesses. This is probably because SBA 7(a) can be used more generally than SBA 504. Notably, the SBA 7(a) program is used to finance working capital and to buy businesses, real estate, or equipment, whereas the SBA 504 program is limited to financing major fixed assets such as land, existing buildings, and facilities. To account for the differences between the programs, this study estimates the effects of the CRA on SBA lending for both the SBA 7(a) and 504 programs.

Table 4.5 shows that the CRA-eligible tracts had fewer businesses but a higher share of businesses with 20 employees or less than the CRA-noneligible tracts, although the difference was small. There was also a small difference in the share of businesses in the retail, transportation, and service sectors between the CRA-eligible and CRA-noneligible tracts. However, the CRA-eligible tracts tend to have a higher share of black or Hispanic populations and slightly lower values for the indicators representing the neighborhood's socioeconomic status, such as the college graduate rate, homeownership rate, number of bank branches, or total bank deposit value. The CRA-eligible group accounts for 32.8 percent in the central cities, 39.0 percent in the inner-ring suburbs, and 28.2 percent in the outer-ring suburbs. On the other hand, the CRA-noneligible group constitutes 28.5 percent in the central cities, 36.5 percent in the inner-ring suburbs, and 35.0 percent in the outer-ring suburbs.

Table 4.5 Descriptive statistics for SBA lending and the other covariate variables

Variable	All samples	MFI Ratio Bin [0.7, 0.8]	MFI Ratio Bin [0.8, 0.9]
Number of all SBA loans per 1,000 businesses	0.698 (0.516)	0.741 (0.552)	0.732 (0.542)
Number of 7a loans per 1,000 businesses	6.107 (4.665)	6.404 (4.927)	6.345 (4.917)
Number of 504 loans per 1,000 businesses	0.875 (1.439)	1.001 (1.534)	0.972 (1.545)
Total number of businesses (log)	4.461 (0.814)	4.312 (0.734)	4.385 (0.753)
Share of firm with employees 20 or less	0.879 (0.045)	0.878 (0.480)	0.877 (0.048)
Share of retail industry	0.107 (0.045)	0.115 (0.445)	0.113 (0.044)
Share of transportation industry	0.056 (0.039)	0.066 (0.039)	0.063 (0.039)
Share of service industry	0.092 (0.052)	0.105 (0.054)	0.099 (0.050)
Share of bachelor's degree or above	0.332 (0.176)	0.252 (0.123)	0.282 (0.127)
Black share	0.187 (0.272)	0.229 (0.279)	0.188 (0.253)
Hispanic share	0.248 (0.257)	0.345 (0.260)	0.305 (0.283)
Ownership rate	0.591 (0.268)	0.486 (0.203)	0.551 (0.202)
Vacancy rate	0.089 (0.080)	0.094 (0.065)	0.879 (0.066)
Number of bank branches (log)	0.694 (0.450)	0.607 (0.400)	0.650 (0.416)
Total bank deposits (log)	10.720 (1.930)	10.477 (1.783)	10.604 (1.823)
Income ratio	1.073 (0.522)	0.750 (0.029)	0.850 (0.029)
Central city	0.276 (0.447)	0.328 (0.470)	0.285 (0.451)
Inner ring	0.350 (0.477)	0.390 (0.488)	0.365 (0.482)
Outer ring	0.375 (0.484)	0.282 (0.450)	0.350 (0.477)
N	105,055	8,753	9,105

4.5.2   Testing the Identification Assumption

This section describes the tests conducted to determine whether all the tract
characteristics affecting SBA lending (other than CRA-eligibility status) changed smoothly
across the threshold because this is the core assumption of the RD design. As discussed, the
results of the descriptive statistics presented in Table 4.5 highlight the differences between the
CRA-eligible and CRA-noneligible tracts for some characteristics. However, they do not reveal
obvious discontinuity at the threshold. This study therefore tests the assumption using both
graphical and statistical analyses. Figure 4.2 plots the predicted values from a regression of the
number of SBA loans per 1,000 businesses on the set of one-year lagged tract characteristics
listed in Table 4.2. Each data point shown in Figure 4.2 represents the mean of the predicted
values for the tracts, and the lines in each panel represent the cubic fits through the points,

