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Abstract

This study provides new evidence on the effectiveness of the Community Reinvestment Act (CRA) on small business lending by focusing on a sample of neighborhoods with changed CRA eligibility status across the country because of an exogenous policy shock in 2013. The results of difference-in-differences analysis provide consistent evidence that the CRA promotes small business lending, especially in terms of number of loan originations, in lower-income neighborhoods. The generally positive effects of the CRA are sensitive to the types of CRA treatment. Losing CRA eligibility status has a relatively larger effect on small business lending activities, while the effects of newly gaining CRA eligibility are less pronounced. The results are fairly robust when alternative sample periods and control groups are used.

Keywords: Small Business, Credit, Community Reinvestment Act

JEL classification: G21, G28, G32

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1. Introduction

The Community Reinvestment Act (CRA), enacted in 1977 to encourage federally regulated depository institutions to meet the credit needs of all families and communities, including those of lower income, is facing a major reform (Office of the Comptroller of the Currency, 2018). However, any reform effort will be hampered by the fact that existing empirical evidence on the significance, magnitude, and mechanisms of the CRA's effects on mortgage lending, small business lending, and community development activities has been inconclusive (Getter, 2015). This paper seeks to generate clearer evidence of the CRA's impact in the context of small business lending. The research takes advantage of a unique opportunity provided by an exogenous policy shock in 2013. Because of the statistical area revision by the Office of Management and Budget (OMB), 549 census tracts across the 48 contiguous states and Washington, D.C. that were once eligible for CRA credit (with a median family income below 80 percent of the area median) became ineligible after 2014, while 432 previously CRA ineligible tracts became newly eligible. The change in CRA eligibility status represents a shift toward more or less prescriptive regulation for small business lending in these tracts, which potentially allows us to identify the CRA's effects.

The empirical results provide quite consistent evidence that the CRA has had a significant impact on the volume of small business lending in lower-income neighborhoods. However, the generally positive effects of the CRA are sensitive to the type of CRA treatment, namely gaining or losing CRA coverage. When a neighborhood loses its low- and moderate-income (LMI) status, we see that the number of small business loans originated in that community decreases relative to lending activities in nearby neighborhoods with unchanged CRA eligibility status.

On the other hand, becoming CRA eligible has a positive yet less significant effect on small business lending activity in a neighborhood. The positive effect makes sense, owing to the increased attention banking institutions are likely to give to these neighborhoods. The relative magnitude also makes sense, because lenders will need to build capacity and accumulate experience to appropriately serve the newly eligible neighborhood.

This study is most closely related to Ding and Nakamura (2017), which examined the CRA's impact on bank mortgage lending activities in the Philadelphia area. Although our research applies a similar methodology, it differs from that research in important ways. First, it focuses on a different loan product; there is no reason to assume that the patterns that exist for one product will hold for others, especially considering that small business lending is more dominated by CRA lenders and often requires more soft information of borrowers than mortgage lending (Greenstone, Mas, Nguyen, 2014). In addition, it improves upon that study by using a national sample of neighborhoods rather than focusing on a single metropolitan area. The national focus, to a certain degree, allows us to explicitly test for spatial heterogeneity of the CRA's effects. The results confirm that such heterogeneity does exist, with the CRA generally having a larger effect in metropolitan neighborhoods, in neighborhoods located in inner cities, and in the Northeast. Finally, unlike Ding and Nakamura (2017), which focuses only on the 2013 policy shock, this study analyzes relationships over the precrisis period as well, which had a distinct policy environment and market conditions.

The overall consistent results of the CRA's impact across different markets and across different study periods suggest that lenders are responsive to the incentives that the CRA provides, and that CRA designations matter in a changing financial landscape. Findings from this

study are consistent with the notion that the CRA has served as an important tool in helping meet the credit needs of underserved communities and populations.

This study contributes to the literature in several ways. First, the unique natural experiment induced by the policy shock provides us an opportunity to overcome the identification challenges and data constraints that hampered prior studies. Most empirical studies on the CRA rely on a regression discontinuity design that compares outcomes in tracts just above and below the CRA eligibility threshold.[1] This identification strategy may be biased if the CRA's effect on neighborhoods with incomes farther from the threshold is systematically different from the effect on those close to the threshold (Ding and Nakamura, 2017; Ringo, 2017). Furthermore, since the policy shock has led to two types of treatments — gaining or losing CRA eligibility status — comparing the effects of different treatments provides information about the market failure. Finally, the examination of the possible spatial and temporal heterogeneity in the effects of the CRA helps us understand the conditions under which the CRA could be more effective in channeling credit to lower-income communities.

This paper is organized as follows: Section 2 provides background information about the CRA, the relevant literature on the CRA's effects, and the implications of the new statistical area definitions. Section 3 describes the methodology and data in more detail. Section 4 presents the empirical results. Section 5 concludes the paper and discusses policy implications.

[1] For a tract to be CRA eligible, it must have a median family income less than or equal to 80 percent of the median income of the metropolitan area in which it is located. If the tract is not located in a metropolitan area, it is CRA eligible if its median family income is less than 80 percent of the median family income for the nonmetropolitan portion of the state in which it is located.

2. Background and Literature Review

The CRA was enacted in 1977 to address the concern that depository institutions had not met the credit needs of lower-income and minority neighborhoods in the years after the enactment of laws in the 1960s, including the Fair Housing Act of 1968 (Munnell et al., 1996; Ross and Tootell, 2004; Garwood and Smith, 1993; Essene and Apgar, 2009). The CRA encourages depository institutions to ensure access to credit for residents in LMI neighborhoods and to LMI borrowers, both of which have historically been underserved, in a manner consistent with safe and sound operation.

Under the law, depository institutions are regularly examined for their compliance in the areas of lending, investments, and services by three federal agencies: the Federal Reserve, the Office of the Comptroller of the Currency (OCC), and the Federal Deposit Insurance Corporation (FDIC).[2] The federal regulators assess whether depository institutions are serving the credit needs of both LMI neighborhoods and LMI populations within their assessment areas. LMI neighborhoods are defined as census tracts that have median family incomes less than 80 percent of the median family income for the surrounding area.[3] Assessment areas are the geographic areas where institutions have their main office, branches, and deposit-taking ATMs. While the performance of banks and thrifts in entire communities is measured during the CRA

[2] Depository institutions include federally chartered financial institutions, such as national banks and savings associations, and state-chartered commercial and saving banks. Smaller institutions that meet certain criteria undergo lending and community reinvestment tests or a lending test only.

[3] The designation is based on the median family income of a tract to the median income of a surrounding area. If the ratio is below 50 percent, the tract is considered low-income; 50 percent to 79.9 percent is moderate-income; 80 percent to 119.9 percent is middle-income; 120 percent or higher is upper-income. The surrounding area for a census tract is either the metropolitan statistical area or the metropolitan division, or, for those tracts not located in a metropolitan area, the nonmetropolitan area of the state.

examination, CRA-related activities in LMI neighborhoods and within a banking institution's assessment area are weighted heavily (Avery, Bostic, and Canner, 2005).

The CRA has at least two channels to incentivize compliance by depository institutions. First, federal regulators must consider an institution's CRA performance when evaluating an application by that institution for a merger or acquisition, the formation of branch, or other business activity. If the benefits of obtaining an Outstanding or Satisfactory CRA rating outweigh the costs, the CRA will effectively promote depository institutions to expand their services in LMI neighborhoods and among LMI populations. Second, and more indirectly, the public release of loan-level data through the Home Mortgage Disclosure Act (HMDA) allows community activists and public interest groups to monitor banking institutions and provide an independent source of bank discipline where the CRA is concerned.

