Effects of the Community Reinvestment Act on small business lending

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\textbf{ABSTRACT}

This study examines the effectiveness of the Community Reinvestment Act (CRA) in facilitating small business lending to lower-income neighborhoods. Taking advantage of an exogenous policy shock that resulted in neighborhood-level changes in CRA eligibility, we identify changes in small business lending in tracts that became CRA eligible and CRA ineligible and compare these with control groups constructed in two ways. The results of our difference-in-differences analysis uniformly show increases in the number of loans associated with CRA eligibility, which is consistent with a view that the CRA promotes small business lending in lower-income neighborhoods.

\section*{Introduction}

Questions remain regarding the efficacy of the Community Reinvestment Act (CRA), which was enacted in 1977 to encourage federally regulated depository institutions to meet the credit needs of all families and communities, including those of lower income, and is facing a major reform (Office of the Comptroller of the Currency, 2018). While there has been much research on its impact on mortgage lending (see, for example, Bhutta, 2011; Ding & Nakamura, in press; Lee & Bostic, 2020; Ringo, 2017) and the evidence regarding its positive effects in this context is becoming clearer, much less work has been done regarding other types of lending and banking services.

This paper seeks to help fill this gap by generating clearer evidence of the CRA’s impact in the context of small business lending. We take advantage of a unique opportunity provided by an exogenous policy shock in 2013—an Office of Management and Budget (OMB) update of metropolitan and micropolitan delineations based on the 2010 standards and Census Bureau data. The revision not only changed the geographic boundaries of Metropolitan Statistical Areas and Metropolitan Divisions (MSAs/MDs) but also altered median family income for the regions, which eventually affected the CRA eligibility of the neighborhoods within the new MSAs/MDs boundaries. As a result, 549 census tracts across the 48 contiguous states and Washington, D.C., that were once eligible for CRA credit (i.e., have a median family income below 80% of the area median) became ineligible in 2014, while 432 previously CRA ineligible tracts became newly eligible. The change in CRA eligibility status triggers a change in the extent of CRA-related regulation, which potentially allows us to identify the CRA’s effects.

The empirical results provide consistent evidence that the CRA has had a significant impact on the volume of small business lending in lower-income neighborhoods. However, the specifics of this impact depend on 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 is consistent with expectations, as the heightened CRA regulatory focus should lead to banking institutions giving these neighborhoods more attention. The smaller relative magnitude also makes sense, because lenders will need to build capacity and accumulate experience to appropriately serve the newly eligible neighborhoods.

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 small business lending. These relationships have been observed in a number of other studies (Bostic & Lee, 2017; Bostic & Robinson, 2003, 2005; Immergluck, 2004; Zinman, 2002), although none features an exogenous shock such as the one we leverage to establish a clean identification strategy. 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. In addition, 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. Also, since the policy shock produced two types of treatments—gaining CRA eligibility status and losing it—comparing the effects of different treatments offers an opportunity to gain a richer feel for prevailing market dynamics. 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.

**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 (Essene & Apgar, 2009; Garwood & Smith, 1993). 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 federal agencies. 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, which we will describe in this paper as CRA-eligible neighborhoods or tracts, are defined as census tracts that have median family incomes less than 80% of the median family income for the surrounding area. The surrounding area for a census tract is either the MSA, the MD, or the nonmetropolitan area of the state for those tracts not located in a metropolitan area. Assessment areas are the geographic areas where institutions have their main office, branches, and deposit-taking automated teller machines (ATMs). While the total performance of banks and thrifts is measured during a CRA examination, CRA-related activities in LMI neighborhoods and within a banking institution’s assessment area are weighted heavily (Avery et al., 2005).

