A PRACTITIONER'S SUMMARY

# THE EFFECTS OF THE COMMUNITY REINVESTMENT ACT (CRA) ON MORTGAGE LENDING IN THE PHILADELPHIA MARKET


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**June 2017**

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The Community Reinvestment Act (CRA) of 1977 encourages federally regulated depository institutions to meet the credit needs of low- and moderate-income (LMI) people and communities. A depository institution is rated based on its record of providing residential mortgages and other financial services to LMI people and neighborhoods, and bank examiners consider the institution's CRA rating before approving bank mergers, acquisitions, and branch openings. As a result, CRA has the potential to increase the supply and alter the sources of mortgage credit in targeted areas (Appendix 1).

The 2013 revision of the metropolitan statistical area/metropolitan division (MSA/MD) definitions by the Office of Management and Budget (OMB) has had unintended consequences for the income designations of a large number of neighborhoods in the previous five-county Philadelphia MD and for CRA lending in these communities. One in three previously CRA-eligible LMI neighborhoods in the Philadelphia MD became newly ineligible for CRA credit after 2014, while the number of LMI tracts that were CRA eligible tripled in three suburban counties. The exogenous policy change, which had caused the changes in the income levels for many lower-income neighborhoods, provided a unique opportunity to examine the impact of CRA on mortgage lending in LMI neighborhoods.

We find that, after 2014, the home purchase originations by CRA-regulated lenders would have been at least 10 percent higher had a neighborhood not lost its CRA eligibility status. The slower growth in lending activities in the newly ineligible neighborhoods was largely due to a decrease (or smaller increase) in lending to minority borrowers and borrowers in formerly CRA-eligible neighborhoods that became newly ineligible after 2014. Without the incentive of CRA, lenders had acted less aggressively than before in responding to the housing recovery in the neighborhoods that were no longer CRA eligible. It is also possible that CRA-covered lenders had redirected a portion of their CRA efforts from the neighborhoods no longer eligible for CRA credit to those that remained CRA eligible. We also observed a smaller increase in purchase lending at the tract level in newly ineligible neighborhoods, although the regression results were largely insignificant. The findings are generally consistent with the notion that CRA has made mortgage credit more accessible to lower-income communities. With the changed regulatory environment and the new market conditions characterized by the booming of nondepository institutions, there are still challenges, as this study suggests, on how to meet the credit needs of underserved communities and populations.

This report summarizes the major findings from a longer research paper examining the impact of the change in the Philadelphia MD definition on CRA lending by answering the following five questions:

1. *Why have neighborhoods in the Philadelphia MD become CRA ineligible/eligible, and where are these neighborhoods?*
2. *Have CRA-regulated lenders decreased their mortgage lending in neighborhoods that became newly CRA ineligible? And if so, how?*
3. *Have CRA-regulated lenders increased their mortgage lending in neighborhoods that became CRA eligible?*
4. *How have nondepository institutions that are not subject to CRA changed their mortgage lending in response to changes in neighborhood CRA eligibility status?*
5. *Have minority and lower-income households been more significantly affected by changes in neighborhood CRA eligibility status?*

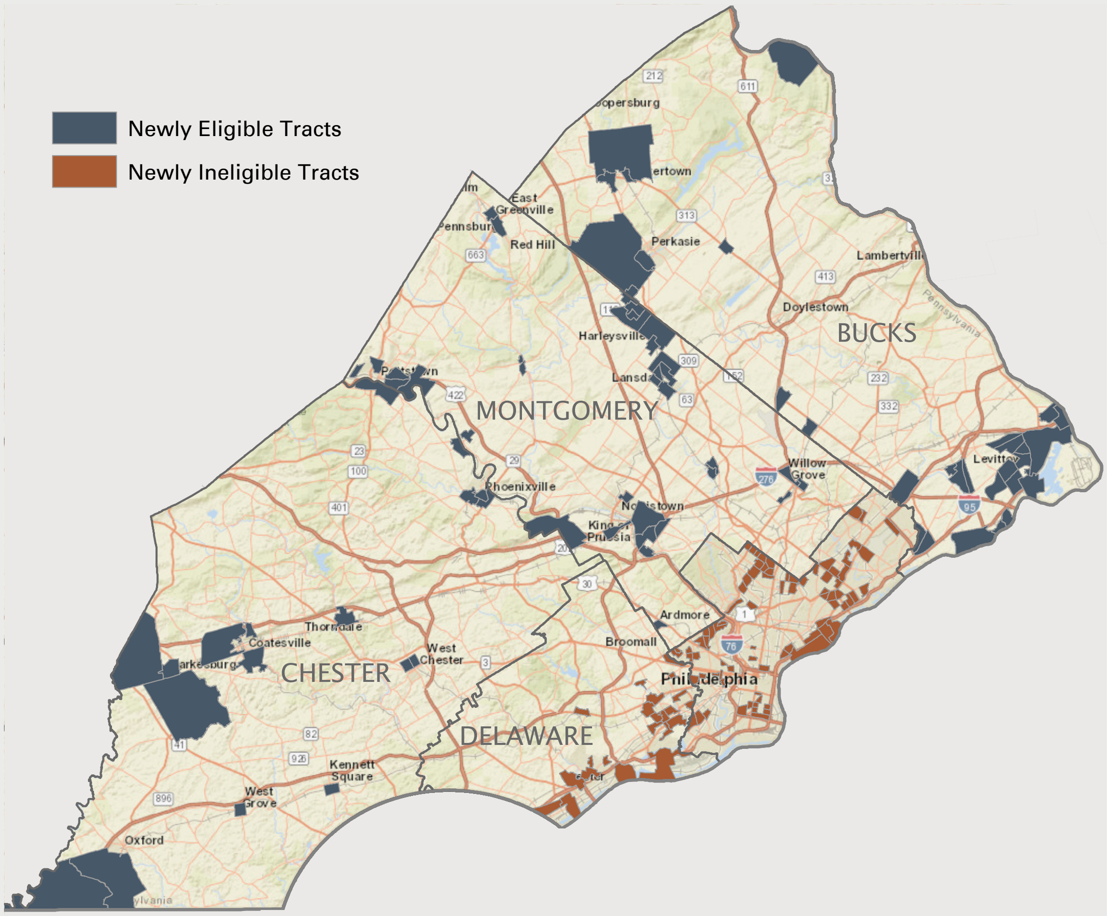
## 1. Why have neighborhoods in the Philadelphia MD become CRA ineligible/eligible, and where are these neighborhoods?

The OMB issues new statistical definitions and revises existing ones periodically to better reflect economic and demographic realities. In 2013, the OMB published a new set of MSA/MD definitions. According to the revised MSA/MD definitions, the previous five-county Philadelphia MD was split into the new Philadelphia, PA MD (Philadelphia County and Delaware County) and the Montgomery County–Bucks County–Chester County, PA MD (or the MBC MD) (Figure 1). The 2013 MSA/MD definition revision led to radical changes in area median family income (MFI), which is defined as the MFI of the corresponding MD: There was a decrease of \$22,200 in area MFI from 2013 to 2014 for neighborhoods in the new Philadelphia MD (from \$76,400 in 2013 to \$54,200 in 2014) and an increase of \$19,000 for those in the new MBC MD (from \$76,400 in 2013 to \$95,400 in 2014).

The neighborhood income levels in the CRA performance evaluations are based on the tract-to-area MFI ratios, so

## FIGURE 1

Changes in Census Tract CRA Eligibility in the Philadelphia and MBC Metropolitan Divisions




Source: Authors' definition based on 2013 and 2014 Federal Financial Institutions Examination Council (FFIEC) Census data and U.S. Census TIGER/Line Shapefiles; ESRI.

## TABLE 1

Transition in Income Levels of Tracts in the Philadelphia and MBC Metropolitan Divisions

| 2013 Income Level | 2014 INCOME LEVEL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Philadelphia MD | | | | | MBC MD | | | | |
| | Low | Moderate | Middle | Upper | Total | Low | Moderate | Middle | Upper | Total |
| Low | 64 | 89 | 0 | 0 | 153 | 5 | 0 | 0 | 0 | 5 |
| Moderate | 0 | 41 | **102** | 0 | 143 | 9 | 26 | 0 | 0 | 35 |
| Middle | 0 | 0 | 32 | 93 | 125 | 0 | **80** | 91 | 0 | 171 |
| Upper | 0 | 0 | 0 | 94 | 94 | 0 | 0 | 123 | 133 | 256 |
| Total | 64 | 130 | 134 | 187 | 515 | 14 | 106 | 214 | 133 | 467 |

Notes: Numbers in bold represent newly ineligible or newly eligible tracts. A total of 16 tracts were coded as "unknown" (13 in the new Philadelphia MD) because of the small number of families in these tracts. Source: Authors' calculation based on 2013 and 2014 FFIEC Census data.

