

**REPAIRING A MORTGAGE CRISIS:
HOLC LENDING AND ITS IMPACT ON LOCAL HOUSING MARKETS**

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Abstract

Between 1933 and 1936 the Home Owners' Loan Corporation purchased more than a million delinquent mortgages from private lenders and refinanced those loans for the borrowers. Its primary goal was to break the cycle of foreclosure, forced property sales and decreases in home values that was affecting local housing markets throughout the nation. We find that the volume of HOLC lending was related to measures of distress in local (county-level) housing markets and that these interventions increased 1940 median home values and homeownership rates, but not new home building.

“[A] tremendous surge of residential building in the [last] decade... was matched by an ever-increasing supply of homes sold on easy terms [and only]... a small decline in prices was necessary to wipe out this equity. Unfortunately, deflationary processes are never satisfied with small declines in values. They feed upon themselves and produce results out of all proportion to their causes... In the field of real-estate finance, particularly, we have depended so much upon credit that our whole value structure can be thrown out of balance by relatively slight shocks. When such a delicate structure is once disorganized, it is a tremendous task to get it into a position where it can again function normally.” (Henry Hoagland, 1935)¹

Introduction

Between 1929 and 1933 hundreds of thousands of homeowners defaulted, thousands of mortgage lending institutions failed, and the supply of home loans dried up. Observers of events since 2007 will find striking parallels in the background and character of the housing and mortgage crisis of the early 1930s. That episode also followed a decade of rapid growth and innovation in the home loan market that quickly reversed into a self-reinforcing cycle of delinquency, foreclosure, forced property sales and decreases in home values. Henry Hoagland, whom we quote at the start of this article, was well-positioned to characterize the crisis as a member of the Federal Home Loan Bank Board. The FHLBB supervised most depression-era housing programs including the Home Owners' Loan Corporation which

¹ Hoagland, “The Relation,” 45-47.

was in the midst of refinancing about one million delinquent mortgages when Hoagland penned his observations in 1935. HOLC purchased all of these distressed loans from private institutions and investors, so it provided support to a severely disrupted mortgage market as well as assistance to individual homeowners. By 1936, HOLC had refinanced nearly one out of every ten nonfarm homeowners and held nearly 20 percent of the nation's residential mortgage debt.

HOLC was a remarkable federal initiative in at least three respects. First, the agency organized and began to operate a national lending network just a few months after being created in the summer of 1933. Second, the corporation dissolved in 1951 (as originally intended) after servicing the mortgages it had written between 1933 and 1936.² Finally, HOLC represented a comprehensive solution to the housing crisis by combining the functions of a bad mortgage bank—it purchased distressed assets from private investors—and a loan modification program—it refinanced those mortgages on more liberal terms.³ Lowell Harriss' detailed account of the procedures, operations and structure of the HOLC remains the indispensable reference for any analysis of the agency and we rely on that resource throughout this paper.⁴ To assess HOLC's effectiveness, however, we need to look beyond its institutional history and understand why homeowners and lenders participated in the program, how its activities were spread across the nation's housing markets, and its ultimate impact within these markets. In this paper we make contributions along all three fronts.

Interest in the HOLC has naturally increased during the current mortgage crisis. Wheelock and Snowden, for example, examine the role that HOLC played within the broad-based federal response to the

² See Tough, "The Life Cycle," for an analysis of the HOLC's financial performance over its lifetime.

³ Unlike HOLC, programs that have been implemented in response to the current crisis have been designed to either purchase or modify distressed mortgages—but not both. The Troubled Asset Relief Program (TARP) and the Public-Private Investment Program (PPIP) were supposed to purchase toxic mortgage loans, for example, while loan modifications are being offered through the White House/Treasury HAMP and HARP programs, the FDIC's IndyMac Loan Modification program and Federal Housing Finance Agency's program for loans held by FannieMae or FreddieMac.

⁴ See Harriss, *History and Policies*.

widespread distress in the housing and mortgage markets that accompanied the Depression.⁵ Rose focuses more specifically on the agency's loan purchase program and especially on negotiations between HOLC and the private investors that held distressed mortgages.⁶ Using data drawn from individual contracts that were written in New York, New Jersey and Connecticut he finds that HOLC encouraged lenders to sell mortgages by setting appraisals, mortgage principals and loan prices above levels justified by current property values.⁷ Fishback, Lagunes, Horrace, Kantor, and Treber (henceforth FLHKT) concentrate on the impacts of HOLC and find that its refinancing activity increased home values and the stock of owned and rented homes in 1940 across the 2,463 counties with populations below 50,000 in 1930.⁸

This paper bridges and extends the work of Rose and FLHKT in two ways. First we examine determinants of county-level HOLC program participation rates for the nation as a whole.⁹ HOLC participation was influenced by the interaction of several factors—borrower need, eligibility requirements, staff judgments regarding borrower distress and property values, and the condition and negotiating strength of lenders. Rose's analysis focuses on the last two of these while we assess the combined impact of all these factors in analyzing county-level application and acceptance rates. In a second step we augment FLHKT's analysis by assessing HOLC's impact on county-level homeownership rates, home values and homebuilding. All three goals were emphasized in legislation and contemporary discussion.

⁵ See Wheelock, "The Federal Response"; and Snowden, "The Anatomy."

⁶ See Rose, "The Incredible HOLC?"

⁷ Under HOLC procedures the higher appraisals also increased the amounts borrowers had to refinance on their HOLC loans. Rose's work clarifies, therefore, that HOLC faced a tradeoff by serving both sides of the mortgage transaction—actions and policies that generated greater lender participation also raised the delinquency rate on HOLC's own loan portfolio.

⁸ See Fishback, Lagunes, Horrace, et al, "The Influence."

⁹ The research employs newly digitized county-level data on number of HOLC applications and acceptances (from Federal Home Loan Bank Board, *Annual Report* (1937)) and the number of homes built in four quinquennia: 1920-24, 1925-29, 1930-35 and 1935-40 (from U.S. Bureau of the Census, *General Characteristics*).

HOLC intervention provided substantial relief to local housing markets, but it did not reverse all of the sharp declines in homeownership and home values that occurred during the deep and protracted crisis of the 1930s. We identify the mechanism through which HOLC cut short these downward trends in the first section of the paper by explaining how its refinancing activities repaired disrupted mortgage lending channels. We then examine county-level rates of HOLC applications, approvals and loans and find that they were all closely related to economic and housing distress and demographic influences, but weakly to measures of economic structure and political considerations. Program participation was also influenced by the distance between each county and the nearest HOLC office and we interpret this pattern as evidence that the residential mortgage remained spatially segmented in the 1930s. Building on this result, we use distance from an office as an instrument to identify the impact that HOLC lending activity had on local housing markets. We find an interesting and important pattern—HOLC activity increased home values and homeownership rates in 1940, but did not stimulate residential construction between 1935 and 1940.¹⁰ We close by discussing some limitations of our results and the lessons that can be drawn from our analysis about programs that are being used to remedy our current mortgage crisis.

How HOLC Repaired Credit Channels

Recent events have shown that it is difficult to reverse, or even moderate, disruptions in housing and mortgage markets once they have occurred. The same lesson was learned during the 1930s. Low interest rates on home loans, for example, normally stimulate home sales, home prices and residential construction, but cheap money by itself has not promoted a recovery in residential real estate during the current mortgage crisis. One challenge in assessing the impact of HOLC, therefore, is to understand how a massive substitution of public for private mortgage credit between 1933 and 1936 improved outcomes in housing markets.

¹⁰ See Snowden, “Building and Loan Associations” and “The Transition” for extensive discussion of spatial segmentation in the residential mortgage market before 1930.

Bernanke, Gertler and Gilchrist provide a framework within which to conceptualize the issue.¹¹ They emphasize that disruptions in credit markets for small business and households are capable of transmitting and amplifying negative economic shocks into large aggregate fluctuations, a phenomenon they refer to as the financial accelerator. Lenders in these personalized markets use costly contractual and institutional mechanisms (such as down payments, collateral or scheduled refinancing) to mitigate borrowers' informational advantages regarding project quality, effort and outcomes. The accelerator arises because the costs associated with these mechanisms spike after a negative shock, so that credit becomes more expensive and more difficult to secure just when small businesses and households need to rely on it most.

One specific channel through which the accelerator operates is the use of borrowers' balance sheets to assess creditworthiness and to set loan rates.¹² When forces external to the credit market decrease the value of assets held by businesses and households, for example, it becomes harder for them to post collateral that lenders insist upon before approving a loan. As a result, the supply of credit contracts, interest rates rise and the shock is transmitted even further. Similar impacts are felt after the failure of intermediaries that serve information-intensive borrowers. This second component of the financial accelerator arises because lenders in these markets develop relationships with their customers and accumulate information about them that lowers the costs of making and enforcing contracts. When agencies like these fail, information about borrowers is lost, the cost of credit intermediation increases and the supply of credit contracts. The financial accelerator deepens crises within loan markets, therefore, because the contractual and institutional mechanisms that are used to control asymmetries of information in these markets transmit distress among some borrowers and lenders to other market participants.

The literature provides compelling circumstantial evidence that both elements of the financial accelerator were at work in the mortgage market during the early 1930s. Mishkin, for example, shows

¹¹ See Bernanke, Gertler and Gilchrist, "The Financial Accelerator."

¹² The discussion of the specific mechanisms behind the accelerator borrows heavily from Bernanke and Gertler, "Inside the Black Box."

that the large decrease in household consumption at the onset of the Depression resulted from deteriorations in household balance sheets as stock values and home prices plummeted, and the level of real household debt increased with deflation.¹³ These same developments would have negatively affected the creditworthiness of households and their ability to meet the down payment or debt-service requirements for a mortgage. Bernanke, on the other hand, shows that a measure of bank failures, his proxy for the “cost of credit intermediation,” explains some of the decline in real economic activity during the early 1930s.¹⁴ Although his empirical analysis focused on the banking system, Bernanke emphasizes that other evidence indicates that similar disruptions occurred among home mortgage lending specialists during the 1930s.¹⁵

A final piece of evidence that a financial accelerator was at work during the mortgage crisis of the early 1930s is Hoagland’s eyewitness testimony that “our whole value structure can be thrown out of balance by relatively slight shocks,” and “[w]hen such a delicate structure is once disorganized, it is a tremendous task to get it into a position where it can again function normally.” He describes an environment in which homeowners were unable to qualify for credit, existing mortgage lenders were severely distressed, and the housing market was in a downward spiral of home foreclosures and decreases in home values. All this bad news led to additional deterioration in household balance sheets and further disruptions in intermediated real estate lending channels.