There is a rich literature on the effectiveness of the CRA. Survey responses 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 et al., 2005). The number of newly initiated CRA agreements—banking institution pledges to provide substantial resources to targeted groups and communities—in a county has been found to be 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 & Robinson, 2003, 2005). For mortgage lending, the preponderance of the evidence suggests that the CRA has helped expand
access (Avery et al., 2005; Bhutta, 2011; Ding & Nakamura, in press; Gabriel & Rosenthal, 2009; Joint Center for Housing Studies, 2002; Lee & Bostic, 2020; Ringo, 2017). However, some studies have concluded that the CRA induced either no change in behavior or a retreat from such neighborhoods (Dahl et al., 2010; Getter, 2015). On balance, the studies in these areas show that banking institutions complied with the law by engaging more with local community organizations and shifting their lending activities to CRA-eligible neighborhoods.

The CRA-focused literature on small business lending is much smaller than that for mortgage lending. Zinman (2002) examines the causal effects of the 1995 CRA reform on small business lending from 1993 to 1998. The paper focuses on new incentives for small business lending in LMI neighborhoods instituted by the 1995 CRA reform and the fact that the incentive would be greater among banks with assets greater than threshold for CRA reporting and examinations and those with tough regulators. Given these differential effects, the paper analyzes changes in the levels of small business lending across different types of banks and found that the CRA increased lending to small businesses and that these increases improved county-level payroll and reduce business bankruptcies. Investigating the CRA effects on small business lending over a longer period from 1996 to 2014, Bostic and Lee (2017) suggest that the CRA effects might differ across the business cycle: 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.

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% 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 et al., 2003; Avery & Brevoort, 2015; Bhutta, 2011; Bostic & Lee, 2017; Gabriel & Rosenthal, 2009).

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. Further, 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 straightforward: 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 should 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. As mentioned above, Zinman (2002) leverages time variation in CRA incentives across bank size and regulator toughness, using the 1995 CRA reforms as a policy shock. Ding and Nakamura (in press) and Ringo (2017) also employ difference-in-differences approaches and use changes in the definitions of MSAs and MDs as the exogenous shock. These studies find positive CRA effects on home mortgage lending, with the effects being greater among lower-income tracts.
This study is most closely related to Ding and Nakamura (in press), which examines the CRA’s impact on bank mortgage lending activities in the Philadelphia area, and Ringo (2017), which examines the CRA effects using the MSA boundary changes in 2003–2004. 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 that lenders often rely upon more soft information of borrowers than is typical for underwriting for mortgages (Greenstone et al., 2014). In addition, the current work improves upon Ding and Nakamura (in press) 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, and the results confirm that such heterogeneity does exist: The CRA generally has a larger effect in metropolitan neighborhoods, in neighborhoods located in inner cities, and in the Northeast. Finally, while Ringo (2017) and Ding and Nakamura (in press) focus, respectively, only on the 2003 and 2013 policy shocks, each of which had a distinct policy environment and market condition, respectively, this study analyzes relationships over the pre- and post-crisis periods and is thus more generalizable than either of those studies.

**The new MSA/MD definitions and their implications for CRA lending**

As noted above, the CRA-eligibility of a census tract is determined by comparing its median family income to the median family income of its MSA, its MD, or the nonmetropolitan portion of the state. 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. The resultant changes in MSA/MD boundaries meant that many tracts had a different surrounding area and thus a different median family income benchmark by which to assess CRA eligibility.

In total, 818 tracts had their CRA eligibility status change as a result of the OMB revision. Of these, 423 were previously ineligible tracts that became newly CRA eligible. 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% 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 part of an MSA is more likely to be CRA eligible. A second type includes 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 area median family income for cities and towns in Essex County 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 area median family income increased slightly from $101,200 to $104,100, causing neighborhoods with incomes 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% 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.