separately estimated on either side of the 0.8 threshold. While most baseline covariates evolved smoothly through the cutoff, some required further statistical investigation to reach a formal conclusion. Table 4.6 presents the results of an identification test for all the covariates in Figure 4.2. No statistically significant difference between the census tracts just below and above the threshold for all the covariates gives credence to the RD design. The results show that all 95% robust confidence intervals contained 0, with p-values ranging from 0.187 to 0.995. In other words, there is no empirical evidence that, at the cutoff, the CRA-eligible and CRA-noneligible tracts differed systematically for these covariates.
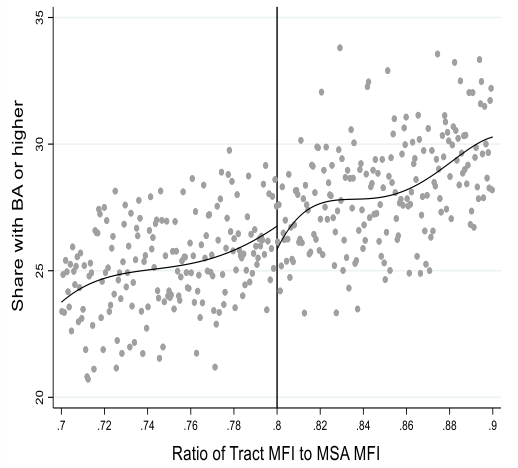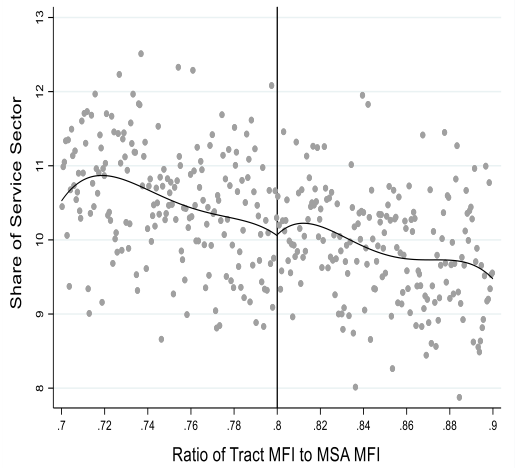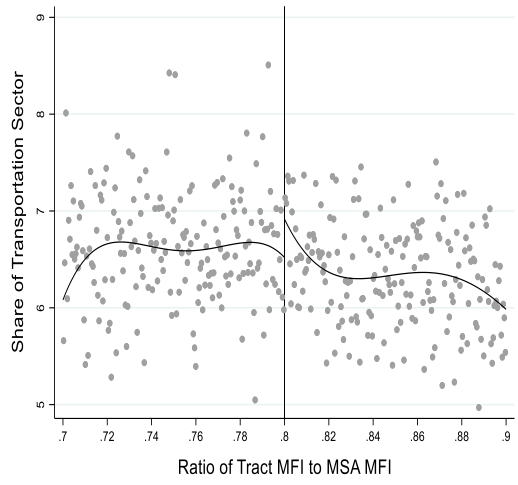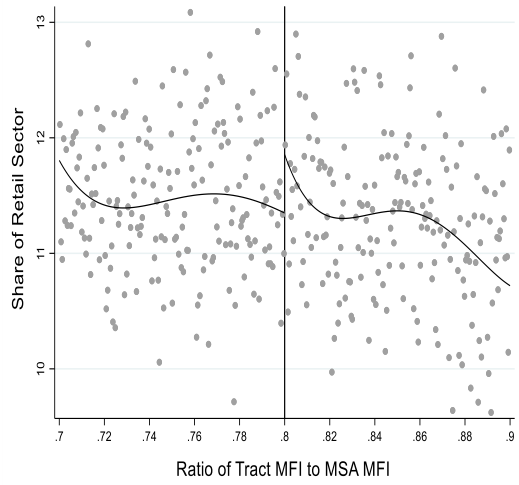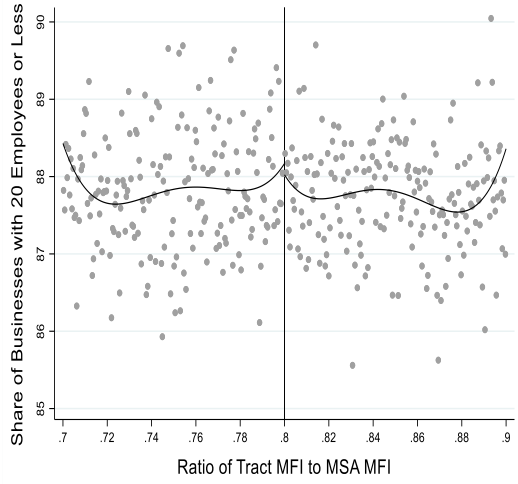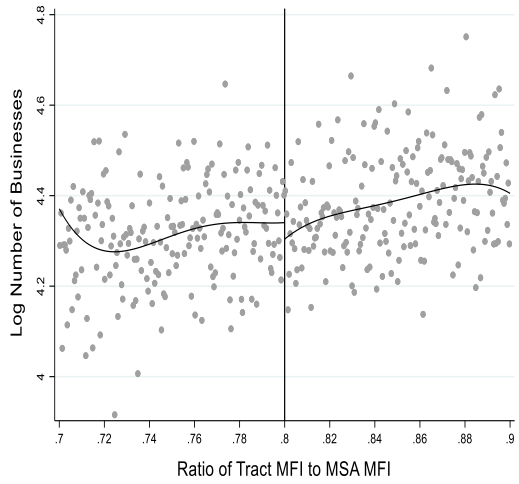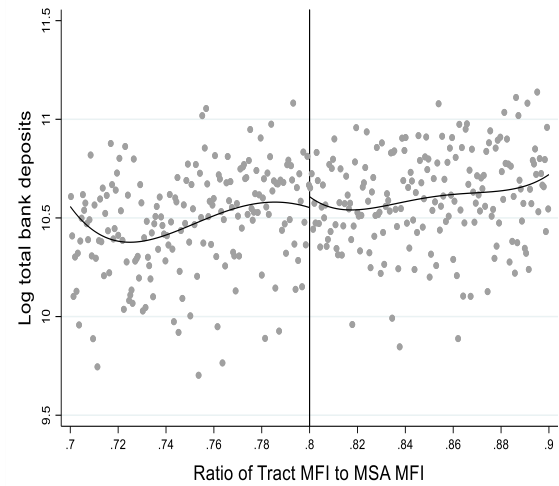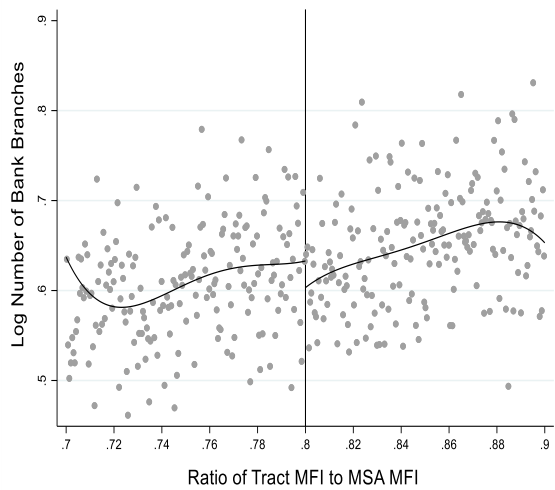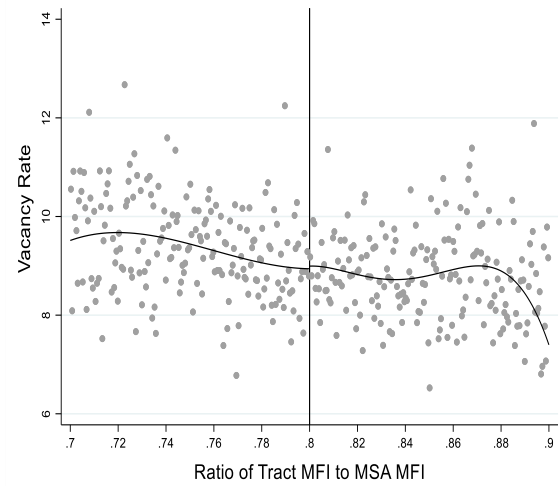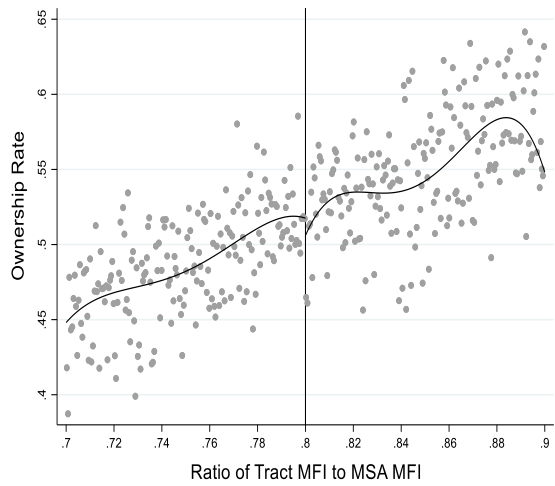
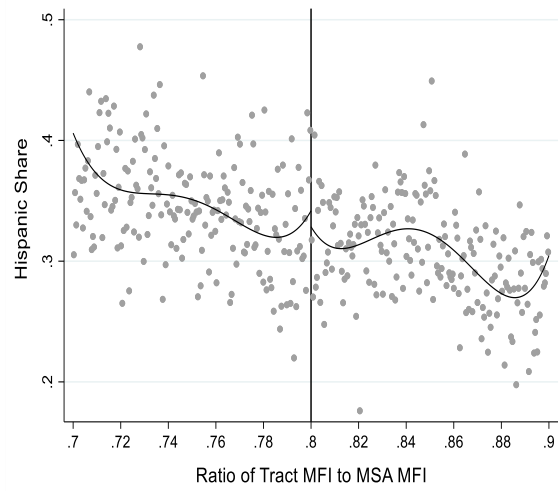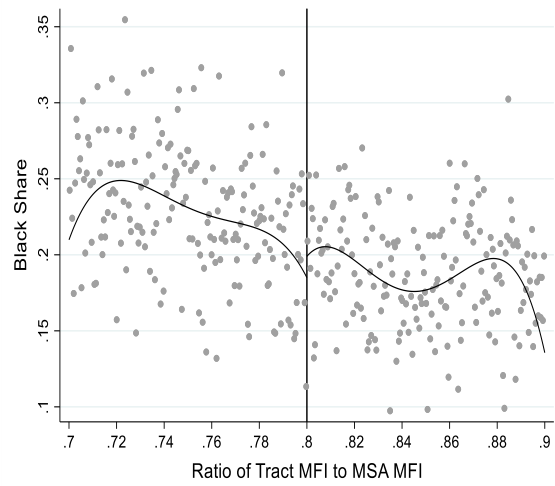*Figure 4.2* RD plots for the predetermined covariates