## TABLE 2

Two Examples Illustrating the Changes in Income Levels in the Philadelphia and MBC Metropolitan Divisions

| | Philadelphia MD | | MBC MD | |
|---|---|---|---|---|
| Tract FIPS code | 42101031900 | | 42091201302 | |
| Year | 2013 | 2014 | 2013 | 2014 |
| Tract median family income (MFI) | $44,320 | $43,447 | $76,247 | $75,996 |
| Area MFI | $76,400 | $54,200 | $76,400 | $95,400 |
| Tract-to-area MFI ratio (%) | 58.0% | 80.2% | 99.8% | 79.7% |
| Income level | Moderate | Middle | Middle | Moderate |
| Eligibility for CRA credit | Eligible | Ineligible | Ineligible | Eligible |

Source: Authors' calculation based on the 2013 and 2014 FFIEC Census data.

the abrupt changes in the area MFI have led to the changes in the income designations for many census tracts in the Philadelphia MD. If the tract-to-area MFI ratio for a given tract is below 50 percent, the tract is considered a "low-income" tract; 50 percent to 79.9 percent, a "moderate-income" tract; 80 percent to 119.9 percent, a "middle-income" tract; and 120 percent or higher an "upper-income" tract.[1] CRA-covered lenders can receive CRA credit for their mortgage lending, services, or other eligible activities in "low-income" and "moderate-income" tracts in their assessment areas, which generally are the MSAs or counties where a bank has branches and takes deposits. As the revised MSA/MD delineations became effective for Home Mortgage Disclosure Act (HMDA) and CRA data collection in 2014, the income designations for 102 tracts in the Philadelphia MD were changed from moderate-income in 2013 to middle-income in 2014, thus making lending in these tracts generally ineligible for CRA credit (Figure 1 and Table 1), even though their economic conditions or population profiles remained largely unchanged. The income levels of 80 tracts in the suburban MBC MD, in contrast, were changed from middle-income in 2013 to moderate-income in 2014, thus making them CRA eligible.

Table 2 presents two examples to illustrate the radical changes in the income designations induced by the 2013 MSA/MD revision. The tract-to-area MFI ratio for tract *42101031900* in Philadelphia County was 58.0 percent in 2013 ($44,320 ÷ $76,400), which met the definition of moderate-income. However, because of the sharp decline in area MFI, the income ratio for the same tract increased to 80.2 percent ($43,447 ÷ $54,200) in 2014; consequently, the tract became a middle-income tract ineligible for CRA credit. For tract *42091201302* in Montgomery County, although the tract MFI had been much higher and generally stable ($76,247 in 2013 versus $75,996 in 2014), the income designation changed from middle-income (CRA ineligible) in 2013 to moderate-income (CRA eligible) in 2014.

Overall, the revised MSA/MD definitions have had unintended consequences for the income designations used in CRA examinations in many lower-income neighborhoods. Putting this into context, about one-third (34.5 percent) of previously CRA-eligible tracts in the new Philadelphia MD became CRA ineligible after 2014, whereas the number of CRA-eligible tracts in the MBC MD tripled from 2013 to 2014 (going from 40 tracts to 120 tracts). Across all the major metropolitan areas in the U.S., the Philadelphia area experienced the most radical changes in the prevalence of neighborhoods with changed LMI designations from 2013 to 2014.[2]

[1] Data for the years between 2012 and 2016 are based on median income data derived from the 2010 Census and the 2006–2010 American Community Survey.

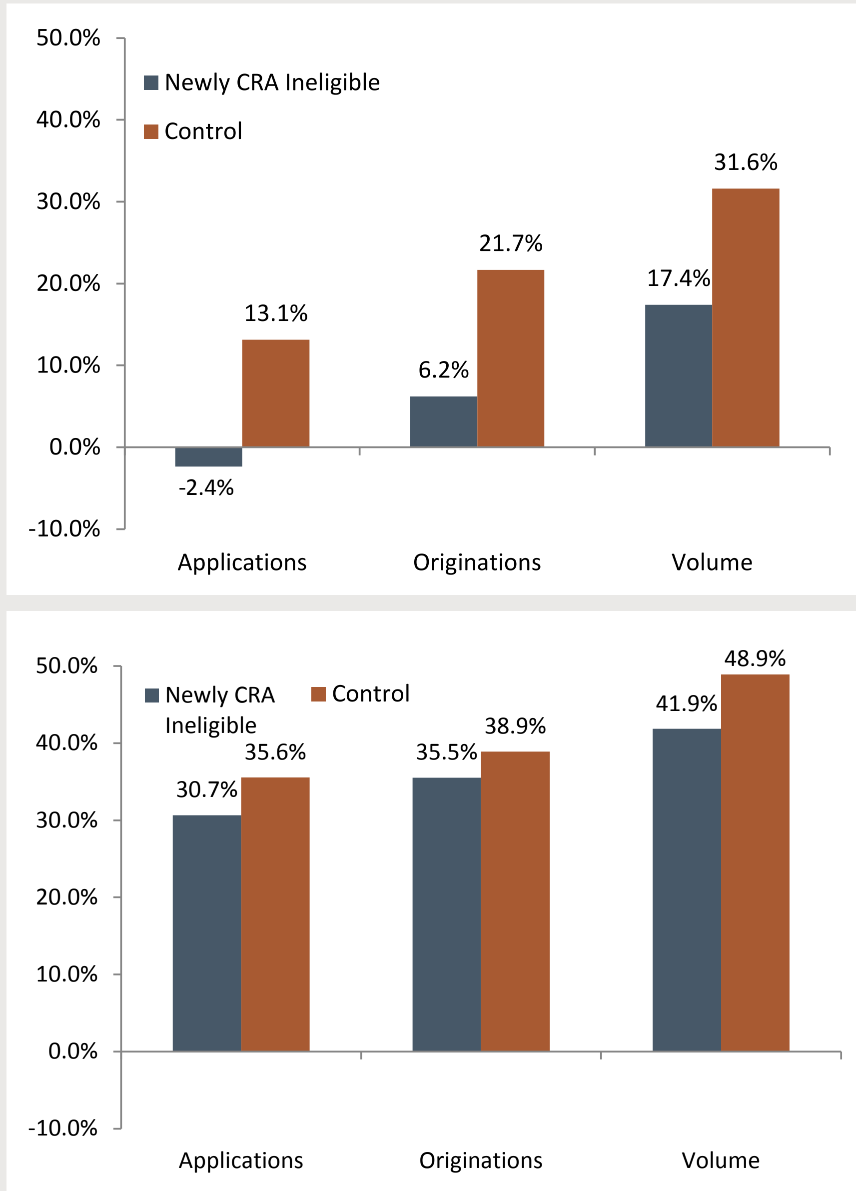
[2] About one in six of all the tracts in the U.S. with changed CRA eligibility status were in the Philadelphia MD.

## 2. Have CRA-regulated lenders decreased their mortgage lending in neighborhoods that became newly CRA ineligible? And if so, how?

The answer is generally yes. We observed a slower growth in purchase mortgage lending activity by CRA-regulated lenders in the newly ineligible tracts, relative to the control group. Empirically, we compared the volume and outcomes of purchase loan applications during the two years before and the two years after January 1, 2014, in neighborhoods with changed CRA eligibility status with those of the control group. We constructed the control group by identifying tracts whose CRA eligibility status remained unchanged from 2013 to 2014, that were within a 0.5-mile radius of a newly eligible or ineligible tract, and that had similar MFI (see more details about the control group in Appendix 2). Also, in this study, "depository institutions" represent all commercial banks and thrifts covered by CRA,[3] and "CRA-regulated lenders" are proxied by depository institutions that have at least one local branch in the same county. "Nondepository institutions" represent those lenders, including independent mortgage companies and credit unions, not covered by CRA.

