The Local Economic Effects of Public Housing in the United States, 1940-1970

Katharine L. Shester*

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Abstract: Between 1933 and 1973, the federal government funded the construction of over 1 million units of low-rent housing. This paper uses new county-level data on public housing construction to assess the effects of the program during this period. I find that communities with high densities of public housing had lower median family income, lower median property values, lower population density, and a higher percentage of families with low income in 1970. However, I find no negative effects of public housing in 1950 or 1960, implying that long-run negative effects only became apparent in the 1960s.

*Assistant Professor, Department of Economics, Washington and Lee University, Lexington, VA 24450 (email: shesterk@wlu.edu, phone: 540 458 8607, fax: 540 458 8639). I am grateful to William J. Collins, Jeremy Atack, George Ehrhardt, Daniel Fetter, Price Fishback, Malcolm Getz, Cindy Kam, Gregory T. Niemesh, Edgar O. Olsen, John J. Siegfried, and Helen Yang as well as seminar participants at the Southern Economic Association Meetings (2011), the Appalachian Spring World History and Economics Conference (2012), the Cliometrics Conference (2012) and the Washington and Lee University Seminar Series (2012) for helpful comments and suggestions. Funding for this research was generously provided by Vanderbilt University in the form of a Social Science Dissertation Fellowship and by Washington and Lee University in the form of a Lenfest Summer Grant.

The United States built approximately 1 million public housing units between 1933 and 1973 (U.S. Department of Housing and Urban Development [HUD] 1973). This federally-supported public housing program sought to eliminate unsafe housing conditions, eradicate slums, provide "decent" housing for low-income families, and stimulate local economic activity (U.S. Housing and Home Finance Agency 1964). It was an ambitious effort to improve the physical environment in which the poor lived in the belief that doing so would directly benefit the poor and indirectly benefit local economies by dampening negative externalities associated with slum conditions. By the early-1970s, however, many believed that public housing had exacerbated the poverty and slum conditions that the program was meant to ameliorate, and political support for the program waned (Husock 2003, Hirsch 1983, Hunt 2001, von Hoffman 2000, Meehan 1979). The federal government temporarily halted funding for the construction of new public housing projects in 1973 and subsequently created a system of rent vouchers for low-income families ("Section 8"). Public housing construction was later resumed, however the relative size of the program was greatly diminished.[1] Most of the projects built during this period are still in use today.

The goal of this paper is to assess the links between public housing and local economic outcomes during the key decades of the program's ascent and expansion (1940 to 1970) and across the entire United States. This broad perspective is valuable for several reasons. First, while there is an extensive empirical literature that examines the effects of public housing on labor market outcomes, children's education, local property values, housing consumption, and the concentration of poverty, much of what is known about public housing's effects is based on information from the 1990s or later, often for residents of public housing in very large cities.[2] Also, the understanding of how and when things went wrong with

[1] In 1970, nearly 96 percent of households receiving low-income housing assistance lived in public housing. By 1980, this figure fell to approximately 37 percent (Olsen 2003, Table 5).

[2] For labor market outcomes, see Popkin, Rosenbaum, and Meaden 1993, Rosenbaum 1995, Yelowitz 2001, Oreopoulos 2003, Olsen et al. 2005, Jacob and Ludwig 2012. For children's education, see Jacob 2004, Currie and Yelowitz 2000. For local property values, see Lee, Culhane, and Wachter 1999, Nourse 1963, Rabiega, Lin, and Robinson 1984, Ellen et al. 2007, Lyons and Loveridge 1993, Goetz, Lam, and Heitlinger 1996. For housing consumption and the mean benefit of public housing to residents, see Kraft and Olsen 1977 and Olsen and Barton 1983. For concentration of poverty, see Massey and Kanaiaupuni 1993. Work by Olsen and Barton and Kraft and

public housing in the U.S., if indeed they did, would benefit from an assessment of the program that covers a longer timeframe and that includes the large share of public housing units in relatively small communities. Finally, the public housing program was an important and enduring element of the dramatic expansion of the federal government's effort to assist the poor, and the long-run history of public housing interacts with a variety of related economic and social policy issues—housing discrimination, unemployment, residential segregation, single-parent households, crime, and economic mobility.[3] Therefore, a better understanding of the rise and fall of public housing may shed light on other important social phenomena.

