PennIUR
PENN INSTITUTE *for* URBAN RESEARCH

PENN IUR **WORKING PAPER**

Who Lends Beyond the Red Line?

The Community Reinvestment Act and the Legacy of Redlining

KEVIN A. PARK
US Department of Housing and Urban Development
Office of Policy Development and Research, Washington, D.C.
Contact Information: kevin.park@hud.gov

ROBERTO G. QUERCIA
Harris Distinguished Professor, Department of City & Regional Planning; UNC Center for Community Capital
University of North Carolina at Chapel Hill
Contact Information: quercia@email.unc.edu

SEPTEMBER 2019

Photo by NCinDC, via Flickr.

Contents

The opinions expressed are those of the authors, and do not necessarily reflect the policies of the US Department of Housing and Urban Development or the Administration. This work was authored as part of the contributor's official duties as an Employee of the United States Government and is therefore a work of the United States Government. In accordance with 17 U.S.C. 105, no copyright protection is available for such works under U.S. Law.

ABSTRACT

"Redlining" is when financial institutions refuse to serve to particular neighborhoods, often based on their racial and ethnic composition. Maps like those infamously created by the New Deal's Home Owners' Loan Corporation in the Great Depression rated and color-coded neighborhoods, assigning red to those considered the greatest credit risk. The Community Reinvestment Act was passed in 1977 to combat the legacy and practice of redlining. However, we find neighborhoods rated "declining" or "hazardous" in the 1930s are still associated with worse economic conditions eight decades later. Moreover, while we find evidence that CRA encourages local banks and thrifts to lend to lower-income borrowers, we find no difference in the market share of CRA-regulated lenders in lower-income neighborhoods. In fact, these institutions lag the market in historically redlined neighborhoods.

Keywords: housing finance, mortgage, redlining, Home Owners' Loan Corporation, Community Reinvestment Act

ABOUT THE AUTHORS

Kevin A. Park is an economist in the Housing Finance Analysis Division of the US Department of Housing and Urban Development. His work focuses on housing finance, particularly homeownership and mortgage insurance offered through the Federal Housing Administration. He earned his doctorate in City and Regional Planning from the University of North Carolina at Chapel Hill. He previously worked in the UNC Center for Community Capital and Harvard University's Joint Center for Housing Studies.

Roberto G. Quercia is Trudier Harris Distinguished Professor of City and Regional Planning and the Director of the UNC Center for Community Capital at the University of North Carolina at Chapel Hill. His work focuses on the economics and financing of affordable housing. He has published books and numerous articles and reports, primarily on the topics of low-income homeownership, affordable lending. He teaches courses on housing economics, real estate development, and personal finance.

INTRODUCTION

Redlining refers to the practice of discrimination, particularly in financial and insurance markets, based on location. In the United States, redlining is often associated with historical maps created by federal agencies like the Federal Housing Administration (FHA) and Home Owners' Loan Corporation (HOLC) during the Great Depression (Jackson 1980). Civil rights legislation in the mid-twentieth century outlawed the use of race and other protected classes, including proxies such as neighborhood, in housing and credit markets. These efforts culminated in the Community Reinvestment Act of 1977 (CRA) which went beyond restrictions against certain practices to create an affirmative obligation for financial institutions to meet the credit needs of their communities in a safe and sound manner. In today's mortgage market, CRA has played a limited but effective role in expanding access to credit for lower-income borrowers and neighborhoods.

CRA encourages banks and thrifts to lend to lower-income borrowers and neighborhoods in regions where they have a local branch office. But the mortgage market has changed significantly since 1977. Non-depository mortgage companies now originate most home loans, not CRA-regulated banks. And even CRA-regulated institutions often lend outside their local markets. These limitations often provide natural experiments for studies on the effectiveness of CRA.

Despite the documented effects of fair housing and community reinvestment policies, recent research has also shown persistent geographical differences in economic opportunity (Chetty et al. 2018). With the digitization of HOLC security maps from the 1930s, some of these disparities have been connected to historical federal policy (Mitchell and Franco 2018; Krimmel 2018; Aaronson et al. 2019). But the connection of redlining in the past to CRA today has not been examined. In this paper we provide a brief history of redlining and subsequent efforts to undo its legacy. We provide empirical evidence that neighborhood risk ratings in the past are associated with differences in socioeconomic conditions in the present. Then we examine whether, given the affirmative obligation to meet the credit needs of their communities, CRA-regulated lenders lead the market in lending to historically redlined neighborhoods.

HISTORICAL NEIGHBORHOOD RISK RATING

The Home Owners' Loan Corporation Act of 1933 (Pub. L. 73-43, June 13, 1933) created a new agency in the Federal Home Loan Bank Board (FHLBB) (itself created a year earlier) to purchase and refinance delinquent home mortgages into self-amortizing loans with longer terms and higher loan-to-value ratios than commonly available at the time. At its peak in 1935, HOLC held nearly 19 percent of all mortgage debt on one- to four-family homes in the country (Wheelock 2008).

Harris's (1951) *History and Policies of the Home Owners' Loan Corporation* states the HOLC received 1,886,491 applications, representing an estimated 40 percent of all mortgagors in the country, but 46 percent were rejected or withdrawn. Courtemanche and Snowden (2010) find applications and acceptance rates were higher in counties with higher pre-crisis home values, likely because of more extensive use of mortgage financing, and greatest economic distress. Acceptance rates were also higher in counties closer to HOLC offices, providing an instrument to estimate the impact of HOLC activity; however, the location of HOLC offices was not random. After accounting for the endogeneity of the distribution in HOLC activities, Courtemanche and Snowden (2010) and Fishback et al. (2010) find minimal impact on the overall housing market. Yet both find a significant increase in house values in smaller counties. Fishback et al. (2010) argue smaller counties may have had more localized mortgage markets and financial institutions that were in greater need of federal assistance.

Under the terms of the legislation, eligibility was limited to distressed mortgages secured by non-farm one- to four-family properties appraised for less than or equal to $20,000. In addition, mortgages were limited to the lesser of 80 percent of the appraised value or $14,000. Principal reductions became available for LTV ratios

greater than 80 percent. Consequently, the appraised value was an integral component of determining HOLC action. HOLC policy estimated the "fair worth" of a property based on the average three values, of which market value was only one. The other components included the cost of construction net of depreciation on a comparable lot and the capitalization of estimated historical rent. In a declining market, the latter technique routinely yields an estimate above the current market value. In a sample of HOLC cases from Connecticut, New Jersey and New York, Rose (2011) finds the final appraised value exceeded HOLC's own estimate of the market value in over 58 percent of properties, with a 4 percent average markup. Rose argues the liberal appraisal policy was a deviation from congressional intent by state officials designed to increase lender participation and recapitalize financial institutions.

In addition to property and borrower evaluation, new federal underwriting guidelines also evaluated the location of the property. HOLC and FHLBB created the City Survey Program to produce detailed maps of 239 cities. "Best" or "A" neighborhoods were colored green and "Still Desirable" or "B" neighborhoods blue, while "Definitely Declining" "D" neighborhood were yellow and "Hazardous" "D" neighborhoods were, of course, red. Although Harris (1951) does not specifically mention neighborhood risk ratings, he notes, "Instructions reminded the appraisers that, in general, cities had stopped growing, indicating the need for caution in estimating 'higher potential use and value'" (46). In addition, contemporaneous FHA underwriting manuals prescribed neighborhood risk rating, including economic stability and protection from adverse influences. "It is not the policy of the Federal Housing Administration to exclude entire cities and towns from the benefits of mutual mortgage insurance. It may well be, however, that within certain communities whose present-day and expected future stability is exceedingly low, only certain favored locations which surpass the general average of the town or community may prove acceptable for insurance. The rating ascribed shall apply to all locations situated in the area rated" (FHA 1936, Part II-216). Protection against adverse influences was "one of the most important features in the Rating of Location…Where little or no protection is provided against adverse influences the Valuator must not hesitate to make a reject rating of this feature" (FHA 1936, Part II-226). Zoning and deed restrictions were encouraged. "Usually the protection against adverse influences afforded by these means include prevention of the infiltration of business and industrial uses, lower-class occupancy, and inharmonious racial groups" (FHA 1936, Part II-229). Hillier (2005) uses spatial regression to analyze the determinants of HOLC grades and finds that "even when controlling for the value and condition of housing, race and immigrant status influenced the neighborhood appraisals" (227).

It is not clear how influential the HOLC security maps were at the time. Despite a policy and practice of generous property valuations, over 21 percent of rejected HOLC applications were denied for "inadequate security" (Harris 1951). However, Hillier (2003a) argues that the HOLC maps were developed after HOLC was most active and were not widely distributed. Hillier examines the HOLC map of Philadelphia and a random sample of property transactions between 1938 and 1950 and finds a statistically significant relationship between lower neighborhood rating and higher mortgage interest rates, but no consistent relationship with the number of mortgages. In fact, Hillier (2003b) finds HOLC lending was disproportionately to Black, Jewish, and foreign-born residents compared to their share of homeowners and disproportionately to older, lower-valued, "Colored" and "Hazardous" ("D"-rated) neighborhoods.[1]

Yet others find a persistent legacy of HOLC neighborhood risk rating on economic outcomes today. Using decades of census data, Krimmel (2018) and Aaronson et al. (2019) compare conditions in bordering neighborhoods with different risk ratings. Krimmel finds "D" rated neighborhoods experienced disproportionate declines in the number of housing units and population density over the course of the 20th century relative to "C" neighborhoods. Similarly, Aaronson et al. find lower graded neighborhoods experienced relative increases in the Black share of the population as well as decreases in homeownership, credit scores, house values and rents. The difference between "B" and "C" graded neighborhoods is particularly large. However, the gap narrows after 1970, which the authors attribute to the implementation of fair housing and community

reinvestment legislation.[2] Nevertheless, Mitchell and Franco (2018) report that nearly three out of four "Hazardous" neighborhoods are Low- or Moderate-Income (LMI) (median family income less than 80 percent of area median) today compared to less than 9 percent of "A" rated neighborhoods, and 64 percent are currently majority-minority compared to 14 percent, respectively.