A number of previous studies have found that banking institutions complied with the law by engaging more with local community organizations and shifting their lending activities to CRA-eligible neighborhoods. For example, the number of newly initiated CRA agreements — banking institution pledges to provide substantial resources to targeted groups and communities — in a county is positively associated with lending activities in the area over a three-year period, and the increased lending persists even after the expiration of an agreement (Bostic and Robinson, 2003; 2005). Survey responses also indicate that many CRA-related lending activities would not otherwise have happened absent the law, which demonstrates the role of the CRA in shaping credit flows in traditionally underserved neighborhoods (Avery, Bostic, and Canner, 2005).

However, the empirical evidence on the effectiveness of the CRA on lending activities directly is, at best, mixed (Getter, 2015). A group of researchers at the Joint Center for Housing Studies compared CRA-regulated lenders and those lenders not covered by the CRA, as well as lending patterns within and outside of their assessment areas, and concluded that the CRA had helped expand access to mortgage lending in the 1993–2000 period (Joint Center for Housing Studies, 2002). On the other hand, Dahl, Evanoff, and Spivey (2002) found that banking institutions that had their CRA ratings downgraded did not significantly alter their lending behaviors, which suggested that this channel of CRA influence had not been effective.

More recent studies examining the causal effects of the CRA have gone beyond the simple ordinary least squares models used in the early literature and instead applied methodologies featuring more rigorous identification strategies. One of the most frequently used approaches has been the regression discontinuity strategy. The regression discontinuity approach exploits the fact that CRA eligibility is determined by whether the median income of a tract is less than 80 percent of the median income of the surrounding area. The existence of an income threshold allows researchers to identify the causal effects of the CRA by comparing the outcomes in census tracts just below and above the threshold (Avery, Calem, and Canner, 2003; Berry and Lee, 2008; Gabriel and Rosenthal, 2008; Bhutta, 2011; Avery and Brevoort, 2015). Using this approach, for example, Bostic and Lee (2017) found that the number and dollar amount of small business loans were greater among CRA-eligible tracts during 1996–2002 and 2012–2014, while small business lending lagged in those tracts between 2003 and 2011.

Although its intuitive design and mild assumptions for causal identification are appealing, the regression discontinuity design might not be the perfect method for examining the causal effects of the CRA. The local treatment effects found from this approach might not necessarily

generalize to other conditions. Tracts just below the income threshold are the most affluent neighborhoods among CRA-eligible tracts, and thus might have lending patterns that are systemically different from neighborhoods with substantially lower incomes. Second, because the approach focuses on the tracts near the income threshold, sample sizes and statistical power decrease as the window gets narrower.

A difference-in-differences framework may help overcome some of these identification challenges and data constraints. The idea is simple: Given an exogenous shock, measuring how the difference in the outcome variable (e.g., credit supply) between entities that are newly eligible or ineligible for the CRA (the treatment group) and those whose status remained constant (the control group) changes from the period before the shock to the period after the shock would reveal the effects of the CRA. One of the strengths of this approach is that it could allow us to estimate the CRA's effects on those neighborhoods with median incomes that are far above or below the CRA eligibility threshold. Finding a plausibly exogenous source of variation, however, could be difficult. One example of a study using this approach is Zinman (2002), which leverages time variation in CRA incentives across bank size associated with 1995 CRA reforms. It finds that the CRA increases lending to small businesses and that these increases improve county-level payroll and reduce business bankruptcies. Ding and Nakamura (2017) and Ringo (2017) also employ difference-in-differences approaches and use changes in the definitions of metropolitan statistical areas (MSAs) and metropolitan divisions (MDs) as the exogenous shock. These studies find positive CRA effects on home mortgage lending, with the effects being greater among lower-income tracts.

The New MSA/MD Definitions and Their Implications for CRA Lending

The depository institutions subject to the CRA are examined by their lending, services, and investment performances in LMI tracts, or *CRA-eligible* tracts,[4] which have a median family income (MFI) below 80 percent of the surrounding area's median family income (AMFI).[5] The AMFI is defined as the median family income for the MSA or MD, if a family or geography is located in an MSA/MD, or the median family income for the statewide nonmetropolitan area, if a family or geography is located outside an MSA. The OMB periodically issues new delineations for the MSAs and revises existing ones to better reflect economic and demographic realities. In 2013, the OMB published a new set of MSA/MD definitions as part of its comprehensive review of statistical area standards and definitions after the 2010 census.[6] Because the CRA eligibility of neighborhoods is based on the tract-to-area MFI ratio, the substantial changes in AMFIs induced by the new statistical area definitions have led to abrupt changes in the income designations for many tracts.

As a result of these definition changes, 818 tracts had their CRA eligibility status change. Of these, 423 were previously ineligible tracts that became newly CRA eligible.[7] There are several types of newly eligible tracts. One type includes tracts that were newly defined as part of an MSA in 2014 (about 40 percent of newly eligible tracts). Because the median family income of an MSA is often higher than that for all nonmetropolitan areas of a state, a tract that became

[4] We use the term *CRA-eligible tract* as shorthand only to mean that the tract is an LMI tract with an MFI below the threshold of 80 percent relevant to CRA regulation. This does not necessarily mean that none of the lending to a CRA-ineligible neighborhood qualifies for CRA credit. For example, lending to LMI borrowers in middle- or upper-income neighborhoods is still eligible for CRA credit.

[5] AMFI is defined as the MFI for the MD if a family or geography is in an MSA that has been subdivided into MDs. The Federal Financial Institutions Examination Council (FFIEC) estimates MFI for MSAs, MDs, and nonmetropolitan portions of each state.

[6] See more details at www.ffiec.gov/cra/OMB_MSA.htm.

[7] We exclude those census tracts that were nonmetropolitan areas in both 2013 and 2014, tracts with zero population, previously nonmetro and newly ineligible tracts, and newly nonmetro and newly eligible tracts (see Table A1 in the Appendix for the decisions we made to narrow the study sample).

part of an MSA is more likely to be CRA eligible. A second includes those tracts in areas where MSA/MD definitions changed. For example, after Essex County in Massachusetts was added to the Cambridge-Newton-Framingham, MA MD, the MD's median family income increased from $83,500 to $93,300. This caused a number of tracts in relatively poorer Essex County to become CRA eligible. In another case, the San Francisco-San Mateo-Redwood City MD was split into the San Francisco-Redwood City-South San Francisco MD and the San Rafael MD after 2014. For neighborhoods in the new San Rafael MD, the AMFI increased slightly from $101,200 to $104,100, causing neighborhoods with income slightly higher than the previous LMI threshold to become CRA eligible.

A total of 395 tracts that were previously CRA eligible lost their status as a result of the definition changes. There were several types of newly ineligible tracts, too. The first is tracts that were newly defined as nonmetro or rural tracts (about 9.3 percent of all newly ineligible tracts). Because the median family income of a rural area in a state is often lower than that of an MSA in that state, a tract that was newly defined to be in a rural area is less likely to be CRA eligible. Other tracts were in areas with changed MSA or MD definitions. For example, after Essex County in Massachusetts was added to the Cambridge-Newton-Framingham, MA MD, the MD's median family income decreased from $101,000 to $93,300. This caused a number of tracts in Middlesex County to become CRA ineligible. When the San Francisco-San Mateo-Redwood City MD was split into the San Francisco-Redwood City-South San Francisco MD and the San Rafael MD, the MD's median family income decreased from $101,200 to $94,800 for neighborhoods in the new San Francisco-Redwood City-South San Francisco MD, causing neighborhoods with income slightly below the LMI threshold to become CRA ineligible.

If lenders subject to the CRA closely monitor the changes in the CRA eligibility of neighborhoods and make strategic adjustments in their lending behavior accordingly, we should be able to isolate the CRA's effects by identifying shifts in lending activity in the newly eligible and ineligible tracts relative to shifts in counterpart neighborhoods. The change in the income designations of a large number of neighborhoods across the nation thus provides us a unique opportunity to implement a sharper identification strategy by investigating how lenders have responded to gaining or losing CRA coverage because of an exogenous policy shock.