The paper seeks to answer three fundamental questions about public housing in the United States. First, did places that engaged more intensively in the program in 1970 subsequently have worse economic outcomes than other places, and if so, is there evidence that this correlation can be given a causal interpretation? Second, in analyses of earlier periods, did the apparent effects of public housing change over time? Third, is there evidence of the channels through which public housing influenced outcomes, such as through increasing the share of rental housing or changing the educational composition of the population? To answer these questions, I collected data from the *Consolidated Development Directory*, published by the U.S. Department of Housing and Urban Development in 1973. It contains information on the location, timing, and character of low-rent housing projects developed from the New Deal through the early 1970s. I linked this data to county-level data, mostly from the population and housing censuses of 1940 to 1970.

To address whether or not places with public housing had worse economic outcomes in 1970, I start with simple regressions of county level outcomes on pre-program control variables and state fixed effects. I find that public housing had strongly negative associations with median family income, median

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Olsen focuses on the 1960s and 1970s. Massey and Kanaiaupuni's work on the concentration of poverty looks at the period 1950-1980.

[3] While there is not a large empirical literature on public housing during this early period, there is a large historical literature focused on specific cities. Fuerst (2003) writes of the early success of public housing in Chicago, while Hirsch (1983) writes of the failures of Chicago's public housing and how the early decisions led to their rapid decline. Venkatesh (2000) also writes of the rise and fall of Chicago's public housing. Williams (2004) writes of the early effects of public housing on African Americans in Baltimore and Meehan (1979) focuses on St. Louis.

property values, the percent of families with low income, and population density in 1970. The results are robust to the inclusion of a much larger set of State Economic Area fixed effects and pre-program population trends. I also assess the necessary magnitude of omitted variable bias that would be required to account for the estimated effects. The results are consistent with public housing having negative effects on economic outcomes in 1970. The effects are largest for counties in metropolitan areas, however there appear to be strong, negative effects for rural counties as well.

Next, I assess whether the apparent effects of public housing were present in earlier periods by running regressions that are similar to the base specification, but with 1960 and 1950 outcomes as my variables of interest. I find no evidence that public housing was negatively correlated with outcomes before 1970. This does not appear to be due to selection into the public housing program in the 1960s. When I allow for different effects of public housing by decade of construction, I find that units built in the 1940s, 1950s, and 1960s have negative effects on 1970 outcomes. This is consistent with the interaction of public housing and local outcomes taking a sharp negative turn during the 1960s.

Finally, I attempt to shed light on the mechanisms through which public housing influenced outcomes in 1970 by investigating whether the public housing "effects" can be explained by an increase in rental housing, or a decline in the level of human capital in the local population. I find that public housing is correlated with a slight increase in the percent of renter-occupied units in 1970, however this does not explain the adverse effects of public housing on county-level outcomes. I also find that public housing is negatively correlated with the percent of high school graduates. These differential changes in local educational attainment account for part, but not all, of the negative effects of public housing. Furthermore, the link between public housing and low education does not appear to be due to the in-migration of low-skilled workers.

1. Background: The Rise, Distribution, and Characteristics of Public Housing

1.1 Policy History

The federal public housing program began in the 1930s after decades of concern regarding the condition of the housing stock inhabited by low-income families. Proponents of public housing argued that slums led to high rates of disease, crime, fire, and delinquency, and that the market could not profitably provide better housing for the poor (Radford 1996). According to this logic and in the presence of assumed externalities, the government was called upon to intervene. The Great Depression brought a significant expansion of federal activity, which allowed public housing to become a significant and entrenched federal policy. The first federally funded public housing was built under the New Deal when, between 1933 and 1937, the Public Works Administration (PWA) built 21,640 units in 36 metropolitan areas across the country (Coulibaly, Green, and James 1998).[4] This was followed by the Housing Acts of 1937 and 1949, among others, which expanded the program's geographic coverage and intensity.