Against this backdrop HOLC needs to be evaluated as a mechanism that attempted to mitigate both channels of the financial accelerator by purchasing distressed mortgages from lenders and offering loan modifications to borrowers. The program was not designed, in particular, to make new home mortgages or to directly stimulate home construction; its mission was limited to serving homeowners who could not secure refinancing from a private lender. There were at least three groups of homeowners in

¹³ See Mishkin, “The Household Balance Sheet.”

¹⁴ See Bernanke, “Nonmonetary Effects.”

¹⁵ See Snowden, “The Anatomy” for disruptions during the early 1930s in Building & Loans, mutual savings banks and private mortgage guaranty companies.

1933 that only HOLC could have helped. The first had purchased homes during the 1920s using the 3- to 5-year balloon loans that were typical at the time. Many of these loans reached maturity between 1930 and 1933 at which time many of these homeowners discovered that they were no longer eligible for a loan renewal because the collateral they could offer—their homes—had decreased significantly in value. A second group included households that had become delinquent on property tax payments as well as their mortgages; HOLC had authority, unlike private lenders, to wrap tax arrearages into refinanced loan balances so that foreclosure could be avoided.

A third group that HOLC was uniquely positioned to help in 1933 were homeowners who had become trapped in one of the thousands of failed Building & Loan associations that became “frozen” as they gradually liquidated. The standard B&L loan at this time combined a non-amortizing mortgage with a contract to purchase shares in the association by means of weekly or monthly dues. Under this arrangement the borrower’s share account served as a sinking fund that eventually grew equal in value, and therefore canceled, the principal of the loan. Borrowers in frozen B&Ls during the early 1930s, however, watched the value of their sinking funds fall as their institution took losses as the pace of defaults and foreclosures picked up in the early 1930s. In this circumstance, a borrower had strong incentives to withhold share installment and loan payments so as not to throw good money after bad. By securing HOLC refinancing these borrowers were able to extract themselves from the failing B&Ls and protect themselves from further risks and losses.¹⁶

Beyond serving borrowers who could not refinance in the private market, HOLC offered loan modification packages that no private intermediary could have matched. The agency’s standard contract was a fifteen-year, fully-amortized mortgage with a 5 percent rate of interest at a time when borrowers in the private market paid 6 percent and higher on short-term, balloon loans.¹⁷ HOLC was also authorized to

¹⁶ Snowden, “The Transition,” describes the fragility of the traditional share accumulation loan used by B&Ls during the 1930s mortgage crisis.

¹⁷ Volume II of the reports from the 1932 President’s Report on Homeownership provides an extensive discussion of loan terms available in the private mortgage market. See Gries and Ford, *Home Finance*, 52-97.

lend up to 80 percent of a generously appraised home value and to waive amortized principal payments for the first three years if the borrower required that consideration.¹⁸ The agency's lending terms were so generous that it had to screen out and discourage applications from ineligible homeowners. The purpose of offering these terms, however, was to offer a mortgage product for hundreds of thousands of distressed borrowers who could not qualify for refinancing under the terms offered by private lenders.¹⁹

The other side of HOLC's business model, the purchase of distressed mortgages, reduced and repaired distress among investors. The agency paid for mortgages with its own guaranteed bonds, so private lenders that sold to HOLC shored up their own balance sheets by substituting safe, marketable assets for distressed residential loans.²⁰ Table 1 illustrates the importance of the purchases by

[INSERT TABLE 1 ABOUT HERE.]

placing them against the backdrop of changes in the volume of debt held by all major categories of home mortgagors during the 1930s. As the crisis took hold between 1930 and 1933, the nation's total home mortgage debt decreased by 17 percent (\$3.6 billion) with the largest reductions in the portfolios of B&Ls and individual investors.²¹ The total decreased by another 17 percent between 1933 and 1936 but this time the decline was almost completely offset by increases in HOLC's mortgage holdings. During the period, moreover, HOLC touched all major lending groups with purchases that equaled two-thirds of the reduction in B&L mortgage holdings and more than the total decrease in the portfolios of individual

¹⁸ Harriss, *History and Policies*, 64-71. HOLC's loan servicing model also included extensive personal contact and counseling if the loan became delinquent. The agency, nonetheless, foreclosed on 20 percent of its loans.

¹⁹ The availability of HOLC refinancing almost certainly cut short some negotiations that could have led to refinancing between borrowers and private lenders, but we shall see evidence below that in many cases HOLC actually facilitated such private renegotiations. Private renegotiations were complicated by 1933, in any case, by foreclosure moratoria that had been passed in more than two dozen states.

²⁰ At first interest but not principal was guaranteed on HOLC bonds, but the guarantee was soon extended. HOLC bonds paid lower interest rates (3 or 4 percent) than privately-written home mortgages. See Harriss, *History and Policies*, pp. 25-29.

²¹ More than 3,000 Building & Loan Associations had failed by 1933 along with nearly the entire guaranty mortgage industry that served individual investors. Both types of institutions then entered protracted liquidations. See Snowden, *The Anatomy*.

investors, mutual savings banks and commercial banks (see the third and fourth rows of Table 1). HOLC purchases were also large when compared to the \$2.8 billion expansion in private lending that occurred between 1936 and 1940. Once again its loan purchases equaled 80 percent or more of the increase in mortgage holdings for all lending groups except insurance companies.

HOLC was designed, therefore, to provide badly needed refinancing to distressed homeowners while simultaneously strengthening private lenders. We are interested here in assessing whether these activities repaired disruptions in mortgage lending channels and reduced distress in local housing and mortgage markets. There are other possibilities, of course. HOLC activity could have been allocated to provide local economies with general relief or to garner political favor. In these cases factors such as unemployment or political variables, rather than local housing distress, would have determined the spatial distribution of HOLC activity, while the lending itself would have had only weak impacts on residential market outcomes. We find no evidence that supports either alternative hypothesis.

Allocation of HOLC Loans across Counties

By name and legislative intent HOLC was a program designed to assist distressed homeowners, but we still do not know why nearly two million households applied to HOLC for mortgage relief or how the relief was allocated across the nation's local mortgage markets.²² The Roosevelt administration believed that the need for HOLC was urgent and used a national radio address to explain the purpose, procedures and eligibility requirements of the program the day after the Home Owners' Loan Act was signed into law on June 11, 1933. The public campaign encouraging distressed homeowners to apply worked so well that the first HOLC office in New York had already received 5,000 applications by mail when it opened its doors on August 14 and found hundreds more homeowners waiting to apply. Given the overwhelming public response, the HOLC focused that summer and fall on hiring staff to open state and local HOLC offices, to receive applications from borrowers, and to encourage lenders to delay

²² *ibid*, pp. 16-23, provides a descriptive account of the national applicant pool and the allocation of HOLC funds among the applicants. .

foreclosure proceedings until the agency had processed each case. As a result, HOLC had refinanced only 50,000 of the 700,000 homeowners that had applied for relief by December 1933 and the agency continued to operate for the next year with a six-month backlog of cases.²³

After the first few months the interplay between HOLC and homeowners became more complex. The agency began in fall 1933 to include information about rejected loan applications in its regular press releases and to explicitly discourage applications from homeowners who did not meet the program's eligibility requirements or who could not demonstrate sufficient distress.²⁴ By then it had also become obvious that private lenders, as well as distressed homeowners, would play an important role in determining the volume of applications and the rate of program participation. Some applications, for example, came from borrowers who were encouraged by their lenders to apply, while one-tenth of all HOLC loans were made through wholesale operations in which the Reconstruction Finance Corporation and HOLC worked together to refinance mortgage loans on the books of failed intermediaries.²⁵ The agency, moreover, regularly reported the number of applications that had been withdrawn after HOLC staff had assisted the private parties to reach agreement on their own refinancing package.²⁶ Finally, 7 percent of HOLC applications failed because lenders refused to sell their loans even though the agency systematically set home appraisals high so that lenders would not be forced to take a haircut.²⁷ The record clearly indicates, therefore, that application and participation rates in the HOLC program depended on complex interactions among homeowners, private lenders, and HOLC staff.

²³ By June 1934 HOLC had received 80 percent of the total applications that would ultimately be submitted but had made only 38 percent of all the loans it would underwrite. It was not until January 1935 that it reached the 80 percent mark.

²⁴ See *New York Times* (October 16, 1933), p. 28 and (October 29, 1933), p. N7. Also see Harriss, *History and Policies*, p. 24, for the summary of an unpublished HOLC study from 1935 that showed that two-thirds of the rejected loan applications were due to inappropriate or undervalued land being put up as security, or from borrowers who could not demonstrate distress or who refused to cooperate.

²⁵ See *ibid.*, pp. 16, 37-38.

²⁶ See *New York Times*, October 16, 1933 (p. 28) and November 18, 1933 (p. N7). Harriss, *History and Policies*, pp. 18-19, also discusses HOLC's efforts to arrange refinancing between applicants and lenders.

²⁷ See *ibid.*, pp. 25-9, and Rose, "The Incredible HOLC?"

The county-level data we employ here are too coarse to identify or assess the determinants of the interplay among all the parties. We focus instead on how the outcomes of these negotiations—HOLC application and participation rates—were influenced by the characteristics of local housing markets in which these interactions took place. We address these issues by examining the determinants of the number of HOLC applications that were made in each county in the U.S. between 1933 and 1936 and the number of these that were accepted into the program. The Federal Home Loan Bank Board reported these data in its fifth annual report. We scale them here by the number of occupied and owner-occupied nonfarm housing units in each county as measured in the Census of 1930 in order to construct four measures of HOLC loan activity: 1) the number of HOLC applications in each county as a percentage of owner-occupied nonfarm homes in 1930 (application rate), 2) the percentage of HOLC applications accepted for purchase and refinancing (acceptance rate), 3) the number of homes refinanced by HOLC as a percentage of the number of owner-occupied homes in 1930 (loan rate 1), and 4) the number refinanced as a percentage of all nonfarm homes in 1930 (loan rate 2).²⁸ The first panel of Table 2 shows that fourteen percent of owner-occupied households in the average county applied for HOLC loans, that an average of just under fifty percent of applications were accepted, and that HOLC financed an average of just over 7 percent of owned homes, or 3.6 percent of all nonfarm homes.

[INSERT TABLE 2 ABOUT HERE.]