**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 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:

\[
Y_{it} = \beta_0 + \beta_1 TREAT_i + \beta_2 POST_t + \beta_3 (TREAT_i \times POST_t) + \gamma N_t + \epsilon_{it}
\]  

(1)

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% and 100% of the area median, and did not have their CRA eligibility status change between 2013 and 2014.5

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% in 2013 to 88.7% in 2014; the control tracts for them had similar average values—73.7% in 2013 and 87.9% in 2014. Likewise, the average median income ratio among newly eligible tracts declined from 88.4% in
2013 to 74.6% in 2014, and the control group tracts had comparable numbers (89.8% in 2013 and 77.3% in 2014). Compared with the LMI tracts, treatment and control tracts tend to have higher median incomes, larger populations, 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 under-representativeness. 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 conduct a set of sensitivity 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 Home Mortgage Disclosure Act (HMDA) mortgage data, the CRA data are the most comprehensive publicly available data on small business lending. Greenstone et al. (2014) report that the CRA data cover approximately 86% of all loans of $1 million or less.

Although it is the best available dataset with which to conduct this kind of analysis, the CRA small business data are not perfect. Perhaps most significantly, the dataset does not include small business loans made by smaller commercial banks and savings associations, nor does it include lending activity by nondepository institutions such as fintech companies and many community development financial institutions. To the extent that these institutions have a large presence in
some areas, the CRA data may be less useful for analyzing small business lending patterns in those areas. Unfortunately, there are no simple ways to address this shortcoming.

With this caveat in mind, we use these data to test the role of the CRA on four possible outcome measures: (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. 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 et al., 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, relative to the control group, we observe a smaller increase after 2014 in the total number of small business loan originations by CRA-covered lenders (Table 2). During the two years after the MSA/MD redefinitions in 2013, the number of small business loan originations increased by 13.8% in the newly ineligible tracts, smaller than the increase of 19.5% 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% increase in the number of small business loans in the treatment tracts, compared with a 16.8% increase in the control tracts).

While these descriptive statistics support the notion that CRA incentives influence bank small business lending activities in LMI neighborhoods, we want to verify these findings by using the regression analysis.

### 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. Figure 1 compares the average small business lending between treated and control tracts in pre-treatment and post-treatment years, from 2009 to 2015. While the trends in the number of small business loan originations had been fairly similar in the pre-treatment period of 2009–2013, the trends in loan volumes look quite different between the two groups. This suggests that the loan volume measures are not well-suited for study using a difference-in-differences approach. As

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| Table 2. Descriptive analysis of changes in small business lending by neighborhood pre- and post-2014. |
|---------------------------------------------------------------|
| | Newly Ineligible Tracts | Newly Eligible Tracts |
| | Number of Originations | Volume of Originations ($1,000s) | Number of Originations | Volume of Originations to Smaller Firms ($1,000s) |
| | Treatment | Control | Treatment | Control | Treatment | Control | Treatment | Control |
| 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% |

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 under-representativeness 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.
Figure 1. The average number and dollar amount of small business loan originations in treatment and groups over time. a. Newly Ineligible Tracts in 2014–2015. b. Newly Eligible Tracts in 2014–2015. Note: Newly ineligible tracts are tracts that lost their CRA-eligibility as a result of the OMB classification of metropolitan areas and districts in 2013. Newly eligible tracts are tracts that gained eligibility as a result of the OMB classification of metropolitan areas and districts. The CRA data from 2009 to 2011 were adjusted to 2010 census tract boundaries. Source: Authors’ calculation based on the 2009–2015 FFIEC CRA Aggregate Flat Files.

a consequence, all subsequent analyses will focus only on the loan origination performance measures.

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. 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 loan originations. Becoming CRA ineligible causes an average decline of 3.3 small business loans (or 5.8% of the pre-2014 mean) per tract-year in the post-2013 period and a decrease of 2.4 loan originations to smaller firms (or 9.3% 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, measured by the number of small business loans per tract-year.

