The Influence of the Home Owners' Loan Corporation on Housing Markets During the 1930s

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Problems with mortgage financing are widely considered to be a major cause of the recent financial meltdown. A large share of the "toxic assets" held by financial institutions is composed of an admixture of credit default swaps insuring collateralized debt obligations largely composed of mortgage-backed securities. The underlying assets for this teetering tower of financial instruments assets are mortgage loans on housing. As the bailout of financial institutions progressed over the past 9 months, many politicians and pundits have suggested that the federal government resurrect an analog of the Home Owners' Loan Corporation (HOLC) from the 1930s and refinance a large number of the troubled mortgage loans. The arguments made are partly populist, suggesting that the "little guy" with the mortgage should get the same type of bailout being offered to the large financial institutions. Others have argued that refinancing the mortgages would reduce the likelihood of mortgage delinquencies and defaults and thus aid in fixing the toxic asset problem from the ground up. In late 2008 a number of the banks holding mortgages began programs to refinance them. In February the Obama Administration announced a program to refinance specific types of mortgages through Fannie Mae and Freddie Mac. On March 4, 2009 President Obama announced the Making Home Affordable Modification Plan to refinance roughly 7 million mortgages held by Fannie Mae and Freddie Mac for homes on which monthly payments are current but the home value has fallen below the principal on the mortgage.[1]

The plans are meant to accomplish the same ends as the HOLC, which refinanced more than one million mortgages between 1933 and 1936. As a temporary relief measure, the HOLC was a success. One million families were able to stave off foreclosure and stay in their homes while paying lower interest rates on amortized loans that stretched over fifteen years rather than five. There were some bumps in the road, however, as the HOLC had to foreclose on 200,000 of the loans by the early 1940s.

To this date, however, we know very little about the impact of the HOLC on housing markets during the 1930s. Did the HOLC help maintain the levels of home ownership? Did it manage to prop up housing prices by reducing the number of foreclosed homes on the market? How did it influence rents and home ownership rates? Our goal is to examine how the distribution of HOLC mortgage funds around the country during the 1930s influenced the market for owned homes and rental markets. There was tremendous variation in the experience in housing markets both in the 1930s and today, so our focus is on county level housing markets throughout the country.

For non-farm housing markets in 2908 U.S. counties we estimate five reduced-form equations to show the relationship between HOLC loans per capita and each of the following housing variables. median nonfarm rents, the number of renters (farm and nonfarm), median nonfarm house values, the number of home owners (farm and nonfarm), and the share of homeowners. We focus on the summary effects of reduced-form estimation because of complications associated with endogeneity. The distribution of HOLC loans was likely to be endogenous as areas with more depressed housing markets were more likely to seek aid from the Roosevelt administration loans, which was more likely to be receptive to aiding such markets. Further, the HOLC financing was

likely to influence both the demand and supply side of the rental and home ownership markets. It is extremely difficult to develop multiple instruments that will allow us to identify separately the effects of the HOLC and the underlying structural interactions across supply and demand in the housing and rental markets. Therefore, we focus on resolving the endogeneity of the HOLC in the equations and use the results from the reduced-form equations to provide a summary of the supply and demand effects in the rental and home ownership markets.

HOUSING TROUBLES IN THE 1930S

Housing markets boomed in the 1920s, as building construction and housing prices rose. The horizontal axis of Figure 1 shows the ratio of the value of owner-occupied housing in 1930 to the value of mortgaged owner-occupied housing in 1920 for 278 of the largest cities in the U.S. The average ratio across the cities was about 1.45. Some cities experienced declines and one outlier in Rhode Island experienced a tripling of prices.

The boom was soon followed by a strong reversal as the housing sector was one of the leading casualties of the Great Depression. Alexander Field (1992) argues that housing markets actually played a key role in contributing to the downturn from 1929 through 1933 and acted as a drag on recovery of GDP and housing after 1933. The negative shape to the cluster of observations in Figure 1 shows that the housing markets where home values rose the most in the 1920s in tended to experience more of a decline in the 1930s. Across the United States as a whole, including all counties with reported information, the median owned home value in 1940 was 48.6 percent below its 1930 value. The dollar drop was quite dramatic as seen in Figure 2 for state averages. New

York experienced the largest dollar drop of roughly $4,426 in nominal terms in the value of owned homes. A number of other northeastern and Midwestern states experienced declines of more than $1,000. These states were states that had higher housing values to begin with.

Even after adjusting for the deflation of the period, owner-occupied housing values had not recovered to the levels at the beginning of the Depression. In contrast, average personal income and average retail sales in the majority of states had re-achieved their 1929 values (in real terms) by 1939.[2]

The situation for median monthly nonfarm rents was not as dire. In nominal terms median rents for the entire United States in 1940 were only 24 percent below the 1930 level. In more than half the states monthly rents fell by less than food prices fell. The biggest dollar drops occurred in Illinois, Michigan, New Jersey, New York, and Ohio.

For the United States as a whole, the decline in housing prices did not lead to a rise in homeownership (including both nonfarm and farm homes). Ten years of Depression caused the national homeownership rate to fall from 47.8 percent in 1930 to 43.6 percent in 1940. Homeownership rates, as shown in Figure 3, fell the most in the Dakota, Wisconsin, New Jersey, Wisconsin, Maryland, and Nebraska. There were bright spots, however, as homeownership rates rose in several western and southern states.

THE HOME OWNERS' LOAN CORPORATION

The Great Contraction from 1929 through 1933 led to a 30- to 40-percent fall in housing prices, a large number of failures of financial institutions, and a sharp rise in

mortgage foreclosures. In response, a large number of states adopted mortgage moratoria that prevented foreclosures. As part of the broad range of New Deal programs established during their First Hundred Days in office, the Roosevelt Administration adopted the HOLC to aid home owners "in hard straits largely through no fault of their own (Federal Home Loan Bank Board 1937, 28)." There were plenty of people that fit this description because 25 percent of the workforce was unemployed and many others were working less than full time. Between 1933 and 1936 (mostly in 1933 and 1934) the HOLC bought and refinanced 1,017,827 troubled mortgage loans with an average value of $3,039 ($48,865 in 2008 dollars) (Federal Home Loan Bank Board 1939, 125; (Harris 1951, 1) The HOLC typically purchased the loans by exchanging HOLC government bonds for the mortgage.[3] The HOLC then refinanced the loans with new terms for the borrowers. The mortgages accounted for roughly 10 percent of the owner-occupied nonfarm homes in the United States.

The borrowers aided were all considered prime loan candidates when their loans were made. They typically had made down payments of 40 to 60 percent of the house price and faced more stringent loan terms than found for current prime loans. The HOLC rejected over 800 thousand applications, some because the household was not in dire need, others because the borrower was not likely to repay the loan.

The changes in the loans made by the HOLC and the FHA (described below) contributed to the diffusion of modern mortgage contracts. Prior to the 1930s most mortgagees were required to place large down payments on their properties – up to 50 percent of the property value – and could only obtain financing for relatively short periods of time – often five years – after which time the mortgage had to be refinanced.

Some institutions had begun offering longer-term amortized loans (Carliner 1998), but these types of loans essentially became the standard after the FHA-insured loans and HOLC mortgages allowed borrowers to make smaller down payments and to pay back their loans over fifteen years. Further, with the government insuring lenders against default risk, interest rates should have fallen as well. Table 1 presents index numbers showing the dramatic changes in the costs and terms of mortgages during the 1930s. From the early 1920s mortgage interest rates had fallen about 15 percent by the latter part of the 1930s, the average length of mortgage terms had increased about 55 percent, and the loan-to-value ratio had increased 16 percent.

The HOLC itself offered a subsidized interest rate of 5 percent when low risk private home loans were offered at 6 percent. The loan to value ratio was allowed to rise from the traditional 50 percent of the value of the home to 80 percent. In many cases the 80 percent figure was applied to the value of the home from better times, so the true percentage loaned on the value of the house was much higher (Rose, 2009, Harris, 1951, 25). The length of the loan was expanded from five to fifteen years. Equally important, instead of the borrower paying interest for five years and then paying a balloon payment of the loan principal at the end, the HOLC loan payments were amortized so that the borrower made equal payments throughout the life of the loan.

The typical mortgage refinanced by the HOLC in 1933 was more than two years in default on the principal, due to a combination of forebearance by lenders and state mortgage repayment moratoria. In addition, the typical loan refinanced had not paid taxes on the property for two to three years (Federal Home Loan Bank Board 1938, 27).

By June 1937 the HOLC had also reconditioned about forty percent of the homes to raise their value as collateral on the loan (Federal Home Loan Bank Board 1938, 29).