The goal of the analysis is to assess whether HOLC lending was directed at disruptions in local housing markets or for other purposes that have been mentioned in the literature. HOLC loans could have been used, to begin with, to provide general relief to homeowners who had become unemployed or had lost income in other ways during the Depression—there is evidence, in fact, that HOLC was the only loan program sponsored by the New Deal that was distributed in response to general measures of relief and

²⁸ A desirable alternative measure of HOLC participation might be number of applications and loans per mortgaged owner-occupied household, but the 1930 Census did not ask whether a household was mortgaged and no other comprehensive data on mortgage indebtedness is available for this year.

recovery.²⁹ A second possibility is that HOLC refinancing was used for political purposes rather than to relieve credit market disruptions. HOLC loans provided borrowers with low-cost mortgages that carried much more liberal terms than private loans, so cheap credit could have been distributed to gain political advantage.³⁰

We employ a modified version of the empirical model that Fishback, Kantor and Wallis (henceforth FKW) used to examine variations in county-level per capita spending levels for 20 New Deal grant and loan programs, including HOLC.³¹ They included demographic controls (population, density and percent urban, illiterate, black, and race other than white or black), measures of economic structure and income (average farm size, percent of county in farmland, retail sales per capita and percent of households filing tax returns), proxies for distress (unemployment rate in 1930, percent farm failures and percent change in retail sales between 1929 and 1933), and a rich set of political variables.

We augment FKW's model in several ways to incorporate factors that could have influenced the allocation of HOLC refinancing across local markets. For example, we extend their demographic specification by including measures of the age composition in each county and the percent married, female, and foreign born. We also incorporate additional information about economic structure by accounting for the share of gainful workers employed in manufacturing, retail and wholesale establishments.³² We capture local financial market distress in the specification, moreover, by including the percent of bank deposits in each county that were held at the end of 1932 in banks that ended up suspending payments in 1933. Finally, and most importantly, we measure housing market distress in each county with the percentage change between 1925-1929 and 1930-1934 in the number of nonfarm

²⁹ See Fishback, Kantor and Wallis, "Can the New Deal's Three R's?" p. 296.

³⁰ *ibid*, 278.

³¹ We thank FKW for the use of their political variables, retail sales and tax return measures. We omit their committee chair political variables, as we were unable to find a clear connection between them and any of our dependent variables.

³² The demographic and economic structure variables were taken from ICPSR data set 2896.

dwelling units built.³³ We consider this a key measure of disruption in local housing markets that should have influenced the perceived need for HOLC refinancing among borrowers and the judgments of HOLC administrators about that need.

We also include additional independent variables to capture factors that should have influenced eligibility for HOLC refinancing and, therefore, both application and acceptance rates. A homeowner had to be encumbered to be eligible for an HOLC loan, so we add the natural logarithms of nonfarm median home values in 1930 and the number of new homes built between 1925 and 1929 since newer and higher-priced homes were more likely to have been mortgaged. High-priced homes of recent vintage should also have appraised for greater property values in 1933, so these same two variables could have been associated with higher acceptance as well as application rates. We also include the nonfarm homeownership rate in each county to see if loan applications or acceptances were sensitive to the mix of owned and rented housing in each local market.³⁴

Finally, we add distance from the nearest HOLC office location to reflect one of the agency's most impressive accomplishments—in a matter of months it created a national loan origination and servicing network. By 1934, HOLC had opened more than 200 offices, with at least one in every state.³⁵ Office location mattered to the agency's reach because distance increased the costs of mortgage lending

³³ The 1930 and 1940 median nonfarm home values are taken from ICPSR data set 2896. The number of nonfarm housing units built in each county between 1925-1929, 1930-1934 and 1935-1940 were taken from the self-reported “vintage” data for the housing stock that was reported in Volume II of the 1940 Census of Housing of 1940. The data on bank suspensions are from the Federal Deposit Insurance Corporation Data on Banks in the United States, 1920-1936, ICPSR data set 00007.

³⁴ The application rate and loan rate 1 dependent variables already incorporate the county's homeownership rates by construction, so we add the homeownership rate to the model to assess if local tenure patterns had an impact other than arithmetic on application and acceptance rates.

³⁵ The locations of the 301 HOLC offices as of January 15, 1934 were taken from Federal Home Loan Bank Board, *Annual Report* (1934). By this time 880,000 applications, or more than 40 percent of the 1933-35 total, had been filed. We dropped the small agency and sub-district offices as well as the wholesale operations offices, leaving 48 state and 174 district offices. Only 209 of our sample counties contained a state or district office since some counties contained more than one. As a robustness check we later utilize July 1935 office locations, taken from *ibid*, (1935), at which point 265 counties contained a state or district office.

for its staff and for borrowers—appraisals required onsite inspections and applications and documents had to move among homeowners, county officials and HOLC staff. We include an indicator for counties containing an HOLC office, another for counties located within 15 miles of an office but not containing an office, and a third for counties located between 15 and 30 miles away from the nearest office. The omitted base category is a distance of greater than 30 miles.³⁶

Our model, therefore, includes seven sets of regressors and takes the following form:

$$HOLC_{is} = \beta_0 + \beta_1 DEMO_{is} + \beta_2 ECON_{is} + \beta_3 INC_{is} + \beta_4 DISTRESS_{is} + \beta_5 POL_{is} + \beta_6 HOUS_{is} + \beta_7 OFFICE_{is} + \alpha_s + \varepsilon_{is} \quad (1)$$

where i and s index counties and states. *HOLC* represents either the application rate, the acceptance rate or two measures of overall participation in the program: the number of HOLC loans as a percentage of owner-occupied homes (loan rate 1) and as a percentage of all nonfarm homes (loan rate 2). The former is simply the product of the application and acceptance rates, while the latter, in our view, is the better measure of the overall extent of HOLC treatment that we use in the next section to examine the impacts of the program. *DEMO*, *ECON*, *INC*, *DISTRESS*, *POL*, and *HOUS* are the sets of demographic, economic structure, income, distress, political, and housing variables. *OFFICE* includes the indicator for an in-county HOLC office as well as the two distance variables. We also include state fixed effects, denoted by α_s . Table 2 provides descriptive statistics for the HOLC, distress, political, housing, and distance variables. Table A1 in the online appendix presents the summary statistics for the demographic, economic structure and income variables as well, along with information on which were included in FKW's model.

We present the results in Table 3. To conserve space we only present the individual coefficient estimates for the distress, political, housing and office variables and report the complete regression results in Table A2 of the online appendix. We do report, however, F-statistics for the joint significance of all

³⁶ We measure distance between the center of each county and the city in which nearest HOLC office was located. We considered alternative distance specifications but found no evidence that additional distance impacted HOLC loan rate beyond 30 miles. Within the 30 mile range, we chose 15-mile groupings of counties because these distances maximize the F statistic from a test of joint significance of the office variables.

the different categories of covariates at the bottom of the table. Besides reporting coefficient estimates and standard errors for individual covariates, we also show (in brackets) the percentage impacts on the dependent variables of one standard deviation increases in the independent variables to help assess economic significance.³⁷

It is useful to begin by using the group F-statistics to characterize how the different categories of covariates influenced application, acceptance and overall loan rates. The three groups of covariates not shown individually in the table—demographic, economic structure and income—all explain more of the variation in application rates than in acceptance rates, while the first two groups also explain significant variation in the two measures of loan rates. Among the covariate groups reported individually in the table, a similar pattern of influence appears only for the political variables which as a group explain application and loan rates, but not acceptance rates. The distress, housing and distance variables, on the other hand, explain substantial variation in both loan rates and in the application and acceptance rates. These latter groups of variables have been chosen to reflect the structure of local housing markets, and the distress and lending costs faced by borrowers and lenders within them. Their combined importance in explaining HOLC activity provides importance evidence that the staff, borrowers and lenders all broadly understood the goals and limits of the program.

Three of the five individual distress covariates show the same consistent pattern of influence across applications, acceptances and loan rates. Two of these, the percentage change in residential building activity and the percent of suspended bank deposits, are key measures that we use here to capture the disruption in local housing and financial markets. The coefficient estimates for both of these variables are of the expected sign, and the magnitude of their impacts are large enough to conclude that HOLC lending activity was sensitive to the distress and disruptions that the program was intended to combat.

³⁷ To illustrate, the top left cell of the table shows that a one point increase in percent change retail sales decreases the application rate by 0.023 percentage points. The sample standard deviation for percent change retail sales is 23.006, and the sample mean for application rate is 13.974 percentage points. The percentage impact on application rate of a one standard deviation increase in percent change retail sales is therefore $-0.023 \times 23.006 / 13.974 \times 100\%$, or -4%.

Increased incidence of farm failures has a modest negative impact on all rates, which could reflect a greater reliance in these areas on the New Deal's Farm Credit Administration.³⁸ The two more generic measures of economic distress in our specification perform less consistently. The percentage change in retail sales has the expected, and statistically significant, negative association with application rates, but not with the rate of HOLC acceptances. The unemployment rate, on the other hand, has virtually no impact on any measure of HOLC activity.

We interpret the large and significant impacts for all of the individual housing covariates as evidence that the pattern of HOLC refinancing was related not only to distress, but also to its eligibility requirements. Markets in which median home values were higher in 1930 had higher rates of both applications and acceptances, presumably because high pre-crisis values indicated a more extensive reliance on mortgages and stronger post-crisis collateral.³⁹ According to the percentage impact calculations, in fact, median home value has the strongest effect of all of the independent variables in every regression. The large positive effect of the volume of new homes built between 1925 and 1929 on county-level application rates also comports with evidence that new homes were more likely to have been under mortgage and eligible for refinancing.⁴⁰ Finally, the statistically significant, positive and large impact of the homeownership rate on acceptance rates is consistent with Harriss' observation that HOLC set appraisals more favorably on properties located in settled, established residential areas than those in mixed, transitional neighborhoods.⁴¹

³⁸ Harriss, *History and Policies*, p. 24.

³⁹ Additionally, multiple specification tests (not reported) revealed that the impact of median home value on the dependent variables was concave suggesting that increases in median home values beyond some point indicated a greater proportion of homes in the county exceeding HOLC dollar restrictions. For instance, if we use the level instead of the log for median home values, the squared term is also highly significant. Also, the proportion of homes valued above \$10,000 dollars in 1930 had a significant negative impact on both application and acceptance rates when median home value was entered linearly, but not when the log of median value was included.

⁴⁰ *ibid*, p. 57.

⁴¹ *ibid*, p. 51.

Against this backdrop, the regressions provide little evidence that HOLC was driven to any appreciable degree by political considerations. Two of the five political variables in our specification (voting rate and tenure in the House) have no statistically significant association with any of our measures of HOLC activity. Two other political variables, the shares of Democratic and Roosevelt votes in 1932, are positively associated with slightly higher acceptance rates but are not significantly related to either overall loan rate. The only significant impact of political considerations on overall loan rates is through the association between stronger party loyalty, as measured by the standard deviation of percent Democrat, and application rates—but the variable has no impact on acceptance rates. Most importantly, the small share of the overall variability in application, acceptance and loan rates that is explained by political considerations (refer to the F statistics) represents evidence that HOLC was not in any important sense an instrument of patronage.