Figure 4.2 (continued)

Table 4.6 Results of the RD identification test

Variable	MSE-Optimal Bandwidth	RD Estimator	p-value	Conf. Int.	Eff. Number Observations
Log number of businesses	0.042	-0.029	0.452	[-0.105, 0.047]	7507
Share of businesses with 20 employees or less	0.022	-0.282	0.388	[-0.922, 0.358]	3924
Share of retail industry	0.046	0.351	0.187	[-0.170, 0.872]	5283
Share of transportation	0.028	0.289	0.245	[-0.198, 0.775]	4946
Share of service industry	0.029	-0.526	0.486	[-0.626, 0.630]	5174
Share of bachelor's degree of above	0.029	-0.526	0.486	[-2.006, 0.954]	5128
Black share	0.023	0.016	0.384	[-0.020, 0.052]	4147
Hispanic share	0.018	-0.036	0.097	[-0.079, 0.007]	3144
Ownership rate	0.022	-0.010	0.476	[-0.038, 0.179]	3941
Vacancy rate	0.032	0.102	0.784	[-0.629, 0.833]	5784
Log number of bank branches	0.041	-0.026	0.225	[-0.068, 0.016]	7349
Log total bank deposits	0.032	0.020	0.844	[-0.176, 0.216]	5675

Note: The number of observations used in the analysis varies for each covariate; this occurs because the MSE-optimal bandwidth is different for every covariate analyzed.