**FIGURE 2**

Percent Change in Home Purchase Lending by CRA-Regulated Lenders (*top*) and Nondepository Institutions (*bottom*), Philadelphia MD




Source: Authors' calculations based on HMDA and Federal Deposit Insurance Corporation (FDIC) Summary of Deposits data.

We observed a slower growth in the volume of purchase mortgage lending activities by CRA-regulated lenders in the newly ineligible tracts compared with the control group (Figure 2). The number of purchase applications accepted by CRA-regulated lenders declined slightly in the newly ineligible tracts in the new Philadelphia MD compared with a moderate increase for the control group (–2.4 percent versus 13.1 percent). The number of purchase mortgage originations by CRA-regulated lend-

[3] Credit unions also take deposits but are not considered as depository institutions here as they are not subject to CRA. The regulatory agency for the large national banks has been reported as "CFPB" in the HMDA data, though they are generally regulated by both the Consumer Financial Protection Bureau (CFPB) and the Office of the Comptroller of the Currency (OCC).

ers increased slightly in the newly ineligible tracts after 2014, but the increase was lower than that of the control group (an increase of 6.2 percent in the treatment tracts, about 15.5 percentage points lower than the 21.7 percent increase for the control group). The pattern was similar when the dollar volume of purchase originations is used as the outcome measure.[4]

Furthermore, the suppressed lending growth we observed in newly ineligible tracts was more pronounced for CRA-regulated lenders than for nondepository institutions (a difference of 15.5 percentage points for CRA-regulated lenders versus 3.4 percentage points for nondepository institutions). The difference in their growth rates suggests that the smaller increase in mortgage lending by CRA-regulated lenders could not be fully explained by the market trend, which is proxied by changes in lending by nondepository institutions that are not impacted by CRA directly. And at the market level (by all lenders), the observed lending growth was about 10.8 percentage points less in the treatment tracts than in the control tracts (Appendix 3A).

However, we did not observe a significant difference in the changes of denial rates by CRA-regulated lenders in the newly ineligible tracts post-2014 (a decline of 4.4 percentage points for the treatment group versus a decline of 4.0 percentage points for the control group). The reduced supply of purchase mortgage credit in newly ineligible tracts by CRA-regulated lenders seems to be largely due to the reduced number of applications accepted, rather than tighter underwriting standards.

To verify whether the pattern we observed from the descriptive analysis still holds after controlling for lending trends across time and factors specific to the neighborhoods, we performed a number of difference-in-differences regressions based on data aggregated at the tract level to assess if the lending growth in the newly ineligible tracts was significantly less than the growth observed in neighboring control tracts. In other words, we wanted to determine how much the lending by CRA-regulated lenders had changed in the newly ineligible tracts compared with nearby neighborhoods with similar income but with unchanged CRA eligibility status.

[4] The lending activities by all depository institutions experienced similar magnitudes of change as did those activities by depository institutions with local branches.

Regression results confirm that the loss of CRA eligibility status for a lower-income neighborhood leads to a decrease of at least 10 percent (larger in some specifications) in the volume of purchase mortgage lending (applications and originations) by CRA-regulated lenders. If the growth in home purchase lending in the newly ineligible neighborhoods had been as sizeable as that in the control group, the lending activity by CRA-regulated lenders would have been at least 10 percent higher post-2014. One possible explanation is that CRA-regulated lenders became slower in increasing their lending capacity, staff training, community outreach, or marketing in newly ineligible neighborhoods during the housing recovery. Another possible explanation is that depository institutions have switched part of their CRA lending efforts from newly ineligible neighborhoods to those neighborhoods remaining CRA eligible, but the results in our empirical analysis suggest this cannot fully explain the observed differences.

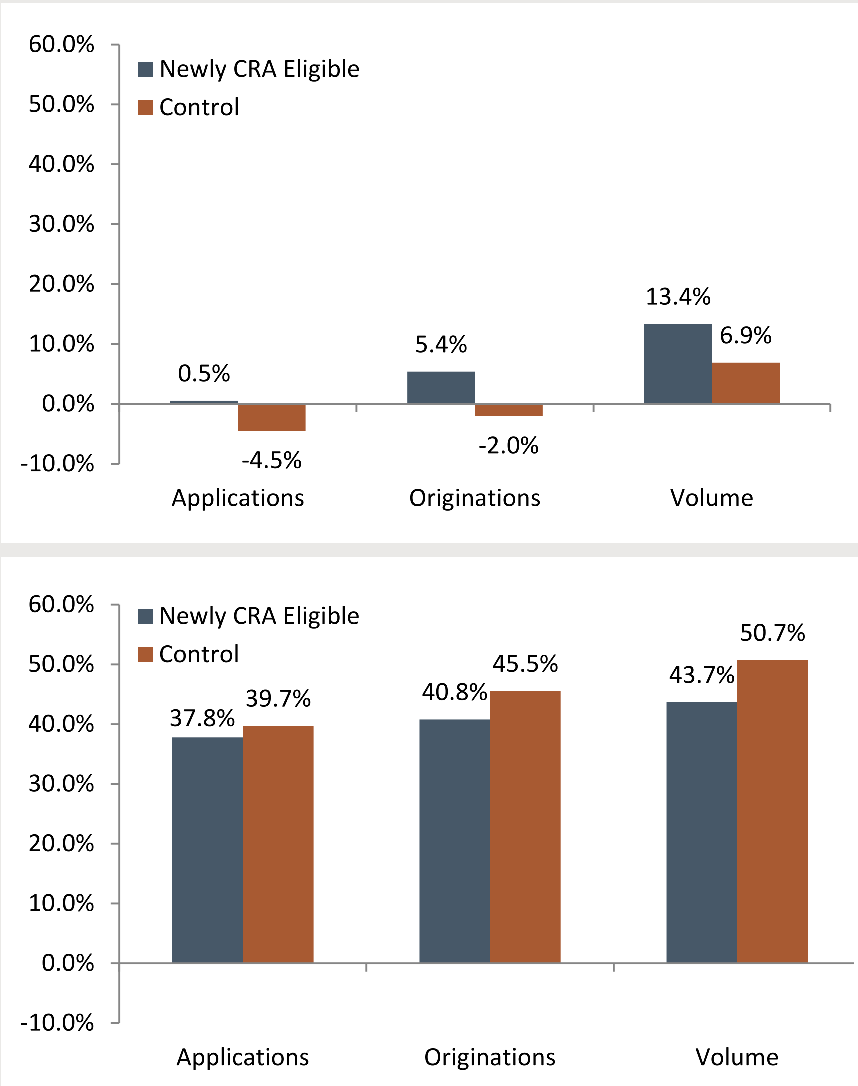
## 3. Have CRA-regulated lenders increased their mortgage lending in neighborhoods that became CRA eligible?

In the MBC MD, CRA-regulated lenders increased their purchase originations to a greater extent in the newly eligible tracts than in the control tracts, but the differences were generally insignificant in regression results. As Figure 3 shows, there was a slight increase in the number of applications in the newly eligible tracts (0.5 percent) compared with a decline in the number of applications in the control group (–4.5 percent). The number of originations by CRA-regulated lenders increased slightly in the treatment group after 2014 and the number for the control group decreased (5.4 percent versus –2.0 percent, or a difference of 7.4 percentage points).

While we observed a slightly higher increase in purchase applications and originations by CRA-regulated lenders in the newly eligible tracts, nondepository institutions increased their lending to a greater extent in the control tracts (a difference of 7.4 percentage points for CRA lenders versus –4.7 percentage points for nondepository institutions). Meanwhile, growth in originations at the aggregate level had been similar between newly eligible tracts and control tracts (an increase of 20.6 percent and 20.2 percent, respectively; see Appen-

## FIGURE 3

Percent Change in Home Purchase Lending by CRA-Regulated Lenders (*top*) and Nondepository Institutions (*bottom*), MBC MD




Source: Authors' calculations based on HMDA and FDIC Summary of Deposits data.

out to be largely insignificant in the tract-level regression analysis. The statistically insignificant results for CRA effects at the tract level, however, should not be taken as definitive proof that CRA does not have any significant effect when a neighborhood gains CRA coverage. It is possible that the credit needs of the borrowers in these neighborhoods in relatively wealthy suburban counties have been well-served through the lenders' normal course of business without the incentive of CRA. It is also important to note that the policy change took effect during a period characterized by significant regulatory changes and relatively tighter credit, thus lenders may already have been reluctant or slow to engage in more innovative practices that could have expanded access to credit to less-than-pristine borrowers. If credit conditions ease in the future and the market regains its appetite for risk, the effects of gaining CRA eligibility status may get more momentum. Furthermore, CRA may impact certain subpopulations more significantly, though the effect is insignificant at the aggregate level, which will be discussed later in this report.

dix 3B). One possible explanation is that becoming CRA eligible only changed the sources of mortgage credit in targeted areas as depository institutions took market share from institutions not covered by CRA; thus, there was no significant change in the total volume of originations for the newly eligible tracts.