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 eligibility were quickly treated less favorably than those neighborhoods that were CRA eligible throughout the study period.

| Table 3. Regression results for baseline test of the CRA’s effects on small business lending. |
|--------------------------------------------------|---------------------------------|
| **Newly Ineligible Tracts**                      | Number of Originations | Number of Originations to Smaller Firms |
| Newly Ineligible x Post-MSA Boundaries Change    | –3.297*                 | –2.413*               |
|                                                | (1.670)                 | (1.144)               |
| Post-MSA Boundaries Change                      | 11.154***               | 8.491***              |
|                                                | (1.442)                 | (1.006)               |
| Constant                                        | 56.943***               | 25.831***             |
|                                                | (0.418)                 | (0.286)               |
| Number of Observations                          | 5,864                   | 5,864                 |
| **Newly Eligible Tracts**                       |                          |                       |
| Newly Eligible x Post-MSA Boundaries Change     | 0.244                   | –0.139                |
|                                                | (1.122)                 | (0.757)               |
| Post-MSA Boundaries Change                      | 9.828***                | 7.276***              |
|                                                | (0.607)                 | (0.392)               |
| Constant                                        | 56.430***               | 24.857***             |
|                                                | (0.280)                 | (0.189)               |
| Number of Observations                          | 6,792                   | 6,792                 |

***, **, and * represent significance at the 0.001, 0.01, and 0.05 level respectively; † = p < 0.10. Tract-level clustered standard errors are in parentheses. Tract fixed effect is controlled in the model, and the estimated coefficients on the newly eligible/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 under-representativeness of matched tracts in different areas.

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.

| Baseline: All Control Tracts | Number of Originations | Number of Originations to Smaller Firms |
|-----------------------------|------------------------|----------------------------------------|
| Newly Ineligible × Post-MSA Boundaries Change | −3.297** | −2.413* |
| Post-MSA Boundary Change | 11.154*** | 8.491*** |
| Constant | 56.943*** | 25.831*** |
| Number of Observations | 5,864 | 5,864 |

| Control: Tracts That Remained CRA Eligible | Number of Originations | Number of Originations to Smaller Firms |
|-------------------------------------------|------------------------|----------------------------------------|
| Newly Ineligible × Post-MSA Boundaries Change | −6.543* | −4.368* |
| Post-MSA Boundary Change | 14.400*** | 10.446*** |
| Constant | 54.889*** | 24.899*** |
| Number of Observations | 3,768 | 3,768 |

| Control: Tracts That Remained CRA Ineligible | Number of Originations | Number of Originations to Smaller Firms |
|---------------------------------------------|------------------------|----------------------------------------|
| Newly Ineligible × Post-MSA Boundaries Change | −0.203 | −0.548 |
| Post-MSA Boundary Change | 8.060*** | 6.627*** |
| Constant | 58.886*** | 26.791*** |
| Number of Observations | 3,676 | 3,676 |

***, **, and * represent significance at the 0.001, 0.01, and 0.05 level respectively; † = p < 0.10. Tract-level clustered 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 under-representativeness of matched tracts in different areas.

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

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, time and effort are needed 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.

Robustness check

In the main analysis, we selected control group tracts that are similar on two attributes: their location (proximity to treatment tracts) and economic status (median income ratio). However, we acknowledge that there might be an arbitrary element to the decision and thus discuss the robustness of the results to alternative approaches in this section.

First of all, we conducted a set of sensitivity analyses using alternative choice of income ranges and distance buffers 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
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 | Number of Originations to Smaller Firms |
|------------------|------------------------|----------------------------------------|
| **Baseline: All Control Tracts** |                        |                                        |
| Newly Eligible × Post-MSA Boundaries Change | 0.244                  | -0.139                                 |
|                  | (1.122)                | (0.757)                                |
| Post-MSA Boundary Change | 9.828***               | 7.276***                               |
|                  | (0.607)                | (0.392)                                |
| Constant | 56.430***              | 24.857***                              |
|                  | (0.280)                | (0.189)                                |
| Number of Observations | 6,792                  | 6,792                                  |
| **Control: Tracts That Remained CRA Eligible** |                        |                                        |
| Newly Eligible × Post-MSA Boundaries Change | -1.275                 | -1.021                                 |
|                  | (1.385)                | (0.940)                                |
| Post-MSA Boundary Change | 11.348***              | 8.158***                               |
|                  | (1.014)                | (0.681)                                |
| Constant | 53.524***              | 23.360***                              |
|                  | (0.365)                | (0.250)                                |
| Number of Observations | 4,256                  | 4,256                                  |
| **Control: Tracts That Remained CRA Ineligible** |                        |                                        |
| Newly Eligible × Post-MSA Boundaries Change | 1.309                  | 0.480                                  |
|                  | (1.204)                | (0.798)                                |
| Post-MSA Boundary Change | 8.764***              | 6.658***                               |
|                  | (0.748)                | (0.467)                                |
| Constant | 57.764***              | 25.503***                              |
|                  | (0.328)                | (0.221)                                |
| Number of Observations | 4,212                  | 4,212                                  |