We close the discussion of HOLC allocation by focusing on the results for the HOLC office location variables separately, as they will prove crucial to the identification of the agency's impact in the next section. Having an HOLC office increases a county's application, acceptance and loan rates. Interestingly, though, the nearest loan office being outside the county but less than 15 miles away or between 15 and 30 miles away matters to acceptance and loan rates but not to application rate.⁴² This result is important and interesting for two reasons. First, it indicates that spatial segmentation in the mortgage market of lending operated more through supply than demand—because the costs to HOLC of conducting on-site appraisals and filing loan documents were greater for loans made in distant locales while most applications for relief were submitted by mail and thus not sensitive to distance to an office. Second, the effect of these costs had on HOLC treatment levels is plausibly exogenous and provides an

⁴² Note also the non-monotonic relationship between distance and acceptance rates: counties within 15 miles of the nearest HOLC office actually had a higher acceptance rate *ceteris paribus* than counties containing an HOLC office. One possible explanation is that, because of the higher application rates in counties with an HOLC office, these applications were on average weaker than those from surrounding counties, leading to more rejections.

avenue through which we can identify the consequence of HOLC loan activity for local housing outcomes.⁴³

HOLC's Intervention and the Local Housing Markets

We next turn to an evaluation of the effectiveness of HOLC. An OLS estimator of the relationship between percentage of homes refinanced by HOLC and housing market outcomes would likely be biased downward since the agency's loans were distributed disproportionately to areas facing the greatest housing and overall distress, as shown in the preceding section. We therefore estimate HOLC's impact with two-stage instrumental variables models in which the first stage predicts treatment intensity using an equation similar to (1) and the second examines the relationship between treatment intensity and 1940 non-farm home values and ownership rates, as well as the number of new non-farm housing units built in each county between 1935 and 1940. Identification requires one or more independent variables that meet the two criteria for valid instruments: they must affect HOLC loan rate in the first stage, and they must be uncorrelated with the second stage error term that reflects unobserved characteristics that impacted housing markets during the 1930s.

Our identification strategy exploits the plausibly exogenous variation in loan activity resulting from the spatial configuration of HOLC's administration. Our earlier results showed that HOLC acceptance and loan rates decreased with the distance between a county and the nearest HOLC office, so the three office variables are likely to satisfy the first condition for valid instruments. The second condition is potentially more problematic. HOLC administrators naturally placed offices in large cities, and housing markets in large urban areas generally suffered the most during the Great Depression.⁴⁴ Even

⁴³ We also considered an alternative set of regressions (not reported) in which we clustered standard errors by state. Doing so increases most of the standard errors slightly, but rarely impacts statistical significance. The most noticeable difference is that in the application rate regression percent illiterate, percent Democrat, and percent Roosevelt minus percent Democrat switch from marginally significant to marginally insignificant.

⁴⁴ Specifically, the correlation between county population in 1930 and our measure of housing market distress—the percentage change in new building between 1925-29 and 1930-34—is a highly significant -0.25, while the correlation between percent urban and change in new building is a highly significant -0.43.

conditional on population, HOLC administrators could have deliberately placed offices in the most troubled areas in an effort to best meet the needs of homeowners and lenders. Either phenomenon could lead to a downward bias when using all three office variables as instruments.

Fortunately, our indicator of nonfarm housing market distress – percentage change in new building during the early stages of the depression – allows us to directly test whether HOLC offices were in fact placed in the most distressed areas. We begin by computing correlations between percentage change in new building from 1925-29 to 1930-34 and each of the three distance from HOLC office variables. The correlation between percentage change in new building and whether the county contains an office is -0.22 and significant at the 0.01 percent level, a result that is not surprising given the discussion above. Interestingly, however, the correlations between the change in building and the other two office variables are much smaller: -0.04 and significant at the 5 percent level for the indicator of whether the nearest office was outside the county but within 15 miles, and a statistically insignificant -0.01 for whether the nearest office was 15 to 30 miles away.

To investigate these patterns more closely, in Figure 1 we display kernel density functions for percentage change in new building, stratified by nearest HOLC office location. These plots reveal a similar story. The kernel density function for counties with an office lies well to the left of the function for the “control group” of counties whose nearest office is more than 30 miles away. The kernel density functions for counties whose nearest office is less than 15 miles away and those whose nearest office is 15 to 30 miles away, however, are similar to that of the control group in shape and value at which the function is maximized.⁴⁵ The correlations and kernel density plots therefore suggest that HOLC indeed opened offices in counties facing the most housing market distress, but that the degree to which this relationship spilled over into surrounding areas was minimal.⁴⁶ Consequently, the under 15 and 15-30

⁴⁵ The kernel density functions for these groups are less smooth and have a narrower range than the kernel density function of the control group, but this is likely because the control group is much larger (2,373 counties).

⁴⁶ We also used the Stata module “asciker” to graph 95% confidence intervals for each of the kernel densities (graphs available upon request). See Fiorio, “Confidence Intervals.” For any two of the four groups, there is at least

mile groups are the most appropriate comparison groups for the over 30 mile control group, while the counties containing an office are not an appropriate comparison group.

With this in mind, we estimate two instrumental variables models using two-stage least squares.

In both, the first stage regression is:

$$\begin{aligned} HOLC_i = & \beta_0 + \beta_1 DEMO_i + \beta_2 ECON_i + \beta_3 INC_i + \beta_4 DISTRESS_i + \beta_5 POL_i \\ & + \beta_6 HOUS_i + \beta_7 OFFICE_i + \beta_8 \Delta DEMO_{i,1940} + \beta_9 \Delta ECON_{i,1940} + \varepsilon_i. \end{aligned} \quad (2)$$

The two second stage regressions are

$$\begin{aligned} Y_{i,1940} = & \gamma_0 + \gamma_1 \widehat{HOLC}_i + \gamma_2 DEMO_i + \gamma_3 ECON_i + \gamma_4 INC_i + \gamma_5 DISTRESS_i + \gamma_6 POL_i \\ & + \gamma_7 HOUS_i + \gamma_8 \Delta DEMO_{i,1940} + \gamma_9 \Delta ECON_{i,1940} + \gamma_{10} IN_COUNTY_i + \mu_i \end{aligned} \quad (3)$$

$$\begin{aligned} Y_{i,1940} = & \gamma_0 + \gamma_1 \widehat{HOLC}_i + \gamma_2 DEMO_i + \gamma_3 ECON_i + \gamma_4 INC_i + \gamma_5 DISTRESS_i + \gamma_6 POL_i \\ & + \gamma_7 HOUS_i + \gamma_8 \Delta DEMO_{i,1940} + \gamma_9 \Delta ECON_{i,1940} + \gamma_{10} IN_COUNTY_i \\ & + \gamma_{11} DIS1_i + \mu_i \end{aligned} \quad (4)$$

where (3) excludes the under 15 and 15-30 mile distance variables (*DIS1* and *DIS2*) as instruments but keeps the variable for whether there is an office in the county (*IN_COUNTY*) as a control, while (4) excludes *DIS2* as an instrument and keeps *IN_COUNTY* and *DIS1* as controls.⁴⁷ In this section, *HOLC* represents the percentage of nonfarm housing units refinanced with HOLC loans in each county. This is the dependent variable from the preceding section that best measures the extent to which a county was “treated” by the program. The second stage dependent variable *Y* is the natural logarithm of non-farm median home value, the non-farm home ownership rate, or the natural logarithm of non-farm new housing units built from 1935 to 1940. Since *HOUS* includes 1930 home values and ownership rates and new building in 1925-1929, the second stage is a lagged dependent variable model that corrects for time-

some range of values of percentage change in new building in which the confidence intervals overlap. This range is narrowest when the group of counties with an office is involved in the comparison, in particular when it is compared to the control group. In contrast, the range of overlap spans practically the entire distribution when comparing amongst the groups whose nearest office is 0-15 miles away, 15-30 miles away, or more than 30 miles away.

⁴⁷ We compute heteroskedasticity-robust standard errors in all regressions. In unreported regressions we also clustered standard errors by state, but this made virtually no difference.

invariant sources of endogeneity bias.⁴⁸ We include the changes in the demographic and economic structure variables between 1930 and 1940 (represented by $\Delta DEMO$ and $\Delta ECON$) since the outcome variables in the second stage regression are measured in 1940. We do not include changes in the other independent variables, such as the income and distress measures, since their values in 1940 are potentially functions of HOLC treatment.⁴⁹ We omit state fixed effects for now to allow the substantial between-state variation in the number of offices that resulted from the states' autonomy in administering the program to increase the explanatory power of our instruments.⁵⁰ We add them later as a robustness check.

In (3), the parameter of interest γ_1 is identified under the assumption that distance from the nearest HOLC office is uncorrelated with unobservable characteristics that impacted housing markets during the 1930s conditional on the county not having an office. In (4), the identifying assumption is that distance from the nearest office is uncorrelated with these unobservable characteristics conditional on there not being an office within 15 miles. We also considered using all three office variables as instruments but found that using IN_COUNTY as an instrument appears to bias the coefficient estimator for HOLC downward in the values and ownership regressions. This pattern is consistent with the correlations and kernel density plots discussed above.

Table 4 reports the results for each of the three dependent variables. The column labeled OLS displays the results from an OLS version of (3), while the columns labeled IV (1) and IV (2) represent the two aforementioned instrumental variables models. We display the coefficient estimates for HOLC loan rate in the second stage. When applicable, we also report the Kleibergen-Paap F statistic from a test of

⁴⁸ Because of the lagged dependent variables, the estimates are identical if we use changes in the dependent variables instead of levels. Our model can therefore alternatively be interpreted as a differences model that includes lagged levels.

⁴⁹ Conceivably, the values of the demographic and economic structure variables in 1940 could also depend on HOLC treatment. Results are virtually identical if we do not include changes in these variables.

⁵⁰ To illustrate, a diverse group of states (California, Connecticut, Florida, Indiana, New Mexico, New Jersey and Virginia) had the greatest number of state and district offices (between 7 and 9). Other states opted for a more centralized structure, with two (Arizona and Idaho) having only a single office.

the joint significance of the instruments in the first stage, along with the p-value from the overidentification test.

[INSERT TABLE 4 ABOUT HERE.]