People who anticipated that the HOLC would fully resolve the problem likely were disappointed. The mortgage foreclosure rate only fell slightly over the next three years. In June 1936 39.4 percent of the HOLC borrowers were more than three months behind on their mortgage payments (Federal Home Loan Bank Board 1937, 28). By 1940 the HOLC had foreclosed on 17 percent of its loans. Most of those foreclosures occurred after delinquencies in both principal and interest had run for more than 18 months with taxes unpaid (Federal Home Loan Bank Board 1937, 28). At some point between 1936 and 1940, the HOLC owned and then resold roughly 2 percent of the owner-occupied nonfarm dwellings in the United States. The foreclosed dwellings were eventually sold off at an average loss of 33 percent per foreclosure, as the HOLC sought to avoid roiling housing markets with their sales (Comptroller General of the United States 1950, 11). Based on current accounting standards for financial institutions it is very likely that the HOLC would have been considered insolvent in the late 1930s.

In the peak lending year 1934, the HOLC employed a sizeable bureaucracy of over 20 thousand people and still employed 10 thousand people in 1940. Unlike most federal agencies, however, the HOLC closed down with a skeleton staff of less than 400 after the repayment of the last of the fifteen-year loans in 1951. The HOLC benefitted many home owners who had been in dire straits and a surprising number repaid the loan in full well before the fifteen years were up. An audit reported that the HOLC had paid net earnings to the U.S. Treasury of $13.994 million between its inception and June 30, 1952. However, the auditor suggested that the net earnings should not be considered

profit. The cost to the Treasury of supplying funds to the Corporation since 1933 was about $91.9 million, so "the net overall cost to the Government has been about $78 million (Comptroller General of the United States 1953, 9). [4]

OTHER NEW DEAL PROGRAMS

The HOLC was the first of several housing programs adopted under the New Deal. The National Housing Act of 1934 made several permanent changes to financial institutions. It provided enabling legislation for the chartering of federal savings and loan associations and expanded the lending activities of the Federal Home Loan Banks (FHA 1959, 2). Equally importantly, it established the concept of federal government insurance of mortgage loans. Title I of the Act provided for federal government insurance of unsecured loans that were designed to facilitate home remodeling.[5] This part of the Act was designed to be temporary with the hope that the spending from the loans would jump-start the crippled housing and construction industries. The significant innovation of the 1934 Act was Title II, which charged the Federal Housing Administration (FHA) with insuring mortgages for building new homes or purchasing/refinancing existing homes. By insuring mortgages the FHA sought to give incentives to banks and other mortgage lenders to make more loans that would stimulate the recovery of the building industry (FHA Annual Report 1935, 1-2; Carliner 1998, 306).

As under the HOLC, the FHA loans were amortized over a longer time period with higher loan to value ratios than allowed in the 1920s. Also, by assuming some of the default risk of the mortgage, the FHA lowered the interest rates that borrowers would have otherwise paid. In choosing the loans to insure, the FHA placed strong emphasis on

insuring credit-worthy mortgages and rejected a significant number of applications when it first began. This focus led to a foreclosure rate on FHA-insured loans between 1935 and 1939 was only 0.4 percent (FHA 1938, 13-15; 1940, 39). FHA loans tended to help families in the upper half of the income distribution. The largest number of loans in the late 1930s went to families with incomes in the $2,000 to $2,500 range, while average annual earnings for full-time employees in nearly every sector of the economy were below $1,500 (FHA 1938, 13-15; Carliner 1998; U.S. Census Bureau 1975, 166-7). By 1940 the FHA was insuring 10.3 percent of all mortgages and 30.6 percent of all new construction in the U.S (Grebler, et. al., 1956, 243). [6]

The housing programs accounted for only a small share of the funds distributed by New Deal programs in Table 2. The bulk of New Deal grant spending was devoted to relief programs such as the Works Progress Administration (WPA), the Federal Emergency Relief Administration (FERA), the Civil Works Administration (CWA), and Social Security Administration's Aid to the Blind, Aid to Dependent Children, and Old-Age Assistance programs. The immediate goal of the projects was to provide relief to the unemployed and low-income people. The relief monies included both direct relief payments with no work requirement and work relief payments. The work relief programs provided employment at hourly wage payments that were roughly half the level of wages on public works projects (see below) for millions of unemployed workers, who worked on maintenance of public structures and constructed sidewalks, post offices, schools, local roads, and other additions to the local infrastructure.

Public works spending included expenditures by the Public Works Administration, Public Building Administration, and the Public Roads Administration.

These programs were administered differently as they focused less on providing immediate work relief in response to greater unemployment, and more on building long-term and large-scale projects like dams, roads, schools, sanitation facilities, and other forms of civil infrastructure (Clarke 1996, 62-68; Schlesinger 1958, 263-96). The programs operated more like traditional government construction projects by hiring contractors who hired workers full-time at full wages.

The farm programs include Agricultural Adjustment Act (AAA) Rental and Benefit payments (later Soil Conservation payments) designed to reduce the acreage under production and loans through the Farm Credit Administration and Farm Security Administration for farm mortgages, tools and crops, and for new starts for farm tenants.

The federal government sponsored a series of loans programs during the 1930s that lent money to banks, railroads, businesses, distressed farmers, agricultural credit institutions, and state and local governments for public works and some relief programs.[7] The New Deal loans that were likely to have the greatest impact on the housing sector were the Reconstruction Finance Corporation's loans to banks and trust companies, mortgage loan companies, industrial and commercial businesses and catastrophe loans. The long-term impact of the loans on the housing sector potentially was limited because the loans were short-term and the majority were repaid by the end of the 1930s (Olson 1988, Jones 1939). On the other hand, the loans may have had a positive impact on the housing sector in the 1930s by providing liquidity to the banking sector during the heart of the Great Depression.[8] Since banks and buildings and loans were a major source of mortgage lending, the increase in liquidity would helped the financial institutions to limit

a decline in lending and the recall of loans that would have contributed to a reduced demand for housing.

ANTICIPATED EFFECTS OF THE HOLC AND NEW DEAL PROGRAMS.

The annual reports about the HOLC suggest that the program was designed to achieve several goals: First, to insure that homeowners who were in danger of defaulting on their mortgages through "no fault of their own" would be allowed to stay in their homes. Second, by buying the weakened mortgages from mortgage lenders, typically with government bonds, the government was injecting more capital into the lending markets that could insure a continued flow of funds for lending in mortgage markets, residential building, or other types of lending.

Consider the impact of these factors in a demand and supply framework for owned homes and rentals in these local areas. The predictions described here rely on the following assumptions. In each year households make the decision whether to move or stay in their current dwelling; therefore, the entire stock of housing is included in the supply and demand analysis for owned housing and rental housing markets. Holding other factors constant, the supplies of owned housing and rental housing have positive slopes, and the demands for each have negative slopes. Even though there is a reasonable degree of substitutability between owned housing and rental housing, there are quality differences in the housing associated with tenure. Thus rents on rental housing and the values of owned homes do not move in lock-step and can even move in different directions when demand and supply shifters in the two markets dictate such a change.

In the home owning market the HOLC potentially had multiple effects on both the demand and supply side of the market. On the demand side of the market, more HOLC financing helped prop up the demand for housing in multiple ways. First, by offering lower interest rates, higher loan to value ratios, and a longer, amortized repayment structure, the HOLC provided troubled borrowers with the funds to stay in their homes. Even in good times, modern studies have shown the relaxation of credit constraints can have a significant impact on the transition to home ownership.[9] Second, the lower interest rates influenced the discount rate used by home buyers and stimulated demand to stay in the home by the present value of the stream of benefits from the home. Finally, HOLC funds were also used to improve the quality of housing, which in turn, would raise the demand and contribute to higher housing prices for those units. Thus, HOLC loans would have been positively related with homeowner demand, housing values, and the number of home owners. [10]

Through its purchases of the troubled mortgages from lenders, the HOLC provided liquidity that gave mortgage lenders the ability to increase their loans either to home buyers or to builders. To the extent that the capital was used for loans to finance home purchases, the demand for owned homes likely would have increased, raising housing prices and the number of home owners. To the extent that the capital underwrote construction loans and thus reduced borrowing constraints on building, the supply of housing for ownership would have increased, leading to lower home prices and more home owners. After combining these multiple effects, the HOLC loans are anticipated to have stimulated both the demand and supply of owned housing, leading to an increase in

the number of homeowners and an uncertain effect on price, depending on which of the two effects were dominant.

The HOLC's aid also influenced rental markets by reducing the number of foreclosure households who would have entered rental markets and driven up the demand for rental housing. On the supply-side of the equation, the HOLC also would have reduced the amount of foreclosed property that was temporarily for rent until it could be sold. As a countervailing force on the supply side, the HOLC's purchase of mortgages would have freed up more capital for the construction of rental housing that would have increased the supply of rental housing, leading to lower rents and more rental property available. The summary effects of the HOLC in the rental market would have been to reduce demand for rental housing and have conflicting effects on the supply-side of the equation. Had the demand change associated with the HOLC dominated, the HOLC would have been associated with lower rents and fewer renters. If the supply reduction dominated, the HOLC would have been associated with higher rents and fewer renters. If the supply increase dominated, the HOLC would have been associated with lower rents and more renters.