The observed larger increase in mortgage lending by CRA-regulated lenders in the newly eligible tracts turned

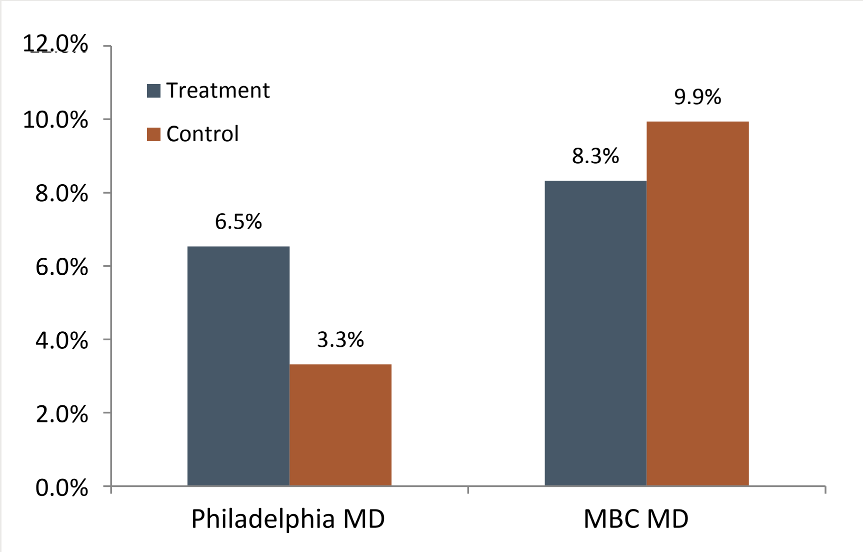
### 4. How have nondepository institutions that are not subject to CRA changed their mortgage lending in response to changes in neighborhood CRA eligibility status?

We found that nondepository institutions significantly increased their market share in newly ineligible tracts. We also observed a greater involvement by nondepositiory institutions in Federal Housing Administration (FHA) lending in these newly ineligible neighborhoods. Nationally, the landscape of the mortgage lending market has shifted radically in the past several years from a market dominated by large banks to one in which more loans are originated by nondepository institutions.[5] And in the Philadelphia MD, the loss of CRA eligibility status in the newly ineligible tracts was accompanied by a significant increase in the share of nondepository institutions in the purchase mortgage market. Nondepository institutions originated 46.6 percent of all purchase mortgage loans in the newly ineligible tracts during the 2012–2013 period. That share rose to 53.1 percent during 2014–2015, an increase of 6.5 percentage points (Figure 4). The increase in market share in newly ineligible tracts doubled that observed in the control tracts, an increase of 6.5 percentage points compared with an increase of 3.3 percentage points, respectively. Regression results confirm that about half, but not all, of the decreases in the mortgage lending by CRA lenders in newly ineligible communities could be substituted by nondepository institutions. There was also an increase in the share of nondepository institutions in the MBC MD, but the increase in the newly eligi-

[5] Marshall Lux and Robert Greene, "What's Behind the Non-Bank Boom?" Harvard Kennedy School Mossavar-Rahmani Center for Business and Government, M-RCBG Associate Working Paper Series, 42, 2015; available at www.hks.harvard.edu/content/download/76449/1714947/version/1/file/Final_Nonbank_Boom_Lux_Greene.pdf.

## FIGURE 4

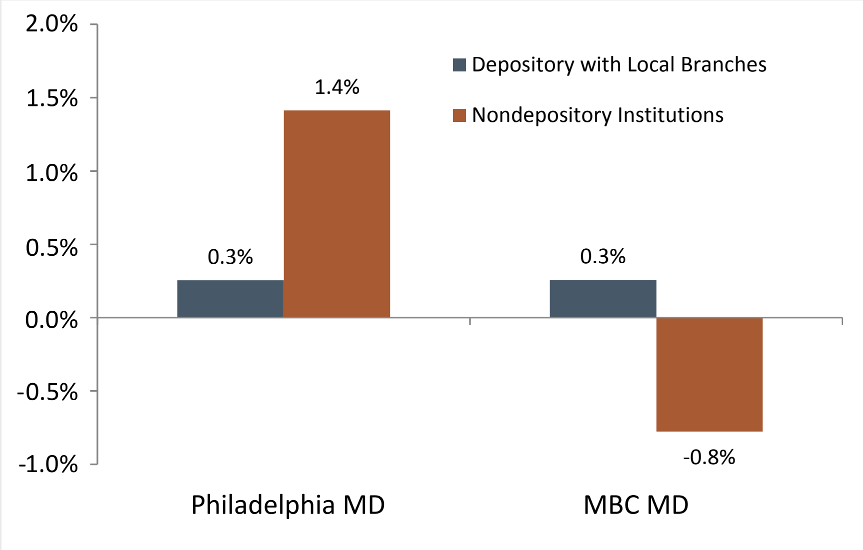
Change in Market Shares in Purchase Originations of Nondepository Institutions, 2014–2015 Versus 2012–2013




Source: Authors' calculations based on HMDA and FDIC Summary of Deposits data.

## FIGURE 5

Difference in Changes in FHA Share of Purchase Originations Between Treatment Tracts and the Control Group, 2014–2015 Versus 2012–2013




Source: Authors' calculations based on HMDA and FDIC Summary of Deposits data.

ble neighborhoods (8.3 percentage points) was less than that in the control group (9.9 percentage points). So, results suggest that CRA can change the sources and possibly the volume of mortgage credit; the loss of CRA eligibility status was associated with a larger decline in the market share of depository institutions, while gaining CRA eligibility status helped depository institutions keep a larger market share.

On the positive side, the increased market share of nondepository institutions suggests these lenders have offered more opportunities to borrowers in the neighborhoods from which the depository institutions are withdrawing. On the negative side, with increased lending activities by the nondepository institutions in the newly ineligible neighborhoods, people are concerned about the costs and quality of the mortgage products that these lenders are providing. We looked at one consequence of the transition from CRA-regulated lenders to nondepository institutions: the prevalence of FHA-backed loans. Relative to prime fixed-rate loans, FHA mortgages, which are popular among first-time homebuyers and lower-income borrowers, are usually more costly and are associated with a slightly higher default rate. Actually, the share of FHA originations declined among all classes of lending institutions after 2014, but the FHA share of nondepository institutions declined to a lesser degree than CRA-regulated lenders in the newly ineligible tracts compared with the control tracts (1.4 percentage points lower for nondepository institutions versus 0.3 percentage points lower for CRA-regulated lenders; see Figure 5). The regression results confirm that becoming CRA eligible leads to an increase in the FHA share of nondepository institutions in the neighborhood. In short, in response to the lower-than-expected increase in mortgage lending by CRA-regulated banks, nondepository institutions had originated more mortgages, a disproportionately large share of which were FHA loans, in the newly ineligible neighborhoods.

## 5. Have minority and lower-income households been more significantly affected by changes in neighborhood CRA eligibility status?

In this section, we expand the analysis performed previously to determine if minority and lower-income borrowers were more significantly affected by a change in the neighborhood's CRA eligibility status. We find that the change in neighborhood CRA eligibility impacted minority borrowers and certain lower-income borrowers to a greater extent than their respective counterparts. The finding is consistent with the notion that the slower growth in mortgage lending by CRA-regulated lenders in newly ineligible tracts in the Philadelphia MD can largely be explained by the withdrawal in lending to borrowers no longer targeted by CRA.