***, **, and * represent significance at the 0.001, 0.01, and 0.05 level respectively; † = p < 0.10. Tract-level clustered 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 under-representativeness of matched tracts in different areas.

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

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%–90%, 50%–100%, 50%–110%, and 50%–120%) 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

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 | 0.5 mile | 0.5 mile | 0.5 mile | 2 miles | 2 miles | 2 miles | 2 miles | 2 miles | 2 miles | 2 miles |
|                  | 0.5 mile | 0.5 mile | 0.5 mile | 0.5 mile | 2 miles | 2 miles | 2 miles | 2 miles | 2 miles |
| **Newly Ineligible Tracts** |         |            |          |          |        |        |        |        |        |        |        |
| Number of Originations | -3.297* | -5.790* | -3.831* | -3.616* | -2.902† | -2.801* |        |        |        |        |        |
|                  | (1.670) | (2.926) | (1.729) | (1.627) | (1.481) | (1.388) |        |        |        |        |        |
| 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) |        |        |        |        |        |
| 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) |        |        |        |        |        |
| Number of Originations to Smaller Firms | -0.139 | 0.330 | -0.220 | -0.188 | 0.402 | 0.468 |        |        |        |        |        |
|                  | (0.757) | (0.686) | (0.761) | (0.756) | (0.728) | (0.723) |        |        |        |        |        |
| Number of Observations | 6,792 | 3,956 | 7,696 | 8,272 | 8,944 | 10,808 |        |        |        |        |        |

***, **, and * represent significance at the 0.001, 0.01, and 0.05 level respectively; † = p < 0.10. Tract-level clustered 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 under-representativeness of matched tracts in different areas.

Source: Authors’ calculation based on the 2012–2015 FFIEC CRA Aggregate Flat Files.
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% to 90% of area median family income is used, compared with a decline of 3.3 loans when using the broader income range of 50% to 100%. 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.

One concern about using a set of control tracts defined by proximity to the treatment tracts is that positive treatment effects might spill over into these proximate tracts, thereby weakening the validity and power of these controls. To mitigate this concern, we selected an alternative set of control tracts along targeted dimensions, which is sometimes described as a nearest-neighbor propensity score matching approach (Rosenbaum & Rubin, 1983; Rubin, 1973).

This approach involves a three-step analytic process (Guo & Fraser, 2015). In the first stage, logistic regression models are employed to predict the propensity for tract $i$ to receive treatment (e.g., gaining or losing CRA eligibility) on various pre-treatment neighborhood characteristics including population density, minority share, college graduate share, poverty rate, homeownership rate, single-family unit share, and median gross rent. The neighborhood characteristics are obtained from the 2010 American Community Survey 5-year estimates, which were used in the FFIEC Demographic and Census data. To ensure that each treated tract is paired with a comparable control tract within the same MSA, we repeated the logistic regression stratified by MSAs. In doing so, the MSAs with less than 100 tracts were excluded.

In the second step, we matched treated tracts with the most similar nontreatment neighbor(s), based on propensity scores derived from the first-stage logistic regression. Building on prior work using this approach, we used a caliper width equal to 0.2 of the standard deviation of the propensity score in our main analysis (Austin, 2011; Rosenbaum & Rubin, 1985). There is no consensus regarding the optimal number of nearest neighbors to use, so we ran three analyses using 1, 2, and 3 neighbors, respectively, to assess robustness. For each analysis, we dropped treatment tracts that failed to garner the required number of nearest neighbors; this ensured a sample with common support.