The HOLC's impact on these markets would have been reduced to the extent that the HOLC was forced to foreclose on properties itself. We know that nationwide the HOLC foreclosed on 17 percent of the properties to which it made loans in the 1930s. To the extent that the distribution of foreclosures was the same as that of the flow of HOLC funds, holding constant the other factors in the regression, the effect will not be biased.

Although we will focus on the HOLC's effects, it is worthwhile to talk about the potential effects of the other programs. The FHA mortgage insurance would have lowered interest rates and improved loan terms for people interested in purchasing or renovating homes. The resulting rise in the demand for home ownership would have contributed to higher home prices and more home owners. In turn, this would have reduced the demand for rental property, lowering rents and the number of renters.

The public works and relief program grants provided more income and job opportunities of the unemployed and construction workers. This likely stimulated the demand for home ownership and thus raised the values of owned homes and the number of home owners to some extent, which in turn would have reduced the demand for rental property. On the other hand, many of these people were in the lower tier of the wealth distribution and the grants might have stimulated demand for rental property by allowing more young adults to leave their parents or relative's households and develop new households. Thus, the effect on rental housing would depend on which of the two shifts were dominant. To the extent that the public works and relief programs crowded out private construction activity by making it more difficult to higher private construction workers, there might have been a reduction in the supply of new rental or owner housing. Estimates of crowding out range from nearly zero to as much as half a private job for each relief job.[11] [12]

The Reconstruction Finance Corporation loans to banks and other sectors might have provided capital to banks that could have been used to finance construction of owned housing and/or rental housing. The resulting increase of supply would lower the prices and increase the number of households in that tenure class.

We do not anticipate that the farm programs had direct effects on nonfarm rents and owner-occupied housing. However, they did influence the number of home owners and renters in our data, which includes farm households. The FCA farm loans included mortgage loans to farmers. Generally, the rates were relatively low and we anticipate that the farm loans would have raised the number of home owners relative to renters among farmers. The impact of spending under the Agricultural Adjustment Act (AAA) is more complex. The AAA spending reported by the OGR was designed to reduce acreage under production. The farmers who received payments were likely to have ended up with higher incomes, but the reduction in land under production was likely to reduce the demand for farm labor, thus lowering the incomes of sharecroppers and farm laborers. This demand reduction may have been exacerbated further by increased adoption of tractors in areas with higher AAA payments (Alston 1981). Finally, the literature on the New Deal has suggested that share tenants and croppers did not receive their expected shares of the AAA payments (Whatley 1983; Biles 1994, 39-43; Saloutos 1974). Thus, the ultimate impact of the AAA on homeownership in the county depends on these countervailing effects of a rise in income for landowners and a potential fall in income for farm workers. If the AAA contributed to a decline in income for farm workers, homeownership rates might well have fallen, particularly since landowners were already likely to own their own homes. The effect of the AAA on our nonfarm measures of housing values and monthly rents is uncertain since the farm program was likely to have only indirect effects on nonfarm housing.

DATA

The data set we use to study the impact of the HOLC is composed of information from 2908 counties that reported information on all of the following housing variables in the 1930 and 1940 population and housing censuses (U.S. Bureau of the Census, 1933, 1943): median contract rents for non-farm rentals in 1930 and 1940, median values of nonfarm owned homes in which the owners lived in 1930 and 1940, the number of renters in 1930 and 1940, and the number of home owners in 1930 and 1940. Information was reported for some of these variables in the remaining counties, but we chose to focus only on counties that reported all of the information so that the sample was consistent across equations estimated. We focus on non-farm monthly contract rents and owned home values because of the complications of evaluating the value of homes and land associated with agriculture. The monthly contract rent included utilities, fuels, etc only if they were included in the rental contract. It also included non-cash rent payments (labor, goods, etc) that were converted to a dollar amount. The full contract rent was reported, even when the tenant might have been delinquent with the rent. The house values are the owner's estimate of the sale value of the housing unit. For single-family, non-farm houses, the estimates included the value of the house and the land. For owner-occupied units theat were part of a building containing other households or businesses, the estimate included the value of only the part where the household resided. The number of renters and home owners reported in the census information include both farm and non-farm households. We are still working on trying to collect information on only non-farm households.[13]

The information on New Deal programs was collected and reported in mimeos by the Office of Government Reports (1940b) and has been computerized and made

available at Price Fishback's website at the University of Arizona. (http://economics.eller.arizona.edu/faculty/fishback.asp) under Datasets from Published Research Projects. Data on the housing value and most other correlates also come from the 1930 and 1940 population censuses and are available in computerized form in ICPSR dataset 2896 (Haines, no date). See the notes to Table 3 for further information on sources.

EVALUATING THE IMPACT OF THE HOLC

As a first cut of the relationship between the HOLC and housing markets, Figures 2 through 4 show scatter plots for state averages from the county sample. In some cases when programs have powerful effects on economic variables, the relationships show up in simple scatter plots. However, none of the scatter plots show a strong positive relationship between HOLC loans per capita and housing market measures. The HOLC loans seem to be negatively related with the changes in self-reported values of owned homes between 1940 and 1930 in Figure 2. The changes in contract rents in Figure 3 also appear to have a negative relationship with the HOLC. It is hard to detect any positive or negative relationship between the change in home ownership and HOLC loans per capita.

The impact of the HOLC may well be disguised by the large number of changes in other New Deal programs during the period or by potential endogeneity bias driven by the distribution of HOLC loans to more troubled sectors of the economy. To investigate these issues further, we develop a group of five reduced-form equations that summarize the relationships between the HOLC and the activity in the rental and home ownership markets.

$$H_{i,40} = \beta_1 HOLC_{i,33\text{-}36} + \gamma_1 X_{i,40} + \alpha_1 S_{s,40} + \theta_{1,I} + u_{1,i,40}. \quad 1a)$$

$$HV_{i,40} = \beta_2 HOLC_{i,33\text{-}36} + \gamma_2 X_{i,40} + \alpha_2 S_{s,40} + \theta_{2,I} + u_{2,i,40}. \quad 1b)$$

$$R_{i,40} = \beta_3 HOLC_{i,33\text{-}36} + \gamma_3 X_{i,40} + \alpha_3 S_{s,40} + \theta_{3,I} + u_{3,i,40}. \quad 1c)$$

$$MR_{i,40} = \beta_r HOLC_{i,33\text{-}36} + \gamma_4 X_{i,40} + \alpha_4 S_{s,40} + \theta_{4,I} + u_{4,i,40}. \quad 1d)$$

$$HOR_{i,40} = \beta_r HOLC_{i,33\text{-}36} + \gamma_4 X_{i,40} + \alpha_4 S_{s,40} + \theta_{4,I} + u_{4,i,40}. \quad 1e)$$

Where $H_{i,40}$ is the natural log of the number of home owners in 1940 in county i, $HOLC_{i,33\text{-}36}$ is the natural log of the value of HOLC loans distributed to county i during the period 1933 through 1936, $HV_{i,40}$ is the natural log of the reported median value of owned nonfarm homes in 1940, $R_{i,40}$ is the natural log of the number of renters in 1940 in county I, $MR_{i,40}$ is the natural log of the median monthly rent of nonfarm homes in 1940. An extra equation is added for the home ownership rate, $HOR_{i,40}$, as a way to summarize the relative number of home owners and renters. $X_{i,40}$ is a vector of factors, including the natural log of other New Deal programs that influence the supply and demand of rental housing and of owned housing in 1940, $\alpha_1 S_{s,40}$ is a series of state policies, for example, real estate and other taxation at the state level, and $\theta_{1,i}$ $\theta_{2,,I}$, $\Theta_{3,i}$ and $\theta_{4,,I}$, are vectors of supply and demand factors that are unmeasured, time-invariant factors that are idiosyncratic to each county. Finally, $u_{1,i}$ $u_{2,,I}$, $u_{3,i}$ and $u_{4,,I}$ are stochastic errors.