4.5.3 RD estimates of the CRA's effect on SBA lending

Table 4.7 presents the results of the CRA's effects on the number of all SBA loans per 1,000 businesses. All the regressions were repeated for four different samples of census tracts. The first column of Table 4.7 includes all the census tracts in the seven metropolitan areas for the purpose of comparison with the RD estimates. The second column includes only the tracts for which the median family income was within 10 percent of the threshold, while the third and the fourth columns include the tracts for which income was within five percent or three percent of the threshold, respectively. This sample design is repeated in Tables 4.8 and 4.9 where the focus is on the impact of CRA tract status on SBA 7(a) and 504 loans. Table 4.10 presents the results of a repeat of the exercise for each metropolitan area but includes only the samples within 10

percent of the threshold because of space limitations. All the regressions included covariates[8], year-fixed effects, and metropolitan-fixed effects.

Before turning to the main relationships of interest, it is important to understand the relationship between SBA lending and the covariates. Table 4.7 shows that the coefficient estimates and their statistical significances were largely consistent across the models with different bandwidths. While most of the relationships were consistent with those delineated in past studies (Bostic & Lee, 2017), some findings were somewhat surprising. In particular, the literature on the effects of the CRA on mortgage lending suggests that black and Hispanic neighborhoods have lower access to bank credit (Bates & Robb, 2015, 2016; Immergluck, 2002). However, this study found that census tracts with a higher share of black or Hispanic populations had a higher number of SBA loans per 1,000 businesses. While the results ostensibly look contradictory, this is unlikely because a higher volume of SBA lending implies that many small businesses in black or Hispanic neighborhoods do not have alternative financial sources other than federal-guaranteed SBA loans. Furthermore, according to the 2014 Annual Survey of Entrepreneurs, black and Hispanic business owners use fewer business loans from banks or financial institutions than white business owners and instead rely more heavily on government-guaranteed business loans as sources of start-up financing (Robb, 2018). This statistic confirms the current finding.

In general, large-sized banks are more likely to provide small business loans than small-sized banks (Small Business Administration, 2018). However, interestingly, this study found that census tracts with a higher value of FDIC-insured bank deposits had lower SBA loans per 1,000

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[8] The author also tested all the regressions without covariates because some researchers have argued that covariates are not necessary in RD design. The size of the coefficients changed slightly, but not the direction or the significance level in most cases. Therefore, this study focused on the results of the analyses that included covariates.

businesses. This may be because census tracts with higher bank deposit values tend to be wealthy neighborhoods where the demand for SBA loans is low. In terms of the other covariates, the results showed that the total number of SBA loans per 1,000 businesses was higher in the census tracts with more business establishments, a higher share of businesses in the retail and transportation sectors, and more residents with college degrees. However, the number of SBA loans per 1,000 businesses was lower in the census tracts with a higher share of businesses with 20 employees or less and higher vacancy rates.

The effects of the CRA on all SBA lending by metropolitan ring

As shown in Table 4.7, the main variables of interest are the CRA, intrametropolitan location, and their interaction terms. Using the CRA-ineligible outer-ring suburbs as the omitted reference group, the statistics revealed the relative effects of the CRA on SBA lending. The results from the full samples showed that CRA coverage was positively related to SBA lending in the central cities and inner-ring suburbs. However, the RD results provided little evidence that CRA coverage increased SBA lending, while there was some heterogeneity by metropolitan rings. The difference in the results between the full samples and the RD samples suggests that the estimates from the full samples may be misleading. This study therefore focused on the results of the RD analysis. As shown in columns 2–4 of Table 4.7, the coefficient of the CRA was negative. This suggests that the CRA-eligible census tracts in the outer-ring suburbs had lower SBA lending than the CRA-noneligible tracts. However, the relationship is only significant for the census tracts where the median family income was within 10 percent of the threshold, and the effects disappeared when the samples were limited to census tracts where the median family income was within three or five percent of the 80 percent MFI ratio. These findings of

nonsignificance in column 3 and 4 may be because smaller sample sizes increase standard errors, thus increasing the potential of Type II error. In terms of the inner-ring suburbs, this study finds that the CRA had a positive effect on SBA lending. Specifically, the CRA designation increased the total number of SBA loans by 0.007 per 1,000 businesses in the inner-ring suburbs given that the coefficient on the CRA is -0.032 and the coefficient on the CRA × Inner-ring is 0.039. Columns 3 and 4 of Table 4.7 show, however, that the effects were not significant.

Table 4.7 RD results of the CRA's effects on SBA lending

VARIABLES	(1) All samples	(2) MFI ratio [0.7, 0.9]	(3) MFI ratio [0.75, 0.85]	(4) MFI ratio [0.77, 0.83]
CRA	-0.048***	-0.032*	-0.018	-0.037
	(0.008)	(0.017)	(0.023)	(0.029)
Central city	0.003	0.010	0.004	0.003
	(0.007)	(0.016)	(0.021)	(0.026)
Inner ring	-0.036***	0.004	-0.003	0.018
	(0.006)	(0.014)	(0.019)	(0.023)
CRA × Central city	0.043***	0.016	0.023	0.038
	(0.010)	(0.018)	(0.024)	(0.030)
CRA × Inner ring	0.083***	0.039**	0.022	-0.003
	(0.010)	(0.017)	(0.023)	(0.029)
Log number of businesses	0.008*	0.031***	0.033**	0.049***
	(0.005)	(0.011)	(0.015)	(0.018)
Share of businesses with employees 20 or less	-0.722***	-0.826***	-0.881***	-0.949***
	(0.051)	(0.113)	(0.148)	(0.178)
Share of retail industry	0.158***	0.190**	0.296**	0.231
	(0.038)	(0.092)	(0.128)	(0.158)
Share of transportation industry	0.156***	0.218*	0.232	0.178
	(0.049)	(0.115)	(0.158)	(0.194)
Share of service industry	-0.107***	-0.028	-0.124	-0.233*
	(0.035)	(0.084)	(0.114)	(0.140)
Share of bachelor's degree or above	0.088***	0.118***	0.061	0.096
	(0.012)	(0.040)	(0.057)	(0.070)
Black share	-0.008	0.058**	0.034*	0.064*
	(0.011)	(0.023)	(0.019)	(0.036)
Hispanic share	0.229***	0.150***	0.121***	0.155***
	(0.012)	(0.024)	(0.032)	(0.039)
Ownership rate	0.039***	0.039	0.010	0.009
	(0.011)	(0.027)	(0.036)	(0.044)
Vacancy rate	-0.279***	-0.264***	-0.307***	-0.305***
	(0.026)	(0.069)	(0.095)	(0.114)
Log number of bank branches	0.003	-0.030	-0.043	-0.087**
	(0.009)	(0.021)	(0.028)	(0.034)
Log total bank deposit	-0.028***	-0.025***	-0.023***	-0.008
	(0.002)	(0.003)	(0.005)	(0.006)
MFI Income ratio	-0.049***	-0.099	0.134	-0.852
	(0.006)	(0.117)	(0.321)	(0.674)
Year fixed effects	Y	Y	Y	Y
MSA fixed effects	Y	Y	Y	Y
Constant	1.510***	1.460***	1.344***	1.965***
	(0.055)	(0.159)	(0.310)	(0.583)
Observations	105,055	17,858	8,979	5,380