We view changes in CRA eligibility by this channel as an exogenous policy shock. Although it is known that changes in MSA and MD definitions will be coming, it is very unlikely that those changes could be anticipated by banking institutions, as the methods for making these determinations are not transparent ex ante to those not involved in the process.

3. Methodology and Data

This study uses a set of difference-in-differences models to compare the volume of small business lending during the two years before and the two years after January 1, 2014, in the neighborhoods with changed CRA eligibility status (the treatment group) and in those of a control group of comparable neighborhoods. In the spirit of a regression discontinuity design, we use geographically proximate neighborhoods with slightly higher or lower median incomes as control groups. Intuitively, in the absence of the redefinitions of MSAs in 2013 and their incorporation into the determination of CRA eligibility starting in 2014, we would not expect any sharp changes in small business lending patterns in the treatment group after January 1, 2014, relative to the control group. Thus, we attribute any significant differences in lending

activity between the treatment group and the control group to the effects of gaining or losing CRA coverage.

Tract-Level Difference-in-Differences Regression Models

Using the policy shock discussed above, we attempt to identify the CRA's effects by comparing variation in lending in the treatment and control tracts before and after the policy change. The two-way, tract-level difference-in-differences model can be specified as:

$$Y_{it} = \beta_0 + \beta_1 * TREAT_i + \beta_2 * POST_t + \beta_3 * TREAT_i * POST_t + \gamma * N_i + \varepsilon_{it}, \quad (1)$$

where Y_{it} represents the value of the outcome measure Y (the number and dollar amount of small business lending) for tract i in year t. $TREAT_i$ represents whether tract i is one that became newly eligible or ineligible after 2014; the variable is ultimately omitted in the estimation because we include tract fixed effects. $POST_t$ is a dummy variable assigned a value of one for the post-2014 period. $TREAT_i * POST_t$ is the two-way interaction of the time and treatment dummies. The coefficient of the two-way interaction term β_3 is expected to capture the CRA's effect on outcome measure Y. N_i represents the fixed effect of tract i, which helps control for tract-level unobserved heterogeneity. Additionally, robust standard errors are used to address potential heteroskedasticity.

For this analysis, there are effectively two treatment groups: tracts that were previously CRA eligible but became CRA ineligible (*newly CRA ineligible*) and tracts that were previously CRA ineligible but became CRA eligible (*newly CRA eligible*) after the definition change. Because lenders may react differently to gaining or losing CRA eligibility, we estimate separate regressions for the two treatment groups.

Control group tracts are located within a half-mile radius of a tract in the treatment group, have a median family income between roughly 50 percent and 100 percent of the area median, and did not have their CRA eligibility status change between 2013 and 2014.[8]

The final sample includes 1,071 control group tracts to be compared with the newly ineligible tracts and 1,279 control group tracts to be compared with the newly eligible tracts. Descriptive statistics for the treatment and control tracts are shown in Table 1. As the MSA boundaries changed, the average median income ratio among the newly ineligible tracts increased from 74.4 percent in 2013 to 88.7 percent in 2014; the control tracts for them had similar average values — 73.7 percent in 2013 and 87.9 percent in 2014. Likewise, the average median income ratio among newly eligible tracts declined from 88.4 percent in 2013 to 74.6 percent in 2014, and the control group tracts had comparable numbers (89.8 percent in 2013 and 77.3 percent in 2014). Compared with the LMI tracts, treatment and control tracts tend to have higher median incomes, greater population, and fewer minorities, and they are more likely to be in principal cities.

Because control tracts were more common in some MSAs, the tracts in the control groups were weighted to avoid any issues of over- or underrepresentativeness. The weights are computed to ensure the share of control tracts within each MSA equals the share of treatment tracts in the same MSA. Of course, some decisions we made to identify the control groups may be arbitrary, such as the range of the income window and the way to calculate the weights, so we

[8] For example, the control group for the newly ineligible tracts is those with unchanged CRA eligibility status, within a half-mile radius of a newly ineligible tract, and with a median family income between 80 percent and 100 percent of area median in 2013 or between 50 percent and 80 percent of the area median in 2014.

conduct a set of sensitive analyses to discern how sensitive the results are to some of our analytical decisions.

Data

The primary data used for the analysis are the CRA small business lending data provided by the Federal Financial Institutions Examination Council (FFIEC). The CRA aggregate flat files include information on the number and dollar amount of small business loans originated by banks and thrifts that are subject to CRA reporting. In a CRA report, small business loans are defined as business loans of $1 million or less. The data also provide the number and dollar amount of those loans to businesses with gross annual revenues of $1 million or less (hereafter, smaller firms). These data are aggregated at the census tract level. Although they provide limited information compared with the HMDA mortgage data, the CRA data are the most comprehensive publicly available data on small business lending. Greenstone, Mas, and Nguyen (2014) reported that the CRA data cover approximately 86 percent of all loans of $1 million or less.

Using the CRA small business lending data set, we test the role of the CRA on four outcome variables: (1) the number of small business loans, (2) the dollar amount of small business loans, (3) the number of small business loans to small firms, and (4) the dollar amount of small business loans to small firms. All figures are inflation-adjusted to 2016 dollars. To assess activities associated with direct underwriting experiences, we focus on small business loan

originations, rather than loan purchases.[9] We also restrict our sample to census tracts within MSAs or MDs at least once before and after the 2013 MSA/MD redefinitions, as lenders are less likely to include nonmetro neighborhoods in their CRA assessment areas (Avery, Bostic, and Canner, 2005).

The changes in the total numbers and dollar amounts of small business loan originations in the treatment and the control groups pre- and post-treatment are summarized in Table 2. In the newly ineligible tracts, we observe a smaller increase after 2014 in the total number of small business loan originations by CRA-covered lenders, relative to the control group (Table 2). During the two years after the MSA/MD redefinitions in 2013, the number of small business loan originations increased by 13.8 percent in the newly ineligible tracts, smaller than the increase of 19.5 percent for the control group. This pattern is consistent across other outcomes. In the newly eligible tracts, however, the increases in the number and dollar amount of small business originations were only slightly larger than that of the control group (e.g., an 18.5 percent increase in the number of small business loans in the treatment tracts, compared with a 16.8 percent increase in the control tracts).

Overall, the descriptive analysis suggests that, relative to the control group, there was a smaller increase in the volume of small business loan originations after 2014 in neighborhoods that became CRA ineligible, while there was a slightly larger increase in small business lending activities in the newly eligible tracts. While these descriptive statistics support the notion that CRA incentives shape bank small business lending activities in LMI neighborhoods, we want to verify these findings by the regression analysis using data aggregated at the tract level.

[9] Also, the number of small business loan purchases (1.6 million) was only a third of the loan originations (4.6 million) and the amount of small business loan purchases ($2 billion) was about 2 percent of the loan originations ($99 billion) in 2016.

4. Empirical Results

This section summarizes the findings regarding the CRA's effects on small business lending and heterogeneity in the CRA's effects from the baseline regressions and the results of various robustness checks using alternative control groups, different study periods, and different weighting methods.

Effects of the CRA on the Volume of Small Business Lending

Table 3 summarizes the regression results from the baseline model, which uses a control group of the tracts within half a mile of any neighborhoods in the treatment group and with slightly higher or lower incomes than the CRA threshold (50 percent to 100 percent of area median family income). Tracts in the control group remained either CRA eligible or CRA ineligible through the study period. The top panel of the table presents results that suggest that the loss of CRA coverage leads to a significant decline in the number of small business loans, although the CRA's effects on the dollar amount of small business loans are statistically insignificant. Becoming CRA ineligible causes an average decline of 3.3 small business loans (or 5.8 percent of the pre-2014 mean[10]) per tract-year in the post-2014 period and a decrease of 2.4 loan originations to smaller firms (or 9.3 percent of the pre-2014 mean). By contrast, the bottom panel of the table shows that gaining CRA eligibility status generally does not have a significant impact on small business lending at the aggregate level, for either the number or dollar amount of small business loans.