We can control for the unmeasured, time-variant county factors, $\theta_{1,i}$ $\theta_{2,,I}$, $\Theta_{3,i}$ and $\theta_{4,i}$ by taking the difference between the values in 1940 and the values in 1930. We therefore estimate the following equations.

$$\Delta H_{i,40\text{-}30} = \beta_1 HOLC_{i,33\text{-}36} + \gamma_1 \Delta X_{i,40\text{-}30} + \alpha_1 \Delta S_{s,40\text{-}30} + \Delta u_{1,i,40\text{-}30}. \quad 2a)$$

$$\Delta HV_{i,40\text{-}30} = \beta_2 HOLC_{i,33\text{-}36} + \gamma_2 \Delta X_{i,40\text{-}30\ I} + \alpha_1 \Delta S_{s,40\text{-}30} + \Delta u_{2,i,40\text{-}30}.$$

2b)

$$\Delta R_{i,40\text{-}30} = \beta_3 HOLC_{i,33\text{-}36} + \gamma_3 \Delta X_{i,40\text{-}30} + \alpha_1 \Delta S_{s,40\text{-}30} + \Delta u_{3,i,40\text{-}30}.$$ 2c)

$$\Delta MR_{i,40\text{-}30} = \beta_r HOLC_{i,33\text{-}36} + \gamma_4 \Delta X_{i,40\text{-}30} + \alpha_1 \Delta S_{s,40\text{-}30} + \Delta u_{4,i,40\text{-}30}.$$

2d)

$$\Delta HOR_{i,40\text{-}30} = \beta_r HOLC_{i,33\text{-}36} + \gamma_4 \Delta X_{i,40\text{-}30} + \alpha_1 \Delta S_{s,40\text{-}30} + \Delta u_{4,i,40\text{-}30}.$$

2d)

In the analysis, we capture the changes in state tax and real estate policies $\Delta S_{s,40\text{-}30}$ with a series of 47 state dummy variables.

Instrumental Variables

The differenced analysis above controls for many of the time-invariant features that might have led to omitted-variables bias in the analysis. However, there still remains the potential of endogeneity bias arising from the way the HOLC distributed its housing loans. The HOLC bought and refinanced troubled loans. To the extent that there were more troubled loans in areas where housing values and home ownership were falling in the mid-1930s, the coefficient on the HOLC is likely to be biased in a negative direction in the change in home ownership and change in housing value regressions. The bias in the change in rent and change in renter equations is less certain because the distribution of HOLC loans would have been influenced indirectly by what was happening in the home ownership markets. If the number of troubled loans that drew HOLC attention in the mid-1930s were associated with foreclosure trends that led to foreclosed homes

becoming rental property and to more renters, the HOLC spending would have been related to rising rental demand and rental supply. The combination would have had offsetting impacts on rents but would have been associated with more renters. Thus, the endogeneity bias for the HOLC loans might have been positive in the number of renters equation and uncertain in the rent equation.

To combat these potential problems with endogeneity, we sought an instrument for the distribution of HOLC funds that is strongly correlated with HOLC funding but is not correlated with the error term in the difference equations with state fixed effects above. One way to approach this is through the administrative side. The HOLC established 244 offices in every state to handle the mortgages. Given the paperwork associated with the loans and the inspections of property required, it seems likely that it was more costly for borrowers who were more distant from the HOLC offices to refinance their loans through the HOLC. It would be more costly to seek the mortgage refinancing and more costly for HOLC workers to evaluate the value of the property and administer loan information related to it. Therefore, as a start, we calculated the difference in miles between the county seat of a county and the nearest county seat of a county where the HOLC office was located. So that the value of the instrument would have a positive relationship with the HOLC funds, we used the inverse of the distance.

There still remains a potential problem if the HOLC chose the office locations on the basis of the number of troubled mortgages in the area. It is not clear how the HOLC would know this information except through using information that we have already included in the regression for 1930, which was the previous census period. Most of the nationwide information that would have been available for 1933-1934 was not collected

until the New Deal programs like the CWA and the FERA collected information, and they did not collect information on housing until 1934. The one area where they might have an accurate assessment might have been the building permit information collected by the BLS for 270 or so cities.[14]

To avoid the potential problem of endogeneity in the choice of HOLC office locations, we use an alternative strategy for picking offices as an instrument. As a starting point for the location of federal offices in each state, we believe that the federal government would have chosen the state's seat of power, the state capital. The next most likely location would have been the county with the largest population in the state, so that they could reach the most people possible. In this alternative formulation, then we developed an artificial administrative version of the HOLC that placed HOLC offices in all state capitals and the largest city in each state. We then determined the distance from the nearest artificial office for each county in the state. We then chose as the instrument the inverse of the distance from the nearer of the state capital or the largest county in the state. In cases where the office was in the county and the distance was zero, we counteracted this problem by adding one mile to all distances before taking the inverse. The artificial geographic distribution of HOLC offices matches the actual distribution to a reasonable degree but does not call for nearly as many offices as the HOLC actually incorporated. There was an HOLC office in the state capital in 34 of the 48 states; the main state office was in the state capital in 20 of those states with branches in the other fourteen. Similarly, there was an HOLC office in the county with the largest population in the state in 35 of the 48 states, including 24 main state offices and 11 branch offices.

There was likely to be endogeneity bias in the coefficients for the other New Deal policies to consider. So far, we have been unable to develop a full set of instruments that allow us to control for the endogeneity bias in all of the programs simultaneously. In estimating the effect of the HOLC, we chose to control for potential omitted-variable bias related to these programs by including them in the analysis. There is a risk that endogeneity bias in estimation of the other New Deal coefficients might spill over into the HOLC coefficient.[15] By including the other New Deal programs, we are at least controlling for their presence.

RESULTS

The coefficients for the difference analysis with state fixed effects in Equations 1a-5e are reported in Table 3, and the final stage results from the from IV analysis of Equation 2a-2e are reported in Table 4. The t-statistics reported in italics below the coefficients are based on standard errors that are clustered at the state level to take into account the correlation of unmeasured factors across counties within the state and are White-corrected to control for heteroskedasticity.

The first-stage results for the IV analysis reported in Table 5 show that the distance to the nearest location of the artificial structure of the HOLC had a strong positive and statistically significant relationship with the log HOLC loans per capita. The Kleibergen-Paap statistic, which updates the Cragg-Donald statistics for robust standard errors) is larger than the critical value established by Stock and Yogo for rejecting weak instrument bias when 15 percent is the minimum weak-instrument bias acceptable.

Comparisons of the results in Tables 3 and 4 are consistent with the view that the HOLC coefficients in the difference analysis with state fixed effects (Equation 1a-1e) are subject to negative endogeneity bias. The HOLC coefficients in the rent, owned home value, and number of renters equations are negative and the coefficient in the number of home owners equation is very small and positive. Even though the rent and home value coefficients are statistically significant, they imply elasticities of -0.05 and -0.04, respectively based on the means of the 1940 values in the sample. Meanwhile, the elasticities for the number of home owners and renters are 0.03 and -0.14. The IV analysis leads to less negative coefficients in all four regressions, consistent with a view that the endogeneity bias of the HOLC coefficient is negative in every equation.

Given that the HOLC is expected to have raised both the demand and supply for owned housing, we would expect to see a rise in the number of home owners but uncertain effects on the median price of owned homes. The HOLC coefficients in the IV analysis in Table 4 are roughly consistent with a finding that the purchase and refinancing of HOLC loans shifted the supply by more than the demand in the owned housing sector. An added dollar per capita in HOLC spending increased the number of owned homes by 1805 while reducing the home values by $23.3 dollars. Only the number of homes coefficient is statistically significant at the 10 percent level in a two-tailed t-test. The coefficients imply an elasticity with respect to HOLC spending of 0.82 for the number of home owners and a very small -0.036 for the median value of owned homes (calculated at the 1940 levels).

In the rental housing sector, the HOLC was expected to reduce the demand for rental housing while having conflicting effects on rental housing supply. The HOLC

results in Table 3 suggest that the number of renters rose and median rents fell with the introduction of the HOLC. However, we cannot reject the hypothesis of no effect. The elasticity for the number of renters with respect to the HOLC is relatively large with a value of 1.3, while the rent elasticity is -0.05. However, neither of the coefficients are statistically significant at the 10-percent level.

The combination of the results suggest that the HOLC succeeded in promoting home ownership to some degree by propping up the demand for housing and providing extra capital for the financing of construction of housing designed for home owners. To the degree that these effects spilled over into the rental housing sector, the HOLC's prevention of a rise in demand in the rental market might well have been offset by a rise in the construction of rental housing from extra capital made available for construction loans. The rise in rental construction appears to have been large enough relative to the stimulus in the owned home housing market to lead to a reduction in the home ownership rate. An additional dollar of HOLC spending per capita was associated with a statistically significant reduction in the home ownership rate of -0.99 in the IV results in Table 3.

Effects of Other Factors

The relationship of a dollar per capita increase in other forms of New Deal funds with the housing markets tended to be smaller or more negative than the IV coefficient for the HOLC. Given the potential for endogeneity bias that was likely to be negative, we do not focus on the other New Deal fund coefficients, and see these variables more as controls.

A number of demographic features were associated with changes in housing markets. Statistically significantly higher rents were found in areas with more foreign born, fewer blacks, less urbanization, more people aged 10-44, higher retail sales per capita, higher infant mortality rates, and lower values of crops per capita. Higher home values were associated with more foreign born, less urbanization, fewer people over aged 45, higher retail sales per capita, faster population growth, higher infant mortality and higher value of crops per capita. The effects on renters and home owners can be summarized by the effects on the home ownership rate. Home ownership rates were statistically significantly higher in areas with fewer black, fewer illiterates, more foreign born, a larger farm population but fewer crops per capita, less mining activity, and areas with more people aged 10 to 19, and 55 to 64 and fewer people aged 20-29. Areas with people earning enough to pay income taxes and larger populations had higher home ownership rates.