The Housing Act of 1937 replaced the Housing Division of the PWA with the United States Housing Authority (USHA). Its goals were broad: *"To provide financial assistance … for the elimination of unsafe and insanitary housing conditions, for the eradication of slums, for the provision of decent, safe and sanitary dwellings for families of low income, and for the reduction of unemployment and the stimulation of business activity…"* (U.S. Housing and Home Finance Agency 1964). The Act delegated the clearance and construction of projects to Local Housing Authorities (LHAs), and the USHA assisted LHAs by providing loans to cover up to 90 percent of the costs of constructing the public housing projects (Coulibaly, Green, and James 1998).[5] The Act also introduced the "equivalent elimination"

[4] Builders and labor unions, public health officials, urban reformers, and many housing analysts lobbied in favor of public housing construction. Support also came from the American Association of University Women, American Association of Social Workers, NAACP, National Conference of Catholic Charities, American Legion, United States Conference of Mayors, and the National Institute of Municipal Law Officers (Fisher 1959, Mulvihill 1961). The U.S. Chamber of Commerce, the U.S. League of Building and Loans, the National Association of Home Builders, the National Apartment Owners Association, the U.S. Savings and Loan League, the National Association of Real Estate Boards, and the National Retail Lumber Dealers Association all opposed public housing (King 1996, Fisher 1959). The Lumber Dealers stressed their own stake in the bill—they were concerned that the federal construction of residential units would use new construction materials like steel and concrete (Radford 1996).

[5] This was increased in 100 percent in 1968 (Weicher 1980).

requirement, which required that for every unit of public housing built, an unsafe or insanitary unit must be demolished or repaired (Fisher 1959). Between 1937 and 1949, a total of 160,000 units were built.[6]

The Housing Act of 1949 was the most far-reaching piece of legislation regarding public housing. Although the public housing framework remained virtually unaltered from the Housing Act of 1937 (e.g., the laws on loans remained the same), an additional 810,000 units of public housing were approved (Bingham 1975). The Act also weakened the equivalent elimination requirement in the original 1937 Act by requiring equivalent elimination only for urban projects that were not built on slum sites. Rural projects and urban projects built on slum sites were exempt (Fisher 1959).[7]

As early as the late 1950s, public housing started to receive criticism from both its original supporters and long-standing skeptics. Catherine Bauer, an early and active supporter of public housing in the 1930s, wrote an article in *Architectural Forum* entitled "The Dreary Deadlock of Public Housing" in 1957, in which she stated that the poor architectural design of public housing projects made it obvious that each housed "the lowest income group."[8] Additionally, the income limits caused a "…trend toward problem families as the permanent core of occupants (Bauer 1957)." In 1958, *The New York Times* writer, Harrison E. Salisbury, wrote about the failure of the New York City public housing system in *The Shook-Up Generation*, in which he accused public housing of institutionalizing slums. Salisbury described "…the broken windows, the missing light bulbs, the plaster cracking from the walls, the pilfered hardware, the cold, drafty corridors, (and) the doors on sagging hinges…" in the Fort Green project and claimed that public housing "…create(d) human cesspools worse than those of yesterday (p. 75)." Public housing received a great deal of criticism in other large cities as well. In 1965, *Chicago Daily News* published a series of articles that referred to the Robert R. Taylor homes as the "$70 Million

[6] The public housing program was temporarily suspended during World War II. Many new and existing units were temporarily used to house war workers. All federal housing agencies were reorganized in 1942, and the USHA was replaced by the Federal Public Housing Authority (FPHA).

[7] Several housing acts (e.g., 1954, 1956, 1959, 1964, and 1969) followed and amended the previous structure. For example, the Act of 1954 required that a "workable program" be created for the prevention and elimination of slums before an annual contributions contract could be established (Weicher 1980) and the Act of 1959 gave local housing authorities more control over establishing income limits and rents (Fisher 1959).

[8] Most projects were designed as "islands," cutting themselves off from the surrounding community.

Ghetto" (Friedman 1966). In St. Louis, the Pruitt-Igoe public housing projects became so dilapidated and crime-ridden that all eleven buildings were demolished between 1972 and 1976 (Meehan 1979).