FAIR HOUSING AND COMMUNITY REINVESTMENT LAW

Discrimination in housing was ostensibly prohibited by the Civil Rights Act of 1866 (14 Stat. 27–30), which states that citizens "of every race and color, without regard to any previous condition of slavery or involuntary servitude … shall have the same right, in every State and Territory in the United States, to make their rights and enforce contracts, to sue, be parties, and give evidence, to inherit, purchase, lease, sell, hold, and convey real and personal property…" Further, the Supreme Court ruled in 1917, "A city ordinance forbidding colored persons from occupying houses as residences, or places of abode or public assembly, on blocks where the majority of the houses are occupied by white persons for those purposes, and in like manner forbidding white persons when the conditions as to occupancy are reversed, and which bases the interdiction upon color. and nothing more, passes the legitimate bounds of police power, and invades the civil right to acquire, enjoy and use property, which is guaranteed in equal measure to all citizens, white or colored, by the Fourteenth Amendment" (*Buchanan v. Warley*, 245 U.S. 60 (1917)). And review of national bank charter applications considered "the needs of the community to be served" since at least 1918.[3] Yet *de jure* discrimination and segregation persisted through Reconstruction for another hundred years. In fact, the federal government was instrumental in spreading institutionalized discrimination even to areas where it had not previously rooted (Coates 2014; Rothstein 2017).

Fair housing advocacy gained momentum in the mid-twentieth century. As early as 1946, the United States brought an anti-trust case against 39 banks and other financial companies in New York, claiming that the defendants had created maps of where Black and Hispanic people lived and refused to originate mortgages in those areas, depriving residents the benefits of competition. A consent decree enjoined the defendants from continuing the alleged practices (63 Yale L.J. 1124 (1954)). Two years later, the Supreme Court ruled racially restrictive covenants unenforceable under the Equal Protection Clause of the Fourteenth Amendment (*Shelly v. Kraemer* 334 U.S. 1 (1948)).

In 1962, President Kennedy issued Executive Order 11063 directing federal agencies "to take all action necessary and appropriate to prevent discrimination because of race, color, creed, or national origin… in the lending practices with respect to residential property and related facilities (including land to be developed for residential use) of lending institutions, insofar as such practices relate to loans hereafter insured or guaranteed by the Federal Government" (27 FR 11527). Within three decades of codifying racial segregation in mortgage underwriting, agencies like FHA and FHLBB had reversed course and have since become a vital source of mortgage credit in underserved communities.

However, Kennedy's directive only applied to federal agencies. Redlining continued to be permitted by private lenders in an era of marked racial segregation and distress in urban neighborhoods. Following the race riots of the "long, hot summer" of 1967, the National Advisory Commission on Civil Disorders, better known as the Kerner Commission, investigated its causes. "The first is surely the continuing exclusion of great numbers of Negroes from the benefits of economic progress through discrimination in employment and education and their enforced confinement in segregated housing and schools. The corrosive and degrading effects of this condition and the attitudes that underlie it are the source of the deepest bitterness and lie at the center of the problem of racial disorder" (91). The report summarizes its conclusion, "Our Nation is moving toward two societies, one black, one white—separate and unequal" (1).

After the assassination of Dr. Martin Luther King, Jr., Congress passed the Civil Rights Act of 1968 (Pub. L. 90-284, April 11, 1968). Title VIII, known as the Fair Housing Act, states, "...it shall be unlawful for any bank, building and loan association, insurance company or other corporation, association, firm or enterprise whose business consists in whole or in part in the making of commercial real estate loans, to deny a loan or other financial assistance to a person applying therefor for the purpose of purchasing, constructing, improving, repairing, or maintaining a dwelling, or to discriminate against him in the fixing of the amount, interest rate duration, or other terms or conditions of such loan or other financial assistance, because of the race, color, religion, or national origin of such person..." Federal courts ruled this section of the Act, "as an explicit prohibition of 'redlining'" (*Laufman v. Oakley Bldg. & Loan Co.*, 408 F. Supp. 489 (S.D. Ohio 1976)).

In the Equal Credit Opportunity Act of 1974 (Pub. L. 93-495, October 28, 1974, Title V), Congress found, "there is a need to insure (sic) that the various financial institutions and other firms engaged in the extensions of credit exercise their responsibility to make credit available with fairness, impartiality, and without discrimination on the basis of sex or marital status." And made it "unlawful for any creditor to discriminate against any applicant on the basis of sex or marital status with respect to any aspect of a credit transaction." Amendments in 1976 extended protection to race, color, religion, national origin, age and public assistance (Pub. L. 94-239, March 23, 1976).

However, these laws were intrinsically limited by the focus on restrictions against discrimination enforced by federal bureaucrats. Applicants must be aware of being the victim of a specific act of disparate treatment and find a willing regulator, who are typically more focused on bank safety and soundness. Moreover, fair housing and equal opportunity legislation does not address the collective action dilemma of reinvestment in underserved neighborhoods. Profit-maximizing financial institutions may find themselves in a "Prisoners' Dilemma" when it comes to being the first mover into a neighborhood that lacks information on collateral values and borrower performance. After one pioneering bank builds the market, accessing this risk information would be easier for other banks (Davis and Whinston 1961; Lang and Nakamura 1993; Ling and Wachter 1998; Bernanke 2007; Haltom 2010).

Two additional pieces of legislation provided a fundamentally different approach to community reinvestment. In 1975, Congress determined "some depository institutions have sometimes contributed to the decline of certain geographic areas by their failure pursuant to their chartering responsibilities to provide adequate home financing to qualified applicants on reasonable terms and conditions." In response, Congress passed the Home Mortgage Disclosure Act (HMDA) (Pub. L. 94-200, December 31, 1975) "to provide the citizens and public officials of the United States with sufficient information to enable them to determine whether depository institutions are filling their obligations to serve the housing needs of the communities and neighborhoods in which they are located and to assist public officials in their determination of the distribution of public sector investments in a manner designed to improve the private investment environment" (Pub. L. 94-200, Dec. 31, 1975, Title III). Banks would be required to publicly release information on the number and amount of mortgages originated by census tract.

The information provided under HMDA enabled "regulation from below," as researchers and community advocates acted as unofficial bank examiners (Fishbein 1992). For example, Bill Dedman received the Pulitzer Prize in 1989 for "The Color of Money," a series of articles in *The Atlanta Journal-Constitution* documenting racial disparities in mortgage lending, beginning with the lede, "Whites receive five times as many home loans from Atlanta's banks and savings and loans as blacks of the same income" (Dedman 1988). Over time, HMDA coverage has been expanded to include non-depository lenders and application-level reporting of important loan, property and applicant characteristics.

Then in 1977 Congress passed the Community Reinvestment Act (CRA) (Pub. L. 95-128, Oct. 12, 1977), which reiterated the requirement that banks "serve the convenience and needs of the communities in which they

are chartered to do business," but went further to state, "regulated financial institutions have continuing and affirmative obligation to help meet the credit needs of the local communities in which they are chartered." Bank regulators would "assess the institution's record of meeting the credit needs of its entire community, including LMI neighborhoods, consistent with safe and sound operation of such institutions." Senator Proxmire, who introduced the legislation, stated,

> *The bill is based on two widely shared assumptions.*
>
> *No. 1: Government through tax revenues and public debt cannot and should not provide more than a limited part of the capital required for local housing and economic development needs. Financial institutions in our free economic system must play the leading role.*
>
> *Second: A public charter for a bank or savings institution conveys numerous benefits and it is fair for the public to ask something in return.*[4]

The "affirmative obligation" under CRA helps overcome the collective action dilemma of investment in underserved neighborhoods and counter the legacy of redlining. Notably, however, CRA regulations do not explicitly incorporate race and ethnicity into the definition of community or the obligation of financial institutions despite being a primary basis for neighborhood discrimination.[5]

CRA has been controversial since its introduction. Armed with HMDA data, advocates contend banks are continuing *de facto* redlining and neglecting profitable lending opportunities. Others insist HMDA omits key underwriting factors and decry government intervention in financial markets. Research over the last two decades has found that CRA is effective in encouraging banks to lender to lower income households but limited in its impact on the overall mortgage market.

EFFECTIVENESS OF THE COMMUNITY REINVESTMENT ACT

CRA's critics argue that the affirmative obligation to serve lower-income communities led to a deterioration in mortgage underwriting standards that fueled the financial crisis in the 2000s (Pinto 2008; Wallison 2011; Agarwal et al. 2012). However, developments in the mortgage market over the last several decades have reduced the share of the market subject to CRA (Avery, Courchane and Zorn 2009). CRA covered only a fraction of lending during the peak of the housing market (Park 2008; 2010). Berry and Lee (2008) find no direct impact of CRA on lending and Dahl, Evanoff and Spivey (2002) find that lending in LMI areas did not increase after lending institutions received a "poor" CRA rating.

Further, an abundance of research finds CRA-related mortgages performed at least as well as other loans during the subsequent recession (Laderman and Reid 2009; Ding et al. 2011; Ghent, Hernandez-Murillo and Owyang 2015; Avery and Brevoort 2015; Bhutta and Ringo 2015). Similarly, Reid et al. (2013) provides an extensive rebuttal to Agarwal et al. (2012) and others to conclude "no credible research to support the assertion that CRA contributed to an increase in risky lending during the subprime boom."

More recent studies do find and association between CRA regulation and lending, often exploiting natural experiments in CRA eligibility (Bhutta 2011). Ding and Nakamura (2017) find that when census tracts in Philadelphia lose CRA eligibility because they are no longer considered LMI, lending in those tracts experienced a decrease in lending of 10 to 29 percent. Ringo (2017) finds that when a census tract gained CRA eligibility, lending increases by two to four percent. Butcher and Munoz (2017) use a regression discontinuity and find CRA eligibility is associate with a reduction in the "thin file" and "credit invisible" share of the population, and a 9 percent increase in the number of loans but not significant increase in delinquency. These findings are consistent with an earlier study by Gabriel and Rosenthal (2009) where they find that CRA mortgage lending results in small increases in the homeownership rate in CRA assessment areas. Casey, Farhat, and Cartwright

(2017) find that lending significantly increases when banks and community groups negotiate agreements that commit banks to specific increases in lending. Van Tol (2019) estimates that since 1996, banks complying with CRA have made more than $1 trillion in community development lending and issued another $1 trillion in small business lending in CRA eligible census tracts.

Other studies have examined the impacts of CRA on small business lending and financial services. Ding, Lee and Bostic (2018) examine changes in area CRA eligibility on small business lending. As the studies mentioned above, the authors find that loss of CRA eligibility is accompanied by a decline in lending, while gaining CRA eligibility is accompanied by an increase in lending. Using a different methodology, Bostic and Lee (2017) find that small business lending increases more in moderate income CRA eligible tracts than in census tracts that have incomes slightly above the CRA limit (higher than 80 percent of area median income). Stegman, Cochran and Faris (2002) find evidence of rating inflation in CRA evaluations of financial services.

Taken together, the evidence indicates that the CRA promotes more lending in LMI communities, but only incrementally. Further, the narrow focus on exploiting natural experiments to find exogenous variation in CRA eligibility to estimate local area treatment effects, while necessary for establishing causality, may also miss the broader issue of geographic disparities along dimensions other than income. In particular, the question remains whether CRA helps ameliorate the legacy of redlining, which was often associated with race and ethnicity rather than income.