[10] In 2012–2013, the average numbers of small business loans and small business loans to smaller firms were 56.8 and 25.9, respectively, among the newly CRA ineligible tracts.

We conducted additional analyses to understand the forces driving the differences in the volume of small business originations between newly ineligible neighborhoods and control group neighborhoods. Because the control group used in the baseline model includes tracts that were either consistently CRA eligible or consistently CRA ineligible, the relative decline in small business lending in the newly ineligible tracts could represent the tracts being treated either less favorably than the CRA-eligible tracts (a decrease relative to consistently CRA-eligible tracts), more similarly to the consistently CRA-ineligible tracts (a decrease relative to consistently CRA-ineligible tracts), or both.

To evaluate these possibilities, we ran separate regressions for the two types of control groups: one including only tracts with LMI status in both 2013 and 2014 (*remaining eligible*) and the other one composed of those with non-LMI status in both 2013 and 2014 only (*remaining ineligible*). When the *remaining eligible* group serves as the control (Table 4), the effect of losing CRA coverage becomes much larger (a decline of 6.5 loans, compared with a decline of 3.3 loans when combining both *remaining eligible* and *remaining ineligible* tracts in the control). By contrast, point estimates for the CRA's effect on the number of loans originated are close to zero and become insignificant when the *remaining ineligible* group was used as the control. These results suggest that those tracts that lost CRA ineligibility were quickly treated less favorably than those neighborhoods that were CRA eligible throughout the study period.

When we replicated the analysis for the newly eligible tracts (Table 5), the CRA's effects remain statistically insignificant, but the point estimates for the CRA's effect are potentially instructive. The point estimate for the numbers of loans originated suggests that the increase in lending is smaller in the newly CRA-eligible tracts (-1.2 loans) than for tracts that were eligible for the entire period. Moreover, the magnitude of the CRA's effect when the *remaining ineligible*

group serves as the control suggests an increase in the volume of lending (1.3 loans versus 0.2 loans in the baseline). This pattern of the CRA's effects, although insignificant, makes sense. One would expect an elevated amount of lending in the newly eligible tracts compared with consistently ineligible tracts owing to the new incentive to lend. However, because small business lending takes significant time and expertise — for example, to collect hard and soft information about borrowers — it might be more challenging to increase the supply of credit in a newly eligible neighborhood to get it to the level of lending observed in neighborhoods where that expertise has had more opportunity to develop. But one should not make too much of this, given that all the coefficients are statistically insignificant.

Identification Assumption

There are important assumptions for the difference-in-differences approach used in this study. The parallel trend assumption, which assumes parallel trends among treatment and control groups prior to the treatment, is the most critical one to ensure the internal validity of difference-in-differences models. To evaluate whether this assumption holds in our data, we conducted falsification tests for other periods, based on the idea that the CRA's effects we found based on the exogenous policy shock in 2013 during the 2012–2015 period would not exist in other periods. To do this, we repeat the regression models for four-year periods, from 2005–2008 to 2013–2016.[11] If we find a significant effect in other years, it may indicate that there were unobserved characteristics that potentially yielded biased estimates. For those tracts with

[11] The CRA asset-size threshold was set to $1 billion for small institutions and $250 million for intermediate small institutions in 2005, and it has gradually increased with inflation and other factors. Before 2005, it was $250 million for small institutions, and intermediate small institutions had no threshold.

changed boundaries, we converted small business lending outcomes from the 2000 census tract boundaries to the 2010 boundaries, using block-level population as weights.[12] Also, we excluded those tracts where CRA eligibility status changed in the 2012 census data refresh for the periods including the break (e.g., 2009–2012 or 2011–2014), given the concern that changed CRA eligibility status would likely impact small business lending during that period. The results are shown in Figure 1. The dots represent the estimated coefficients on the interaction term, and the vertical bars are the 95 percent confidence interval of the coefficients.

In general, the newly eligible and ineligible tracts had no systemic difference in small business lending in earlier or later years compared with those control tracts. Among those newly ineligible tracts, the estimated coefficient is not significantly different from zero in the years before the 2013 policy shock and becomes significant for the periods that include the 2013–2014 break. The coefficient becomes statistically significant during our study period (2012–2015) for two outcomes: the number of small business loans and the number of loans to smaller firms, which supports the contention that the CRA's effects found in this study were mainly due to the exogenous policy shock in 2014. Results from the diagnostic tests of the parallel trend assumption give us confidence for the use of the difference-in-differences model as the identification strategy.

Robustness Check

Some decisions we made to identify the control group, such as the choice of income ranges and buffers used to identify control tracts, had an arbitrary element to them, so we

[12] We repeated the same analysis for the census tracts with consistent boundaries. The results were qualitatively unchanged.

conducted a set of sensitivity analyses using alternative control groups to discern how robust the results are to some of our analytical decisions. For the sake of simplification, we include only the results of some of the important robustness checks and mention some general patterns from the robustness testing. Table 6 summarizes the CRA's effects from regressions using alternative control groups identified using different income ranges (70 percent–90 percent, 50 percent–100 percent, 50 percent–110 percent, and 50 percent–120 percent) and different buffers (a half-mile, two miles, and five miles). The results provide qualitatively consistent evidence that the loss of CRA coverage leads to a significant decline in the number of small business loans (overall and originations to smaller firms), while the effects of becoming CRA eligible remain insignificant for newly eligible tracts.

Of course, we notice some slight differences in the CRA's effects when alternative control groups are used. First, the effect of losing CRA coverage becomes larger when we use tracts within a narrower income range: We find a decline of 5.8 loans on average when the income range of 70 percent to 90 percent of area median family income is used, compared with a decline of 3.3 loans when using the broader income range of 50 percent to 100 percent. In addition, when we use control groups comprising tracts in different buffers (a half-mile, two miles, and five miles), the magnitude of the CRA's effect decreases with the increase in the buffer. The results are consistent with the notion of a spatial decay of the CRA's effects and a less significant effect of the CRA on neighborhoods with incomes farther from the income eligibility threshold.

We also applied state-level, instead of MSA-level, weighting to check whether the results are sensitive to the types of weighting method used. The results remain quite consistent when the state-level weighting method is used.

Spatial Heterogeneity in the CRA's Effects on Small Business Lending

We further evaluate whether the CRA's effects identified in the baseline model vary across neighborhoods and regions. We first examine whether the CRA has a larger effect in neighborhoods that had been defined as part of an MSA for the whole study period, excluding those formerly or newly nonmetro, or rural, tracts. While most newly ineligible tracts were within MSA boundaries during the study period, almost 40 percent of newly eligible tracts were newly merged into an MSA in 2014 as a result of the MSA/MD redefinitions. Because nonmetro neighborhoods are less likely to be included in lenders' assessment areas, we suspect that lenders have less experience and infrastructure in those previously nonmetro tracts than in other metropolitan neighborhoods. If more resources and effort are needed for lenders to increase small business lending in these newly eligible metro tracts, the CRA's effects are expected to be larger by dropping these neighborhoods from the final sample.