If successful, this matching method should yield a sample with few or no significant differences between treated and control tracts in observable characteristics. Table 7 presents the results of balance tests examining the differences between treated and control tracts after matching for samples matched with different numbers of nearest neighbors. The matched samples generally do not show significant differences between the treatment and control groups. We do note that newly eligible tracts are less well matched than newly ineligible tracts, particularly when three nearest neighbors are included as the control.

In the third step, we performed difference-in-differences regressions using the matched samples to compare the small business lending outcomes of treated and control tracts. The regression results are shown in Table 8. While the magnitudes of the effects are somewhat larger than the baseline results, the general pattern still holds. When a neighborhood loses its CRA eligibility, the number of small business loans declines by 5.4 to 7.9 loans and the number of loans to smaller firms decreases by 3.2 to 4.8 loans. Interestingly, unlike in the baseline case, we find statistically significant effects of gaining CRA eligibility. Here we see that newly eligible tracts receive 3.8 to 4.3 more loans and 2.0 to 2.3 more loans to smaller firms.
Table 7. Balancing test for nearest neighbor matching.

| Newly Ineligible Tracts | Population density (persons per square mile) | % Minority | % Bachelor’s degree+ | % Poverty | % Home ownership | % Single-family | Median gross rent ($) |
|------------------------|---------------------------------------------|------------|---------------------|-----------|------------------|----------------|----------------------|
| Number of Matched Neighbors = 1 | Treatment Group | 8,262.8 | 41.4 | 24.3 | 13.7 | 62.1 | 65.6 | 938.9 |
| | Control Group | 8,685.6 | 41.3 | 24.9 | 14.3 | 59.7 | 62.1 | 931.8 |
| | Difference | −422.8 | 0.1 | −0.5 | −0.6 | 2.4 | 3.5† | 7.1 |
| Number of Matched Neighbors = 2 | Treatment Group | 8,262.8 | 41.4 | 24.3 | 13.7 | 62.1 | 65.6 | 938.9 |
| | Control Group | 8,231.5 | 40.8 | 25.1 | 14.1 | 61.4 | 64.2 | 927.5 |
| | Difference | 31.3 | 0.7 | −0.8 | −0.3 | 0.7 | 1.4 | 11.4 |
| Number of Matched Neighbors = 3 | Treatment Group | 8,262.8 | 41.4 | 24.3 | 13.7 | 62.1 | 65.6 | 938.9 |
| | Control Group | 7,688.3 | 39.8 | 25.3 | 13.8 | 62.3 | 64.6 | 931.1 |
| | Difference | 574.5 | 1.6 | −1.0 | −0.0 | −0.2 | 1.1 | 7.9 |
| Newly Eligible Tracts | Number of Matched Neighbors = 1 | Treatment Group | 19,380.4 | 38.8 | 22.7 | 14.2 | 53.9 | 48.7 | 933.4 |
| | Control Group | 21,565.4 | 45.0 | 22.8 | 15.5 | 52.2 | 45.2 | 940.5 |
| | Difference | −2,185.0 | −6.2† | −0.1 | −1.3 | 1.8 | 3.4 | −7.2 |
| Number of Matched Neighbors = 2 | Treatment Group | 19,380.4 | 38.8 | 22.7 | 14.2 | 53.9 | 48.7 | 933.4 |
| | Control Group | 22,562.8 | 45.4 | 23.4 | 15.3 | 51.7 | 44.0 | 948.9 |
| | Difference | −3,182.4 | −6.6** | −0.7 | −1.1 | 2.3 | 4.7* | −15.5 |
| Number of Matched Neighbors = 3 | Treatment Group | 19,380.4 | 38.8 | 22.7 | 14.2 | 53.9 | 48.7 | 933.4 |
| | Control Group | 24,205.2 | 46.2 | 23.0 | 15.6 | 51.0 | 43.2 | 961.0 |
| | Difference | −4,824.8* | −7.4** | −1.3 | −1.3* | 3.0† | 5.4** | −27.7 |

***, **, and * represent significance at the 0.001, 0.01, and 0.05 level respectively; † = p < 0.10. Tract-level clustered standard errors are in parentheses. The unmatched census tracts are restricted to those within MSAs having at least one treatment tract. All dollar amounts are adjusted to 2010 dollars.