CRA does not target specific racial or ethnic groups, but the change in neighborhood CRA eligibility may have a larger impact on minorities if CRA expands access to credit more successfully among minorities than others or if minorities are more concentrated in the newly eligible or newly ineligible neighborhoods. Over half (51.1 percent) of purchase loans were originated to minority borrowers in newly ineligible neighborhoods in 2013, while that share was 13.6 percent in the newly eligible neighborhoods. As Figure 6 shows, the growth in purchase mortgage lending in newly ineligible neighborhoods was more restrained when focusing on loans made to minorities than when considering loans made to non-Hispanic whites.[6] In the Philadelphia MD, the number of purchase originations to minority borrowers by CRA lenders increased by only 4.9 percent in the newly ineligible tracts but increased by a substantial 25.9 percent in the control group, a differential of about 21.0 percentage points (see Appendix 3C). This differential likely represents the difference in the impact of CRA in encouraging lending to LMI neighborhoods among minorities and non-Hispanic whites. Purchase originations by CRA lenders to non-Hispanic whites decreased in the newly ineligible tracts by 9.2 percent and increased in the control tracts by 2.0 percent, a differential of 11.2 percentage points only.

In the newly eligible neighborhoods, CRA coverage improved the supply of mortgage credit by CRA-regulated lenders to a larger degree to minority borrowers, with an increase 28.3 percentage points higher among minority borrowers versus an increase only 5.9 percentage points higher for non-Hispanic whites (see Appendix 3D).[7] The neighborhood-level regression re-

[6] Minority borrowers include African American, Hispanic, and other borrowers who do not identify as non-Hispanic white.

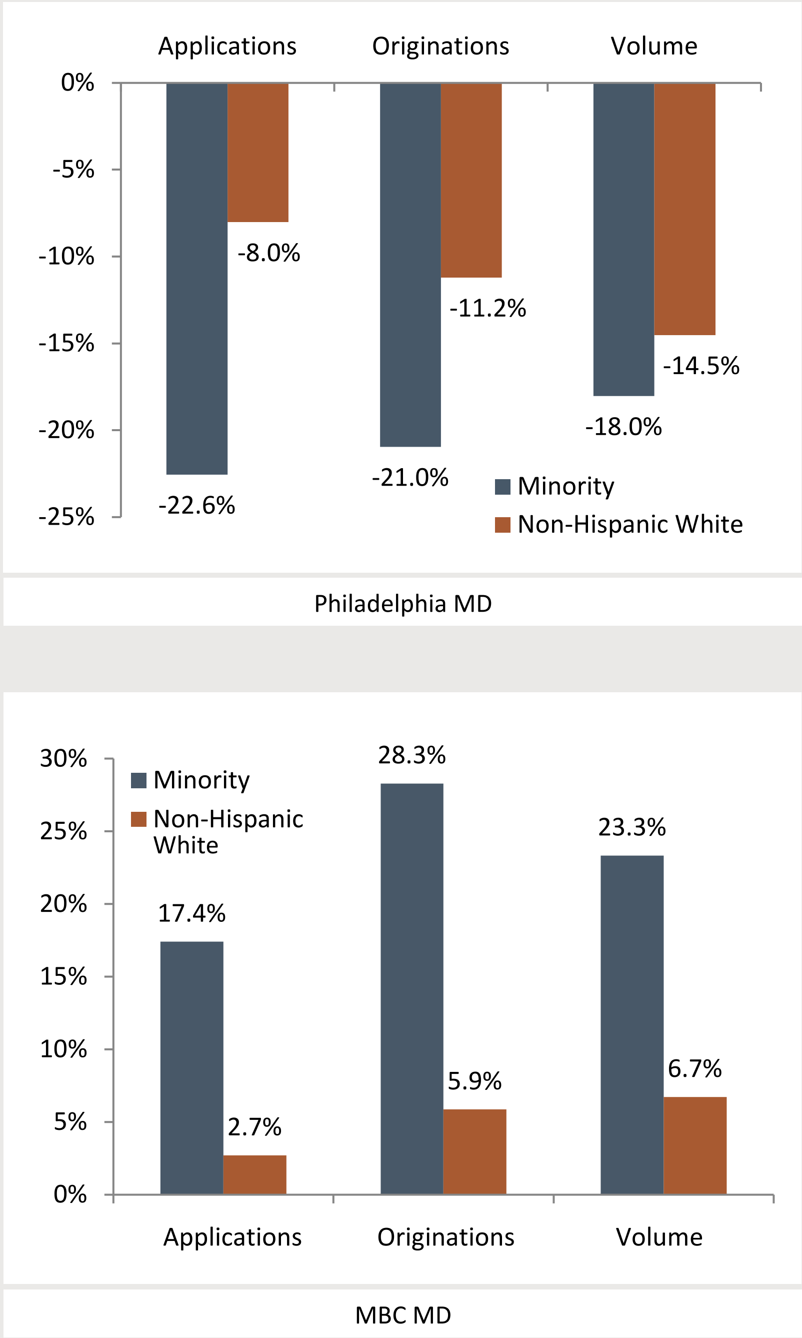
[7] One explanation for the more dramatic increase in the MBC MD is the relatively very small number of minority borrowers in the newly eligible tracts.

sults confirm that CRA effects on mortgage lending activities are larger in magnitude for minority borrowers.

Because CRA targets both LMI neighborhoods and LMI borrowers,[8] lenders can receive CRA credit for lending to a LMI borrower, regardless of whether the neighborhood is CRA eligible. So, we expect that a change in CRA eligibility status would have a larger impact on borrowers who became newly CRA ineligible/eligible than on borrowers whose CRA eligibility status remained the same. We classified borrowers into three groups based on their income: lower-income borrowers who were likely to be considered as LMI both before and after 2014, borrowers who had likely experienced changes in their LMI status, and higher-income borrowers who were not considered LMI in any period.[9] In the newly ineligible tracts in the Philadelphia MD, the suppressed growth in purchase lending was more pronounced for the latter two groups that were no longer eligible for CRA after 2014 (Figure 7). Purchase

## FIGURE 6

Difference in Percent Change in Purchase Lending by CRA-Regulated Lenders Between Treatment Tracts and Control Group by Borrower Minority Status, Philadelphia MD (*top*) and MBC MD (*bottom*)