Note: The table reports RD estimates from four separate regressions. Column heading corresponds to the sample, with columns (1) presenting results for the full census tracts in seven metro areas, columns (2) through (4) representing census tracts in which their median family income ratio (MFI) is within the range specified in the square brackets. Dependent variable is the number of all SBA lending per 1,000 businesses in a census tract. Robust standard errors are shown in parentheses, *** p<0.01, **p<0.05, *p<0.1

As discussed previously, the SBA 7(a) and 504 programs differ in terms of their purposes, loan sizes, interest rates, and terms. This study therefore analyzes the effects of the CRA on SBA 7(a) and SBA 504. Table 4.8 shows the results of the CRA's effects on the number of SBA 7(a) loans per 1,000 businesses, while Table 4.9 shows the results of the CRA's effects on the number of SBA 504 loans per 1,000 businesses. As demonstrated in Table 4.8, this study found no evidence to suggest that the CRA has a positive impact on SBA 7(a) lending in LMI neighborhoods. However, the findings presented in Table 4.9 suggest that the CRA increases SBA 504 lending in these neighborhoods. Specifically, the coefficient of the CRA × Inner-ring is positive and significant in column 2 although the coefficient of the inner-ring suburbs is negative and significant across all the models in Table 4.9. These findings suggest that the number of SBA 504 loans per 1,000 businesses was higher in the CRA-eligible tracts than in the CRA-ineligible tracts. In the case of the central cities, the findings in column 4 suggest that the CRA has a positive effect on SBA 504 lending. While there may be several reasons for the increase in SBA 504 lending with the CRA, one possible explanation is that the 504 program is more focused on community development, including job creation and retention, than the 7(a) program. Accordingly, there is a high probability that institutions granting 504 loans will receive CRA consideration, which may provide an incentive for banks to increase SBA 504 lending. However, the results in column 2 show that the LMI census tracts in the outer-ring suburbs still had lower 504 lending activity despite CRA coverage. Taken together, the findings suggest that the effects of CRA coverage on SBA lending can vary by metropolitan ring.

Table 4.8 RD results of CRA's effects on SBA 7(a)

VARIABLES	(1) All samples	(2) MFI ratio [0.7, 0.9]	(3) MFI ratio [0.75, 0.85]	(4) MFI ratio [0.77, 0.83]
CRA	-0.401***	-0.229	-0.131	-0.319
	(0.073)	(0.157)	(0.217)	(0.272)
Central city	0.115*	0.076	0.034	0.099
	(0.066)	(0.145)	(0.197)	(0.241)
Inner ring	-0.174***	0.160	0.089	0.311
	(0.050)	(0.126)	(0.173)	(0.212)
CRA × Central city	0.435***	0.139	0.180	0.250
	(0.091)	(0.169)	(0.227)	(0.282)
CRA × Inner ring	0.619***	0.250	0.147	-0.095
	(0.089)	(0.161)	(0.215)	(0.267)
Controls	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y
MSA fixed effects	Y	Y	Y	Y
Constant	10.636***	9.090***	7.816***	13.592**
	(0.494)	(1.449)	(2.871)	(5.397)
Observations	105,055	17,858	8,979	5,380

Note: The table reports RD estimates from four separate regressions. Column heading corresponds to the sample, with columns (1) presenting results for the full census tracts in seven metro areas, columns (2) through (4) representing census tracts in which their median family income ratio (MFI) is within the range specified in the square brackets. Dependent variable is the number of SBA 7(a) lending per 1,000 businesses in a census tract. Control variables include total number of businesses, firm size, industrial composition, education, black and Hispanic share, ownership rate, vacancy rate, number of bank branches, total amount of bank deposit, and income ratio. Robust standard errors are shown in parentheses, *** p<0.01, **p<0.05, *p<0.1

Table 4.9 RD results of CRA's effects on SBA 504

VARIABLES	(1) All samples	(2) MFI ratio [0.7, 0.9]	(3) MFI ratio [0.75, 0.85]	(4) MFI ratio [0.77, 0.83]
CRA	-0.093***	-0.089*	-0.041	-0.056
	(0.023)	(0.050)	(0.069)	(0.089)
Central city	-0.089***	0.010	-0.015	-0.105
	(0.021)	(0.044)	(0.058)	(0.072)
Inner ring	-0.183***	-0.138***	-0.143***	-0.187***
	(0.015)	(0.038)	(0.051)	(0.063)
CRA × Central city	0.024	0.041	0.063	0.167*
	(0.029)	(0.053)	(0.071)	(0.091)
CRA × Inner ring	0.243***	0.164***	0.088	0.116
	(0.028)	(0.050)	(0.068)	(0.087)
Controls	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y
MSA fixed effects	Y	Y	Y	Y
Constant	4.765***	5.743***	5.819***	5.617***
	(0.155)	(0.443)	(0.884)	(1.737)
Observations	105,055	17,858	8,979	5,380