METHODOLOGY

Although HOLC's City Survey Program may not have directly caused redlining, they are still a reflection of the attitudes of financial institutions at the time of the credit risks associated with certain neighborhoods and a primary historical source for where redlining was likely occurring or would occur. Geo-rectified shapefiles of HOLC graded areas for certain cities are available from the Digital Scholarship Lab at the University of Richmond (Nelson et al. 2019). Given Courtemanche and Snowden (2010) and Fishback et al. (2010) find HOLC had a stronger impact on smaller counties, we want to examine a range of city sizes, not just large urban areas commonly examined in CRA studies. We select 14 cities in 3 states in the southeast of the United States for analysis (HOLC map dates in parentheses):

- Asheville, NC (September 22, 1937)
- Atlanta, GA (June 25, 1938)
- Augusta, GA (September 15, 1937)
- Charlotte, NC (May 15, 1937)
- Columbus, GA (June 7, 1937)
- Durham, NC (July 23, 1937)
- Greensboro, NC (June 2, 1937)
- Lynchburg, VA (May 15, 1937)
- Macon, GA (July 26, 1937)
- Newport News, VA (April 3, 1937)
- Norfolk, VA (No Date)
- Richmond, VA (April 3, 1937)
- Roanoke, VA (May 15, 1937)
- Winston-Salem, NC (August 28, 1937)

HOLC graded areas do not align with current census geographies. To reconcile borders, we found the centroid, or geographic center, of each census block in the county or independent city being examined.[6] If the centroid of the block fell within a graded area, then the census block was assigned that HOLC grade. The blocks were then aggregated to census tracts. Where a census tract encompasses blocks with different HOLC grades or graded and ungraded areas, we create multiple records for that tract and assign a weight based on the proportion of housing units from the 2010 decennial census that falls in a given part of the tract. The result is 846 records with an associated HOLC grade covering 503 census tracts, which reduce to 297 after weighting.[7]

Table 1 provides some descriptive statistics of these census tracts by HOLC grade. Roughly half of the sampled tracts are in Atlanta, Norfolk and Richmond. Neighborhoods in Georgia (e.g., Augusta, Columbus, and Macon) appear disproportionately rated "hazardous" while neighborhoods in North Carolina (e.g., Asheville, Charlotte, and Greensboro) were disproportionately graded "A." Overall, census tracts in our analysis have a higher minority share of the population and lower homeownership rate than the rest of the country or even the rest of the South. As of the 2010 census, the national homeownership rate was 65 percent and nearly 67 percent in the South but only 51 percent in our selected cities and 44 percent in the census tracts in our sample. The minority share of the population was 36 percent in the United States, 40 percent in the South and 37 percent in our selected cities but 58 percent in our sample. In part, these patterns reflect that HOLC grades are typically only available for historic city centers and urban areas are disproportionately populated by renters and minorities. The skewness of our sample may limit the extent to which our findings can be generalized to the entire country, which includes other regions as well as suburbs and exurbs.

We use neighborhood HOLC grades as explanatory variables for current economic conditions and the distribution of mortgage lending using ordinary least squares and maximum likelihood estimation. The generalized research design estimates an outcome (Y) in a census tract (j) based only on HOLC neighborhood grades ($HOLC$) and fixed effects (α_g) for metropolitan statistical area.[8] Standard errors are clustered by census tract to account for multiple records.

$$Y_{jg}=\alpha_g+\delta HOLC_{jg}+\gamma INC_{jg}+\varepsilon_{jg}$$

We estimate models with and without a measure of the relative median family income in the neighborhood (INC), a component of the Lending Test in CRA evaluations. We obtain tract and area median income, based on the 2015 American Community Survey, from the Federal Financial Institutions Examination Council (FFIEC) CRA disclosure files.[9] Following the characterization used in CRA evaluations: "High Income" is defined as median family income equal to 120 percent or more of the area median, "Middle Income" is 80 up to 120 percent, "Moderate Income" is 50 up to 80 percent, and "Low Income" is less than 50 percent of area median income.

FINDINGS

Consistent with previous research (Appel and Nickerson 2016; Anders 2019; Mitchell and Franco 2018; Krimmel 2018; Aaronson et al. 2019), our descriptive analyses find a persistent legacy of redlining in the contemporary geography of economic conditions. Neighborhoods rated "C" or "D" by the HOLC in the late 1930s are correlated with lower economic mobility for children born in the late 1970s and early 1980s, even controlling for parental income (Figure 1). Historically redlined neighborhoods are correlated with lower homeownership rates and higher minority population shares in 2010 (Figure 2) and with higher mortgage credit risk today (Figure 3). In addition, while banks and thrifts in their assessment areas account for a disproportionate share of lending to lower-income borrowers in 2017, we find CRA-regulated lending lags the market, particularly non-depository mortgage companies, in lending to historically redlined neighborhoods (Figure 4).

PAST REDLINING AND CURRENT ECONOMIC CONDITIONS

Table 2 shows the results of linear regressions predicting the minority share of the population and homeownership rate by census block and census tract. Aggregating to census tracts reduces the precision in assigning HOLC grades, possibly creating attenuation bias; however, a comparison of results does not reveal a meaningful difference in estimated patterns. Consistent with Aaronson et al. (2019), compared to "A" neighborhoods, the minority share of the population in "C" neighborhoods is 44.8 percentage points higher when using 16,408 census blocks as the unit of analysis and 43.9 percentage points higher when using

weighted census tracts. The minority share is 67.0 percentage points and 69.9 percentage points higher, respectively, in "D" neighborhoods. Similarly, compared to "A" neighborhoods, the homeownership rate in "C" neighborhoods is 33.5 percentages points lower when using census blocks and 35.7 percentage points lower when using census tracts. The homeownership rate is 39.3 percentage points and 46.1 percentage points lower, respectively, in "D" neighborhoods. The correlation between historical risk rating and minority share of the population or homeownership rate is not surprising given the factors used in HOLC grading (Hillier 2005). Krimmel (2018) and Aaronson et al. (2019) develop stronger causal arguments, but even this descriptive analysis demonstrates the persistence of differences in economic geography over decades.

How much of this correlation with historic redlining practices is accounted for by current neighborhood income? Table 3 shows the cross-tabulation of neighborhood income by historical HOLC grade. Nearly 80 percent of neighborhoods graded "A" by the HOLC in the late 1930s are High Income in the mid-2010s and none are Low Income. By contrast, over half of neighborhoods rated "D" are Low Income today. A Chi-square test rejects the null hypothesis of independent distributions. Nevertheless, there is enough differentiation between HOLC grades and current neighborhood income that including neighborhood income does not eliminate the statistical significance of historical risk rating. Low Income neighborhoods are associated with a minority share of the population that is 51.4 percentage points higher than High Income neighborhoods, but "D" rated neighborhoods continue to be associated with minority share that is 35.8 percentage points higher than "A" neighborhoods after controlling for current neighborhood income. The relationship with homeownership rate is even stronger. Low Income neighborhoods are associated with a homeownership rate that is 11.4 percentage points lower while "C" and "D" neighborhoods are associated with 30-40 percentage point lower homeownership rates. Neighborhood income classifications, like those used in CRA regulations, are not a sufficient proxy for historical redlining and its continued intersection with race.

To more fully explore the relationship between historical redlining and economic inequality, we use data from the Opportunity Atlas created by Chetty et al. (2018). This project estimates the earnings distribution of adults based on where they lived as children and their parents' income. Table 4 shows the predicted percentile of household income by HOLC grade. Without controlling for parental income, children that grow up in "D" rated neighborhoods are associated with a household income that is nearly 30 percentiles lower than children that grew up in "A" rated neighborhoods. Controlling for neighborhood income reduces the associated effect to 16.5 percentiles. Controlling for parental income as well reduces the effect to roughly 7 percentiles but remains statistically significant and roughly equivalent to growing up in a Moderate Income neighborhood instead of a High Income neighborhoods. Table 5 shows the results by race and ethnicity for children with parental income at the national median. There is a stronger correlation between HOLC grades and household income among Hispanic children, but the results are not statistically significant among Black children. Notably, Chetty et al.'s sample frame consists of people born between 1978 and 1983, all after CRA was passed, yet significant differences in economic mobility are still associated with historic redlining practices.

In addition, we examine the credit risk associated with historically redlined neighborhoods. We use administrative records on 30,687 FHA-insured 30-year fixed-rate loans active in our selected cities at the beginning of 2016 or later originated. We use Fine and Gray's (1999) semi-parametric survival analysis framework to estimate the likelihood a loan ever falls 90-days delinquent. Survival analysis allows us to account for differences in maturity at the beginning of the period and censored performance windows, as well as the competing risk of prepayment. The likelihood of a specific hazard is a function of the HOLC risk rating for that census tract and metropolitan area fixed effects, relative to an unspecified baseline hazard. Roughly two-thirds (65 percent) of the sample was originated prior to 2016, with an average loan age of 49 months. The remainder were originated in or after January 2016. Between then and March 2019, 6 percent of the sample experienced a 90-day delinquency for the first-time at some point and 23 percent prepaid.

The results of the survival analysis are shown in Table 6. Loans in neighborhoods rated by the HOLC as "C" are 2.4 times more likely to default than loans in "A"-rated neighborhoods and "D"-rated neighborhoods are 2.6 times more likely. The second column of Table 5 shows the results after controlling for common borrower characteristics:

Credit Score	The minimum decision credit score at origination.
Loan-to-Value Ratio	The loan amount as a share of the property value, defined as the lesser of the appraised value or sales price, if a home purchase loan.
Debt-to-Income Ratio	Total debt burden, including mortgage principal and interest payments, property taxes and insurance, and any recurring debt payments as a share of effective borrower income.

The descriptive statistics in Table 1 show these variables do not vary significantly across HOLC neighborhood risk ratings. Nevertheless, second-order polynomial functions and complete interactions are used to account for multiplicative effects of risk layering. Accounting for individual borrower risk factors does not meaningfully change the risk associated with geography. The second column in Table 6 shows loans in neighborhoods rated "C" or "D" are associated with a risk of default 2.2 times greater than comparable loans in "A" rated neighborhoods. The final specification includes neighborhood income. Moderate and Low Income neighborhoods are associated with 73 and 93 percent increase in the likelihood of default, respectively. Controlling for neighborhood income reduces the additional risk associated with "C" and "D" neighborhoods to 64 and 58 percent, respectively. This descriptive analysis does not explain how or why historically redlined neighborhoods continue to be associated with a higher likelihood of default after controlling for borrower risk characteristics. Credit risk can be both a cause and consequence of underinvestment, including not only mortgage lending but also financial services and community development. The distressed financial ecosystem of these communities is why CRA continues to be needed.