Source: Authors’ calculation based on the 2012 FFIEC CRA Aggregate Flat Files and 2010 American Community Survey 5-year estimates.

**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 nonmetropolitan tracts. While most newly ineligible tracts were within MSA boundaries during the study period, almost 40% of newly eligible tracts were newly merged into an MSA in 2014 as a result of the MSA/MD redefinitions. Because neighborhoods in nonmetropolitan areas are less likely to be included in lenders’ assessment areas, we suspect that lenders have less experience and infrastructure in those previously nonmetropolitan 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 9), 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. The CRA’s
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.

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

**Table 9.** 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)|       |
| 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)|       |
| Number of Observations | 5,864    | 5,564       | 2,712                   | 2,548     | 1,116   | 1,784 | 416   |
| **Newly Eligible Tracts** |          |             |                         |           |         |       |       |
| Number of Originations | 0.244    | 2.050       | −1.363                  | 2.016     | 0.696   | −4.367|       |
| (1.122)            | (1.624)  | (1.862)     | (1.851)                 | (1.732)   | (1.455) | (2.962)|       |
| Number of Originations to Smaller Firms | −0.139   | 0.799       | −0.754                  | 0.744     | −0.061  | −0.237|       |
| (0.757)            | (1.111)  | (1.247)     | (1.275)                 | (1.188)   | (0.909) | (1.712)|       |
| Number of Observations | 6,792    | 5,248       | 3,724                   | 4,592     | 636     | 1,352| 212   |

***, **, and * represent significance at the 0.001, 0.01, and 0.05 level respectively; † = p < 0.10. Tract-level clustered 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 under-representativeness of matched tracts in different areas.

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

effects in the newly ineligible metropolitan tracts, however, remain quite consistent after dropping a small share of tracts (less than 10%) that were classified as being in nonmetropolitan areas after 2014.¹⁰

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 9) 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% 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%) are in the Northeast, about 28.0% are in the South, 17.5% are in the Midwest, and the remainder (about 5.0%) are in the West. Similarly, most newly eligible census tracts are located in the Northeast (52.0%), followed by the South (29.6%), the Midwest (14.3%), and the West (4.1%). We explore whether geographic location is associated with different CRA effects by partitioning the sample by region and re-estimating the baseline regression, the results of which are in the final four columns of Table 9. We find that 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. 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.

When using control tracts identified by the propensity score matching approach, rather than the approach used for the baseline, we find the results remained largely unchanged in terms of the sign and significance of the CRA effects on small business lending across different geographies. The generally consistent results using alternative control groups give us confidence regarding our findings on the spatial heterogeneity of the CRA effects.

**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 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. The regression results are summarized in Table 10.

Interestingly, the 2003–2004 results are quite consistent with the findings from the 2012–2015 sample: Losing CRA eligibility 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 stringy to the robustness of the CRA effect. The 2003–2004 analysis is based on a completely different sample of neighborhoods. Also, the pre-crisis period was characterized by the subprime boom and relatively loose underwriting standards—
Table 10. 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)   |
| Number of Originations to Smaller Firms | −2.413*              | −2.030†   |
|                      | (1.144)              | (1.119)   |
| Number of Observations | 5,864                | 4,522     |
| **Newly Eligible Tracts** |                      |           |
| Number of Originations | 0.244                | 0.474     |
|                      | (1.122)              | (1.101)   |
| Number of Originations to Smaller Firms | 0.139               | 0.773     |
|                      | (0.757)              | (0.529)   |
| Number of Observations | 6,792                | 6,224     |

### Notes

***, **, and * represent significance at the 0.001, 0.01, and 0.05 level respectively; † = p < 0.10.

Tract-level clustered 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 under-representativeness of matched tracts in different areas.