Note: The table reports RD estimates from four separate regressions. Column heading corresponds to the sample, with columns (1) presenting results for the full census tracts in seven metro areas, columns (2) through (4) representing census tracts in which their median family income ratio (MFI) is within the range specified in the square brackets. Dependent variable is the number of SBA 504 lending per 1,000 businesses in a census tract. Control variables include total number of businesses, firm size, industrial composition, education, black and Hispanic share, ownership rate, vacancy rate, number of bank branches, total amount of bank deposit, and income ratio. Robust standard errors are shown in parentheses, *** p<0.01, **p<0.05, *p<0.1

The effects of the CRA on SBA lending by metropolitan area

Table 4.10 presents the results of the CRA's effects on SBA lending for the seven metropolitan areas. Panel A shows the results of the total SBA loans, while panels B and C present the results of the SBA 7(a) and 504 programs, respectively.

Overall, the findings in panel A suggest that the CRA had a minimal effect on increasing the total number of SBA loans. However, the results varied across and within the metropolitan areas. In particular, Table 4.10 shows that the CRA had no positive effect on the total number of SBA loans for the central cities and outer-ring suburbs in any of the metropolitan areas. In Atlanta and Philadelphia, there was no significant difference in SBA lending activity across the metropolitan rings. The results also showed that the CRA had no effect on SBA loans in the Chicago, New York, and Washington DC areas. However, this study found some evidence of the effect of the CRA on SBA lending in the inner-ring suburbs of Los Angeles and Miami.

Similar to the results in Table 4.8, the results in panel B show that the CRA had no effect on the 7(a) programs in any of the metropolitan areas except the inner-ring suburbs of Los Angeles. In terms of the SBA 504 program, this study found some interesting variations across the metropolitan areas (panel C). CRA coverage had no significant effect on the number of SBA 504 loans across the metropolitan rings of Atlanta, Los Angeles, Miami, New York, and Washington, DC. However, in Chicago, the number of 504 loans per 1,000 businesses was higher in the CRA-eligible tracts in the central city and inner-ring suburbs, but 504 lending activity was low in the CRA-eligible tracts in the outer-ring suburbs despite the CRA. In contrast, in Philadelphia, the CRA had a positive effect on 504 lending in the outer-ring suburbs but a negative effect in the central city and inner-ring suburbs.

Table 4.10 RD results of CRA's effects on SBA lending by MSA

VARIABLES	(1) Atlanta	(2) Chicago	(3) Los Angeles	(4) Miami	(5) New York	(6) Philadelphia	(7) Washington DC
	Panel A: Total number of SBA lending per 1,000 businesses						
CRA	-0.006	-0.018	-0.073*	-0.036	-0.001	0.071	-0.033
	(0.066)	(0.038)	(0.042)	(0.033)	(0.030)	(0.076)	(0.048)
Central city	0.050	0.139***	0.102**	-0.042	-0.041	-0.068	-0.058
	(0.142)	(0.035)	(0.042)	(0.123)	(0.026)	(0.060)	(0.057)
Inner ring	-0.025	-0.048*	0.015	0.038	0.065**	-0.014	-0.131***
	(0.065)	(0.028)	(0.035)	(0.031)	(0.027)	(0.049)	(0.039)
CRA × Central city	0.016	0.014	0.024	0.050	0.009	-0.124	-0.008
	(0.160)	(0.041)	(0.050)	(0.130)	(0.029)	(0.085)	(0.065)
CRA × Inner ring	-0.003	0.011	0.112***	0.058*	-0.022	-0.006	0.012
	(0.065)	(0.038)	(0.043)	(0.033)	(0.032)	(0.076)	(0.046)
Controls	Y	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y	Y
Constant	1.472*	1.042***	1.938***	0.891**	0.037	-0.364	0.383
	(0.800)	(0.336)	(0.412)	(0.414)	(0.261)	(0.600)	(0.465)
Observations	1,246	2,950	3,725	1,457	5,597	1,420	1,463
	Panel B: Number of SBA 7(a) lending per 1,000 businesses						
CRA	0.193	0.091	-0.775**	-0.220	-0.017	0.285	-0.376
	(0.634)	(0.344)	(0.384)	(0.286)	(0.284)	(0.737)	(0.460)
Central city	0.480	1.507***	0.596	0.123	-0.336	-0.514	-0.992*
	(1.331)	(0.309)	(0.365)	(1.038)	(0.252)	(0.576)	(0.547)
Inner ring	0.046	0.057	0.003	0.203	0.658**	-0.088	-1.126***
	(0.611)	(0.247)	(0.303)	(0.261)	(0.259)	(0.469)	(0.370)
CRA × Central city	0.315	-0.036	0.353	0.013	0.108	-0.809	0.055
	(1.520)	(0.370)	(0.452)	(1.111)	(0.276)	(0.823)	(0.620)
CRA × Inner ring	-0.235	-0.220	1.115***	0.460	-0.253	0.236	0.065
	(0.620)	(0.338)	(0.385)	(0.280)	(0.308)	(0.739)	(0.440)
Controls	Y	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y	Y
Constant	11.688	4.909*	10.030***	2.443	-1.601	-4.467	1.199
	(7.492)	(2.980)	(3.610)	(3.465)	(2.519)	(5.792)	(4.439)
Observations	1,246	2,950	3,725	1,457	5,597	1,420	1,463
	Panel C: Number of SBA 504 lending per 1,000 businesses						
CRA	-0.229	-0.313**	-0.056	-0.159	-0.013	0.420***	0.073
	(0.153)	(0.138)	(0.145)	(0.132)	(0.074)	(0.139)	(0.118)
Central city	0.076	-0.158	0.383***	-0.497	-0.053	-0.161	0.380***
	(0.318)	(0.120)	(0.132)	(0.488)	(0.058)	(0.109)	(0.131)
Inner ring	-0.252*	-0.558***	0.065	0.178	-0.002	-0.056	-0.201**
	(0.145)	(0.096)	(0.109)	(0.123)	(0.060)	(0.088)	(0.087)
CRA × Central city	-0.192	0.263*	-0.046	0.471	-0.005	-0.436***	-0.136
	(0.366)	(0.147)	(0.169)	(0.518)	(0.070)	(0.155)	(0.156)
CRA × Inner ring	0.192	0.391***	0.113	0.127	0.043	-0.298**	0.067
	(0.150)	(0.134)	(0.144)	(0.130)	(0.079)	(0.139)	(0.109)
Controls	Y	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y	Y
Constant	3.016*	5.525***	10.040***	6.584***	2.056***	0.824	2.449**
	(1.785)	(1.172)	(1.316)	(1.642)	(0.589)	(1.092)	(1.063)
Observations	1,246	2,950	3,725	1,457	5,597	1,420	1,463