CRA LENDING IN HISTORICALLY REDLINED NEIGHBORHOODS

We use data from the Home Mortgage Disclosure Act (HMDA) to examine lending patterns across neighborhoods according to their HOLC risk rating. Given the difficulties of estimating latent demand for homeownership and mortgage credit simultaneously with the supply of credit, we instead focus on the relative market share of CRA-regulated institutions to evaluate the effect of CRA. We use a loan-level logistic regression to model the probability that a borrower *i* in census tract *j* obtains a home mortgage from a local bank or thrift (i.e., a CRA-regulated lender in their assessment area) (Y_{ijg}=1) as a function of the HOLC risk rating for that census tract and metropolitan area fixed effects. We identify CRA-regulated lenders and their assessment areas in 2017 using disclosures provided by FFIEC. Assessment areas are merged with HMDA loan/application records for 2017 by lender tax identification number and census tract.[10]

HMDA records are restricted to first lien loan originations for purchase or refinance of owner-occupied one- to four-unit properties in census tracts with HOLC grades, resulting in a sample of 28,558 loans. Over a fifth of loans were originated by banks and thrifts in their assessment area (Table 7). Applying the tract-level weights previously discussed, nearly 9 percent of loans are in HOLC graded "A" neighborhoods, 20 percent are in "B" neighborhoods, 49 percent in "C" neighborhoods and 23 percent in "D" neighborhoods.

The results of the binomial logistic regression are shown in Table 8. Relative to HOLC-graded "A" neighborhoods, the odds of a loan being originated by a local bank or thrift are 28 percent lower in "B" neighborhoods, 46 percent lower in "C" neighborhoods and 50 percent lower in "D" neighborhoods. This general pattern is consistent when examining only conventional loans, purchase loans, or refinances; however,

there are no statistically significant differences by risk rating when restricted to government-insured loans (i.e., loans insured by the Federal Housing Administration, Veterans Administration, or Rural Housing Service).

We re-estimate the lender type model with additional borrower and neighborhood covariates, including:

Black	Indicator of whether any borrower or co-borrower is Black.[11]
Hispanic	Indicator of whether any borrower or co-borrower is Hispanic
Borrower Income	Categorical variable indicating whether the reported income is less than half the area median income estimated by FFIEC (Low Income), 50 to less than 80 percent (Moderate), 80 to less than 120 percent (Middle), or missing. Over 120 percent of area median income (High Income) are the reference group.
Homeownership Rate	Owner-occupied share of housing units in the 2010 decennial census.
Loan Type	Indicator of whether the loan is conventional. Loans insured by a government agency (Federal Housing Administration, Veterans Administration or Rural Housing Service) are the reference group.
Loan Purpose	Indicator of whether the loan is a refinancing. Purchase loans are the reference group.
Loan Amount	Natural logarithm of the loan amount

Table 8 presents select results showing effects associated with HOLC grade, borrower and neighborhood income. Full results are available in an appendix. LMI borrowers are generally more likely to use local banks and thrifts than High Income borrowers, suggesting a positive impact of CRA in promoting lending to underserved groups. Using average marginal effects, the estimated market share of banks and thrifts in their assessment area is roughly 20.2 percent among High Income borrowers but 22.7 and 24.4 percent among Moderate and Low Income borrowers, statistically significant increases of 2.4 and 4.2 percentage points, respectively. On the other hand, borrowers in Moderate Income neighborhoods are less likely to use local banks and thrifts. The coefficient associated with Low Income neighborhoods is not statistically significant. There remain no statistically significant differences when restricting the sample to loans insured by a federal agency.

The results also show that even after controlling for borrower and neighborhood income, as well as other borrower and loan characteristics, the geography of historical redlining practices is still evident in current mortgage lending patterns. Relative to HOLC-graded "A" neighborhoods, the odds of a loan being originated by a local bank or thrift are 12 percent lower in "B" neighborhoods and 23 percent lower in "C" and "D" neighborhoods. Using average marginal effects, the estimated market share of banks and thrifts in their assessment area is 24.4 percent in "A" neighborhoods but 20.3 percent in "C" and "D" neighborhoods, a statistically significant difference of 4.1 percentage points. In other words, for local banks and thrifts to have the same market share as they have in HOLC-graded "A" neighborhoods, they would need to increase their lending in "C" in "D" neighborhoods by 20 to 27 percent, depending on whether they poach existing non-CRA loans or increase the overall number of loan originations. This would constitute up to a 5 percent increase in total lending in "C" and "D" neighborhoods and up to an 18 percent increase in lending by banks and thrifts in their assessment areas.

CRA's requirement that lending be "consistent with the safe and sound operation of the institution" (12 CFR 25.11(b)) may help explain the lower market share of banks and thrifts in historically redlined neighborhoods. However, the first column of Table 9 excludes loans with an annual percentage rate equal to or greater than 150 basis points over the Average Prime Offer Rate according to Freddie Mac Primary Mortgage Market Survey, a

common definition of higher-priced loans in HMDA.[12] The restriction does not meaningfully change the results (full results are available in the appendix).

We have shown that historic neighborhood risk rating is correlated with the current racial composition of census tracts. The second column of Table 9 shows whether the current minority share of the population is a mediating variable that explains the legacy of redlining in mortgage lending. The share of the neighborhood population that is not non-Hispanic white has a small but statistically significant inverse relationship with the market share of local banks and thrifts. The correlation with minority share diminishes but does not eliminate the effect associated with HOLC risk rating (full results are available in the appendix).

The next two columns in Table 9 divide the sample into "Large" and "Small" cities. Large cities in our sample include Atlanta, Charlotte and Norfolk-Newport News, which each have over 400,000 people as of the 2017 American Community Survey. None of the remaining Small cities have more than 300,000. Local bank and thrifts market share is not significantly different in HOLC-graded "A" and "B" neighborhoods in Large cities, but significantly lower in historically redlined neighborhoods. By contrast, local bank and thrift market share is lower in all but "A" neighborhoods in Small cities, although the difference is not statistically significant for the worst-rated neighborhoods.

The final column of Table 9 weights loans by loan amount, reflecting the total dollar volume financial institutions are investing in neighborhoods. Loan amounts are generally smaller among lower income borrowers, reflecting underwriting standards that measure the capacity to repay loans. But measuring the total dollar amount invested also magnifies the disparity in historically redlined neighborhoods even controlling for borrower and neighborhoods income. The market share of local banks and thrifts by dollar volume is 7 to 8 percentage points lower in HOLC-graded "C" and "D" neighborhoods compared to "A" neighborhoods. In other words, banks and thrifts would need to increase the *dollar volume* of lending to historically redlined neighborhoods in their assessment areas by 35 to 50 percent to equal their market share in HOLC-graded "A" neighborhoods, corresponding to an overall increase in lending to these neighborhoods of up to 11 percent and an increase in CRA assessment area lending by up to 29 percent.

What type of mortgage lenders serve historically redlined neighborhoods if local banks and thrifts disproportionately do not? We replace the dichotomous dependent variable with a multinomial logistic model, where the vector of coefficients associated with local banks and thrifts is normalized to zero, yielding one in the numerator. Then we compare the relative likelihood of a borrower using alternative loan channels, specifically (1) banks and thrifts outside their CRA assessment areas, (2) credit unions, and (3) non-bank mortgage companies, against the likelihood of using banks and thrifts inside their CRA assessment areas. Over a quarter of loans were originated by bank and thrifts outside their assessment areas, 3 percent were originated by credit unions, and nearly half were originated by non-depository mortgage companies (Table 7). The results for each alternative type of lender are shown in Table 10 (full results available in appendix). LMI borrowers are disproportionately served by local banks and thrifts relative to any of the three alternative lender types. By contrast, non-depository mortgage companies are more likely to serve Middle and Moderate Income neighborhoods, but also historically redlined neighborhoods. All else equal, the market share of mortgage companies is 6.5 to 6.8 percentage points higher in HOLC-graded "C" and "D" neighborhoods, respectively, compared to "A" neighborhoods. The relative risk ratios associated with credit unions and banks and thrifts outside their assessment areas are also positive, but not statistically significant.

CONCLUSION

The Community Reinvestment Act was enacted to counter the practice and legacy of redlining by creating an "affirmative obligation" for banks to lend to all communities in which they are located. However, the implementation of CRA evaluations is specifically based on borrower and neighborhood income.

There is a strong correlation between current neighborhood income and historical redlining. Roughly four out of five neighborhoods rated "Best" by the HOLC in the late 1930s are High Income today and none are Low Income while over half of neighborhoods rated "Hazardous" are Low Income. But neighborhood income is an incomplete proxy for underserved geographies. Neighborhoods graded "Declining" or "Hazardous" by the HOLC in the 1930s continue to be associated with worse economic mobility and higher likelihood of default even after controlling for neighborhood income.

However, we find CRA-regulated institutions lag the market in historically redlined neighborhoods. Local banks and thrifts would need to increase lending in "C" and "D" graded neighborhoods by 20 to 27 percent (35 to 50 percent by dollar volume) to have the same market share as they have in "A" neighborhoods. Given the higher credit risk associated with historically redlined neighborhoods, independent of borrower and loan characteristics, the avoidance by local banks and thrifts may be rational. On the other hand, that higher credit risk may be a symptom of persistent disinvestment in the neighborhood by financial institutions. Further, it is contrary to the affirmative obligation of local banks and thrifts to serve all communities. By narrowly following the letter of CRA regulations, to lend to lower-income borrowers and neighborhoods, banks and thrifts appear to have missed the spirit of CRA, an affirmative obligation to meet the credit needs of all the local communities in which they are chartered.

Of course, the foreclosure and financial crises demonstrated the importance of safe and sound lending for both households and financial institutions. However, there is now extensive evidence that CRA helps expand access to homeownership without unduly increasing risk. Moreover, it is not sufficient to note that historically redlined neighborhoods are being served by non-bank mortgage lenders. While these financial institutions provide an important connection between capital and primary mortgage markets, they also do not integrate mortgage lending with traditional bank deposits and other financial services. According to the FDIC (2018), 6.5 percent of households are unbanked and another 18.7 percent are under-banked. The absence of local banks and thrift mortgage lending in historically redlined neighborhoods is comparable to the absence of other financial services that lead households to use higher risk, more expensive products.