When focusing on neighborhoods that had been defined as part of an MSA for the whole study period (Table 7), we find that the magnitude of the effect of gaining CRA eligibility becomes larger (an increase of 2.3 loans versus 0.2 loans in the baseline) and significant in some specifications, although the one included in Table 6 is statistically insignificant.[13] The CRA's effects in the newly ineligible metropolitan tracts, however, remain quite consistent after

[13] The effects of gaining CRA eligibility in tracts remaining part of an MSA become significant when alternative control groups are used, such as using a narrower income range (70–90 percent of area median) or the larger buffer (2 miles or 5 miles). Results are not included here but are available upon request.

dropping a small share of tracts (less than 10 percent) that were classified as nonmetro areas after 2014.[14]

Second, because the CRA was in part motivated by concerns about redlining and discrimination issues in inner-city neighborhoods, we expect the CRA may have had a greater impact on neighborhoods in central cities in major population centers than on those in suburban areas and small cities. The regression results (column 3 in Table 7) confirm that losing CRA eligibility status has a larger effect on neighborhoods in principal cities, which are the main core cities or the largest cities of metropolitan areas. Becoming CRA ineligible leads to an average decline of 5.6 small business loans per tract-year for neighborhoods in principal cities (or 9.9 percent of the pre-2014 mean), larger than the decline of 3.3 loans in the baseline model. Similarly, losing CRA coverage for tracts in principal cities leads to a decrease of 3.6 loans to smaller firms, larger than the decline of 2.4 loans when the full sample is used. The effect of becoming CRA eligible, however, remains insignificant for neighborhoods in principal cities.

Third, the newly ineligible tracts are not evenly distributed across the nation. Nearly half (49.4 percent) are in the Northeast, about 28.0 percent are in the South, 17.5 percent are in the Midwest, and the remainder (about 5.0 percent) are in the West. Similarly, most newly eligible census tracts are located in the Northeast (52.0 percent), followed by the South (29.6 percent), the Midwest (14.3 percent), and the West (4.1 percent). We explore whether geographic location is associated with different CRA effects by partitioning the sample by region and reestimating the baseline regression, the results of which are in the final four columns of Table 7. We find that

[14] The analysis of newly ineligible neighborhoods does not include the previously eligible tracts in nonmetropolitan areas. They may be defined as CRA eligible, but they are less likely to be included in lenders' CRA assessment areas.

the CRA treatment, either gaining or losing CRA eligibility status, has a much larger effect in the Northeast. We observe a decrease of 7.3 loans on average in the Northeast after a tract becomes CRA ineligible, larger than the overall average effect of a decrease of 3.3 loans. The effects of gaining CRA eligibility on the number of small business loans remain statistically insignificant, but the magnitude becomes larger for the Northeast. In contrast, the CRA's effects are generally statistically insignificant in three other regions, except for some significant coefficients in the South (but with the opposite sign).

In considering these results across geographies, we note that there was a concentration of tracts with changed CRA eligibility status after 2013 in Pennsylvania, New Jersey, and New York. These tracts are more likely to be located in metropolitan areas or in principal cities, and they are more spatially concentrated than those in other regions.[15] Thus, if the CRA has a larger effect in metropolitan areas and inner-city neighborhoods (as our results suggest), it is unsurprising to observe more significant effects of CRA treatment in the Northeast.

Temporal Heterogeneity in the CRA's Effects on Small Business Lending

Results from the various regressions discussed above provide generally consistent evidence that there were fewer small business loans originated in neighborhoods that became CRA ineligible, relative to the comparison group, after the 2013 MSA/MD redefinitions. While the CRA designation matters during the 2012–2015 period, a related question is whether the results are robust over time, especially during periods in which market conditions and the policy

[15] For example, the old Philadelphia MD alone has a total of 102 newly ineligible tracts and a total of 80 newly eligible tracts (Ding and Nakamura, 2017).

environment are different. To evaluate potential temporal heterogeneity, we replicated the analysis using 2003–2004 data. The 2003–2004 sample includes tracts with changed CRA eligibility status after the 2003 MSA redefinitions, as well as control tracts identified using the same algorithm used in the 2012–2015 analysis.[16] The regression results are summarized in Table 8.

Interestingly, the 2003–2004 results are quite consistent with the findings from the 2012–2015 sample: Losing CRA eligibility status causes a significant decline in the number of small business loans, as well as in the number of small business loans to smaller firms. The magnitude of the CRA's effects on the total number of originations identified in the 2003–2004 analysis is quite similar (a decrease of 3.8 loans versus a decline of 3.3 loans during 2012–2015), while the decline in originations to smaller firms is slightly smaller (a decline of 2.0 loans versus a decline of 2.4 loans during 2012–2015). Consistent with the 2012–2015 results, gaining CRA eligibility status after 2003 generally does not have a significant impact on small business lending.

The results from this robustness test point strongly to the robustness of the CRA effect. The 2003–2004 analysis is based on a completely different sample of neighborhoods. Also, the precrisis period was characterized by the subprime boom and relatively loose underwriting standards — a policy environment and market conditions that differed markedly from the post-Great Recession period.

[16] Because the CRA eligibility status for a small number of census tracts changed from 2002 to 2003 as a result of the use of the 2000 census information, we chose to focus on the 2003–2004 period only, instead of the 2002–2005 period.

5. Conclusion

This study provides new empirical evidence on the effects of the CRA on small business lending activities. Capitalizing on changes to MSA/MD definitions that altered CRA eligibility for nearly 1,000 tracts, we conducted an analysis that uncovered heterogeneous CRA effects. When a neighborhood loses its LMI designation and becomes CRA ineligible, it is quickly treated by banking institutions less favorably than those neighborhoods that have been consistently eligible under the CRA. By contrast, the effects of gaining CRA eligibility status on small business lending activities are generally insignificant at the aggregate level. The pattern of point estimates provides some indication that banking institutions start to give more attention to newly eligible neighborhoods. The findings are robust when different study periods and a set of alternative control groups are used.

Overall, the empirical results are consistent with the contention that the CRA, a law that encourages depository institutions to help meet the credit needs of the LMI households and neighborhoods, has made small business credit more accessible to its targeted areas. While there is some heterogeneity in the CRA's effects across neighborhoods, the results suggest that a CRA designation still matters in a changing financial landscape. Findings from this study, as well as from other studies that find a significant impact of the CRA (for example, Ding and Nakamura, 2017), imply that the CRA has served as a useful tool in helping meet the credit needs of underserved communities and populations. They further suggest that its preservation can help ensure that the goal of equal access to credit be achieved in a changing regulatory environment and evolving market conditions.

This study focuses only on the CRA's effects on the volume of small business lending. Many other unanswered questions remain. For example, the CRA could have much broader effects on small business lending by altering the underwriting, pricing, or sources of small business credit. If data become available, future research could benefit from an examination of the effects of the CRA on both the quality and costs of small business lending. In addition, nondepository institutions (e.g., online marketplace lenders or fintech companies) have been playing an increasingly vital role in small business lending (U.S. Small Business Administration, 2017). However, the CRA does not cover nondepository institutions, and nondepository small business lenders do not have to report their data to regulators. Future research could evaluate the small business lending activities of lenders not covered by the CRA, with perhaps a focus on how this relates to and affects the activities of depository institutions in the small business market, especially in lower-income communities. Such research could uncover important insights that can inform how best to modernize the CRA in a changing financial landscape.