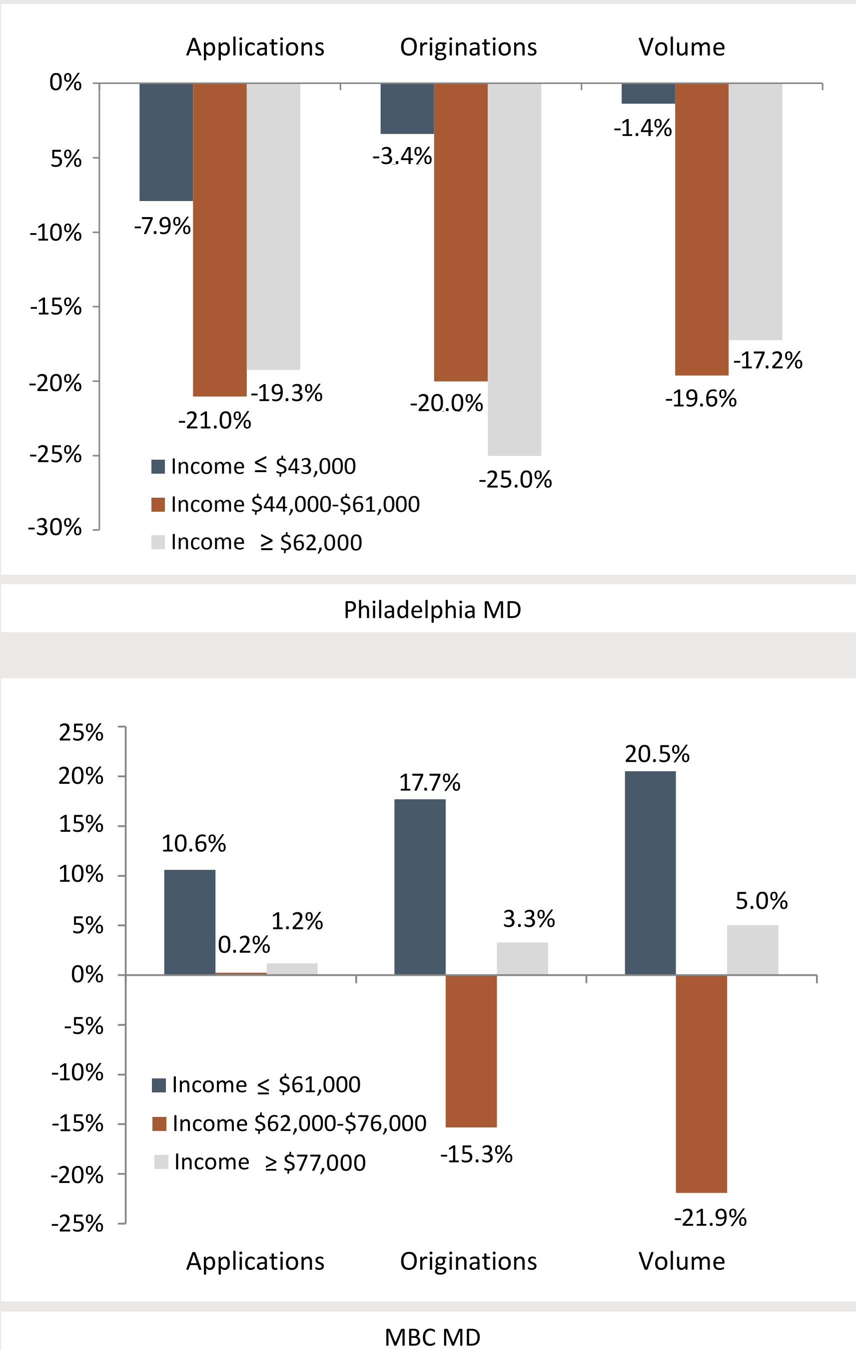

Source: Authors' calculations based on HMDA and FDIC Summary of Deposits data.

8 The HMDA data report borrowers' income (in $1,000s), which may be different from borrowers' family income. For example, if a two-wage earner family decides to apply for a mortgage using the income of one of the wage earners, the borrower income reported in the HMDA data could be significantly lower than the actual family income.

9 The lower-income borrowers had income below the lower of the 2013 and the 2014 LMI thresholds. The borrowers who had income between the 2013 and the 2014 LMI thresholds were likely to experience changes in their LMI status, while the higher-income borrowers who had income at or above the higher of the 2013 and the 2014 thresholds would not be considered as LMI during the entire study period. LMI income threshold may change over time due to inflation, so our definition is a proxy only.

## FIGURE 7

Difference in Percent Change in Purchase Lending by CRA-Regulated Lenders Between Treatment Tracts and Control Group by Borrower Income, Philadelphia MD (*top*) and MBC MD (*bottom*),




Source: Authors' calculations based on HMDA and FDIC Summary of Deposits data.

originations to borrowers who lost their LMI status declined by 16.6 percent in the newly ineligible tracts but increased by 3.4 percent in the control tracts (see Appendix 3C). Such a difference of 20.0 percentage points is much larger than the difference of 3.4 percentage points for the borrowers who had remained LMI during the study period. Lending to borrowers with higher income also experienced a significantly lower level of increase than did that of lending to LMI borrowers. Regression results confirm that a neighborhood losing CRA eligibility status has a more significant impact on the newly ineligible borrowers in the treatment group than on those borrowers who remained LMI.

In the newly eligible tracts in the MBC MD, the results are somewhat mixed. CRA-regulated lenders increased their purchase originations to a greater extent among LMI borrowers who were considered CRA eligible before and after 2014 (see Appendix 3D). However, we did not observe a more significant increase in lending activity among borrowers above the LMI threshold. As mentioned earlier, the credit needs of the higher-income borrowers in these neighborhoods may have been well-served even without the incentive of CRA or the CRA effects on these subpopulations have not become evident in the short term.

## SUMMARY

In summary, we found that one in three previously LMI neighborhoods in the Philadelphia MD became ineligible for CRA credit after 2014, while the number of LMI tracts that became CRA eligible tripled in the MBC MD. The volume of purchase mortgage originations by CRA-regulated lenders was significantly lower in the neighborhoods that became CRA ineligible than in the control neighborhoods. We also observed smaller increases at the tract level in purchase lending in the newly ineligible neighborhoods. In response to changes in CRA-targeted areas, lenders seemed to have adjusted their lending behavior by withdrawing from neighborhoods no longer eligible for CRA and concentrating on neighborhoods remaining CRA eligible or neighborhoods becoming newly eligible. The results demonstrate how lenders respond to changes in the incentive of CRA credit and how the use of MSA/MD MFI can generate unintended consequences for CRA lending activities.

Overall, the results are consistent with the notion that CRA has encouraged depository institutions to extend mortgage credit to lower-income communities. Nondepository institutions have started to take a larger share of the mortgage market. Nondepository institutions help offset part, but not all, of the supply of mortgage credit in the neighborhoods from which the depository institutions are withdrawing. However, nondepository institutions have been blamed for the relatively poorer quality of mortgages originated during the subprime boom,[10] and there are still concerns about the access, quality, and costs of lending by institutions not subject to CRA, as signaled by their greater involvement in FHA lending.

[10] Elizabeth Laderman and Carolina Reid, "Lending in Low- and Moderate-Income Neighborhoods in California: The Performance of CRA Lending During the Subprime Meltdown," Federal Reserve Bank of San Francisco Working Paper 2008-05, 2008; available at www.frbsf.org/community-development/files/wp08-051.pdf.

# APPENDIX 1: BACKGROUND OF THE COMMUNITY REINVESTMENT ACT

The Community Reinvestment Act (CRA), enacted in 1977, requires depository institutions to meet the credit needs of lower-income households and neighborhoods in which they operate in a safe and sound manner. Regulators, including the Federal Reserve System, Office of the Comptroller of the Currency (OCC), and Federal Deposit Insurance Corporation (FDIC), conduct periodic examinations of the performance of institutions they regulate in meeting the credit needs of low- and moderate-income (LMI) borrowers and communities (those with median family income (MFI) less than 80 percent of the area median). A CRA rating of satisfactory or better is preferred when regulators evaluate an institution's application for a merger, acquisition, or branch opening. The performance of large institutions is measured under three categories of bank activities: lending, services, and investment, with the lending test carrying the most weight (at least 50 percent), while the performance of smaller institutions is primarily measured by their lending activities alone. The lending test examines the amount and proportion of lending activities made within an institution's assessment area, generally the metropolitan statistical area or county where a bank has branches and takes deposits.[11]

As Avery and Brevoort pointed out, there are at least three possible CRA effects on mortgage lending.[12] First, CRA may have had little or no effect on mortgage lending. The credit needs of the entire communities may have been adequately served even without the incentive of CRA. So, gaining and losing CRA coverage would not alter the volume, pricing, or sources of credit. Second, CRA-regulated institutions may have extended more credit in CRA-targeted neighborhoods but accomplished this through increased capacity or greater community outreach and marketing, without changing the pricing or underwriting standards of loans. So, becoming CRA eligible or ineligible would have altered the sources of mortgage credit in targeted areas (e.g., as depository institutions take market share from institutions not covered by CRA), without resulting in a net change in lending activities at the market level. Finally, depository institutions may have responded to CRA by providing products featuring lower interest rates or more flexible underwriting standards, such as requiring low down payments, alternative credit verification, and higher debt-to-income thresholds, to borrowers from targeted neighborhoods. They could also require and fund homeownership counseling for potential borrowers to improve their creditworthiness. These responses would have increased the share of lending accounted for by CRA-regulated institutions in CRA-targeted communities, and the amount of credit extended would have increased at the market level as well.

[11] The CRA assessment area for a retail-oriented banking institution must include "the areas in which the institution has its main office or operates branches and deposit-taking automated teller machines and any surrounding areas in which it originated or purchased a substantial portion of its loans." See more details in Robert B. Avery, Raphael W. Bostic, and Glenn B. Canner, "CRA Special Lending Programs," *Federal Reserve Bulletin*, November: 711, 717–719, 2000; available at www.federalreserve.gov/pubs/bulletin/2000/1100lead.pdf.

[12] Robert B. Avery and Kenneth P. Brevoort, "The Subprime Crisis: Is Government Housing Policy to Blame?" *Review of Economics and Statistics*, 97(2): 352–363, 2015; available at www.mitpressjournals.org/doi/pdf/10.1162/REST_a_00491.