The swing from the foreclosure crisis induced by subprime lending to an affordability crisis driven by lack of supply has raised housing issues to national prominence. The Dodd–Frank Wall Street Reform and Consumer Protection Act of 2010 involves numerous housing reforms, including data collected under HMDA that helps inform CRA evaluations. More recently, the Office of the Comptroller of the Currency issues an advanced notice of proposed rulemaking in August 2018 on reforms to CRA itself (83 FR 45053). The proposed American Housing and Economic Mobility Act of 2018 (S. 3503) introduced by Sen. Elizabeth Warren (D-MA) would expand CRA to cover credit unions and non-depository mortgage companies. In addition, Title II of the bill, entitled "Reversing the Legacy of Housing Discrimination and Government Negligence," would provide downpayment assistance for first-time homebuyers earning less than 120 percent of area median income in targeted neighborhoods.[13] Eligibility would be limited to

> (A) census tracts graded as ''hazardous'' in maps drawn by the Home Owners' Loan Corporation that are, as of the date of enactment of this Act, low-income communities; and
>
> (B) census tracts that were designated for non-White citizens in jurisdictions that historically had racially segregated zoning codes and are, as of the date of enactment of this Act, low-income communities

Some areas experiencing gentrification may see a noticeable difference between current mortgage market activity and previous racial composition (Immergluck, Earl and Powell 2019); nevertheless, the correlation between HOLC grades and measures of economic opportunity today suggest a strong persistence in geographic disparities. This paper finds merit in including historic neighborhood risk ratings as a determinant

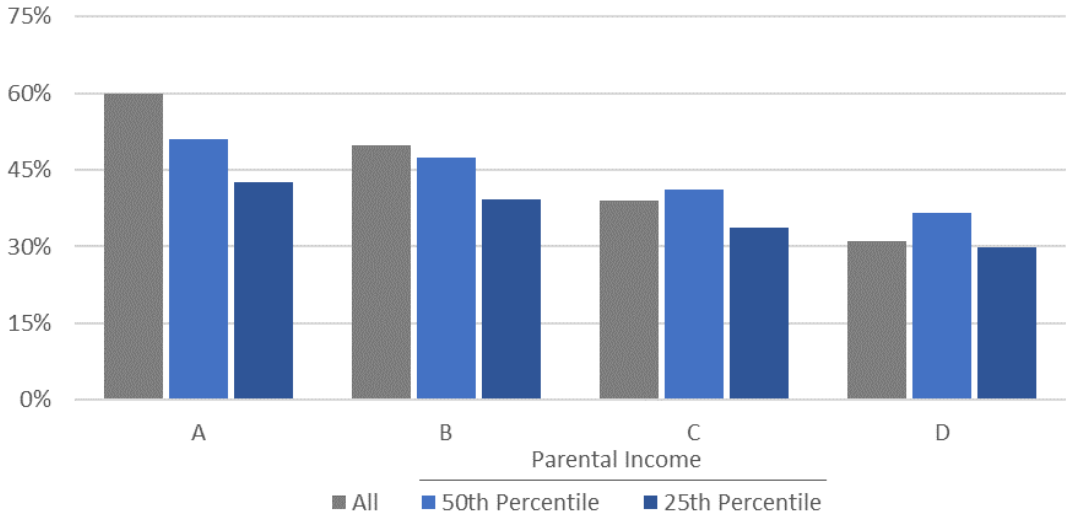
for current community reinvestment, particularly given that explicitly incorporating borrower or neighborhood race and ethnicity may face legal challenges (Badger 2019).

It has been 50 years since the enactment of the CRA. Taken together, the existing research on the impacts of the CRA on lending indicates that CRA-regulated institutions are more active lower income communities than they would have otherwise been. CRA modernization efforts need to build upon this success.

However, expanding the criteria used to define targeted neighborhoods for CRA evaluations is a double-edged sword. The ease of identifying LMI census tracts provides clarity for both financial institutions and community advocates on what lending is covered by CRA. This has been a major feature of the Lending Test in CRA evaluations compared to the more amorphous qualification criteria in the Services and Investment Tests. Yet the narrow focus on income ignores the actual practice and legacy of redlining that CRA was meant to address. Neighborhood risk rating was often based on the racial composition of neighborhoods at the time. At a minimum, discussion of the efficacy of CRA should consider the systemic outcomes it was meant to address and not merely the specifics of how it has been implemented.

FIGURE 1:

Economic opportunity by HOLC risk rating



Mean percentile rank in the national distribution of household income in 2014-2015 for children born between 1978 and 1983, with parents at a given percentile in the national household income distribution.

FIGURE 2:

Homeownership rates and minority population shares by HOLC risk rating

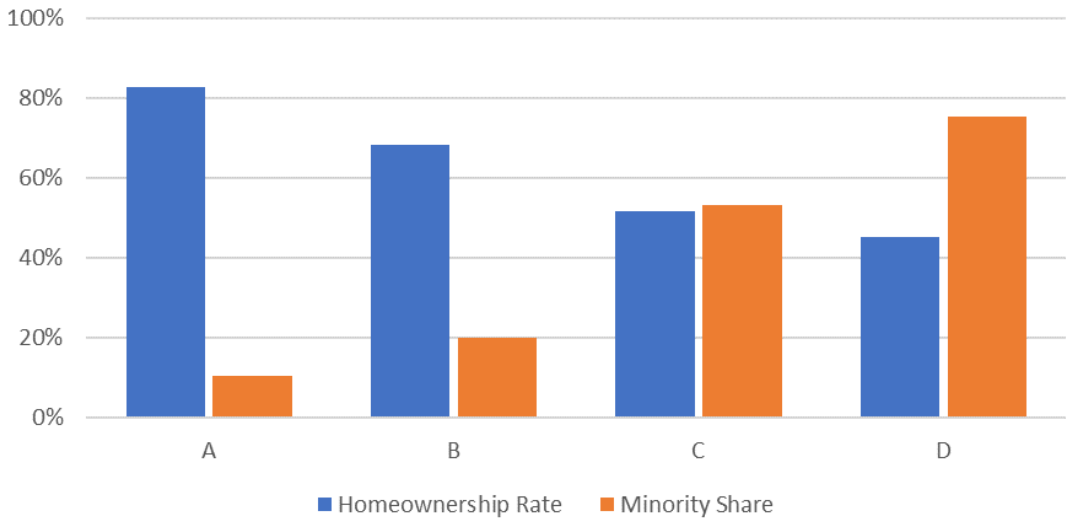
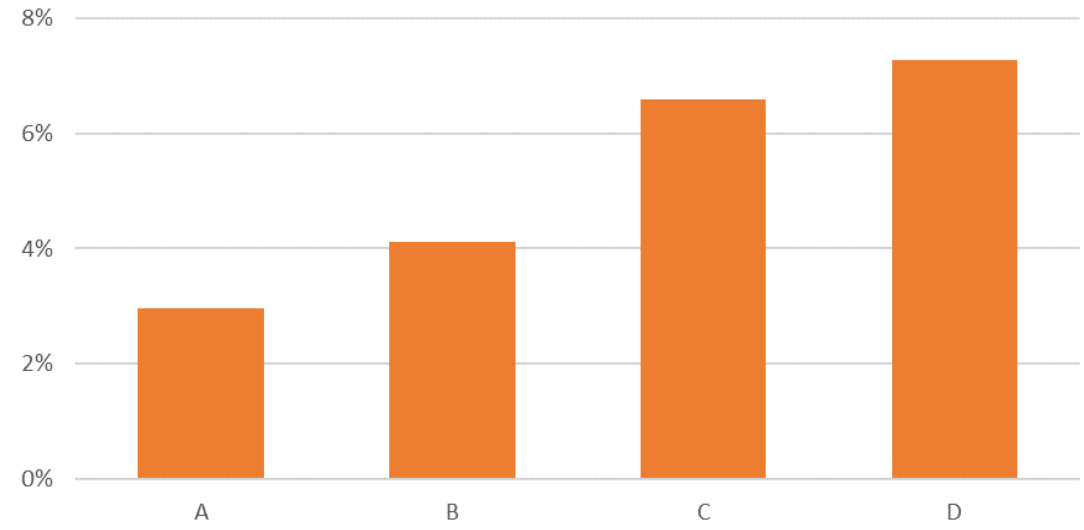


FIGURE 3:

FHA default rate by HOLC risk rating



Among FHA-insured 30-year fixed-rate loans active or originated after Jan. 1, 2016.

FIGURE 4:

Lender type by HOLC risk rating

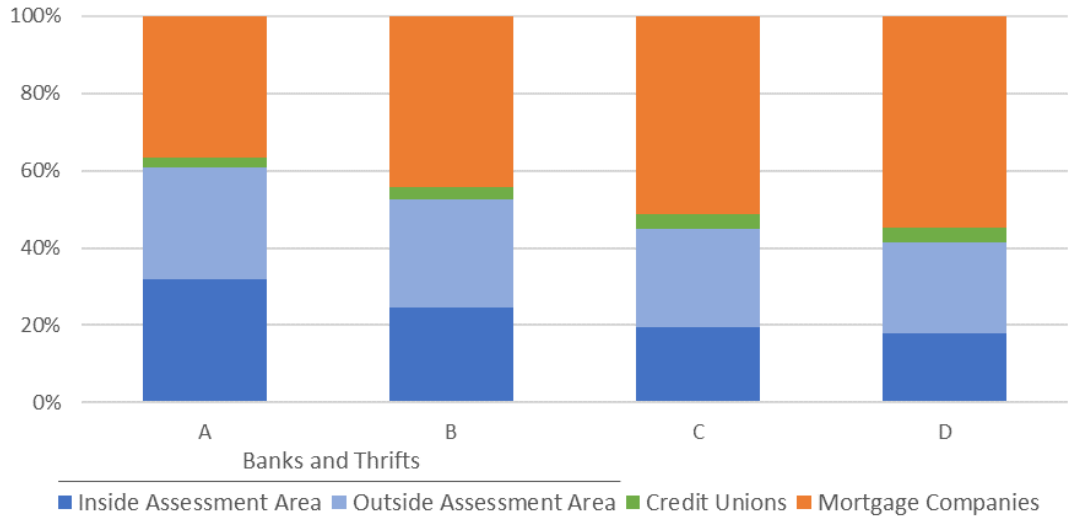


TABLE 1:

Descriptive statistics

	HOLC Grade				
	A	B	C	D	All
Observations	71	154	347	274	846
Weighted	17.2	40.1	127.0	112.4	296.7
Metropolitan Area					
Asheville, NC	11%	22%	48%	18%	100%
Atlanta, GA	2%	13%	47%	38%	100%
Augusta, GA	2%	8%	19%	71%	100%
Charlotte, NC	15%	17%	30%	37%	100%
Columbus, GA	1%	13%	26%	60%	100%
Durham, NC	10%	5%	46%	40%	100%
Greensboro, NC	16%	18%	47%	19%	100%
Lynchburg, VA	7%	15%	64%	14%	100%
Macon, GA	1%	6%	21%	72%	100%
Newport News, VA	8%	8%	48%	36%	100%
Norfolk, VA	3%	10%	48%	39%	100%
Richmond, VA	7%	21%	37%	35%	100%
Roanoke, VA	1%	7%	56%	36%	100%
Winston-Salem, NC	9%	15%	50%	25%	100%
Housing Units Per Tract	534.8	590.6	755.4	601.0	661.9
	(321.7)	(410.4)	(494.2)	(305.3)	(422.1)
Homeownership Rate	77.3%	57.8%	43.8%	33.2%	43.6%
	(19.3)	(23.6)	(16.9)	(16.9)	(21.4)
Minority Share of Population	11.1%	24.9%	54.6%	80.6%	57.9%
	(12.4)	(26.7)	(28.1)	(21.7)	(33.4)
Mean Household Percentile	59.9%	49.7%	39.0%	31.0%	38.6%
	(13.9)	(13.0)	(10.1)	(5.4)	(12.2)
Parental Income					
25th	42.7%	39.3%	33.8%	29.8%	33.5%
	(10.2)	(8.6)	(5.8)	(3.1)	(6.8)
50th	51.0%	47.3%	41.2%	36.5%	40.8%
	(8.3)	(7.7)	(6.4)	(5.0)	(7.5)
Loan Originations Per Tract	85.7	76.2	60.2	45.5	60.7
	(51.8)	(48.7)	(50.8)	(47.1)	(51.0)
FHA-Insured Loans[1]					
Debt-to-Income Ratio	38.8%	38.9%	39.4%	39.9%	39.5%
	(13.6)	(11.5)	(8.7)	(8.9)	(9.4)
Loan-to-Value Ratio	93.3%	93.5%	93.1%	92.5%	92.9%
	(11.3)	(8.9)	(7.5)	(8.5)	(8.3)
Credit Score	694.1	696.2	688.9	684.0	688.4
	(72.6)	(62.6)	(48.8)	(50.0)	(52.4)
Delinquency Rate	3.0%	4.1%	6.6%	7.3%	6.4%

Standard deviations shown in parentheses.

[1]Loans active between January 2016 and March 2019.

TABLE 2:

Minority share of population and homeownership rate

	Minority Share of Population			Homeownership Rate		
	Block	Tract		Block	Tract	
	(1)	(2)	(3)	(4)	(5)	(6)
HOLC Grade						
B	0.106***	0.148***	0.083***	-0.168***	-0.215***	-0.212***
	(0.008)	(0.029)	(0.020)	(0.009)	(0.035)	(0.035)
C	0.448***	0.439***	0.221***	-0.335***	-0.357***	-0.332***
	(0.007)	(0.027)	(0.021)	(0.008)	(0.032)	(0.034)
D	0.670***	0.699***	0.358***	-0.393***	-0.461***	-0.399***
	(0.007)	(0.027)	(0.026)	(0.008)	(0.033)	(0.036)
Tract Income						
Middle			0.152***			-0.005
			(0.027)			(0.029)
Moderate			0.365***			0.001
			(0.027)			(0.024)
Low			0.514***			-0.114***
			(0.023)			(0.024)
Constant	0.086***	0.106***	0.060***	0.847***	0.793***	0.795***
	(0.006)	(0.021)	(0.018)	(0.007)	(0.030)	(0.030)
Observations	16408	846	835	16408	846	835
Clusters		503	498		503	498
F-Statistic	3880.2***	256.7***	348.8***	956.8***	77.9***	45.5***
R^2-Statistic	0.386	0.495	0.742	0.167	0.359	0.405

*Statistically significant at the *** 0.001 ** 0.010 * 0.050 level*

HOLC grade "A" neighborhoods are reference group. Metropolitan area fixed effects not shown.

Robust (block) or clustered (tract) standard errors shown in parentheses.

TABLE 3:

HOLC risk rating vs neighborhood income

	HOLC Grade				
	A	B	C	D	All
Neighborhood Income					
High	4.6%	7.6%	11.4%	2.8%	26.5%
Middle	0.9%	3.6%	6.9%	6.0%	17.4%
Moderate	0.3%	2.0%	15.0%	8.1%	25.4%
Low	0.0%	0.3%	9.4%	21.1%	30.7%
All	5.8%	13.5%	42.7%	38.0%	100.0%

TABLE 4:

Mean percentile rank of household income by parental income

	All		25th		50th	
	(1)	(2)	(3)	(4)	(5)	(6)
HOLC Grade						
B	-0.108***	-0.074***	-0.039*	-0.023	-0.040**	-0.022***
	(0.022)	(0.019)	(0.016)	(0.015)	(0.013)	(0.012)
C	-0.216***	-0.128***	-0.095***	-0.055***	-0.103***	-0.051***
	(0.020)	(0.020)	(0.015)	(0.015)	(0.013)	(0.012)
D	-0.296***	-0.165***	-0.135***	-0.074***	-0.151***	-0.070***
	(0.020)	(0.020)	(0.015)	(0.015)	(0.013)	(0.013)
Tract Income						
Middle		-0.109***		-0.053***		-0.054***
		(0.012)		(0.009)		(0.008)
Moderate		-0.156***		-0.071***		-0.089***
		(0.012)		(0.009)		(0.008)
Low		-0.191***		-0.090***		-0.119***
		(0.012)		(0.008)		(0.008)
Constant	0.606***	0.631***	0.432***	0.444***	0.515***	0.528***
	(0.019)	(0.019)	(0.015)	(0.015)	(0.012)	(0.012)
Observations	846	835	846	835	846	835
Clusters	503	498	503	498	503	498
F-Statistic	136.2***	160.3***	68.0***	62.3***	88.2***	95.9***
R^2-Statistic	0.465	0.709	0.371	0.545	0.367	0.612

*Statistically significant at the *** 0.001 ** 0.010 * 0.050 level*

HOLC grade "A" and High Income neighborhoods are reference groups.

Clustered standard errors shown in parentheses.

Metropolitan area fixed effects not shown.

TABLE 5:

Mean percentile rank of household income by race/ethnicity

	White		Black		Hispanic	
	(1)	(2)	(3)	(4)	(5)	(6)
HOLC Grade						
B	-0.031*	-0.020	0.010	0.016	-0.106***	-0.110***
	(0.012)	(0.012)	(0.012)	(0.013)	(0.028)	(0.028)
C	-0.074***	-0.045***	-0.015	-0.001	-0.147***	-0.146***
	(0.012)	(0.012)	(0.011)	(0.012)	(0.036)	(0.036)
D	-0.097***	-0.060***	-0.024*	-0.003	-0.173***	-0.172***
	(0.016)	(0.016)	(0.011)	(0.013)	(0.041)	(0.042)
Tract Income						
Middle		-0.023*		-0.023		-0.061
		(0.011)		(0.012)		(0.037)
Moderate		-0.060***		-0.026*		-0.046
		(0.012)		(0.011)		(0.032)
Low		-0.065***		-0.035***		-0.116***
		(0.017)		(0.010)		(0.031)
Constant	0.551***	0.558***	0.371***	0.379***	0.569***	0.626***
	(0.011)	(0.011)	(0.010)	(0.013)	(0.035)	(0.044)
Observations	662	657	749	742	156	154
Clusters	378	376	445	442	94	93
F-Statistic	24.8***	16.4***	5.7***	4.0***	6.3***	5.9***
R^2-Statistic	0.215	0.296	0.113	0.150	0.292	0.376

*Statistically significant at the *** 0.001 ** 0.010 * 0.050 level*

For children raised with parents at national median income.

HOLC grade "A" and High Income neighborhoods are reference groups.

Clustered standard errors shown in parentheses.

Metropolitan area fixed effects not shown.

TABLE 6:

Likelihood of default (subhazard ratios)

		With Borrower Risk Factors	
	(1)	(2)	(3)
HOLC Grade			
B	1.442**	1.439**	1.302
	(0.196)	(0.196)	(0.177)
C	2.385***	2.187***	1.638**
	(0.334)	(0.305)	(0.233)
D	2.561***	2.219***	1.577**
	(0.370)	(0.320)	(0.233)
Neighborhood Income			
Middle			1.310*
			(0.147)
Moderate			1.726***
			(0.187)
Low			1.931***
			(0.223)
Observations	50,981	50,981	50,856
Clusters	30,687	30,687	30,625
Wald χ^2	274.730***	654.790***	683.480***

*Statistically significant at the *** 0.001 ** 0.010 * 0.050 level*

HOLC grade "A" and High Income neighborhoods are reference group.

Clustered standard errors shown in parentheses.

Metropolitan area fixed effects and additional characteristics not shown.

TABLE 7:

Lender type by HOLC risk rating

	HOLC Grade			
	A	B	C	D
Lender Type				
Bank or Thrift				
Inside Assessment Area	2.7%	4.9%	9.5%	4.1%
Outside Assessment Area	2.4%	5.5%	12.5%	5.4%
Credit Union	0.2%	0.6%	1.8%	0.8%
Mortgage Company	3.1%	8.8%	25.1%	12.5%
All	8.5%	19.8%	48.9%	22.8%

First lien loans originated for purchase or refinance of owner-occupied one- to four-unit properties in 2017.

TABLE 8:

Likelihood of CRA lending (odds ratios)

	All	Conventional	Government-Insured	Purchase	Refinance
	(1)	(2)	(3)	(4)	(5)
HOLC Grade					
B	0.723***	0.738***	1.268	0.742***	0.692***
	(0.033)	(0.035)	(0.257)	(0.041)	(0.058)
C	0.543***	0.587***	0.989	0.554***	0.526***
	(0.025)	(0.029)	(0.201)	(0.031)	(0.045)
D	0.504***	0.581***	0.881	0.531***	0.440***
	(0.027)	(0.033)	(0.191)	(0.035)	(0.044)
Observations	50,207	37,783	12,424	35,623	14,584
Clusters	28,558	20,881	7,677	20,303	8,255
χ^2	933.9***	396.7***	157.1***	663.3***	311.6***
Pseudo R^2	0.042	0.020	0.044	0.042	0.045

*Statistically significant at the *** 0.001 ** 0.010 * 0.050 level*

HOLC grade "A" neighborhoods are reference group.

Clustered standard errors shown in parentheses.

Metropolitan area fixed effects not shown.