CONCLUSIONS

The HOLC refinancing of troubled mortgages in the 1930s had complex effects. Not only did it prop up home-owners in trouble but it also provided additional capital to many financial institutions who were providing loans for real estate construction. Our analysis of the impact of the HOLC in over 2900 counties across the United States is consistent with a series of shifts in the supply and demand of rental and owned housing. The HOLC appears to have had positive effects on the demand for owned housing as well as positive effects on the supply of owned housing that led to an increase in the number of homeowners but left housing prices largely unchanged. In rental markets it appears that the results are consistent with the notion that the HOLC's prevention of a large

number of foreclosures kept the demand for rental housing lower than it otherwise would have been. Rents were lower to some degree, while the extra funds available to financial institutions allowed the building of additional rental units.

There are several other issues that we plan to address related to the impact of the HOLC. In this analysis the number of home owners and renters includes farm housing. We are working on trying to get estimates specific to nonfarm housing that will allow us to focus more fully on the nonfarm housing market.

We also plan to try different techniques for estimation based on matching estimators with multiple continuous treatments. There is a great deal of variation in the nature of housing markets across counties, and we believe that we can use matching methods to obtain tighter estimates of the impact of the HOLC by comparing the counties that are most alike.

The results here suggest that the HOLC stimulated building activity by providing additional funds to financial institutions. We have collected data on building permits from over 200 cities that we can use to examine the impact of the HOLC on building activity during the mid-1930s. Further, we are interested in examining how the distribution of HOLC loans and FHA insurance influenced the interest rates charged and loan terms on nonHOLC and nonFHA loans. We are in the early stages of computerizing a survey of financial institutions in over 100 cities that shows these loan terms and we plan to examine the change in loan terms across cities as a function of HOLC and FHA activity. Finally, we are in the process of computerizing information on housing values in over 10,000 neighborhoods during the 1930s that will allow us to examine the

influence of HOLC lending on home values while controlling more fully for the quality of housing.

Figure 1
Scatter Plot for 278 Cities of Ratio of Average Value of Owned Homes 1940/1930 versus Ratio of Average Value of Owned Home in 1930 to Average Value of Mortgaged Home in 1920

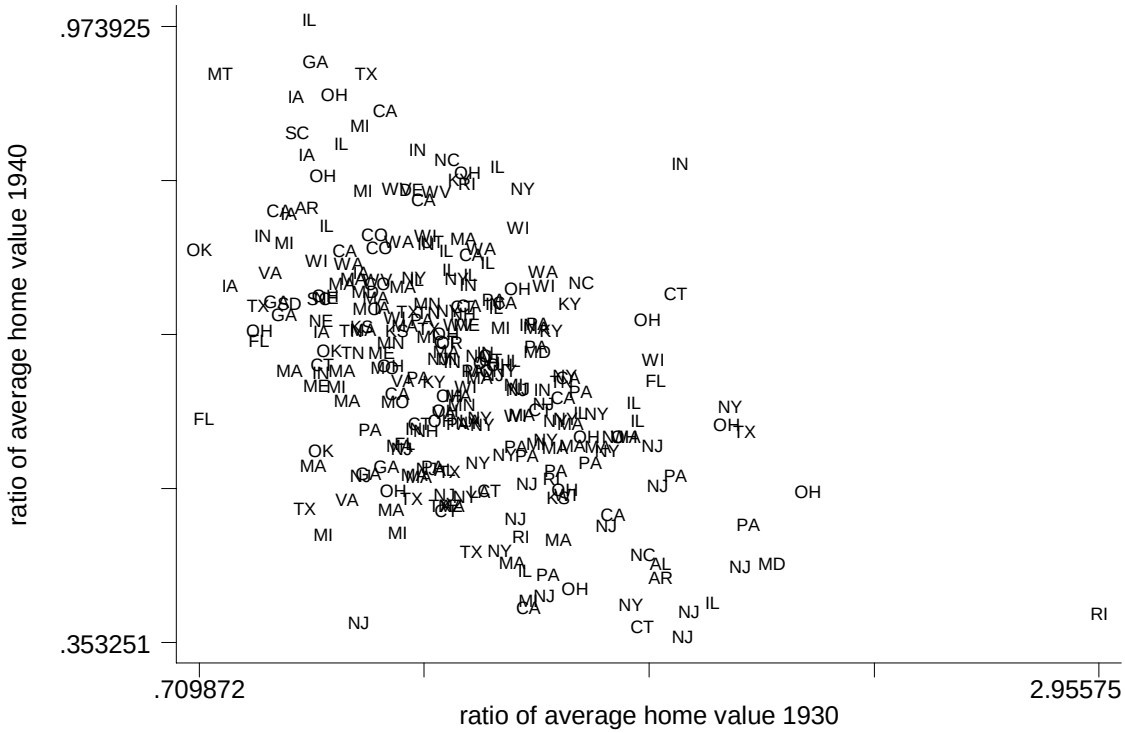
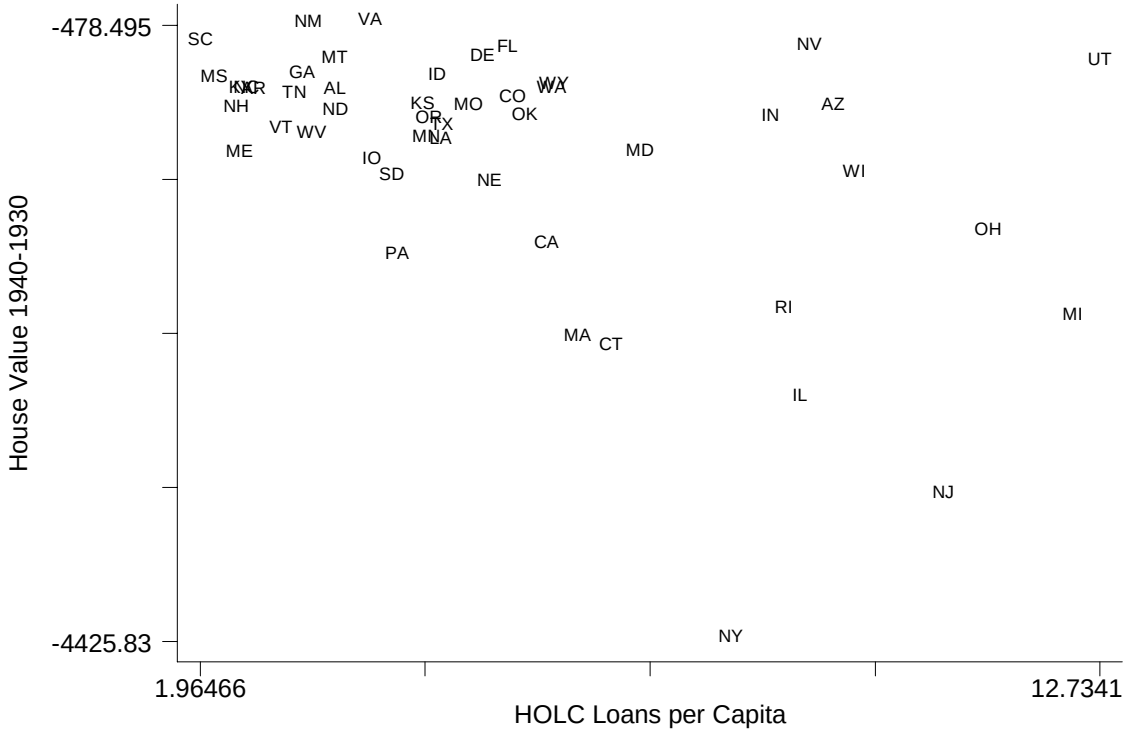