Panel A of Table 4 displays the results for median home values. In the OLS regression, HOLC loan rate is statistically insignificant and its effect is minimal. In both IV regressions, loan rate becomes statistically significant while the coefficient estimate reaches a magnitude (7.2-8.6 percent) that implies the median home value in the average county increased by 19-22 percent for an additional standard deviation increase in HOLC lending. The models reported in Panel B reveal a similar pattern for HOLC's impact on home ownership—the estimated coefficient is essentially zero using OLS, but large and statistically significant in both IV regressions. A one percentage point increase in the HOLC loan rate is associated with a 1.4-1.5 percentage point increase in the home ownership rate, meaning that HOLC actually preserved more than one homeowner for every home that it refinanced. These estimates imply that an additional standard deviation of HOLC lending increased the average county's home ownership rate by 3.6-3.9 percentage points. For both values and ownership rates, Hausman tests (not reported) reject the consistency of the OLS estimator and confirm our suspicion that it suffers from a downward bias. Both overidentification tests fail to reject the null hypothesis that *DIS1* and *DIS2* are valid instruments. The first-stage F statistics are virtually identical in the two sets of regressions, differing only because of the slightly larger sample size for homeownership. They are large enough to rule out weak instrument bias using a maximum acceptable bias of 20 percent in IV (1) and 15 percent in IV (2).

Panel C shows HOLC's estimated impact on the volume of new homebuilding between 1935 and 1940. HOLC lending is associated with a statistically significant reduction in building in the OLS regression, but the magnitude is small. A one percentage point increase in loan rate is associated with a 1.3 percent reduction in new building, which would translate to only a 0.16 percent reduction in overall housing stock based on the sample means of the new building variable and the number of housing units. In both IV regressions, loan rate becomes insignificant and its effect remains small. The evidence is therefore consistent with HOLC having a minimal effect on housing production. Since all three estimates

are close to zero, neither the Hausman nor overidentification tests reject the null hypothesis. The first stage F statistics are identical to those for homeownership rates as the sample is the same.

We tested the sensitivity of the IV results by performing a wide range of robustness checks that are reported in Table A3 of the online appendix. First, we included additional controls that measure per capita spending on five New Deal programs besides HOLC, state fixed effects, and changes in the dependent variables within the *farm* portion of each county during the 1930s.⁵¹ We also employed different methods of measuring distance from the nearest HOLC office: three 10 mile distance dummies instead of two 15 mile dummies, a single 30 mile distance dummy plus the interaction of this dummy with linear distance and the distance from July 1935, instead of January 1934, office locations. Additional models incorporated more flexible specifications for the important population, population density and percent urban control variables, while others used different measures of HOLC treatment intensity—the proportion of owned (instead of all) homes that were refinanced and a per capita dollar measure of lending in each county. We also use levels rather than logs of median home values and new home construction, and weight each county by the natural logs of population and nonfarm housing units. Finally, we consider models that restrict the sample to counties that did not contain an HOLC office and those that did not have an HOLC office within 15 miles. Our central result that HOLC lending increased home values and ownership rates, but not new building, persists throughout all of these specifications.

Heterogeneity

⁵¹ The five New Deal programs are Federal Housing Administration loans insured, relief and public works grants, Reconstruction Finance Corporation loans, Agricultural Adjustment Administration grants, and farm loans. These variables, graciously shared by Price Fishback, are the New Deal controls used by Fishback, Lagunes, Horrace et al., “the Influence.” For the farm sector trends, when using the natural logarithm of non-farm median home value in 1940 as the dependent variable, we control for the change in the natural logarithm of the value of the average farm building between 1930 and 1940. Average farm building value is the closest analog to median non-farm home value available in county-level data. When non-farm home ownership rate in 1940 is the dependent variable, we include change in farm ownership rate from 1930 to 1940. When the natural logarithm of new non-farm dwellings from 1935-1940 is the dependent variable, we include change in the natural logarithm of new farm dwellings from 1925-1929 to 1935-1940.

Thus far our analysis of HOLC’s impact on local housing markets has focused on identifying average effects. A particular amount of HOLC lending could have had different effects in different housing markets, however, because the severity of disruptions in mortgage lending channels would have depended on the institutional and contractual elements used in each market, while the impacts of the disruptions would have varied across different categories of mortgaged homeowners. To examine whether HOLC effects were heterogeneous we split the sample into two subsamples based on population, percent urban, percent minority (race other than white), percent over 65 years old and percent change in new building between 1925-29 and 1930-34.⁵² We constructed subsamples by first dropping the 209 counties that contained HOLC offices—as they are not used for identification in our IV specifications—and then splitting the remaining 2698 counties into those above and below the median along the selected dimension. We then conducted IV estimation with *DIS1* and *DIS2* as instruments.

Table 5 reports the results, with “low” and “high” indicating the halves of the sample below and above the sample median. The impact of HOLC on home values and ownership rates appears to have been strongest in large, urban areas with a diverse and young population. This result could indicate that younger homeowners, who tend to stretch financially when purchasing a home, benefitted disproportionately by HOLC refinancing since they had less wealth than older homeowners to absorb the shocks associated with disruptions in income. Interestingly, HOLC also appears to have had the greatest effect in the half of the counties facing the lower amounts of housing market distress. This could indicate that HOLC was effective so long as mortgage disruptions were not too severe—but beyond some point even HOLC loans could not ameliorate the damage.

Artificial Offices, Large Urban Markets and Identifying the Impacts of the HOLC

We close our analysis with an effort to tie our results together with those of FLHKT to provide a clear picture of what we have and have not learned about the effects of HOLC on local housing markets

⁵² We also considered further divisions, but splitting the sample into more than two subsamples severely limits the precision of the estimates.

during the Great Depression. Like us, FLHKT exploit distance from HOLC offices in their identification strategy and recognize the potential endogeneity of these office locations. Whereas we account for this potential endogeneity by controlling for whether the county has an office, their proposed solution is to use “artificial” instead of actual office locations. Noting that HOLC offices were typically placed in large cities, they place an artificial office in each state’s capital and the four most heavily populated counties, and then create the instrument by computing distances from these artificial locations. Constructing artificial office locations using pre-depression characteristics such as size should indeed correct for bias from HOLC administrators deliberately placing offices in counties facing the greatest housing market distress. But their approach is still susceptible to bias from large counties experiencing different housing market shocks than other areas in the 1930s for reasons aside from HOLC. The other controls should mitigate the extent of this bias, but may not eliminate it completely.

To better understand how the identification issue can change our view of HOLC’s impacts, in this section we consider two variations of the artificial HOLC office approach. The first specification (referred to as “Artificial Offices 1”) duplicates the artificial office locations used by FLHKT: each state’s capital and four largest counties. The second specification (“Artificial Offices 2”) offers our own method of constructing artificial office locations. We first estimate a probit model with *IN_COUNTY* as the dependent variable and county characteristics from 1920 – before both the 1920s boom and 1930s bust – as the independent variables. These 1920 variables include the set of demographic characteristics plus dummy variables for the state capital and the five most heavily populated counties in the state. We then assign offices to the 209 counties with the highest predicted probabilities, subject to the constraint that every state has at least one office. This method correctly predicts 147 of the 209 actual office locations, while FLHKT’s artificial office approach correctly predicts 138. We then construct distances from the nearest artificial HOLC office, using the same divisions as before: in the county, outside the county but within 15 miles, between 15-30 miles and beyond 30 miles.

As with actual offices, we can assess the validity of these artificial office approaches by examining the relationship between our set of distance-from-office variables and our measure of nonfarm

housing market distress – the percentage change in new building from 1925-29 to 1930-34. Using “Artificial Offices 1,” the correlation between *IN_COUNTY* and percentage change in new building from 1925-29 to 1930-34 is -0.19 and significant at the 0.01 percent level. The correlations between change in new building and *DIS1* and *DIS2*, however, are both only -0.03 and insignificant at the 5 percent level. Using “Artificial Offices 2,” the correlation between change in new building and *IN_COUNTY* is a significant -0.24, while the correlations between change in new building and *DIS1* and *DIS2* are both an insignificant -0.03. Accordingly, the kernel density plots in Figures A1 and A2 of the online appendix both show that the distress distribution for counties with an artificial office lies to the left of the distributions for the other three groups of counties. These patterns point to the same conclusion reached with actual offices: relative to the “control group” of counties whose nearest artificial HOLC office is more than 30 miles away, counties whose nearest artificial office is within 15 miles (but not in the county) or 15-30 miles away are more appropriate comparison groups than counties that contain an artificial office.

Table 6 displays the results from the artificial offices regressions utilizing both *DIS1* and *DIS2* as instruments and *IN_COUNTY* as a control.⁵³ As with actual offices, HOLC lending has a statistically and economically significant impact on median home values and ownership rates but no effect on new building. The magnitudes of the estimates are slightly smaller but well within the 95% confidence intervals of those obtained using actual offices.

Our results can now be combined with those of FLHKT to assess what we know and do not know about HOLC’s role in stabilizing home values and home ownership. Importantly, both papers agree that HOLC increased housing values and home ownership (stock of owned homes in their case, ownership rate in ours) once the few hundred largest counties are excluded from the sources of identifying

⁵³ We find that using *IN_COUNTY* as an instrument instead of a control appears to bias the coefficient estimator for HOLC downward in the home value and ownership regressions for both artificial office definitions (results available upon request). We also reported this pattern for actual offices and these similarities suggest that the bias observed with actual office locations with *IN_COUNTY* as an instrument more likely reflects differential shocks in large urban markets than the intentional placement of offices in distressed areas.

variation.⁵⁴ The evidence therefore indicates that HOLC successfully repaired credit channels and prevented further disruptions in the housing and mortgage markets across most of the nation's counties. HOLC's effectiveness in the largest counties, however, is less clear. FLHKT noted that keeping counties with over 50,000 residents in the sample weakened HOLC's estimated impacts dramatically and conjectured that this result was due to heterogeneity in impacts between the largest counties and all other markets in the sample. We argue, in contrast, that the distance-based instrumental variable approach is simply not appropriate to identify HOLC's impacts within the largest counties because these markets hosted disproportionate numbers of actual or artificial offices while facing the greatest housing market distress in the early stages of the depression.

These differences in interpretation point to the need for future research to examine HOLC's intervention in the largest counties. The issue matters because these markets took the brunt of the real estate crisis in terms of average decreases in home values, homeownership rates and housing production—and also received a disproportionately large share of HOLC funds.⁵⁵

Conclusion

The Home Owner's Loan Corporation was created during FDR's first hundred days—at the nadir of the deepest housing crisis in American history. In less than three years the HOLC assembled a nationwide network of offices and made long-term, amortized loans to more than million homeowners. The goal was to repair severely disrupted lending channels and to prevent further damage in housing markets by purchasing distressed mortgages from private lenders and refinancing them for borrowers. The evidence presented here indicates that HOLC activity was distributed across local markets in a pattern that reflected the severity of housing market distress rather than the need for general relief or political considerations. Our IV estimates, moreover, provide evidence that HOLC lending increased

⁵⁴ Recall that we prevent the largest counties from providing identifying variation by controlling for whether counties had an actual or artificial HOLC office, while FLHKT do this by simply dropping the 394 counties with over 50,000 residents from the sample.