Note: The table reports RD estimates for the seven metropolitan areas. All of the regressions are estimated using MFI ratio of 0.7 to 0.9. Dependent variable in panel A is the number of all SBA lending per 1,000 businesses in a census tract. In panel B, dependent variable is the number of SBA 7(a) loans per 1,000 businesses. Dependent variable in panel C is the number of SBA 504 lending per 1,000 businesses. Control variables include total number of businesses, firm size, industrial composition, education, black and Hispanic share, ownership rate, vacancy rate, number of bank branches, total amount of bank deposit, and income ratio. Robust standard errors are shown in parentheses, *** p<0.01, **p<0.05, *p<0.1

4.6 Discussion

This study links two different but closely related policies—the CRA and SBA lending programs—and evaluates how the CRA influences SBA lending across and within seven metropolitan areas. Using an RD analysis, this study found little evidence that the CRA increases SBA lending in LMI neighborhoods, which is consistent with the findings of previous studies (Berry & Lee, 2007; Getter, 2020). However, when looking into the effects of CRA coverage by metropolitan ring and metropolitan area, there were some variations. Specifically, there was no significant difference in the number of SBA loans per 1,000 businesses, either for SBA 7(a) or 504 loans, in the central cities of any metropolitan area except Chicago and Philadelphia. Furthermore, with the exception of Philadelphia, no evidence was found that the CRA has a positive effect on SBA loans in outer-ring suburbs. In inner-ring suburbs, however, this study found that the CRA increased the number of SBA 504 loans per 1,000 business overall, but among the seven MSAs, the effects were only significant in Chicago. While there may be various reasons, the significant effects of CRA on SBA 504 loans in Chicago and Philadelphia may be due to the higher proportion of manufactures in these regions (Immergluck & Mullen, 1998).

While this study found that the CRA had some positive effects on SBA loans, the overall results suggest that the incentives that the CRA generates are not sufficient for banks to increase credit to LMI neighborhoods. Furthermore, given the other incentives that exist simultaneously alongside the CRA, it is difficult to conclude that the increased loan volumes in LMI neighborhoods can be solely attributed to the CRA (Getter, 2020). Although the lack of credit availability in LMI neighborhoods can be explained by many factors, many scholars have argued that it is because of the difficulty in getting sufficient information about borrowers in LMI

neighborhoods (Lang & Nakamura, 1993; Stiglitz & Weiss, 1981). As discussed, the CRA was designed to address the need for credit in LMI neighborhoods by incentivizing financial institutions to grant loans to LMI borrowers, and SBA loans can be particularly attractive to lenders and borrowers compared to many of the other commercial loans available to small businesses. For lenders, the CRA can act as a shock absorber in the event of a borrower's default, and the opportunity exists to receive CRA consideration when the loans support community development in particular, for example, through the SBA 504 program. For borrowers, SBA loans provide lower interest rates and conditions compared to other commercial loans. However, given that technological innovation in the information and financial sectors allows banks to better evaluate the creditworthiness of borrowers, this argument may be outdated. Furthermore, given that the CRA is not a federal assistance program and several regulators have implemented it separately, no single federal agency is responsible for evaluating its overall effectiveness (Getter, 2020). Accordingly, the effects of the CRA may depend on how it is implemented rather than how it is designed.

This study contributes to the literature by linking two policies that are different but closely related. To date, most previous studies have examined the effects of the CRA on the overall small business loans in the market (Bates & Robb, 2015; Bostic & Lee, 2017; Ding et al., 2018; Rupasingha & Wang, 2017). There has therefore been limited understanding of how the CRA influences government-guaranteed small business lending even though there are reasons to believe it does. This study is thus the first to examine the effects of the CRA on small business loans with a particular focus on SBA lending. Second, this study adds a spatial dimension to the discussion on the effects of the CRA on small business lending. Some previous studies have examined the geographic distribution of small business loans by income category or racial

composition (Canner, 1999; Immergluck, 2002; Smith, 2003). However, to the best of my knowledge, no study has investigated small business lending by different metropolitan rings such as the central cities and inner- and outer-ring suburbs. Lastly, this study provides a richer assessment of the effects of the CRA on SBA lending by separately estimating the effects by program and metropolitan area.