Source: Authors’ calculation based on the FFIEC CRA Aggregate Flat Files

a policy environment and market conditions that differed markedly from the post-Great Recession period.

### 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 & Nakamura, in press), 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.

The regulation governing the CRA is currently undergoing a major reform. As the law has been one of the most important tools in the United States for ensuring equitable access to credit, the details of this reform will determine the distribution of capital and investment flows across neighborhoods and ultimately whether the CRA achieves its mission of expanding access to credit and banking services. This reform effort should make every effort to leverage evidence such as that presented here to craft a regulation that enhances the CRA’s efficacy.

Notes

1. 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.
2. Our use of CRA-eligible tract is shorthand and 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 neighborhoods above the CRA median family income threshold is still eligible for CRA credit.
3. The OMB periodically issues new delineations for the MSAs and revises existing ones to better reflect economic and demographic realities. See more details at www.ffiec.gov/cra/OMB_MSA.htm.
4. 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).
5. 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% and 100% of area median in 2013 or between 50% and 80% of the area median in 2014. We test an alternative set of control tracts in a later section.
6. Also, the number of small business loan purchases (1.6 million) was only one third of the loan originations (4.6 million) and the amount of small business loan purchases ($2 billion) was about 2% of the loan originations ($99 billion) in 2016.
7. 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.
8. Consistent with this argument, we could find greater CRA effects over time when we interact the treatment variable with year dummies rather than the post dummy (Appendix Table A2).
9. 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% of area median) or the larger buffer (2 miles or 5 miles). Results are not included here but are available upon request.
10. 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.
11. For example, the old Philadelphia MD alone has a total of 102 newly ineligible tracts and a total of 80 newly eligible tracts (Ding & Nakamura, in press).
12. The effects of losing CRA eligibility on small business lending in principal cities and the Northeast have the same sign and an even larger magnitude. The effects of gaining CRA eligibility remain positive but become significant in two areas, the Northeast and the Midwest. Detailed results are available upon request.
13. 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.
14. The regressions using alternative control tracts identified by the propensity score matching method, instead of the spatial proximity approach, provide generally consistent results, with the CRA effects having the same sign and similar magnitude (although becoming slightly less significant in some specifications because matching has led to a smaller sample size). Results are available upon request.
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No potential conflict of interest was reported by the authors.

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Appendix

Table A1. Construction of the final study sample (0.5 mile, 50–100% of AMFI).

| (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) | Newly Ineligible | Newly Eligible |
|---|---|---|
| | Treatment | Control | Treatment | Control |
| (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/ineffective 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

Table A2. Summarized results for the baseline model and the model with year-dummies.

| Newly Ineligible Tracts | Number of Originations | Number of Originations to Smaller Firms |
|---|---|---|
| Baseline Model: Newly Ineligible × Post-MSA Boundaries Change | −3.297* | (1.670) | −2.413* | (1.144) |
| Newly Ineligible × 2014 FEs | −2.929† | (1.771) | −2.405* | (1.142) |
| Newly Ineligible × 2015 FEs | −3.666* | (1.701) | −2.421† | (1.240) |
| Number of Observations | 5,864 | 5,864 |

| Newly Eligible Tracts | Number of Originations | Number of Originations to Smaller Firms |
|---|---|---|
| Baseline Model: Newly Eligible × Post-MSA Boundaries Change | 0.244 | (1.122) | −0.139 | (0.757) |
| Newly Eligible × 2014 FEs | 0.031 | (1.000) | −0.219 | (0.638) |
| Newly Eligible × 2015 FEs | 0.457 | (1.408) | −0.059 | (1.012) |
| Number of Observations | 6,792 | 6,792 |

***, **, and * represent significance at the 0.001, 0.01, and 0.05 level respectively; † = p < 0.10. Tract-level clustered standard errors are in parentheses. Tract fixed effect is controlled in the model. 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 under-representativeness of matched tracts in different areas.

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