⁵⁵ In our data the 7 percent of counties that contained an HOLC office received 58 percent of the agency's loans.

median home values and homeownership rates, but without stimulating new production in markets where the housing stock was already, if anything, in surplus. A limitation of our IV analysis, however, is that endogeneity concerns force us to exclude the largest counties from the sources of identifying variation, leaving HOLC's impacts in these areas as an important direction for future research. We interpret these results, nonetheless, as evidence that HOLC mitigated a “financial accelerator” that was deepening the residential mortgage crisis in the early 1930s.

Our investigation offers some relevant lessons and insights about policies that have been implemented in response to the housing and mortgage crisis of 2007. The HAMP program, in particular, provides distressed borrowers today with the same basic type of loan modification that HOLC offered—lower rates, longer terms and lower monthly payments with no reduction in principal.⁵⁶ We have two reasons to suspect that HAMP's program will be less effective. First, HOLC's modified loans offered borrowers much greater relief because they were used to refinance short-term, balloon mortgages. HAMP, in contrast, is attempting to modify loan contracts that in most cases were already designed to minimize the borrower's monthly obligations.⁵⁷ A second difference between the programs is that HOLC bought and held the mortgages it refinanced, while the loans modified by HAMP stay on the books of private lenders.⁵⁸ The difference in ownership will lead to potentially important differences in how the loans are serviced. HOLC was patient after defaults, provided concessions to avoid re-defaults when possible, and attempted to reduce impacts on local housing markets when foreclosure became necessary. Private lenders and servicers cannot be expected to make similar accommodations today and so we might see higher rates of re-default in HAMP than we saw in HOLC.

⁵⁶ The Treasury's Home Affordable Modification Program (HAMP) was established in 2009 to encourage private mortgage lenders and servicers to offer trial and permanent mortgage loan modifications to distressed mortgage borrowers.

⁵⁷ The lower value of HAMP modifications relative to the original helps to explain why only 450,000 loans have been permanently modified in the first 16 months of the HAMP program, while HOLC modified some 534,000 loans over the same horizon within a much smaller mortgage market.

⁵⁸ The Treasury created a structure that was designed to remove distressed loans from private lenders' balance sheets—its Legacy Securities Public-Private Investment Program—but participation in it has been minimal.

More generally, lessons drawn from HOLC's success must be framed within two important generalizations. First, there were no public safety nets that protected borrowers from income shocks and mortgage lenders from credit shocks during the early 1930s. In their absence, the financial accelerator was more powerful than it is today which, in turn, increased the value and impact and value of an intervention like the HOLC. Second, the increases in home values and homeownership that we report for HOLC ameliorated, but did not reverse, the damage from the crisis of the 1930s. Between 1930 and 1940, in fact, nonfarm homeownership decreased from 45 to 40 percent, nominal home values decreased by nearly 40%, and housing construction activity remained well below 1920s levels. An important lesson from HOLC, therefore, is that policies that are designed to repair mortgage lending channels during a crisis should not be expected to reverse or cut short the pain associated with adjusting to an oversupply of residential housing after a credit-driven boom. Even when successful, policies like HOLC do no more than remove a potentially important impediment to that adjustment process.

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Table 1 – Mortgages Held by Major Lending Groups on 1-4 Family Non-Farm Homes and Purchased by HOLC, 1930-1940 (\$ millions)

	B&L to S&L	Mutual Savings Banks	Commercial Banks	Insurance companies	Others & Individuals
Mortgages Held in 1930	6149	2341	2212	1838	6457
Change 1930-33	-1676	+ 13	- 311	- 136	-1561
Change 1933-36	-1216	- 272	- 183	- 382	- 545
Home Mortgages Purchased by HOLC 1933-1936	[770]	[410]	[525]	[165]	[880]
Change 1936-40	+ 816	+ 80	+ 668	+ 518	+ 686
Mortgages Held in 1940	4073	2162	2386	1838	5011

Source: Grebler, 1956, N-4; U.S. Housing and Home Finance Agency (1952), iv.

Table 2 – Summary Statistics for Key Variables

		Year	Mean (Std. Dev.)
HOLC	Application Rate	1933-36	14.0 (8.2)
	Acceptance Rate	1933-36	48.2 (14.9)
	Loan Rate 1 (base is owned nonfarm units)	1933-36	7.2 (5.3)
	Loan Rate 2 (base is nonfarm units)	1933-36	3.6 (2.6)
Distress	Percentage Change in Retail Sales	1933-1929	-47.6 (23.0)
	Unemployment Rate	1930	2.8 (2.2)
	Percent Farm Failures	1929	3.1 (3.7)
	Percentage Change in New Building	1925-29 to 1930-34	-25.1 (56.3)
	Percentage Deposits in Suspended Banks	1932	17.9 (27.8)
Political	Percent Democrat	1896-1928	49.4 (18.5)
	Percent Roosevelt – Percent Democrat	1932	18.7 (10.3)
	Standard Deviation Percent Democrat	1896-1932	11.6 (4.8)
	Voting Rate	1932	31.5 (15.0)
	Tenure in House of Representatives	1933	52.2 (64.8)
Housing (all nonfarm)	Median Home Value (Pre-HOLC)	1930	2559 (1286)
	Median Home Value (Post-HOLC)	1940	1622 (899)
	Home Ownership Rate (Pre-HOLC)	1930	50.7 (11.5)
	Home Ownership Rate (Post-HOLC)	1940	47.4 (9.9)
	New Building (Pre-HOLC)	1925-1929	1210 (7208)
	New Building (Post-HOLC)	1935-1939	790 (3108)
Distance	HOLC Office in County	1934	0.070 (0.255)
	0<Distance to HOLC Office≤15	1934	0.021 (0.143)
	15<Distance to HOLC Office≤30	1934	0.140 (0.347)

Note: Summary statistics for the demographic, economic structure and income variables are available in Table A1 of the online appendix.

Table 3 – Determinants of HOLC Loan Activity

		Applic. Rate	Accep. Rate	Loan Rate (1)	Loan Rate (2)
Distress	Pct. Change Retail Sales	-0.023 [-4%] (0.006)***	-0.020 [-1%] (0.014)	-0.013 [-4%] (0.004)***	-0.007 [-5%] (0.002)***
	Unemployment Rate	0.071 [1%] (0.069)	0.377 [2%] (0.215)*	0.050 [2%] (0.044)	0.017 [1%] (0.023)
	Pct. Farm Failures	-0.054 [-1%] (0.032)*	-0.157[-1%] (0.084)*	-0.059 [-3%] (0.019)***	-0.025 [-3%] (0.009)***
	Pct. Change New Building	-0.008 [-3%] (0.003)***	-0.036 [-4%] (0.006)***	-0.007 [-5%] (0.002)***	-0.003 [-5%] (0.0009)***
	Pct. Deposits in Suspended Banks	0.024 [5%] (0.004)***	0.026 [2%] (0.009)***	0.013 [5%] (0.003)***	0.007 [5%] (0.001)***
Political	Pct. Democrat	0.005 [1%] (0.013)	0.065 [2%] (0.033)**	0.009 [2%] (0.008)	0.001 [1%] (0.004)
	Pct. Roosevelt – Percent Democrat	-0.008 [-1%] (0.022)	0.086 [2%] (0.048)*	0.010 [1%] (0.014)	0.006 [2%] (0.007)
	Standard Deviation Pct. Democrat	-0.148 [-5%] (0.047)***	-0.099 [-1%] (0.106)	-0.095 [-6%] (0.030)***	-0.043 [-6%] (0.014)***
	Voting Rate	0.039 [4%] (0.027)	0.050 [2%] (0.070)	0.017 [4%] (0.018)	0.007 [3%] (0.009)
	Tenure in House of Representatives	0.000 [0%] (0.002)	0.002 [0%] (0.004)	0.001 [1%] (0.001)	0.000 [1%] (0.001)
Housing	ln(Median Home Value)	6.078 [21%] (0.443)***	9.970 [10%] (1.103)***	3.971 [27%] (0.282)***	1.890 [26%] (0.133)***
	Home Ownership Rate	-0.005 [-0%] (0.018)	0.188 [4%] (0.039)***	0.027 [4%] (0.011)**	0.076 [24%] (0.006)***
	ln(New Building)	1.924 [21%] (0.215)***	-0.190 [-1%] (0.481)	1.055 [22%] (0.136)***	0.550 [23%] (0.069)***
Office	HOLC Office in County	2.525 [5%] (0.532)***	1.965 [1%] (0.924)**	2.264 [8%] (0.385)***	0.960 [7%] (0.184)***
	0<Distance to HOLC Office≤15	0.564 [1%] (0.712)	5.226 [2%] (1.373)***	1.051 [2%] (0.478)**	0.653 [3%] (0.267)**
	15<Distance to HOLC Office≤30	-0.014 [0%] (0.298)	2.523 [2%] (0.693)***	0.327 [2%] (0.185)*	0.228 [2%] (0.098)**
	Observations	2922	2917	2922	2922
	R ²	0.571	0.414	0.577	0.576
	F Demographics	21.59***	3.94***	18.03***	20.36***
	F Economic Structure	4.13***	0.16	3.00**	2.33**
	F Income	4.87***	1.11	1.56	1.06
	F Distress	13.71***	12.83***	16.68***	16.06***
	F Political	3.80***	1.13	3.32**	2.55**
	F Housing	108.55***	35.68***	99.51***	136.85***
	F Distance	7.69***	8.76***	12.41***	10.90***

Notes: Coefficient estimates, heteroskedasticity-robust standard errors (in parentheses), and percentage impacts of one standard deviation increases (in brackets) are reported. *** statistically significant at 1% level; ** 5% level; * 10% level. State fixed effects are included in all regressions. Results for the individual demographic, economic structure and income variables are available in Table A2 of the online appendix.