Figure 2

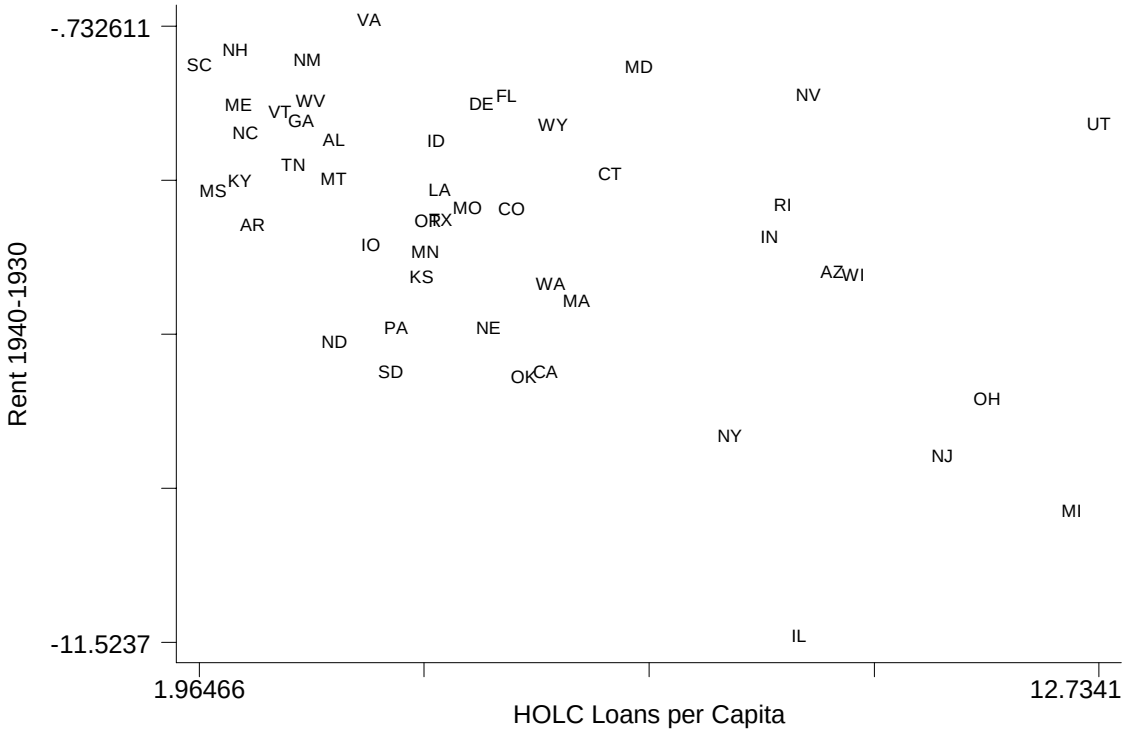
Scatter Plot of Change in Median Value of Owned Homes between 1940 and 1930 Against HOLC Loans per Capita, 1933-1936 by State



Notes. From sample of 2908 counties described in text. Median owned house value is the population-weighted average of the medians in each county.

Figure 3

Scatter Plot of Change in Median Contract Rent Between 1940 and 1930 Against HOLC Loans per Capita, 1933-1936 by State



Notes. From sample of 2908 counties described in text. Median contract rent is the population-weighted average of the medians in each county.

Figure 4

Scatter Plot of Change in Percent Home Ownership Between 1940 and 1930 Against HOLC Loans per Capita, 1933-1936 by State

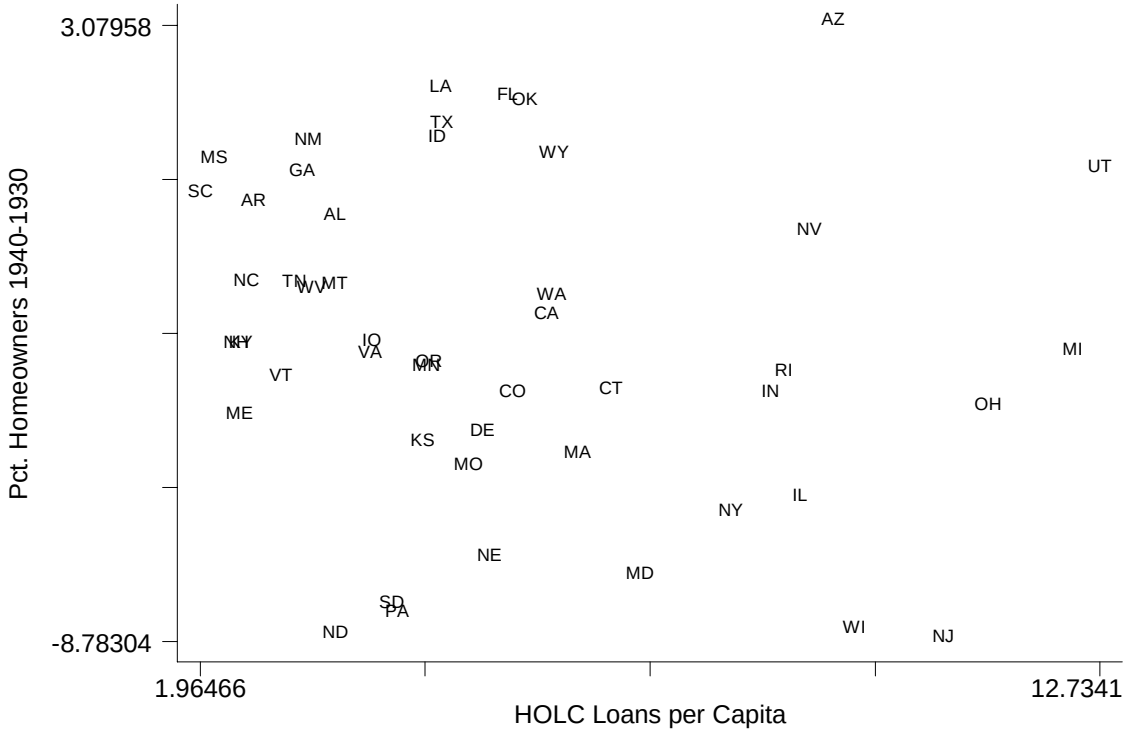


Table 1
Weighted Indexes of Terms of First Mortgages

	Interest rate	Contract length	Loan-to-value ratio
1920-1924	100.0	100.0	100.0
1925-1929	97.9	105.2	103.7
1930-1934	97.6	103.5	104.6
1935-1939	85.5	155.6	116.5
1940-1947	72.1	178.0	131.8

Notes: The indexes measure the terms of mortgages on 1- to 4-family houses made by commercial banks, savings and loan associations, and life insurance companies.

Source: Grebler, Blank, and Winnick (1956, 236).

Table 2
Federal Government's Distribution of New Deal Funds, March 1933 to June 1939

Programs	Total Federal Funds
GRANT PROGRAMS	
Relief Programs	
Federal Emergency Relief Administration	2,654,860,349
Civil Works Administration	757,172,702
Work Projects Administration	5,908,626,227
Old Age Assistance	511,532,437
Aid to Dependent Children	47,318,977
Aid to the Blind	37,158,640
Public Works Programs:	
Public Works Administration, Non Federal Projects	1,367,347,520
Public Works Administration, Federal Projects	798,501,411
Public Roads Administration, Completed Projects	1,346,365,170
Public Building Administration, Federal Buildings	174,228,825
Other Projects under works Program	313,759,435
U.S. Housing Authority, Housing	127,206,671
Department of Agriculture: Agricultural Adjustment Administration	
Agricultural Adjustment Administration, Rental & Benefit Payments	1,311,402,872
Conservation Programs, 1936	367,288,930
Conservation Programs, 1937	303,110,103
Farm Security Administration, Rural Rehabilitation	93,408,281
Total Federal Expenditures Non-Repayable	16,119,288,550
Home Owners' Loan Corporation, 1933-1936	3,077,258,287
Reconstruction Finance Corporation	$4,425,940,596
Disaster Loan Corporation	10,504,466
Public Works:	
Public Works Administration, Non Federal Projects	567,616,807
U.S. Housing Authority, Loan Contracts	449,854,991
Public Roads Administration, Active Project Allotments	209,925,198
Department of Agriculture:	
Farm Credit Administration, Land Bank Commission	965,597,730
Farm Credit Administration, Emergency Crop and Feed	219,884,875
Farm Security Administration, Rural Rehabilitation	310,324,936
Farm Security Administration, Farm Tenant Purchase	32,962,211
Rural Electrification Administration	226,247,292
Farm Credit Administration, 1934-1935, Drought Relief	72,008,531
Farm Security Administration, Farm Debt Reduction	84,645,528
Total Value of Loans Disbursed	10,652,771,448

Federal Housing Administration Mortgage Insurance:	
Title I, Value of Modernization and Improvement Loans Insured	836,762,382
Title II, Value of Mortgages Accepted for Insurance	1,870,798,030

Source: U.S. Office of Government Reports (1940b)