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Figure 1. The Estimated Coefficients of the Interaction Across Sample Periods, Treat * Post (Distance: 0.5 Mile, Income: 50–100%)

A. Newly Ineligible Tracts

Figure 1. (Continued)

B. Newly Eligible Tracts

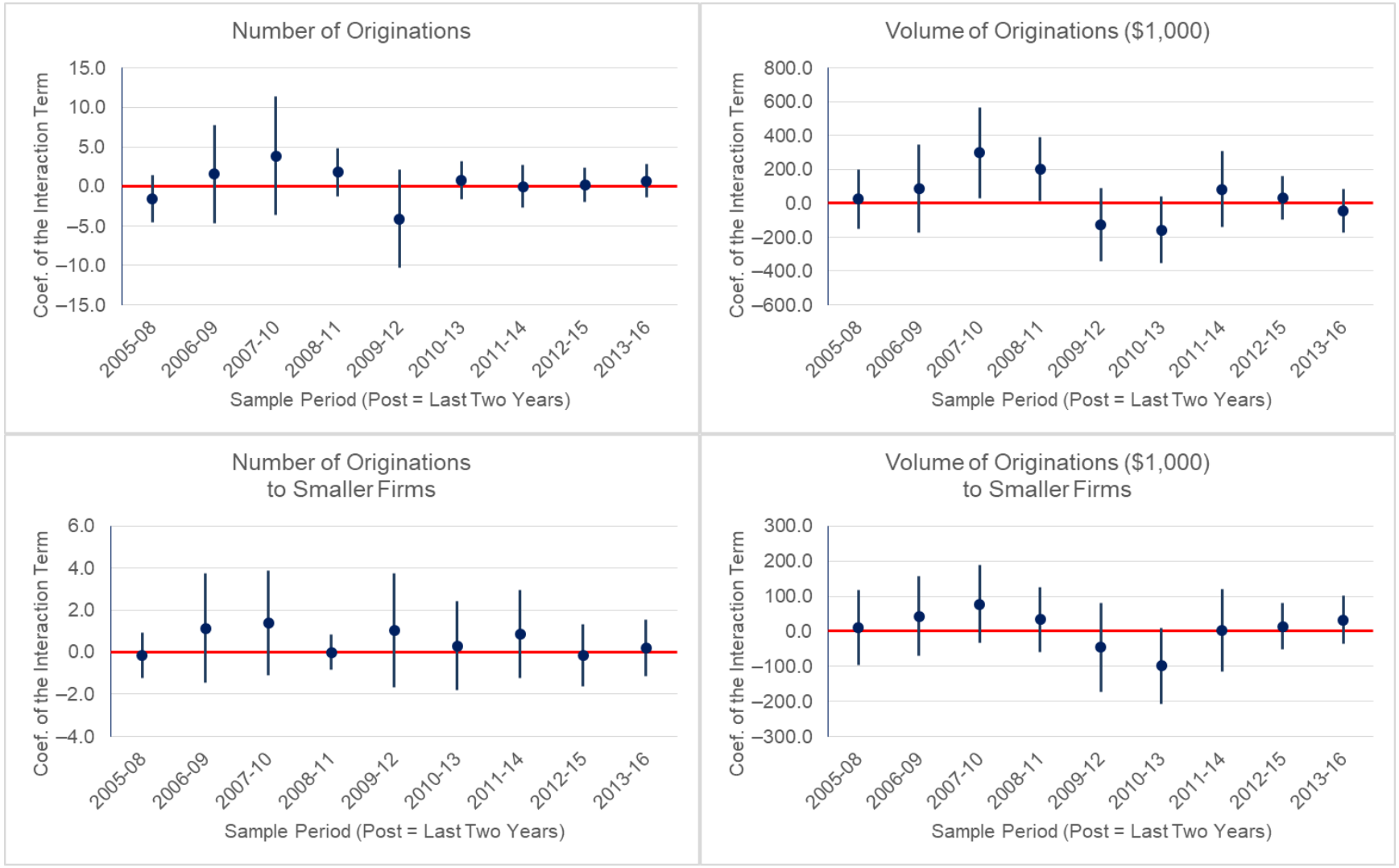

Table 1. Representativeness of the Newly Ineligible and Newly Eligible Tracts

	All 2013	Newly Ineligible Tracts		Newly Eligible Tracts	
Neighborhood Characteristics	LMI Tracts	Treatment	Control	Treatment	Control
Median Family Income in 2013 ($1,000s)	42.4	61.4	60.9	58.5	60.8
Population	3,894.8	4,230.5	4,410.2	4,038.6	4,230.7
Minority (%)	62.0	39.8	43.8	36.9	39.5
Median Family Income Ratio in 2013 (%)	57.6	74.4	73.7	88.4	89.8
Median Family Income Ratio in 2014 (%)	58.0	88.7	87.9	74.6	77.3
Number of Small Business Loans	53.8	60.8	62.6	59.5	63.3
Loan Amount of Small Business Loans ($1,000s)	2,499.3	2,547.2	2,424,8	2,430.4	2,538.7
Number of Small Business Loans to Small Businesses with Gross Annual Revenues ≤ $1 Million	24.5	28.9	30.0	27.3	29.6
Loan Amount of Small Business Loans to Small Businesses with Gross Annual Revenues ≤ $1 Million ($1,000s)	786.0	895.7	850.6	827.3	939.6
Within 2013 MSAs (%)	99.2	100.0	100.0	60.6	67.8
Within 2014 MSAs (%)	99.6	90.6	90.6	100.0	100.0
Within Principal City (%)	64.6	43.3	45.3	33.7	36.8
N	19,721	395	1,071	419	1,279

Notes: Tracts remaining in nonmetropolitan areas, tracts with zero population, tracts in small counties (no more than 30,000 inhabitants), and tracts in noncontiguous states were excluded. In addition, tracts in the control group (1) are within a half-mile of those in the treatment group, (2) did not change CRA eligibility status, and (3) have slightly higher income and slightly lower median income than those in the treatment group (about 50–100% of area median). Weight for the control tract equals the treatment tract share of total/control tract share of total. All dollar amounts are adjusted to 2016 dollars.

Table 2. Descriptive Analysis of Changes in Small Business Lending by Neighborhood Pre- and Post-2014

	Number of Originations		Volume of Originations ($1,000s)		Number of Originations to Smaller Firms		Volume of Originations to Smaller Firms ($1,000s)	
	Treatment	Control	Treatment	Control	Treatment	Control	Treatment	Control
Newly Ineligible Tracts								
2012–2013	44,892	45,077	1,960,168	1,830,166	20,458	20,355	699,111	647,222
2014–2015	51,099	53,889	2,064,344	2,001,008	25,260	27,063	716,155	696,686
Percent Change	13.8%	19.5%	5.3%	9.3%	23.5%	33.0%	2.4%	7.6%
Newly Eligible Tracts								
2012–2013	45,625	48,952	1,979,376	2,082,364	19,918	21,742	689,537	789,456
2014–2015	54,066	57,188	2,093,955	2,172,552	25,899	27,840	697,001	785,365
Percent Change	18.5%	16.8%	5.8%	4.3%	30.0%	28.0%	1.1%	-0.5%

Notes: Tracts in the control group (1) are within a half-mile of those in the treatment group, (2) did not change CRA eligibility status, and (3) have slightly higher income and slightly lower median income than those in the treatment group (about 50–100% of area median). The number of newly ineligible tracts is 395 (N=1,071 for the control group); the number of newly eligible tracts is 419 (N=1,279 for the control group). Tracts in the control groups have been weighted to compensate for over- or underrepresentativeness of matched tracts in different areas. All dollar amounts are adjusted to 2016 dollars.
Source: Authors' calculation based on the 2012–2015 FFIEC CRA Aggregate Flat Files

Table 3. Regression Results for Baseline Test of the CRA's Effects on Small Business Lending

	Number of Originations	Volume of Originations ($1,000s)	Number of Originations to Smaller Firms	Volume of Originations to Smaller Firms ($1,000s)
Newly Ineligible Tracts				
Newly Ineligible	–	–	–	–
Post-MSA Boundaries Change	11.154***	216.256***	8.491***	62.612***
	(1.442)	(39.145)	(1.006)	(23.163)
Newly Ineligible × Post-MSA Boundaries Change	–3.297**	–84.388	–2.413**	–41.036
	(1.670)	(64.578)	(1.144)	(36.204)
Constant	56.943***	2398.946***	25.831***	852.109***
	(0.418)	(16.144)	(0.286)	(9.051)
Number of Observations	5,864	5,864	5,864	5,864
Newly Eligible Tracts				
Newly Ineligible	–	–	–	–
Post-MSA Boundaries Change	9.828***	107.622**	7.276***	–4.882***
	(0.607)	(42.188)	(0.392)	(23.592)
Newly Eligible × Post-MSA Boundaries Change	0.244	29.106	–0.139	13.789
	(1.122)	(65.751)	(0.757)	(33.160)
Constant	56.430***	2423.473***	24.857***	882.454***
	(0.280)	(16.438)	(0.189)	(8.290)
Number of Observations	6,792	6,792	6,792	6,792