Table 4 – Effects of HOLC Loan Activity

	OLS	IV (1)	IV (2)
Distance Variables:			
As Instrumental Variables	--	DIS1/DIS2	Only DIS2
As Controls	--	IN_COUNTY	IN_COUNTY and DIS1
Panel A: Impact on 1940 ln(Median Home Value) (n=2896)			
HOLC Rate	0.003 (0.002)	0.086 (0.027)***	0.072 (0.034)**
First stage F statistic	-	10.56	12.27
Overidentification p-value	-	0.550	-
Panel B: Impact on 1940 Home Ownership Rate (n=2907)			
HOLC Rate	-0.004 (0.041)	1.536 (0.509)***	1.426 (0.694)**
First stage F statistic	-	10.64	12.47
Overidentification p-value	-	0.809	-
Panel C: Impact on 1935-1940 New Homes Built (n=2907)			
HOLC Rate	-0.014 (0.003)***	-0.006 (0.034)	-0.028 (0.044)
First stage F statistic	-	10.64	12.47
Overidentification p-value	-	0.452	-

Notes: Heteroskedasticity-robust standard errors in parentheses. *** statistically significant at 1% level; ** 5% level; * 10% level. All regressions include the demographic, economic structure, distress, political, and housing controls as well as the changes in the demographic and economic structure variables between 1930 and 1940. IV (1) corresponds to equation (3) in the text and IV (2) corresponds to equation (4).

Table 5 – Heterogeneity

		ln(Median Home Value)	Home Ownership Rate	ln(New Building)
Panel A: Stratify by Population	Low	0.046 (0.029)	0.520 (0.459)	-0.031 (0.045)
	High	0.068 (0.031)**	1.735 (0.687)**	-0.026 (0.039)
Panel B: Stratify by Percent Urban	Low	0.062 (0.035)*	1.302 (0.701)*	-0.075 (0.048)
	High	0.087 (0.035)*	1.349 (0.576)**	0.022 (0.045)
Panel C: Stratify by Percent Minority	Low	0.046 (0.021)**	1.263 (0.501)**	0.046 (0.038)
	High	0.161 (0.079)***	2.682 (1.355)**	-0.064 (0.076)
Panel D: Stratify by Percent Over 65	Low	0.131 (0.052)**	1.667 (0.799)**	0.033 (0.053)
	High	0.039 (0.022)*	1.188 (0.484)**	-0.039 (0.036)
Panel E: Stratify by Percent Change New Building	Low	0.050 (0.024)**	1.132 (0.497)**	-0.037 (0.041)
	High	0.086 (0.047)*	2.927 (1.194)**	-0.0004 (0.055)

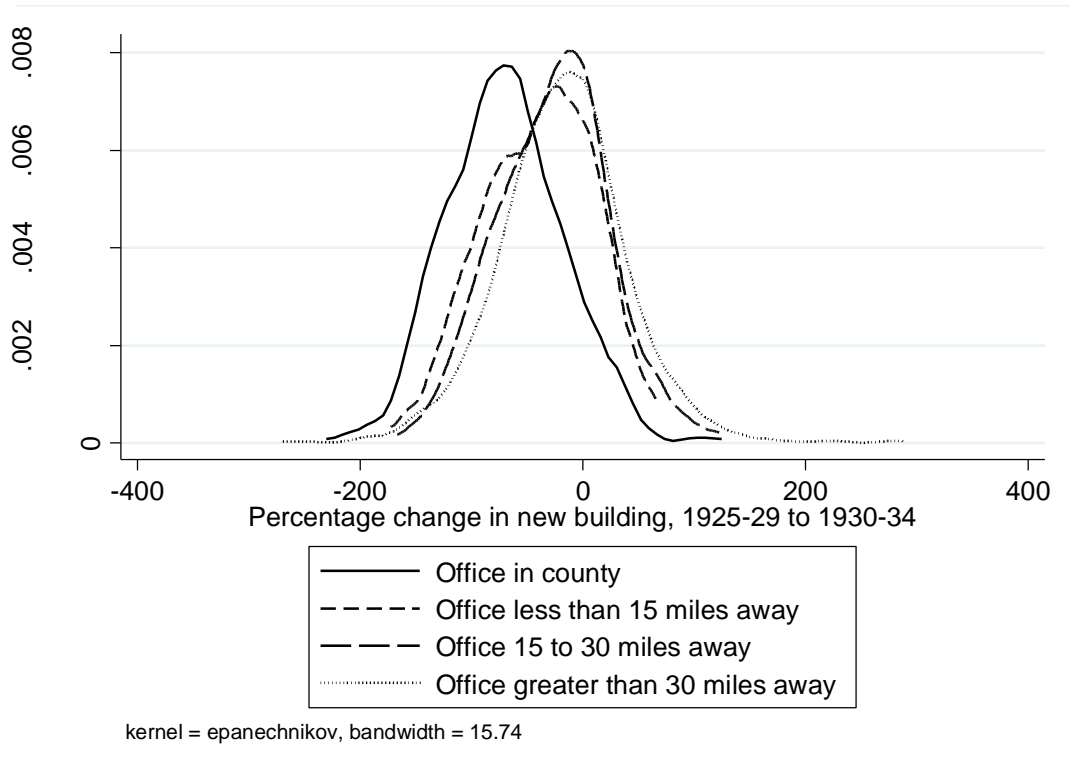
Notes: Heteroskedasticity-robust standard errors in parentheses. *** statistically significant at 1% level; ** 5% level; * 10% level. All regressions include the demographic, economic structure, distress, political, and housing controls as well as the changes in the demographic and economic structure variables between 1930 and 1940.

Table 6 – Artificial Offices

	ln(Median Home Value)	Home Ownership Rate	ln(New Building)
Artificial Offices (1)	0.067 (0.020)***	1.078 (0.418)***	-0.011 (0.031)
Artificial Offices (2)	0.050 (0.015)***	1.034 (0.361)***	-0.017 (0.024)

See notes for Table 5.

Figure 1 – Kernel Density Plots of Percentage Change in New Building by Distance from HOLC Office Category



APPENDIX : Repairing a Mortgage Crisis: HOLC Lending and its Impact on Local Housing Markets: Charles Courtemanche and Ken Snowden

Table A1 – Summary Statistics for All Variables

		FKW	Year	Mean (S. Dev.)
HOLC	Application Rate	-	1933-36	14.0 (8.2)
	Acceptance Rate	-	1933-36	48.2 (14.9)
	Loan Rate 1 (base is owned nonfarm units)		1933-36	7.2 (5.3)
	Loan Rate 2 (base is nonfarm units)	-	1933-36	3.6 (2.6)
Demographic	Population	YES	1930	39093 (123142)
	Density (hundreds of people/square mile)	YES	1930	0.9 (6.5)
	Percent Urban	YES	1930	21.7 (24.8)
	Percent Black	YES	1930	11.2 (18.3)
	Percent Non-White and Non-Black	NO	1930	2.4 (8.3)
	Percent Illiterate	YES	1930	5.4 (5.8)
	Percent Married	NO	1930	61.5 (3.4)
	Percent Female	NO	1930	48.4 (2.1)
	Percent 25 to 44	NO	1930	25.9 (3.1)
	Percent 45 to 64	NO	1930	16.9 (3.3)
	Percent Over 65	NO	1930	5.8 (2.2)
	Percent Foreign Born	NO	1930	4.8 (5.9)
Economic Structure	Average Farm Size	YES	1929	279.5 (864.8)
	Percent Farmland	YES	1929	65.0 (27.3)
	Percent Manufacturing	NO	1930	8.5 (10.9)
	Percent Wholesale	NO	1930	1.3 (1.7)
	Percent Retail	NO	1930	5.0 (2.7)
Income	Tax Returns Per Capita	YES	1929	1.4 (1.3)
	Retail Sales Per Capita	YES	1929	547.5 (264.5)
Distress	Percentage Change in Retail Sales	YES	1933-1929	-47.6 (23.0)
	Unemployment Rate	YES	1930	2.8 (2.2)
	Percent Farm Failures	YES	1929	3.1 (3.7)
	Percentage Change in New Building	NO	1925-29 to 1930-34	-25.1 (56.3)
	Percentage Deposits in Suspended Banks	NO	1932	17.9 (27.8)
Political	Percent Democrat	YES	1896-1928	49.4 (18.5)
	Percent Roosevelt – Percent Democrat	YES	1932	18.7 (10.3)
	Standard Deviation Percent Democrat	YES	1896-1932	11.6 (4.8)
	Voting Rate	YES	1932	31.5 (15.0)
	Tenure in House of Representatives	YES	1933	52.2 (64.8)

– Continued –

		FKW	Year	Mean (S. Dev.)
Housing (all nonfarm)	Median Home Value (Pre-HOLC)	NO	1930	2559 (1286)
	Median Home Value (Post-HOLC)	NO	1940	1622 (899)
	Home Ownership Rate (Pre-HOLC)	NO	1930	50.7 (11.5)
	Home Ownership Rate (Post-HOLC)	NO	1940	47.4 (9.9)
	New Building (Pre-HOLC)	NO	1925-1929	1210 (7208)
	New Building (Post-HOLC)	NO	1935-1939	790 (3108)
Distance	HOLC Office in County	NO	1934	0.070 (0.255)
	0<Distance to HOLC Office≤15	NO	1934	0.021 (0.143)
	15<Distance to HOLC Office≤30	NO	1934	0.140 (0.347)

Note: FKW indicates whether the variable was included in FKW's model.