Table 3
Regression Results for Differences with State Fixed Effects

		Coefficient/*t-statistic*				
		Change Between 1940 and 1930 in				
	Mean *Std. Dev.*	Rent	House Value	Number of Owners	Number of Renters	Percent Home Owner
New Deal Average Annual Per Capita						
HOLC Loans	**2.54**	-0.252	-63.8	70.2	-404.3	-0.321
	3.09	*-7.13*	*-8.23*	*1.06*	*-0.69*	*-5.47*
Value of FHA Loans Insured	**1.64**	0.043	12.9	-130.3	-1156.8	0.040
	3.02	*0.97*	*1.86*	*-1.51*	*-1.44*	*0.89*
Relief and Public Works Grants	**17.70**	0.002	-0.1	5.5	45.1	0.006
	19.54	*0.32*	*-0.14*	*2.05*	*1.81*	*0.77*
RFC Loans	**2.58**	-0.004	-5.3	48.1	108.5	-0.027
	5.16	*-0.37*	*-3.10*	*2.16*	*1.63*	*-2.62*
AAA Grants	**10.20**	-0.002	1.1	-19.2	-59.9	0.022
	15.21	*-0.42*	*1.49*	*-2.68*	*-1.89*	*1.38*
Farm Loans	**5.77**	-0.027	-3.3	-1.5	71.0	-0.199
	7.14	*-1.86*	*-1.60*	*-0.18*	*1.45*	*-6.84*
Change Between 1940 and 1930 in						
Percent Black	**-0.45**	-0.148	-4.3	72.3	402.5	-0.331
	1.55	*-4.81*	*-0.83*	*1.77*	*1.52*	*-6.15*
Percent Foreign-Born	**-1.00**	0.127	28.5	-204.1	-986.0	0.138
	2.20	*3.84*	*3.74*	*-1.66*	*-1.48*	*2.15*
Percent Illiterate	**0.32**	0.014	-2.7	18.4	113.6	-0.054
	2.13	*0.70*	*-0.84*	*0.90*	*1.07*	*-1.05*
Percent Urban	**1.91**	-0.050	-17.9	21.8	192.1	-0.086
	6.58	*-4.56*	*-7.01*	*1.95*	*2.65*	*-2.47*
Percent Rural Nonfarm	**0.98**	-0.065	-17.1	7.1	53.5	-0.093
	7.23	*-5.70*	*-7.19*	*0.70*	*0.84*	*-3.13*
Percent Aged 10-19	**-1.07**	0.090	-4.5	-296.4	-1387.6	0.364
	1.28	*1.60*	*-0.34*	*-2.51*	*-2.45*	*2.98*
Percent Aged 20-29	**0.77**	0.392	15.0	-304.1	-1455.9	-0.324
	1.60	*6.69*	*0.95*	*-2.44*	*-2.26*	*-2.17*
Percent Aged 30-34	**0.64**	0.574	15.3	-215.9	-138.0	-0.029
	0.70	*5.28*	*0.65*	*-1.39*	*-0.18*	*-0.10*
Percent Aged 35-44	**-0.12**	0.188	-14.1	-195.5	-220.1	-0.215

	1.05	*2.30*	*-1.05*	*-2.13*	*-0.51*	*-1.36*
Percent Aged 45-54	**0.58**	-0.094	-79.5	208.2	948.1	-0.016
	1.03	*-0.97*	*-5.34*	*2.52*	*2.18*	*-0.10*
Percent Aged 55-64	**0.96**	-0.187	-56.3	161.1	471.6	0.626
	0.91	*-2.61*	*-3.52*	*2.74*	*1.34*	*4.69*
Percent Aged 65 over	**1.34**	-0.300	-49.8	-28.8	-323.0	-0.132
	0.80	*-2.84*	*-2.79*	*-0.18*	*-0.35*	*-0.65*
Retail Sales Per Capita	**-9.48**	0.004	0.4	-1.3	-6.5	0.003
	122.42	*4.18*	*3.72*	*-1.70*	*-1.68*	*2.91*
Tax Returns Per Capita	**0.04**	-1.685	-1232.1	8515.5	22371.2	7.388
	0.03	*-0.46*	*-1.66*	*1.77*	*0.73*	*0.92*
Population (000)	**2.98**	-0.002	-3.9	338.5	1349.2	0.002
	16.64	*-0.72*	*-2.63*	*5.74*	*1.98*	*0.57*
Infant Mortality Rate	**-9.73**	0.005	0.5	-1.4	-8.5	0.006
	28.80	*2.75*	*1.51*	*-0.99*	*-1.40*	*1.43*
Value of Crops Per Capita	**-0.44**	-0.408	40.1	76.3	1816.3	-0.602
	0.40	*-2.61*	*1.41*	*0.44*	*1.20*	*-1.40*
Per Capita Mining Output	**-0.03**	-1.774	167.6	3424.3	24865.5	-1.237
	0.09	*-1.77*	*1.27*	*2.33*	*1.62*	*-0.84*
Wholesale Sales per Capita	**-52.36**	0.000	0.0	-0.6	-3.2	0.000
	251.53	*0.25*	*0.26*	*-1.22*	*-1.24*	*0.56*
Constant		-0.449	-1275.0	2527.0	-2585.3	-1.918
		-1.01	*-12.11*	*3.52*	*-0.54*	*-1.77*
State Fixed Effects		*Included*	*Included*	*Included*	*Included*	*Included*

Notes. There were 2098 observations. Sources are discussed in the Text. The Difference in the Infant Mortality Rate is between the years 1940 and 1933 to include information on Texas and South Dakota, which did not report infant deaths and births by county until 1933. The differences for the per capita measures of retail sales, wholesale sales mining, and value of crops are for the years 1939 and 1929. Means (std. deviations for the dependent variables are -3.53 (2.72) for the change in nonfarm rents, -938.86 (576.99) for the change in owner-occupied non-farm house values, 1322.21 (6707) for the number of owners, 2817 (29321) for number of renters, and -2.51 (4.70) for the percent home owners.

Sources: The New Deal program information is from U.S. Office of Government Reports (1940b). The data on the nonfarm contract rents, sale value of nonfarm owner—occupied homes, number of renters, number of owners are from the 1930 census volume on Families (volume 6) and the 1940 census volume on Housing (U.S. Bureau of the Census 1933, 1943) and in computerized form in Haines (no date). The information on the population, retail sales, wholesale sales, value of crops, mining output, and the percents black, foreign-born, illiterate, urban, and rural nonfarm are from the 1930 and 1940 Censuses and are available in computerized from in Haines (no date). Information

on age distributions comes from the population censuses and in computerized form from Gardner and Cohen (1992). The infant mortality rate information comes from information on births and infant deaths from the volumes on births, deaths, infant deaths and stillbirths (The U.S. Bureau of the Census, various years). Information on the number of tax returns in the county for 1940 is from Rand McNally (1943), and for 1930 from U.S. Bureau of Internal Revenue (1932).

Table 4
Instrumental Variable Results for Differences with State Fixed Effects

	Coefficient/*t-statistic*				
	Change Between 1940 and 1930 in				
	Rent	House Value	Number of Owners	Number of Renters	Percent Home Owner
Annual Average Per Capita					
HOLC Loans	-0.227	-23.4	1805.8	3672.9	-0.986
	-1.30	*-0.53*	*1.78*	*0.71*	*-3.11*
Value of FHA Loans Insured	0.037	2.8	-564.5	-2176.8	0.206
	0.56	*0.23*	*-1.70*	*-1.70*	*1.66*
Relief and Public Works Grants	0.002	-0.1	3.2	39.8	0.007
	0.36	*-0.30*	*0.56*	*1.31*	*0.97*
RFC Loans	-0.005	-7.8	-57.4	-139.3	0.013
	-0.41	*-2.26*	*-0.82*	*-0.49*	*0.54*
AAA Grants	-0.001	2.1	23.7	41.1	0.006
	-0.22	*1.55*	*1.09*	*0.40*	*0.42*
Farm Loans	-0.027	-2.7	21.5	125.2	-0.208
	-1.75	*-1.15*	*0.84*	*1.37*	*-8.76*
Change Between 1930 and 1940 in					
Percent Black	-0.149	-5.8	5.1	244.7	-0.305
	-5.54	*-1.13*	*0.10*	*0.86*	*-6.20*
Percent Foreign-Born	0.125	25.8	-321.6	-1262.0	0.183
	3.90	*4.02*	*-2.67*	*-2.58*	*3.40*
Percent Illiterate	0.015	-1.3	79.4	256.9	-0.077
	0.81	*-0.32*	*1.78*	*1.20*	*-1.83*
Percent Urban	-0.049	-16.4	87.4	346.4	-0.112
	-3.41	*-5.79*	*2.05*	*1.90*	*-4.81*
Percent Rural Nonfarm	-0.065	-16.4	39.2	129.0	-0.105
	-5.75	*-7.32*	*1.58*	*1.06*	*-5.56*
Percent Aged 10-19	0.088	-7.2	-415.0	-1666.3	0.409
	1.82	*-0.68*	*-2.39*	*-2.51*	*4.03*
Percent Aged 20-29	0.393	17.5	-197.8	-1206.2	-0.365
	7.53	*1.56*	*-1.57*	*-2.11*	*-3.72*
Percent Aged 30-34	0.578	21.9	70.3	534.2	-0.138
	6.32	*1.08*	*0.31*	*0.76*	*-0.68*