Notes: ***, **, * represent significance at the 0.01, 0.05, or 0.1 level. Heteroskedastic-robust standard errors are in parentheses. Tract fixed effect is controlled in the model, and the estimated coefficients on the newly ineligible tracts are absorbed in tract fixed-effects. The estimated coefficients on the interaction terms can be interpreted as the change in small business lending activity in tracts with changed CRA eligibility status relative to that of the control group. Tracts in the control group (1) are within a half-mile of those in the treatment group, (2) did not change CRA eligibility status, and (3) have slightly higher income and slightly lower median income than those in the treatment group (about 50–100% of area median). Tracts in the control groups have been weighted to compensate for over- or underrepresentativeness of matched tracts in different areas. All dollar amounts are adjusted to 2016 dollars.
Source: Authors' calculation based on the 2012–2015 FFIEC CRA Aggregate Flat Files.

Table 4. Results for One-Sided Tests of the CRA's Effects on Small Business Lending, Becoming Newly Ineligible as the Treatment

	Number of Originations	Volume of Originations ($1,000s)	Number of Originations to Smaller Firms	Volume of Originations to Smaller Firms ($1,000s)
Baseline: All Control Tracts				
Newly Ineligible Tracts	–	–	–	–
Post-MSA Boundary Change	11.154***	216.256***	8.491***	62.612***
	(1.442)	(39.145)	(1.006)	(23.163)
Newly Ineligible	–3.297**	–84.388	–2.413**	–41.036
× Post-MSA Boundaries Change	(1.670)	(64.578)	(1.144)	(36.204)
Constant	56.943***	2398.946***	25.831***	852.109***
	(0.418)	(16.144)	(0.286)	(9.051)
Number of Observations	5,864	5,864	5,864	5,864
Control: Tracts That Remained CRA Eligible				
Newly Ineligible Tracts	–	–	–	–
Post-MSA Boundary Change	14.400***	223.965***	10.446***	80.843**
	(2.780)	(58.680)	(1.989)	(33.769)
Newly Ineligible	–6.543**	–92.097	–4.368**	–59.268
× Post-MSA Boundaries Change	(2.905)	(77.993)	(2.063)	(43.761)
Constant	54.889***	2378.456***	24.899***	832.500***
	(0.537)	(19.763)	(0.374)	(10.869)
Number of Observations	3,768	3,768	3,768	3,768
Control: Tracts That Remained CRA Ineligible				
Newly Ineligible Tracts	–	–	–	–
Post-MSA Boundary Change	8.060***	208.905***	6.627***	45.227
	(0.927)	(52.170)	(0.494)	(31.842)
Newly Ineligible	–0.203	–77.037	–0.548	–23.651
× Post-MSA Boundaries Change	(1.253)	(73.220)	(0.736)	(42.292)
Constant	58.886***	2473.535***	26.791***	893.133***
	(0.320)	(19.149)	(0.199)	(10.667)
Number of Observations	3,676	3,676	3,676	3,676

Notes: ***, **, * represent significance at the 0.01, 0.05, or 0.1 level. Heteroskedastic-robust standard errors are in parentheses. Tract fixed effects are controlled in the model, and the estimated coefficients on the newly ineligible tracts are absorbed in tract fixed-effects. Results are from a set of two-way difference-in-differences models predicting the volume of small business originations. Tracts in the control groups have been weighted to compensate for over- or underrepresentativeness of matched tracts in different areas. All dollar amounts are adjusted to 2016 dollars.

Source: Authors' calculation based on the 2012–2015 FFIEC CRA Aggregate Flat Files

Table 5. Results for One-Sided Tests of the CRA's Effects on Small Business Lending, Becoming Newly Eligible as the Treatment

	Number of Originations	Volume of Originations ($1,000s)	Number of Originations to Smaller Firms	Volume of Originations to Smaller Firms ($1,000s)
Baseline: All Control Tracts				
Newly Eligible Tracts	–	–	–	–
Post-MSA Boundary Change	9.828***	107.622**	7.276***	–4.882
	(0.607)	(42.188)	(0.392)	(23.592)
Newly Eligible	0.244	29.106	–0.139	13.789
× Post-MSA Boundaries Change	(1.122)	(65.751)	(0.757)	(33.160)
Constant	56.430***	2423.473***	24.857***	882.454***
	(0.280)	(16.438)	(0.189)	(8.290)
Number of Observations	6,792	6,792	6,792	6,792
Control: Tracts That Remained CRA Eligible				
Newly Eligible Tracts	–	–	–	–
Post-MSA Boundary Change	11.348***	93.178	8.158***	–20.499
	(1.014)	(70.819)	(0.681)	(39.978)
Newly Eligible	–1.275	43.551	–1.021	29.407
× Post-MSA Boundaries Change	(1.385)	(86.949)	(0.940)	(46.276)
Constant	53.524***	2351.488***	23.360***	847.032***
	(0.365)	(20.636)	(0.250)	(10.106)
Number of Observations	4,256	4,256	4,256	4,256
Control: Tracts That Remained CRA Ineligible				
Newly Eligible Tracts	–	–	–	–
Post-MSA Boundary Change	8.764***	117.747**	6.658***	6.065
	(0.748)	(51.830)	(0.467)	(28.716)
Newly Eligible	1.309	18.982	0.480	2.842
× Post-MSA Boundaries Change	(1.204)	(72.326)	(0.798)	(36.985)
Constant	57.764***	2448.788***	25.503***	876.409***
	(0.328)	(18.557)	(0.221)	(9.062)
Number of Observations	4,212	4,212	4,212	4,212

Notes: ***, **, * represent significance at the 0.01, 0.05, or 0.1 level. Heteroskedastic-robust standard errors are in parentheses. Tract fixed effects are controlled in the model, and the estimated coefficients on the newly ineligible tracts are absorbed in tract fixed-effects. Results are from a set of two-way difference-in-differences models predicting the volume of small business originations. Tracts in the control groups have been weighted to compensate for over- or underrepresentativeness of matched tracts in different areas. All dollar amounts are adjusted to 2016 dollars.

Source: Authors' calculation based on the 2012–2015 FFIEC CRA Aggregate Flat Files

Table 6. Robustness Check 1: Using Different Income Ranges for Control Groups (Coefficients of the Interaction, *Treat ∗ Post*)