Table A2 – Determinants of HOLC Loan Activity; Full Output

		Application Rate	Acceptance Rate	Loan Rate (1)	Loan Rate (2)
Demographic	In(Population)	-1.700 [-12%] (0.323)***	0.679 [1%] (0.747)	-1.090 [-15%] (0.209)***	-0.576 [-16%] (0.106)***
	Density	-0.016 [-1%] (0.014)	-0.005 [-0%] (0.030)	-0.011 [-1%] (0.011)	-0.006 [-1%] (0.004)
	Percent Urban	0.032 [6%] (0.010)***	0.047 [2%] (0.022)**	0.030 [10%] (0.007)***	0.015 [11%] (0.003)***
	Percent Black	0.059 [8%] (0.016)***	0.045 [2%] (0.034)	0.035 [9%] (0.009)***	0.016 [8%] (0.004)***
	Percent Non-White and Non-Black	0.093 [6%] (0.024)***	0.161 [-2%] (0.056)***	0.044 [-5%] (0.016)***	0.013 [3%] (0.007)*
	Percent Illiterate	-0.081 [-3%] (0.045)*	-0.207 [3%] (0.110)*	-0.056 [-5%] (0.029)*	-0.018 [-3%] (0.013)
	Percent Married	0.260 [6%] (0.049)***	0.368 [3%] (0.112)***	0.152 [7%] (0.031)***	0.082 [8%] (0.016)***
	Percent Female	-0.384 [-6%] (0.116)***	-0.272 [-1%] (0.266)	-0.293 [-8%] (0.078)***	-0.151 [-9%] (0.038)***
	Percent 25 to 44	-0.342 [-8%] (0.089)***	-0.710 [-5%] (0.195)***	-0.227 [-10%] (0.052)***	-0.140 [-12%] (0.025)***
	Percent 45 to 64	0.089 [2%] (0.106)	0.214 [1%] (0.230)	-0.002 [-0%] (0.067)	0.004 [0%] (0.035)
	Percent Over 65	-1.291 [-20%] (0.154)***	-1.116 [-5%] (0.357)***	-0.683 [-21%] (0.098)***	-0.394 [-24%] (0.051)***
	Percent Foreign Born	0.021 [1%] (0.043)	-0.087 [-1%] (0.089)	-0.018 [-1%] (0.028)	0.004 [1%] (0.015)
	Econ. Structure	Average Farm Size	-0.0001 [-1%] (0.0002)	0.0004 [1%] (0.0009)	-0.0000 [-0%] (0.0001)
Percent Farmland		-0.006 [-1%] (0.007)	0.004 [0%] (0.017)	-0.001 [-0%] (0.005)	0.0008 [1%] (0.002)
Percent Manufacturing		-0.043 [-3%] (0.013)***	0.021 [0%] (0.031)	-0.021 [-3%] (0.009)**	-0.006 [-2%] (0.004)
Percent Wholesale		0.090 [1%] (0.070)	-0.003 [-0%] (0.160)	0.052 [1%] (0.050)	0.009 [0%] (0.024)
Percent Retail		0.348 [7%] (0.148)**	0.139 [1%] (0.338)	0.247 [9%] (0.100)**	0.146 [11%] (0.050)***
Income	Tax Returns Per Capita	-0.570 [-5%] (0.203)***	-0.054 [-0] (0.432)	-0.242 [-4%] (0.144)*	-0.086 [-3%] (0.070)
	Retail Sales Per Capita	-0.001 [-2%] (0.002)	0.006 [3%] (0.004)	-0.000 [-0%] (0.001)	-0.000 [-2%] (0.001)

– Continued –

		Application Rate	Acceptance Rate	Loan Rate (1)	Loan Rate (2)
Distress	Percentage Change Retail Sales	-0.023 [-4%] (0.006)***	-0.020 [-1%] (0.014)	-0.013 [-4%] (0.004)***	-0.007 [-5%] (0.002)***
	Unemployment Rate	0.071 [1%] (0.069)	0.377 [2%] (0.215)*	0.050 [2%] (0.044)	0.017 [1%] (0.023)
	Percent Farm Failures	-0.054 [-1%] (0.032)*	-0.157[-1%] (0.084)*	-0.059 [-3%] (0.019)***	-0.025 [-3%] (0.009)***
	Percentage Change New Building	-0.008 [-3%] (0.003)***	-0.036 [-4%] (0.006)***	-0.007 [-5%] (0.002)***	-0.003 [-5%] (0.0009)***
	Percentage Deposits in Suspended Banks	0.024 [5%] (0.004)***	0.026 [2%] (0.009)***	0.013 [5%] (0.003)***	0.007 [5%] (0.001)***
Political	Percent Democrat	0.005 [1%] (0.013)	0.065 [2%] (0.033)**	0.009 [2%] (0.008)	0.001 [1%] (0.004)
	Percent Roosevelt – Percent Democrat	-0.008 [-1%] (0.022)	0.086 [2%] (0.048)*	0.010 [1%] (0.014)	0.006 [2%] (0.007)
	Standard Deviation Percent Democrat	-0.148 [-5%] (0.047)***	-0.099 [-1%] (0.106)	-0.095 [-6%] (0.030)***	-0.043 [-6%] (0.014)***
	Voting Rate	0.039 [4%] (0.027)	0.050 [2%] (0.070)	0.017 [4%] (0.018)	0.007 [3%] (0.009)
	Tenure in House of Representatives	0.000 [0%] (0.002)	0.002 [0%] (0.004)	0.001 [1%] (0.001)	0.000 [1%] (0.001)
Housing	ln(Median Home Value) (pre-HOLC)	6.078 [21%] (0.443)***	9.970 [10%] (1.103)***	3.971 [27%] (0.282)***	1.890 [26%] (0.133)***
	Home Ownership Rate (pre-HOLC)	-0.005 [-0%] (0.018)	0.188 [4%] (0.039)***	0.027 [4%] (0.011)**	0.076 [24%] (0.006)***
	ln(New Building) (pre- HOLC)	1.924 [21%] (0.215)***	-0.190 [-1%] (0.481)	1.055 [22%] (0.136)***	0.550 [23%] (0.069)***
Office	HOLC Office in County	2.525 [5%] (0.532)***	1.965 [1%] (0.924)**	2.264 [8%] (0.385)***	0.960 [7%] (0.184)***
	0<Distance to HOLC Office≤15	0.564 [1%] (0.712)	5.226 [2%] (1.373)***	1.051 [2%] (0.478)**	0.653 [3%] (0.267)**
	15<Distance to HOLC Office≤30	-0.014 [0%] (0.298)	2.523 [2%] (0.693)***	0.327 [2%] (0.185)*	0.228 [2%] (0.098)**
	Observations	2922	2917	2922	2922
	R ²	0.571	0.414	0.577	0.576
	F Demographics	21.59***	3.94***	18.03***	20.36***
	F Economic Structure	4.13***	0.16	3.00**	2.33**
	F Income	4.87***	1.11	1.56	1.06
	F Distress	13.71***	12.83***	16.68***	16.06***
	F Political	3.80***	1.13	3.32**	2.55**
	F Housing	108.55***	35.68***	99.51***	136.85***
	F Distance	7.69***	8.76***	12.41***	10.90***

Notes: Coefficient estimates, heteroskedasticity-robust standard errors (in parentheses), and percentage impacts of one standard deviation increases (in brackets) are reported. *** statistically significant at 1% level; ** 5% level; * 10% level. State fixed effects are included in all regressions.

Table A3 – Robustness Checks

		ln(Median Home Value)	Home Ownership Rate	ln(New Building)
Panel A: Additional Controls	Add New Deal	0.083 (0.028)***	1.382 (0.520)***	-0.028 (0.037)
	Add State Fixed Effects	0.129 (0.047)***	2.323 (0.864)***	0.014 (0.049)
	Add Change in Farm	0.079 (0.025)***	1.583 (0.523)***	-0.006 (0.033)
Panel B: Alternate Functional Forms	10 Mile Distance Dummies	0.071 (0.020)***	1.500 (0.416)***	0.003 (0.028)
	30 Mile Distance Dummy plus Continuous Distance up to 30 Miles	0.092 (0.026)***	1.593 (0.502)***	0.014 (0.033)
	1935 Offices	0.082 (0.026)***	1.951 (0.531)***	-0.037 (0.036)
	Alternate HOLC Rate	0.051 (0.017)***	0.911 (0.316)***	-0.003 (0.020)
	Amount of HOLC Loans Per Capita	0.033 (0.014)***	0.571 (0.230)**	-0.003 (0.013)
	Levels instead of logs	124.299 (38.555)***	1.519 (0.473)***	23.814 (102.256)
	Population Dummies	0.082 (0.027)***	1.642 (0.533)***	-0.016 (0.037)
	Population Density Dummies	0.067 (0.023)***	1.531 (0.479)***	0.005 (0.032)
	Percent Urban Dummies	0.092 (0.028)***	1.572 (0.528)***	-0.006 (0.036)
	Panel C: Weighting	Weighted by ln(Population)	0.086 (0.027)***	1.576 (0.521)***
Weighted by ln(Nonfarm Housing Units)		0.087 (0.029)***	1.656 (0.552)***	-0.004 (0.036)
Panel D: Alternate Samples	Drop if Office In County	0.087 (0.027)***	1.674 (0.526)***	-0.001 (0.035)
	Drop if Office within 15 Miles	0.072 (0.036)**	1.665 (0.787)**	-0.025 (0.048)

Notes: Heteroskedasticity-robust standard errors in parentheses. *** statistically significant at 1% level; ** 5% level; * 10% level. All regressions include the demographic, economic structure, distress, political, and housing controls as well as the changes in the demographic and economic structure variables between 1930 and 1940.

Figure A1 – Kernel Density Plots of Percentage Change in New Building by Distance from HOLC Office Category: Artificial Offices 1

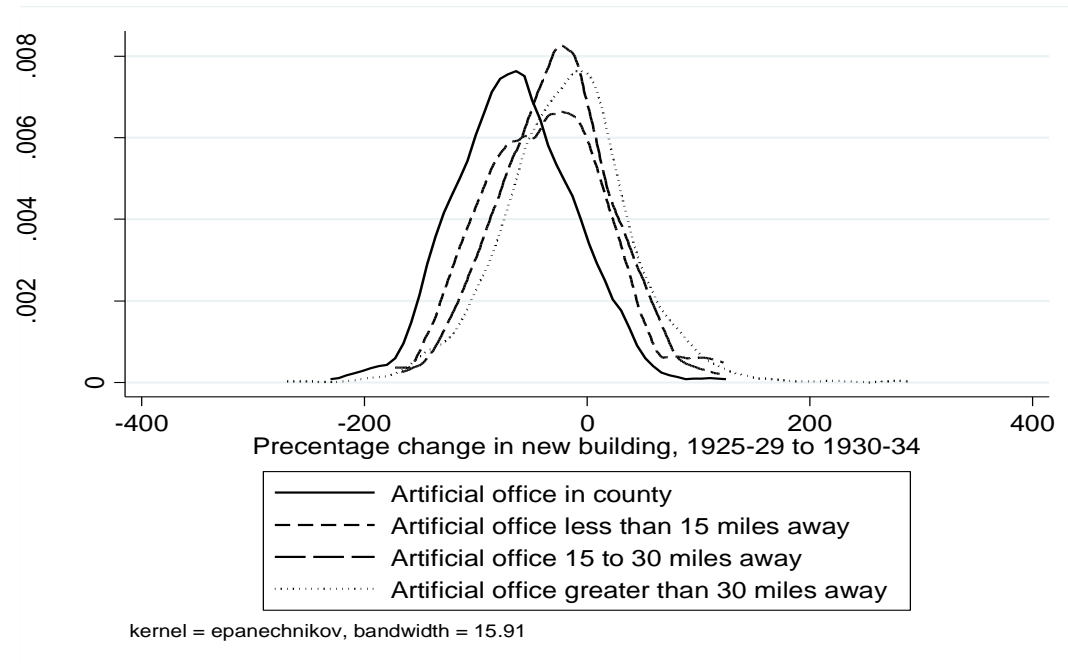


Figure A2 – Kernel Density Plots of Percentage Change in New Building by Distance from HOLC Office Category: Artificial Offices 2