Percent Aged 35-44	0.187	-17.2	-328.9	-533.4	-0.164
	2.90	*-1.13*	*-1.77*	*-0.72*	*-1.23*
Percent Aged 45-54	-0.105	-96.8	-532.2	-791.4	0.267
	-1.14	*-4.43*	*-1.27*	*-0.36*	*1.48*
Percent Aged 55-64	-0.197	-72.3	-526.1	-1142.9	0.889
	-2.32	*-3.43*	*-1.22*	*-0.55*	*4.94*
Percent Aged 65 over	-0.306	-58.8	-416.4	-1233.6	0.016
	-3.45	*-3.14*	*-1.23*	*-0.76*	*0.10*
Retail Sales Per Capita	0.004	0.5	3.4	4.5	0.001
	5.04	*3.54*	*1.31*	*0.36*	*0.86*
Tax Returns Per Capita	-2.957	-3321.1	-81131.1	-188225.5	41.714
	-0.31	*-1.47*	*-1.65*	*-0.83*	*2.46*
Population (000)	-0.002	-4.4	314.6	1293.0	0.011
	-0.73	*-2.84*	*5.07*	*1.83*	*1.80*
Infant Mortality Rate	0.005	0.6	1.7	-1.2	0.005
	2.49	*1.74*	*0.63*	*-0.13*	*1.29*
Value of Crops Per Capita	-0.396	59.5	909.3	3773.1	-0.921
	-2.51	*1.78*	*1.77*	*1.66*	*-3.07*
Per Capita Mining Output	-1.709	274.2	8001.9	35619.1	-2.990
	-1.57	*1.56*	*2.41*	*2.84*	*-1.92*
Wholesale Sales per Capita	0.000	0.0	0.3	-1.2	0.000
	0.45	*0.74*	*0.52*	*-0.56*	*-0.23*
Constant	-0.361	-1130.4	8735.5	11999.7	-4.296
	-0.41	*-4.69*	*2.49*	*0.63*	*-3.04*
State Fixed Effects	*Included*	*Included*	*Included*	*Included*	*Included*

*Sources and Notes***.** See also the notes to Table 3. See Table 5 for first-stage results.The instrument for the HOLC per capita loan variable is the inverse of the distance from the artificial location of HOLC offices based on placements in the state capitals and in the cities in each state with the largest populations.

Table 5
First-Stage Results for IV Analysis in Table 4

	Coef.	t-stat.
Instrument	1.67454	3.68
New Deal Funds Per Capita		
Value of FHA Loans Insured	0.24442	2.86
Relief and Public Works Grants	0.00139	0.5
RFC Loans	0.05383	2.59
AAA Grants	-0.0234	-4.95
Farm Loans	-0.0108	-1.04
Change from 1930 to 1940 in		
Percent Black	0.03705	1.88
Percent Foreign-Born	0.07302	2.4
Percent Illiterate	-0.0353	-2.4
Percent Urban	-0.0364	-4.21
Percent Rural Nonfarm	-0.0185	-2.39
Percent Aged 10-19	0.08388	1.62
Percent Aged 20-29	-0.044	-0.8
Percent Aged 30-34	-0.1408	-1.49
Percent Aged 35-44	0.08462	1.27
Percent Aged 45-54	0.42958	7.27
Percent Aged 55-64	0.40243	6.1
Percent Aged 65 over	0.23224	3.01
Retail Sales Per Capita	-0.0027	-5.4
Tax Returns Per Capita	49.0754	10.21
Population (000)	0.00967	1.45
Infant Mortality Rate	-0.0017	-1.26
Value of Crops Per Capita	-0.4639	-3.32
Per Capita Mining Output	-2.7028	-3.02
Wholesale Sales per Capita	-0.0004	-2.45
Constant	-3.6916	-5.53
State Fixed Effects	Included	
Kleibergen-Paap Wald rank F-statistic	13.57	
Stock-Yogo weak ID test critical values: 10% maximal IV size	16.38	
Stock-Yogo weak ID test critical values: 15% maximal IV size	8.96	

Sources and Notes. See the notes from Table 3. The instrument for the HOLC per capita loan variable is the inverse of the distance from the artificial location of HOLC

offices based on placements in the state capitals and in the cities in each state with the largest populations.

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ENDNOTES

[1] See http://www.makinghomeaffordable.gov/ for descriptions of the program.

[2] Glaeser and Gyourko (2001) have recently argued that negative economic shocks lead to decreases in housing prices that are greater in absolute value than decreases in population. During the 1930s, nearly every geographic area experienced a negative shock between 1929 and 1933 and despite recovery in real incomes to 1929 levels by the end of the decade, the unemployment rate remained above 10 percent for the rest of the decade. The comparisons here show that a severe negative shock can have a substantial negative effect on housing values that can last for an extended period of time.

[3] Jonathan Rose (2009) finds evidence in Connecticut, New Jersey, and New York, that the HOLC tended to offered generous appraisals of the values of properties on which they made loans and also tended to pay high prices to the financial institutions when purchasing the troubled loans.

[4] The overall cost to the Government of the lending portion of the HOLC was probably higher still because the HOLC had been authorized to invest funds in Federal Savings and Loan Associations and state-chartered institutions who were members of the Federal Home Loan Bank System or whose accounts were insured by the Federal Savings and Loan Insurance Corporation. Cumulative earnings from interest and dividends on these investments of $224 million had added $44.8 million to the plus side of the HOLC balance sheet, while dividends on investments in the FSLIC added another $28 billion from inception through 1951 (Comptroller General of the United States 1949, 6; 1952, 27).

[5]Individuals could borrow up to $2,000 for home improvement loans. The banks making the loans were insured against losses of up to 20 percent of the value of such home improvement loans (Federal Housing Administration, First Annual Report).

[6]Other housing programs included the creation of Fannie Mae to develop a secondary market for mortgages in 1938. We do not focus on Fannie Mae here because the program started very late in the decade. The Public Works Administration built several public housing projects with $127 million in grant money between 1935 and 1937 and then the U.S. Housing Authority established another $450 million in loan contracts for the same purpose. We are focusing on these programs in studies using neighborhood data in the cities in which they were located.

[7] The Reconstruction Finance Corporation (RFC) was initiated under the Hoover Administration on February 2, 1932. Approximately 40 percent of the RFC loans were made by June 1933. The New Deal also provided for a number of smaller loan programs with less direct connections to the housing markets. In addition to its grant programs, the PWA loaned money to state and local governments to aid in financing public works projects. In the agricultural arena the Farm Security Administration (FSA) offered a

combination of grants and loans to low-income farm families who were unable to obtain credit from any other sources, while also offering loans to tenants to help them purchase farm land. The Farm Credit Administration (FCA) offered small loans in 1934 and 1935 to aid drought-stricken farm areas, made emergency crop and feed loans, and made new loans or refinanced indebtedness for farmers facing a specific set of risks (U.S. Farm Credit Administration 1935, 6, 7, 15, 16; 1936, 7). The Rural Electrification Administration (REA) provided loans to finance rural electrification. The Disaster Loan Corporation (DLC), organized in February 1937, provided loans to areas hit by disasters (Jones 1939, 1). The loan variable in our analysis excludes housing loans which are considered separately.

[8]For extended discussions of the role of the RFC in the banking sector, see Mason and Mason and Schiffman.

[9]See, for example, Englehardt 1996, Engelhardt and Mayer 1998, Haurin, Hendershott, and Wachter 1997, Linneman and Wachter 1989, and Zorn 1989).

[10] Instead of describing the HOLC as increasing demand with its loans, another way to describe it is as reducing the supply of housing that would have been dumped on the market through foreclosures, which would have driven home ownership values down, the number of homeowners down, increased the number of renters, and potentially raised rents. Thus, the causal effect of the HOLC through this mechanism would have been to raise housing values, raise the number of home owners, reduce the number of renters, and reduce rents.

[11] For estimates finding no crowding out, see Fleck (1999), Wallis and Benjamin (1981). Neumann, Fishback, and Kantor (forthcoming) find some positive stimulus of private employment in the period prior to June 1935, but they find crowding out of private employment in the period after December 1936. Meanwhile, Wallis and Benjamin (1989) find evidence of crowding out over most of the period.

[12] There might be some unusual distribution effects caused by the fact that the people helped were in the lower tier of the wealth distribution. If, for example, the relief funds raised the demand for owned homes among the poor in ways that led to an increase in quantity supplied of owned homes with values below the median home value, the median owned home value would fall as the number of owners rose.

[13]For definitions of the variables, see U.S. Bureau of the Census, Housing, 1943, Volume I, Part 1, pp. 1-7 and U.S. Bureau of the Census, Families, 1933, Vol. IV, pp. 5-11. The 1930 census asked questions about families, while the 1940 census asked questions about dwelling units. Thus, the 1940 census contains information on vacant dwelling units that are unavailable in the 1930 census.

[14] We considered an alternative strategy in which we used the minutes of the HOLC oversight committee in the National Archives to determine the date in which the office first opened. The HOLC gave out loans in such a short period, we thought offices that opened later would have been at a disadvantage in distributing loans. Here again,

there are worries that the date of opening was determined by the extent of problems with troubled loans.

[15] The New Deal program most closely correlated with the HOLC is the FHA with a correlation between logged values of 0.5. Correlations with the other programs are 0.30 with the RFC, 0.176 with the public works and relief, -0.136 with the AAA, and -0.19 with the farm loans.