TABLE 9:

Likelihood of CRA lending, full model (odds ratios)

	All	Conventional	Government-Insured	Purchase	Refinance
	(1)	(2)	(3)	(4)	(5)
HOLC Grade					
B	0.881*	0.874*	1.306	0.923	0.786*
	(0.045)	(0.047)	(0.266)	(0.058)	(0.074)
C	0.772***	0.772***	1.167	0.823**	0.673***
	(0.046)	(0.049)	(0.247)	(0.060)	(0.074)
D	0.773***	0.796**	1.040	0.851	0.612***
	(0.055)	(0.061)	(0.239)	(0.074)	(0.081)
Borrower Income					
Middle	0.906	0.886*	0.756	0.904	0.858
	(0.048)	(0.050)	(0.122)	(0.057)	(0.088)
Moderate	1.170*	1.122	0.851	1.131	1.056
	(0.075)	(0.079)	(0.149)	(0.087)	(0.127)
Low	1.301**	1.301*	0.580*	1.213	1.085
	(0.132)	(0.146)	(0.155)	(0.159)	(0.175)
Neighborhood Income					
Middle	0.914	0.888*	1.229	0.902	0.943
	(0.049)	(0.051)	(0.214)	(0.058)	(0.095)
Moderate	0.871*	0.881*	0.945	0.839**	0.981
	(0.049)	(0.053)	(0.168)	(0.056)	(0.106)
Low	1.043	1.021	1.172	1.085	0.958
	(0.074)	(0.079)	(0.258)	(0.088)	(0.149)
Observations	50,108	37,723	12,385	35,546	14,562
Clusters	28,512	20,854	7,658	20,267	8,245
χ^2	1428.8***	850.2***	187.6***	1180.1***	421.4***
Pseudo R^2	0.089	0.053	0.060	0.105	0.094

*Statistically significant at the *** 0.001 ** 0.010 * 0.050 level*

HOLC grade "A" neighborhoods and High Income borrower and neighborhoods are reference groups.

Clustered standard errors shown in parentheses.

Metropolitan area fixed effects and additional characteristics not shown.

TABLE 10:

Likelihood of CRA Lending, supplemental results (odds ratios)

	Excluding Higher-Priced Loans (1)	Controlling for Minority Share of Tract Pop. (2)	Large Cities (3)	Small Cities (4)	Weighted by Loan Amount (5)
HOLC Grade					
B	0.891*	0.895*	0.958	0.772***	0.788***
	(0.046)	(0.046)	(0.066)	(0.060)	(0.049)
C	0.775***	0.818***	0.781**	0.771*	0.645***
	(0.046)	(0.049)	(0.059)	(0.079)	(0.047)
D	0.776***	0.845*	0.747**	0.845	0.627***
	(0.056)	(0.061)	(0.066)	(0.106)	(0.054)
Borrower Income					
Middle	0.904	0.903	0.893	0.927	0.598***
	(0.049)	(0.048)	(0.061)	(0.080)	(0.032)
Moderate	1.174*	1.173*	1.116	1.236*	0.711***
	(0.076)	(0.075)	(0.095)	(0.123)	(0.045)
Low	1.289*	1.308**	1.329	1.230	0.669***
	(0.134)	(0.133)	(0.193)	(0.177)	(0.069)
Neighborhood Income					
Middle	0.920	1.017	0.955	0.910	0.777***
	(0.050)	(0.060)	(0.069)	(0.077)	(0.047)
Moderate	0.879*	1.087	0.845*	0.910	0.743***
	(0.050)	(0.082)	(0.059)	(0.088)	(0.047)
Low	1.048	1.436***	1.024	1.062	0.883
	(0.076)	(0.147)	(0.087)	(0.144)	(0.069)

*Statistically significant at the *** 0.001 ** 0.010 * 0.050 level*

HOLC grade "A" neighborhoods and High Income borrower and neighborhoods are reference groups.

Clustered standard errors shown in parentheses.

Metropolitan area fixed effects and additional characteristics not shown.

TABLE 11:

Likelihood of lender type (relative risk ratios)

	Banks and Thrifts Outside Assess. Area	Credit Union	Mortgage Companies
	(1)	(2)	(3)
HOLC Grade			
B	1.040	1.053	1.230***
	(0.063)	(0.135)	(0.069)
C	1.133	1.245	1.445***
	(0.079)	(0.187)	(0.094)
D	1.120	1.200	1.453***
	(0.094)	(0.206)	(0.112)
Borrower Income			
Middle	1.033	0.971	1.171**
	(0.064)	(0.108)	(0.067)
Moderate	0.772***	0.727*	0.907
	(0.058)	(0.090)	(0.062)
Low	0.745*	0.588**	0.776*
	(0.088)	(0.110)	(0.082)
Neighborhood Income			
Middle	1.034	1.196	1.133*
	(0.064)	(0.143)	(0.066)
Moderate	1.105	1.203	1.167**
	(0.072)	(0.145)	(0.069)
Low	0.933	1.097	0.955
	(0.078)	(0.168)	(0.073)

*Statistically significant at the *** 0.001 ** 0.010 * 0.050 level*

Banks and Thrifts Inside their Assessment Area is base outcome.

HOLC grade "A" neighborhoods and High Income borrower and neighborhoods are reference groups.

Clustered standard errors shown in parentheses.

Metropolitan area fixed effects and additional characteristics not shown.

NOTES

1. Hillier (2003b) does find historical evidence that HOLC reinforced segregation by relying on local brokers to sell foreclosed properties.

2. For additional research on the long-term impacts of redlining, see Appel and Nickerson (2016), Anders (2019), and An et al. (2019).

3. "The National-Bank Act as Amended." Senate Documents No. 216, 66th Congress, 2nd Session (1920). https://fraser.stlouisfed.org/files/docs/historical/congressional/192002sen_nbact.pdf The National Bank Act of 1935 (Pub. L. 74-305, August 23, 1935) expanded this to "the convenience and needs of the community to be served by the bank."

4. "Community Credit Needs" Hearings before the Committee on Banking, Housing and Urban Affairs, United States Senate on S. 406 (95th Congress, 1st session, March 23, 24, and 25, 1977). https://catalog.hathitrust.org/Record/002941335

5. See Immergluck (2004) for more history and discussion of fair lending and community reinvestment policy.

6. The Aiken County, SC portion of the Augusta, GA HOLC map and the Clayton County, GA portion of the Atlanta, GA HOLC map are excluded from the analysis.

7. 19 census tracts encompassed at least one block with an HOLC grade, but the aggregation of those blocks contained no housing units. These census tracts are excluded.

8. Newport News and Norfolk are both in the Virginia Beach-Norfolk-Newport News, VA-NC metropolitan statistical area, resulting in 13 fixed effects for 14 cities.

9. CRA files available from FFIEC (https://www.ffiec.gov/cra/craflatfiles.htm).

10. Loan/application HMDA records are from the 2017 dynamic data (https://ffiec.cfpb.gov/data-publication/dynamic-national-loan-level-dataset, accessed April 2019). Respondent tax identification numbers are available from the transmittal sheets associated with each file, merged based on agency code and respondent identification number.

11. HMDA allows applicants to select up to five race categories. This variable indicates whether Black is chosen in any of the five fields for the primary applicant or co-applicant.

12. In addition, the Ability-to-Repay rule under the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 provides lenders additional legal protection for lower-priced loans that meet the definition of a Qualified Mortgage (QM) compared to the "rebuttable presumption" of higher-priced Qualified Mortgages. The relationship between CRA and higher-priced lending may have been different prior to the QM rule or when the subprime mortgage market is more active.

13. Sen. Kamala Harris has also proposed $100 billion in downpayment and closing cost assistance to lower-income first-time homebuyers that have lived in lower-income, historically redlined neighborhoods for at least 10 years. https://kamalaharris.org/homeownership-gap/

REFERENCES

Aaronson, D., Hartley, D. and Mazumder, B. (2019). The Effects of the 1930s HOLC "Redlining" Maps. Federal Reserve Bank of Chicago, Working Paper 2017-12, Chicago, ILhttps://www.chicagofed.org/~/media/publications/working-papers/2017/wp2017-12-pdf.pdf

Agarwal, S., Benmelech, E., Bergman , N., and Seru, A. (2012). Did the Community Reinvestment Act (CRA) Lead to Risky Lending? National Bureau of Economic Research No., 18609, Cambridge, MA. https://www.nber.org/papers/w18609

An, B.Y., Orlando, A.W., and Rodnyansky, S. (2019). The Physical Legacy of Racism: How Redlining Cemented the Modern Built Environment. American Real Estate and Urban Economics National Conference, Washington, DC. https://areuea.org/conferences/papers/download.phtml?id=5565

Anders, J. (2019). The Long Run Effects of De Jure Discrimination in the Credit Market: How Redlining Increased Crime. Working Paper, Texas A&M University, College Station, TX. https://jpaulanders.com/the-long-run-effects-of-de-jure-discrimination-in-the-credit-market-how-redlining-increased-crime/

Appel, I., and Nickerson, J. (2016). "Pockets of Poverty: The Long-Term Effects of Redlining." (October 15, 2016). Available at SSRN: https://ssrn.com/abstract=2852856 or http://dx.doi.org/10.2139/ssrn.2852856

Yale Law Journal. (1954). Application of the Sherman Act to Housing Segregation. *Yale Law Journal*, 63(8): 1125-1147.

Avery, R.B., Courchane, M.J., and Zorn, P.M. (2009). The CRA Within a Changing Financial Landscape. In Chakrabarti, P., Erickson, D., Essene, R., Galloway, I., and Olson, J. (Eds.), *Revisiting the CRA: Perspectives on the Future of the Community Reinvestment Act*. (pp. 28-46).Federal Reserve Banks of Boston and San Francisco, San Francisco, CA. https://www.frbsf.org/community-development/files/revisiting_cra.pdf

Avery, R.B., and Brevoort, K.P. (2015). The Subprime Criss: Is Government Housing Policy to Blame? *The Review of Economics and Statistics*, 97(2): 352-363.

Badger, E. (2019). Can the Racial Wealth Gap Be Closed Without Speaking of Race? *The Upshot, The New York Times* (May 10, 2019). https://www.nytimes.com/2019/05/10/upshot/racial-wealth-gap-2020-candidates.html

Bernanke, B.S. (2007). The Community Reinvestment Act: Its Evolution and New Challenges. Speech at the Community Affairs Research Conference, Washington DC (March 30, 2007) https://www.federalreserve.gov/newsevents/speech/bernanke20070330a.htm#

Berry, C.R. and Lee, S.L. (2008). The Community Reinvestment Act after Thirty Years. Harris School of Public Policy, University of Chicago, Chicago, ILhttps://www.chicagofed.org/~/media/others/research/research-calendar-attachments/seminars-2009/sem-berry021209-pdf.pdf

Bhutta, N. (2011). The Community Reinvestment Act and Mortgage Lending to Lower Income Borrowers and Neighborhoods, *Journal of Law and Economics*, 54(4): 953-983.