	Baseline	Income Range			Distance	
	0.5 Mile 50–100%	0.5 Mile 70–90%	0.5 Mile 50–110%	0.5 Mile 50–120%	2 Miles 50–100%	5 Miles 50–100%
Newly Ineligible Tracts						
Number of Originations	–3.297**	–5.79**	–3.831**	–3.616**	–2.902*	–2.801**
	(1.670)	(2.926)	(1.729)	(1.627)	(1.481)	(1.388)
Volume of Originations ($1,000s)	–84.388	–107.002	–84.163	–85.925	–100.288	–91.153
	(64.578)	(83.016)	(62.996)	(62.757)	(61.318)	(59.617)
Number of Originations to Smaller Firms	–2.413**	–4.200**	–2.951**	–2.746**	–1.843*	–1.768*
	(1.144)	(2.041)	(1.334)	(1.244)	(1.009)	(0.955)
Volume of Originations to Smaller Firms	–41.036	–61.964	–43.331	–37.485	–34.201	–32.653
($1,000s)	(36.204)	(48.061)	(35.538)	(35.349)	(34.197)	(33.274)
Number of Observations	5,864	3,476	6,680	7,176	9,344	14,556
Newly Eligible Tracts						
Number of Originations	0.244	1.425	0.018	0.168	1.107	1.211
	(1.122)	(1.354)	(1.120)	(1.110)	(1.080)	(1.071)
Volume of Originations ($1,000s)	29.106	90.214	42.814	27.430	44.985	49.345
	(65.751)	(84.035)	(64.508)	(63.765)	(63.028)	(60.373)
Number of Originations to Smaller Firms	–0.139	0.330	–0.220	–0.188	0.402	0.468
	(0.757)	(0.868)	(0.761)	(0.756)	(0.728)	(0.723)
Volume of Originations to Smaller Firms	13.789	45.699	22.275	16.610	31.853	32.362
($1,000s)	(33.160)	(39.941)	(32.326)	(31.930)	(31.967)	(30.987)
Number of Observations	6,792	3,956	7,696	8,272	8,944	10,080

Notes: ***, **, * represent significance at the 0.01, 0.05, or 0.1 level. Heteroskedastic-robust standard errors are in parentheses. Results are from a set of two-way difference-in-differences models predicting the volume of small business originations. Coefficients can be interpreted as the change in small business lending activity in tracts with changed CRA eligibility status relative to that of the control group. Tract fixed effects are controlled in the model. Tracts in the control groups have been weighted to compensate for over- or underrepresentativeness of matched tracts in different areas. All dollar amounts are adjusted to 2016 dollars.

Source: Authors' calculation based on the 2012–2015 FFIEC CRA Aggregate Flat Files

Table 7. Robustness Check 2: Spatial Heterogeneity in the CRA's Effects (Coefficients of the Interaction, *Treat * Post*)

	Baseline	Within MSAs	Within Principal Cities	Northeast	Midwest	South	West
Newly Ineligible Tracts							
Number of Originations	–3.297**	–3.347*	–5.561*	–7.271**	1.068	–0.159	2.968
	(1.670)	(1.786)	(2.988)	(3.011)	(1.570)	(1.801)	(7.621)
Volume of Originations ($1,000s)	–84.388	–56.386	–73.005	–137.493*	–94.602	–33.098	183.966
	(64.578)	(67.462)	(103.495)	(78.309)	(129.638)	(130.527)	(509.635)
Number of Originations to Smaller Firms	–2.413**	–2.440**	–3.604*	–4.788**	–0.820	–0.271	3.365
	(1.144)	(1.239)	(2.103)	(2.157)	(1.048)	(1.031)	(3.610)
Volume of Originations to Smaller Firms	–41.036	–17.542	–50.387	27.471	–77.764	–114.954	–172.030
($1,000s)	(36.204)	(37.027)	(56.232)	(44.187)	(79.366)	(81.884)	(149.217)
Number of Observations	5,864	5,564	2,712	2,548	1,116	1,784	416
Newly Eligible Tracts							
Number of Originations	0.244	2.305	–1.363	2.016	0.696	–2.457*	–4.367
	(1.122)	(1.624)	(1.862)	(1.851)	(1.732)	(1.455)	(2.962)
Volume of Originations ($1,000s)	29.106	102.725	104.695	87.025	–133.825	–15.046	183.483
	(65.751)	(88.170)	(104.663)	(96.035)	(180.544)	(108.419)	(209.009)
Number of Originations to Smaller Firms	–0.139	0.799	–0.754	0.744	–0.061	–1.779*	0.237
	(0.757)	(1.111)	(1.247)	(1.275)	(1.188)	(0.909)	(1.712)
Volume of Originations to Smaller Firms	13.789	20.328	38.485	–5.065	–35.415	49.632	167.785
($1,000s)	(33.160)	(41.115)	(47.790)	(43.664)	(94.715)	(64.610)	(118.733)
Number of Observations	6,792	5,248	3,724	4,592	636	1,352	212

Notes: ***, **, * represent significance at the 0.01, 0.05, or 0.1 level. Heteroskedastic-robust standard errors are in parentheses. Results are from a set of two-way difference-in-differences models predicting the volume of small business originations. Coefficients can be interpreted as the change in small business lending activity in tracts with changed CRA eligibility status relative to that of the control group. Tracts in the control group (1) are within a half-mile of those in the treatment group, (2) did not change CRA eligibility status, and (3) have slightly higher income and slightly lower median income than those in the treatment group (about 50–100% of area median). Tract fixed effects are controlled in the model. Tracts in the control groups have been weighted to compensate for over- or underrepresentativeness of matched tracts in different areas. All dollar amounts are adjusted to 2016 dollars.
Source: Authors' calculation based on the 2012–2015 FFIEC CRA Aggregate Flat Files

Table 8. Robustness Check 3: Temporal Heterogeneity in the CRA's Effects (Coefficients of the Interaction, *Treat ∗ Post*; Control Group: Within 0.5 Mile and 50–100% of AMFI)

	Baseline: 2012–2015	2003–2004
Newly Ineligible Tracts		
Number of Originations	–3.297**	–3.780**
	(1.670)	(1.847)
Volume of Originations ($1,000s)	–84.388	–21.849
	(64.578)	(145.825)
Number of Originations to Smaller Firms	–2.413**	–2.03*
	(1.144)	(1.119)
Volume of Originations to Smaller Firms ($1,000s)	–41.036	84.603
	(36.204)	(93.484)
Number of Observations	5,864	4,522
Newly Eligible Tracts		
Number of Originations	0.244	–0.474
	(1.122)	(1.101)
Volume of Originations ($1,000s)	29.106	37.266
	(65.751)	(94.007)
Number of Originations to Smaller Firms	–0.139	–0.773
	(0.757)	(0.529)
Volume of Originations to Smaller Firms ($1,000s)	13.789	17.745
	(33.160)	(65.032)
Number of Observations	6,792	6,224

Notes: ***, **, * represent significance at the 0.01, 0.05, or 0.1 level. Heteroskedastic-robust standard errors are in parentheses. Results are from a set of two-way difference-in-differences models predicting the volume of small business originations. Coefficients can be interpreted as the change in small business lending activity in tracts with changed CRA eligibility status relative to that of the control group. Tracts in the control group (1) are within a half-mile of those in the treatment group, (2) did not change CRA eligibility status, and (3) have slightly higher income and slightly lower median income than those in the treatment group (about 50–100% of area median). Tract fixed effects are controlled in the model. Tracts in the control groups have been weighted to compensate for over- or underrepresentativeness of matched tracts in different areas. All dollar amounts are adjusted to 2016 dollars.
Source: Authors' calculation based on the FFIEC CRA Aggregate Flat Files.

Appendix

Table A1. Construction of the Final Study Sample, 2013–2014 (0.5 Mile, 50–100% of AMFI)

	Newly Ineligible		Newly Eligible	
	Treatment	Control	Treatment	Control
(1) Tracts with changed CRA eligibility status from 2013 to 2014 in contiguous states only (and not in small counties with no more than 30,000 inhabitants)	549	-	432	-
(2) Drop tracts remaining in nonmetro areas, tracts with no population, previously nonmetro and newly ineligible, newly nonmetro and newly eligible tracts from treatment groups	395	2,023	423	2,284
(3) Drop newly eligible/ineligible tracts/nonmetro tracts, tracts with zero population from control groups	395	2,008	423	2,275
(4) Drop tracts not in the income range (50–100% AMFI) from control groups	395	1,088	423	1,314
(5) Drop tracts without any matches in the same MSA from treatment groups and control groups	395	1,071	419	1,279
(6) Final sample	**395**	**1,071**	**419**	**1,279**

Source: Authors' definition based on 2013 and 2014 FFIEC Census and Demographic data