# APPENDIX 2: DATA

Data used in this study comes from several different sources. Information on mortgage lending activities comes from data collected under the Home Mortgage Disclosure Act (HMDA), which requires mortgage lending institutions with offices in metropolitan areas to disclose to the public detailed information about their home-lending activities each year. HMDA data include the disposition of each mortgage application; the type, purpose, and size of each loan; loan pricing information (high cost or not); demographic information about loan applicants, including gender, race, ethnicity, and income; the census-tract location of the property securing the loan; and information about whether the loan was sold. HMDA data also report the lending institution's name, address, and regulator. For example, we identified the depository institutions that are likely subject to CRA examination by focusing on those that are supervised by the OCC, Federal Reserve System, FDIC, and Consumer Financial Protection Bureau. We included only those applications for first-lien home purchase mortgages and excluded those loans with large loan amounts (above $1 million). We focused on applications for home purchase loans, instead of refinance loans, because the former have a more direct impact on homeownership and are less sensitive to interest rate changes and neighborhood income.

This study also used the FDIC Summary of Deposits (SOD) data, which provide a limited amount of branch-level information on all the branches belonging to FDIC-insured depository institutions. We merged all depository institutions with branches in the Philadelphia MD during 2012–2015 with the lenders in the HMDA data by lender names. We corrected some typos and spelling issues with lender names in both data sets and merged about 98 percent of all the branches of the FDIC-insured institutions with HMDA lenders.[13]

For the new Philadelphia MD, the control group for the 102 tracts in the treatment group (previously CRA eligible but became CRA ineligible in 2014) was defined as:

- Tracts that remained eligible or ineligible for CRA credit in both 2013 and 2014, within 0.5-mile radius of a newly ineligible tract, and with MFI between 80 percent and 90 percent of the area median in 2013 and between 50 percent and 80 percent of the area median in 2014 (tract MFI between $61,120 and $68,760 in 2013 or $27,100 and $43,360 in 2014).

For the MBC MD, the control group for the 80 tracts in the treatment group (previously CRA ineligible but became CRA eligible in 2014) was defined as:

- Tracts that remained eligible or ineligible for CRA credit in both 2013 and 2014, within 0.5-mile radius of a newly eligible tract, and with MFI slightly lower than the area median in 2013 and between 80 percent and 90 percent of the area median in 2014 (tract MFI between $27,100 and $61,120 in 2013 or $76,320 and $85,860 in 2014).

[13] The name of the same lender could be different in the SOD and the HMDA data because there are some typos and different abbreviations used in different data sets. For example, we believe "Bank of America, National Association" in the SOD data and the "Bank of America, N.A." in the HMDA data should represent the same lender. Furthermore, the SOD data may continue to use a lender's old name in the year in which the lender had been merged with another one, while HMDA data have been using the name of the merged lender. Finally, not all FDIC-insured depository institutions originate mortgages so some lenders in the SOD data could not be merged.

# APPENDIX 3: DETAILED RESULTS FROM THE DESCRIPTIVE ANALYSIS

## APPENDIX 3A

Descriptive Analysis of Changes in Purchase Mortgage Lending by Neighborhood Pre- and Post-2014 in the New Philadelphia MD

| | Applications | | Originations | | Origination Volume ($) | | Denial Rate (%) | | FHA Share (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Newly Ineligible | Control | Newly Ineligible | Control | Newly Ineligible | Control | Newly Ineligible | Control | Newly Ineligible | Control |
| **Depository Institutions with Local Branches** | | | | | | | | | | |
| 2012–2013 | 2,422 | 2,818 | 1,577 | 1,836 | 218,895 | 272,320 | 23.6% | 23.4% | 44.8% | 41.1% |
| 2014–2015 | 2,365 | 3,188 | 1,675 | 2,234 | 257,005 | 358,337 | 19.2% | 19.4% | 34.1% | 30.1% |
| % Change | –2.4% | 13.1% | 6.2% | 21.7% | 17.4% | 31.6% | –4.4% | –4.0% | –10.7% | –11.0% |
| *Difference in differences* | –15.5% | | –15.5% | | –14.2% | | –0.4% | | 0.3% | |
| **Nondepository Institutions** | | | | | | | | | | |
| 2012–2013 | 3,504 | 3,914 | 2,370 | 2,613 | 356,866 | 406,140 | 17.5% | 17.8% | 50.4% | 47.5% |
| 2014–2015 | 4,578 | 5,306 | 3,212 | 3,630 | 506,240 | 604,808 | 13.4% | 14.7% | 45.4% | 41.0% |
| % Change | 30.7% | 35.6% | 35.5% | 38.9% | 41.9% | 48.9% | –4.1% | –3.0% | –5.1% | –6.5% |
| *Difference in differences* | –4.9% | | –3.4% | | –7.1% | | –1.1% | | 1.4% | |
| **All Lending Institutions** | | | | | | | | | | |
| 2012–2013 | 7,548 | 8,497 | 5,087 | 5,656 | 736,112 | 856,983 | 19.6% | 20.0% | 50.7% | 46.9% |
| 2014–2015 | 8,551 | 10,559 | 6,046 | 7,331 | 950,675 | 1,205,136 | 15.4% | 16.2% | 41.5% | 36.9% |
| % Change | 13.3% | 24.3% | 18.9% | 29.6% | 29.1% | 40.6% | –4.3% | –3.8% | –9.2% | –10.0% |
| *Difference in differences* | –11.0% | | –10.8% | | –11.5% | | –0.4% | | 0.8% | |

Notes: The control group refers to the tracts within 0.5 mile of any neighborhoods in the treatment group and with similar income (slightly lower or higher). Changes for the volume of applications and originations are relative changes but are absolute changes for denial rate and FHA share. Source: Authors' calculation based on HMDA data and FDIC Summary of Deposits data.

## APPENDIX 3B

Descriptive Analysis of Changes in Purchase Mortgage Lending by Neighborhood Pre- and Post-2014 in the MBC MD

| | Applications | | Originations | | Origination Volume ($) | | Denial Rate (%) | | FHA Share (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Newly Eligible | Control | Newly Eligible | Control | Newly Eligible | Control | Newly Eligible | Control | Newly Eligible | Control |
| **Depository Institutions with Local Branches** | | | | | | | | | | |
| 2012–2013 | 1,867 | 1,685 | 1,357 | 1,221 | 238,937 | 228,304 | 15.1% | 16.0% | 19.5% | 19.6% |
| 2014–2015 | 1,877 | 1,609 | 1,430 | 1,196 | 270,861 | 244026 | 12.6% | 13.4% | 14.7% | 14.5% |
| % Change | 0.5% | –4.5% | 5.4% | –2.0% | 13.4% | 6.9% | –2.5% | –2.6% | –4.8% | –5.0% |
| *Difference in differences* | 5.0% | | 7.4% | | 6.5% | | 0.1% | | 0.3% | |
| **Nondepository Institutions** | | | | | | | | | | |
| 2012–2013 | 3,285 | 2,699 | 2,436 | 1,939 | 462,559 | 386,712 | 11.2% | 13.4% | 35.4% | 32.9% |
| 2014–2015 | 4,526 | 3,771 | 3,430 | 2,822 | 664,546 | 582,848 | 9.7% | 10.2% | 31.5% | 29.7% |
| % Change | 37.8% | 39.7% | 40.8% | 45.5% | 43.7% | 50.7% | –1.6% | –3.2% | –4.0% | –3.2% |
| *Difference in differences* | –1.9% | | –4.7% | | –7.1% | | 1.6% | | –0.8% | |
| **All Lending Institutions** | | | | | | | | | | |
| 2012–2013 | 6,661 | 5,642 | 4,906 | 4,116 | 906,113 | 807,171 | 12.9% | 14.2% | 30.9% | 28.8% |
| 2014–2015 | 7,826 | 6,606 | 5,916 | 4,947 | 1,141,405 | 1,025,781 | 10.5% | 10.6% | 26.2% | 24.2% |
| % Change | 17.5% | 17.1% | 20.6% | 20.2% | 26.0% | 27.1% | –2.4% | –3.5% | –4.7% | –4.6% |
| *Difference in differences* | 0.4% | | 0.4% | | –1.1% | | 1.1% | | –0.1% | |

Notes: The control group refers to the tracts within 0.5 mile of any neighborhoods in the treatment group and with similar income (slightly lower or higher). Changes for the volume of applications and originations are relative changes but are absolute changes for denial rate and FHA share. Source: Authors' calculation based HMDA data and FDIC Summary of Deposits data.