While this study provides important insights into the small business credit market, it has some limitations. First, this study found that there were variations in the effects of the CRA on SBA lending across and within the seven metropolitan areas but did not test the mechanism underlying these findings. For example, why is the CRA effective in inner-ring suburbs? Why is it not effective in the central cities and outer-ring suburbs? Furthermore, the Philadelphia results were quite different from those of the other metropolitan areas. Why? The answers to these questions remain unresolved in this study, yet it is important to understand why the CRA works in some areas but not in others. Accordingly, further research may provide more insights into this issue by examining the mechanisms underlying the heterogenous effects of the CRA across and within metropolitan areas. Second, this study measured the CRA incentives as a binary variable. In line with many previous studies that used an RD design to estimate the effects of the CRA on lending, this study used the CRA's clear eligibility status to divide the treatment and comparison groups. However, in practice, CRA incentives are not that simple. Indeed, the extent to which the CRA incentivizes banks' lending decisions depends on many factors. For example, how tough are local banking regulators? How many banks receive CRA evaluations in the local market? Future works should therefore address these issues by measuring CRA incentive structures more precisely. Lastly, methodologically, the RD estimates have limited external validity—that is, the RD effect is generally not representative of the treatment effects for units with scores farther

away from the threshold. In other words, there is a likelihood that business environments, including access to capital, in tracts with median household incomes barely high or low from the cutoff differ systematically from those in tracts with median household incomes farther away from the cutoff. Therefore, the results presented herein should be interpreted with some caution.

5   CONCLUSION

The three essays in this dissertation have all focused on small business lending policies in the U.S. and make several unique contributions to the literature. First, by examining small business lending programs at different administrative levels (i.e., national, county, and census tract), the three essays in this collection provide a more comprehensive and nuanced understanding of small business lending programs in the U.S. Second, although some studies have examined the effects of SBA lending by assessing community characteristics, the scope has been limited to the low–high-income continuum (Cortes, 2010; Craig et al., 2007). This dissertation adds race as an additional community dimension and pays particular attention to black and Hispanic neighborhoods. Third, this dissertation links two policies that are different but closely related. To date, most previous studies have investigated the effects of the CRA on the overall small business loans in the market (Bates & Robb, 2015; Bostic & Lee, 2017; Ding et al., 2018; Rupasingha & Wang, 2017). Given that SBA loans account for only a small proportion of total small business loans, there has been limited understanding of how the CRA influences government-guaranteed small business lending. While some previous studies have examined the geographic distribution of small business loans by income category or racial composition (Canner, 1999; Immergluck, 2002; Smith, 2003), to the best of my knowledge, no study has investigated small business lending by different metropolitan rings such as central cities and inner- and outer-ring suburbs. The essays in this dissertation therefore provide important insights that may assist policy makers in tailoring SBA programs based on communities' characteristics in a changing financial landscape.

Since detailed findings are discussed at the end of each chapter, I conclude this dissertation by highlighting the major themes that emerged from these studies and point to

possible directions for future research along the way. First, in this dissertation, the primary

measure of the performance of the SBA loan programs was the number of loans per business in a

specified geographic unit. While the count measure is straightforward and easy to understand, it

is not sufficient to capture the dynamics of the small business credit market. For instance, even

with the same number of SBA loans per business, the credit market conditions each

neighborhood faces may vary substantially if they have, for example, different interest rates,

guaranteed rates, and/or default rates. Accordingly, future studies should use other indicators to

measure the performance of SBA loans to provide a more comprehensive understanding of the

programs' effects and further help identify adjustments that may improve the programs' results.

Second, evidence suggests that macroeconomic conditions have a substantial impact on

credit markets and the small business sector (Bostic & Lee, 2017). This dissertation focused on

the post-recession period between 2010 and 2015 and assumed that the demand and supply of

small business loans and their impact on the local economy were not the same as those before or

during the recession, which were the periods most previous studies addressed. While some of the

differences in the findings between this dissertation and prior studies cannot be solely attributed

to the macroeconomic situation, its role also cannot be ruled out. While writing this dissertation,

on March 11, 2020, the World Health Organization declared the coronavirus outbreak a

pandemic (Ducharme, 2020). As the country hardest hit by the coronavirus globally, the federal

and state governments of the U.S. took action to legally enforce "social distancing" in order to

slow the spread of the virus. This included aggressive moves to shut down local businesses for

30 days or more (Duncan & Sonmez, 2020). Since many small businesses have relatively little

cash on hand, the quarantine has caused them considerable financial distress. As a response to

this challenging time, on March 27, 2020, President Trump signed the Coronavirus Aid, Relief,

and Economic Security Act, which allocated $376 billion to help small businesses keep their workers employed as part of SBA loan programs (Cowley, 2020). After the country overcomes this challenge, researchers should examine how the government funding was allocated (e.g., who received the loans, who did not, and why) and how effective the SBA loan programs were in helping the small business sector. Such studies will help improve accountability to stakeholders and provide further insights into how to improve the planning and implementation of these programs.

Finally, in reviewing the literature on small business lending, I found that little attention was paid to understanding the implementation process even though it is as important as the policy design. For example, the CRA was designed to reduce discriminatory credit practices against businesses in LMI neighborhoods. However, it is not entirely clear whether CRA examiners pay sufficient attention to who receives the loans in LMI neighborhoods. Banks may receive credit as long as the borrowers are located in LMI neighborhoods but seemingly irrespective of the financial status of these borrowers. In other words, banks may have an incentive to seek out the most creditworthy borrowers in LMI neighborhoods instead of those who need loans the most. In so doing, SBA loan programs may appear at face value to be highly effective. Future works should therefore address these issues by examining the implementation process more precisely.

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