Bhutta, N. and Ringo, D. (2015). Assessing the Community Reinvestment Act's Role in the Financial Crisis. FEDS Notes, Board of Governors of the Federal Reserve System, Washington, DC.https://www.federalreserve.gov/econresdata/notes/feds-notes/2015/assessing-the-community-reinvestment-acts-role-in-the-financial-crisis-20150526.html

Bostic, R.W. and Lee, H. (2017). Small Business Lending under the Community Reinvestment Act. *Cityscape* 19(2): 63-84. https://www.huduser.gov/portal/periodicals/cityscpe/vol19num2/article6.html

Butcher, K.F. and Munoz, A.P. (2017). Using Credit Reporting Agency Data to Assess the Link Between the Community Reinvestment Act and Consumer Credit Outcomes. *Cityscape* 19(2): 85-108. https://www.huduser.gov/portal/periodicals/cityscpe/vol19num2/article7.html

Casey, C., Farhat, J., and Cartwright, G. (2017). Community Reinvestment Act and Local Governance Contexts: Advancing the Future of Community Reinvestment. *Cityscape* 19(2): 137- 160. https://www.huduser.gov/portal/periodicals/cityscpe/vol19num2/article10.html

Chetty, R., Friedman, J.N., Hendren, N., Jones, M.R., and. Porter, S.R. (2018). The Opportunity Atlas: Mapping the Childhood Roots of Social Mobility. https://opportunityinsights.org/

Courtemanche, C., Snowden, K.A. (2010). Repairing a Mortgage Crisis: HOLC Lending and its Impact on Local Housing Markets. National Bureau of Economic Research, Working Paper 16245, Cambridge, MA. https://www.nber.org/papers/w16245.pdf

Coates, T. (2014). The Case for Reparations. *The Atlantic*. https://www.theatlantic.com/magazine/archive/2014/06/the-case-for-reparations/361631/

Dahl, D., Evanoff, D.D., and Spivey, M.F. (2002). Community Reinvestment Act Enforcement and Changes in Targeted Lending. *International Regional Science Review*, 25(3): 307-322.

Davis, O.A., and Whinston, A.B. (1961). The Economics of Urban Renewal. *Law and Contemporary Problems* 26(1): 105-117.

Dedman, B. (1988). The Color of Money: Atlanta Blacks Losing in Home Loans Scramble; Banks Favor White Areas by 5-1 Margin. *The Atlanta-Journal Constitution* (May 1, 1988, A1).

Ding, L., Quercia, R.G., Li, W. and Ratcliffe, J. (2011). Risky Borrowers or Risky Mortgages: Disaggregating Effects Using Propensity Score Models. *Journal of Real Estate Research* 33(2): 245-277.

Ding, L. and Nakamura, L. (2017). "Don't Know What You Got Till It's Gone" – The Effects of the Community Reinvestment Act (CRA) on Mortgage Lending in the Philadelphia Market. Federal Reserve System Working Paper 17-24, Opportunity and Inclusive Growth Institute, Minneapolis, MN.https://www.minneapolisfed.org/institute/working-papers/dont-know-what-you-got-till-its-gone-the-effects-of-the-community-reinvestment-act-cra

Ding, L., Lee, H., Bostic, R.W. (2018). Effects of the Community Reinvestment Act (CRA) on Small Business Lending. Working Paper 18-27, Federal Reserve Bank of Philadelphia, Philadelphia, PA. https://www.philadelphiafed.org/research-and-data/publications/working-papers/2018/

Federal Housing Administration. (1936). *Underwriting Manual: Underwriting Analysis Under Title II, Section 203 of the National Housing Act*. US Government Printing Office, Washington, DC.

Fine, J.P. and Gray, R.J. (1999). A Proportional Hazards Model for the Subdistribution of a Competing Risk. *Journal of the American Statistical Association* 94(446): 496-509.

Fishback, P.V., Flores-Lagunes, A., Horrace, W., Kantor, S.E., and Treber, J. (2010). The Influence of the Home Owners' Loan Corporation on Housing Markets During the 1930s. Working Paper 15824, National Bureau of Economic Research, Cambridge, MA. https://www.nber.org/papers/w15824.pdf

Fishbein, A.J. (1992). The Ongoing Experiment with "Regulation from Below": Expanded Reporting Requirements for HMDA and CRA. *Housing Policy Debate*. 3(2): 601-636.

Gabriel, S.A. and Rosenthal, S.S. (2009). The GSEs, CRA, and Homeownership in Targeted Underserved Neighborhoods. In Glaeser, E. and Quigley, J. (Eds.), *Housing Markets and the Economy: Risk, Regulation, and Policy*. (pp. 202-229). Cambridge: Lincoln Institute, 2009

Ghent, A.C., Hernandez-Murillo, R. and Owyang, M.T. (2015). Did Affordable Housing Legislation Contribute to the Subprime Securities Boom. *Real Estate Economics* 43(4): 820-854.

Haltom, R.C. (2010). The CRA and the Subprime Crisis. *Region Focus* Federal Reserve Bank of Richmond, Richmond, VA (Fourth Quarter): 6-9. https://www.richmondfed.org/-/media/richmondfedorg/publications/research/econ_focus/2010/q4/pdf/federal_reserve.pdf

Harriss, C.L. (1951). *History and Policies of the Home Owners' Loan Corporation*. National Bureau of Economic Research, Cambridge, MA. https://www.nber.org/books/harr51-1

Hillier, A.E. (2003a). Redlining and the Homeowners' Loan Corporation. *Journal of Urban History*. 29(4): 394-420.

Hillier, A.E. (2003b). Who Received Loans? Home Owners' Loan Corporation Lending and Discrimination in Philadelphia in the 1930s. *Journal of Planning History*. 2(1): 3-24.

Hillier, A.E. (2005). Residential Security Maps and Neighborhood Appraisals. The Homeowners' Loan Corporation and the Case of Philadelphia. *Social Science History* 29(2): 207-233.

Immergluck, D. (2004). *Credit to the Community: Community Reinvestment and Fair Lending Policy in the United States*. Routledge, New York, NY.

Immergluck, D., Earl, S. and Powell, A. (2019). Black Homebuying after the Crisis: Appreciation and Segregation Patterns in Fifteen Large Metropolitan Areas. forthcoming in *City and Community*. https://doi.org/10.1111/cico.12436

Jackson, K.T. (1980). Race, Ethnicity, and Real Estate Appraisal: The Home Owners Loan Corporation and the Federal Housing Administration. *Journal of Urban History*, 6(4): 419-452.

Krimmel, J. (2018). Persistence of Prejudice: Estimating the Long Term Effects of Redlining. Working Paper, University of Pennsylvania, Philadelphia, PA. https://osf.io/uxeaz/ (Revised December 21, 2018).

Laderman, E., and Reid, C. (2009). CRA Lending During the Subprime Meltdown. In Chakrabarti, P., Erickson, D., Essene, R., Galloway, I., and Olson, J. (Eds.), *Revisiting the CRA: Perspectives on the Future of the Community Reinvestment Act*. (pp. 115-133).Federal Reserve Banks of Boston and San Francisco, San Francisco, CA. https://www.frbsf.org/community-development/files/revisiting_cra.pdf

Lang, W.W. and Nakamura, L.I. (1993). A Model of Redlining. *Journal of Urban Economics*, 33(2): 223-234.

Ling, D.C., and Wachter, S.M. (1998). Information Externalities and Home Mortgage Underwriting. *Journal of Urban Economics*, 44(3): 317-332.

Mitchell, B. and Franco, J. (2018). HOLC "Redlining" Maps: The Persistent Structure of Segregation and Economic Inequality. National Community Reinvestment Coalition, Washington, DChttps://ncrc.org/holc/

Nelson, R.K., Winling, L., Marciano, R., Connolly, N. (2019)., Mapping Inequality, In Nelson, R.K. and Ayers, E.L. (Eds.), American Panorama, accessed April, 2019, https://dsl.richmond.edu/panorama/redlining

Park, K.A. (2008). Subprime Lending and the Community Reinvestment Act. Joint Center for Housing Studies, Harvard University, Cambridge, MA.https://www.jchs.harvard.edu/sites/default/files/n08-2_park.pdf

Park, K.A. (2010). CRA Did Not Cause the Foreclosure Crisis. Center for Community Capital, University of North Carolina at Chapel Hill, Chapel Hill, NC.

Pinto, E. (2008). Memorandum: Sizing Total Exposure to Subprime and Alt-A Loans in the US First Mortgage Market as of 6.30.08. https://fcic-static.law.stanford.edu/cdn_media/fcic-docs/0000-00-00%20Pinto%20-%20Sizing%20Total%20Exposure%20to%20Subprime%20and%20Alt-A%20Loans%20as%20of%202008-06-30.pdf

Reid, C., Seidman, E., Willis, M., Ding, L., Silver, J. and Ratcliffe, J. (2013). Debunking the CRA Myth—Again. Center for Community Capital, University of North Carolina at Chapel Hill, Chapel Hill, NC.https://communitycapital.unc.edu/files/2013/01/DebunkingCRAMyth.pdf

Ringo, C. (2017). "Mortgage Lending, Default and the Community Reinvestment Act." (December 14, 2017). Available at SSRN: https://ssrn.com/abstract=2585215 or http://dx.doi.org/10.2139/ssrn.2585215

Rose, J.D. (2011). The Incredible HOLC? Mortgage Relief During the Great Depression. *Journal of Money, Credit and Banking*. 43(6): 1073-1107.

Rothstein, R. (2017). *The Color of Law: A Forgotten History of How Our Government Segregated America*. Liverlight, New York, NY.

Van Tol, J. (2019). Testimony to Consumer Protection and Financial Institutions Subcommittee, "The Community Reinvestment Act: Assessing the Law's Impact on Discrimination and Redlining" (April 9, 2019). https://ncrc.org/testimony-of-jesse-van-tol-ceo-national-community-reinvestment-coalition-april-9-2019-consumer-protection-and-financial-institutions-subcommittee/#_edn8

Stegman, M., Cochran, K. and Faris, R. (2002). Creating a Scorecard for the CRA Service Test. Policy Brief 96, Brookings Institution, Washington, DC.

Wallison, P.J. (2011). Dissent from the Majority Report of the Financial Crisis Inquiry Commission. American Enterprise Institute, Washington, DC.http://www.aei.org/publication/dissent-from-the-majority-report-of-the-financial-crisis-inquiry-commission-2/

Wheelock, D.C. (2008). The Federal Response to Home Mortgage Distress: Lessons from the Great Depression. Federal Reserve Bank of St. Louis Review, 90(3): 133-148. https://files.stlouisfed.org/files/htdocs/publications/review/08/05/Wheelock.pdf