## APPENDIX 3C

Descriptive Analysis of Changes in Purchase Mortgage Lending by CRA-Regulated Lenders by Borrowers Pre- and Post-2014 in the New Philadelphia MD

| | Applications | | Originations | | Origination Volume ($) | | Denial Rate (%) | | FHA Share (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Newly Ineligible | Control | Newly Ineligible | Control | Newly Ineligible | Control | Newly Ineligible | Control | Newly Ineligible | Control |
| **Minority** | | | | | | | | | | |
| 2012–2013 | 1,250 | 1,413 | 793 | 885 | 95,794 | 106,185 | 26.10% | 26.70% | 58.40% | 55.30% |
| 2014–2015 | 1,183 | 1,656 | 832 | 1,114 | 104,806 | 135,322 | 21.00% | 23.90% | 47.20% | 41.10% |
| % Change | –5.4% | 17.2% | 4.9% | 25.9% | 9.4% | 27.4% | –5.1% | –2.8% | –10.7% | –11.0% |
| *Difference in differences* | –22.6% | | –21.0% | | –18.0% | | –2.3% | | 0.3% | |
| **Non-Hispanic White** | | | | | | | | | | |
| 2012–2013 | 905 | 998 | 629 | 704 | 96,199 | 120,913 | 18.2% | 17.8% | 30.7% | 29.5% |
| 2014–2015 | 807 | 970 | 571 | 718 | 98,121 | 140,892 | 17.4% | 13.7% | 19.8% | 18.9% |
| % Change | –10.8% | –2.8% | –9.2% | 2.0% | 2.0% | 16.5% | –0.8% | –4.1% | –10.9% | –10.6% |
| *Difference in differences* | –8.0% | | –11.2% | | –14.5% | | 3.4% | | –0.3% | |
| **LMI Borrowers ($43,000 or Lower)** | | | | | | | | | | |
| 2012–2013 | 1,068 | 1,346 | 684 | 863 | 80,382 | 102,365 | 27.0% | 25.9% | 54.5% | 53.1% |
| 2014–2015 | 1,147 | 1,552 | 824 | 1,069 | 109,703 | 141,115 | 20.0% | 21.7% | 40.3% | 38.3% |
| % Change | 7.4% | 15.3% | 20.5% | 23.9% | 36.5% | 37.9% | –7.0% | –4.2% | –14.2% | –14.8% |
| *Difference in differences* | –7.9% | | –3.4% | | –1.4% | | –2.8% | | 0.6% | |
| **Newly Ineligible Borrowers ($44,000–$61,000)** | | | | | | | | | | |
| 2012–2013 | 603 | 567 | 409 | 384 | 56,354 | 54,560 | 19.4% | 21.1% | 49.1% | 44.3% |
| 2014–2015 | 473 | 564 | 341 | 397 | 46,465 | 55,690 | 17.6% | 18.5% | 42.2% | 36.3% |
| % Change | –21.6% | –0.5% | –16.6% | 3.4% | –17.5% | 2.1% | –1.8% | –2.6% | –6.9% | –8.0% |
| *Difference in differences* | –21.0% | | –20.0% | | –19.6% | | 0.9% | | 1.1% | |
| **Higher-Income Borrowers ($62,000+)** | | | | | | | | | | |
| 2012–2013 | 751 | 905 | 484 | 589 | 82,159 | 115,395 | 22.1% | 21.0% | 27.5% | 21.6% |
| 2014–2015 | 745 | 1,072 | 510 | 768 | 100,837 | 161,532 | 18.8% | 16.3% | 18.6% | 15.6% |
| % Change | –0.8% | 18.5% | 5.4% | 30.4% | 22.7% | 40.0% | –3.3% | –4.7% | –8.9% | –5.9% |
| *Difference in differences* | –19.3% | | –25.0% | | –17.2% | | 1.4% | | –2.9% | |

Notes: The control group refers to borrowers in the tracts within 0.5 mile of any neighborhoods in the treatment group and with similar income (slightly lower or higher). Changes for the volume of applications and originations are relative changes but are absolute changes for denial rate and FHA share. Source: Authors' calculation based HMDA data and FDIC Summary of Deposits data.

## APPENDIX 3D

Descriptive Analysis of Changes in Purchase Mortgage Lending by CRA-Regulated Lenders by Borrowers Pre- and Post-2014 in the MBC MD

| | Applications | | Originations | | Origination Volume ($) | | Denial Rate (%) | | FHA Share (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Newly Eligible | Control | Newly Eligible | Control | Newly Eligible | Control | Newly Eligible | Control | Newly Eligible | Control |
| **Minority** | | | | | | | | | | |
| 2012–2013 | 204 | 270 | 128 | 173 | 22,542 | 31,133 | 25.3% | 21.3% | 34.4% | 55.3% |
| 2014–2015 | 238 | 268 | 162 | 170 | 29,178 | 33,033 | 19.3% | 20.9% | 25.9% | 41.1% |
| % Change | 16.7% | –0.7% | 26.6% | –1.7% | 29.4% | 6.1% | –6.0% | –0.4% | –8.4% | –14.1% |
| *Difference in differences* | 17.4% | | 28.3% | | 23.3% | | –5.5% | | 5.7% | |
| **Non-Hispanic White** | | | | | | | | | | |
| 2012–2013 | 1,395 | 1,193 | 1,030 | 905 | 180,761 | 171,519 | 13.8% | 13.4% | 18.2% | 17.8% |
| 2014–2015 | 1,345 | 1,118 | 1,046 | 866 | 198,130 | 176,475 | 11.6% | 11.4% | 14.2% | 14.2% |
| % Change | –3.6% | –6.3% | 1.6% | –4.3% | 9.6% | 2.9% | –2.2% | –2.0% | –3.9% | –3.6% |
| *Difference in differences* | 2.7% | | 5.9% | | 6.7% | | –0.2% | | –0.3% | |
| **LMI Borrowers ($61,000 or Lower)** | | | | | | | | | | |
| 2012–2013 | 898 | 779 | 611 | 549 | 91,539 | 80,913 | 19.2% | 18.7% | 20.6% | 23.1% |
| 2014–2015 | 842 | 648 | 620 | 460 | 99,533 | 71,374 | 16.3% | 16.5% | 16.8% | 13.9% |
| % Change | –6.2% | –16.8% | 1.5% | –16.2% | 8.7% | –11.8% | –3.0% | –2.2% | –3.8% | –9.2% |
| *Difference in differences* | 10.6% | | 17.7% | | 20.5% | | –0.7% | | 5.4% | |
| **Newly Eligible Borrowers ($62,000–$76,000)** | | | | | | | | | | |
| 2012–2013 | 270 | 219 | 200 | 147 | 35,649 | 27,330 | 15.1% | 22.4% | 27.5% | 25.2% |
| 2014–2015 | 283 | 229 | 217 | 182 | 40,056 | 36,692 | 8.5% | 10.0% | 19.8% | 18.1% |
| % Change | 4.8% | 4.6% | 8.5% | 23.8% | 12.4% | 34.3% | –6.6% | –12.4% | –7.7% | –7.0% |
| *Difference in differences* | 0.2% | | –15.3% | | –21.9% | | 5.8% | | –0.6% | |
| **Higher-Income Borrowers ($77,000+)** | | | | | | | | | | |
| 2012–2013 | 699 | 687 | 546 | 525 | 111,749 | 120,061 | 9.8% | 11.0% | 15.2% | 14.3% |
| 2014–2015 | 752 | 731 | 593 | 553 | 131,272 | 135,000 | 10.0% | 11.8% | 10.6% | 13.9% |
| % Change | 7.6% | 6.4% | 8.6% | 5.3% | 17.5% | 12.4% | 0.2% | 0.8% | –4.6% | –0.4% |
| *Difference in differences* | 1.2% | | 3.3% | | 5.0% | | –0.6% | | –4.2% | |

Notes: The control group refers to borrowers in the tracts within 0.5 mile of any neighborhoods in the treatment group and with similar income (slightly lower or higher). Changes for the volume of applications and originations are relative changes but are absolute changes for denial rate and FHA share. Source: Authors' calculation based HMDA data and FDIC Summary of Deposits data.

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