The physical deterioration of public housing projects was widespread and due in part to the design of the public housing program. Price ceilings on the cost per room established in the Housing Acts of 1937 and 1949 put downward pressure on construction quality, which was exacerbated by a lack of maintenance.[9] The way that the fiscal arrangements were set up, the federal government paid for the capital costs of the public housing projects, but local housing authorities (LHAs) were responsible for all other expenses. LHAs received rental income from tenants and used this income to pay for utilities, maintenance, and repairs. In years in which a LHA had money left over, it could place the remaining funds in cash reserves. However, the total amount that a LHA could hold was limited to no more than 50 percent of one year's rent. Once it held its maximum in reserves, any additional revenue was required to go towards paying off the capital costs. This essentially prohibited LHAs from building up the funds necessary for major repairs, such as roof maintenance (Meehan 1979).[10]

There was a decline in the "quality" of tenants during this period as well, due partially to changes in eligibility requirements. Under the Housing Act of 1937, potential tenants could make an income no more than four times the local fair market rent to become eligible for public housing and, once living in public housing, were evicted if their income increased to more than 25 percent over the eligible income limit (Meehan 1979). Rent was set to approximate operating costs, which implicitly put a lower bound on tenant income as tenants had to be able to cover operating costs (Weicher 1980). In the late 1940s and 1950s, the federal housing agency forced local housing agencies to enforce these income limits, removing some of the better-off tenants (von Hoffman 2000).[11] The Housing Act of 1949 also influenced the pool

[9] The Housing Act of 1937 also put a price ceiling on the cost per unit. The Housing Act of 1949 removed this (Meehan 1979).

[10] The federal government began offering operating small-scale subsidies in 1961, however they were much too small to meet demand. Operating subsidies increased in the late 1960s and 1970s (Meehan 1979, Schnare 1991).

[11] Between 1937 and 1959, local housing authorities were given freedom in choosing tenants from the pool of applicants, given that they fit the criteria above (Weicher 1980). Local housing authorities did not deny residency to some of the "chronically poor", however they did refuse admission to individuals with criminal backgrounds or those believed to have poor moral character (Freedman 1969).

of potential public housing tenants by displacing very poor families through Urban Renewal and highway construction, and relocating them into public housing (Jones, Kaminsky, and Roanhouse 1979).[12] In 1959, Congress gave LHAs the right to set their own income limits and rents. The majority of housing authorities set rent as a proportion of income for most tenants, but required that all tenants' rent cover operation costs. While this maintained the lower bound on tenant income that existed earlier (i.e., they must afford the operating costs), the escalations in rent with income blunted work incentives. High inflation in the 1960s caused operation costs to increase faster than tenant income and LHAs responded by increasing rents in an attempt to cover their costs. Congress reacted to the growing rents in 1969 by passing the Brooke Amendment, which limited rent to 25 percent of a tenant's income for tenants with incomes less than four times the operating costs (Weicher 1980). The combination of these changes led to notable changes in the predominant character of the tenant population, from the temporarily unemployed and working class, to households on welfare, the otherwise homeless, and the disabled (Epp 1996). Between 1950 and 1969, the median family income of public housing residents fell from 63.5 to 42.4 percent of the national median, the percent of nonwhite residents increased from 38 to 52 percent, and the number of single-parent families increased from 19 to 31 percent (Silverman 1971).[13]

On January 8, 1973, President Nixon announced that all housing programs would be suspended pending a thorough policy review (Orlebeke 2000). Congress subsequently passed the 1974 Housing and Community Development Act, Section 8 of which gave low-income families subsidies to pay the difference between the "fair market rent" (FMR) on a standard quality unit in their particular locality and 25 percent of their income. This movement from a unit- to a tenant- based subsidy marked a sea change

[12] Between 1966 and 1973, fewer than 12 percent of families entering public housing had been displaced by public action, and 1.2 percent had been displaced by urban renewal or housing development (Meehan 1977).

[13] After analyzing the Housing Act of 1949, Abner Silverman (1971) stated that "these actions slowly but surely changed the tenant body from a predominantly white, upwardly mobile, normal two-parent, working class population to a predominantly non-white, poverty affected, non-mobile lower-class population (p. 582)."

in public housing policy. The public housing program was reactivated by Congress in 1976, however the program's relative importance in the provision of low-income housing began to decline.[14]

1.2 Potential Effects of Public Housing on Communities

A priori, it is unclear how the expansion of public housing would affect community-level outcomes, such as property values, wages, or population growth. Early supporters of public housing hoped that by removing slums and building higher-quality housing for low-income families, they would reduce crime, improve labor market and education outcomes, lower demands for city services (e.g., fire, police), and raise the value of properties. The logic suggests a potentially virtuous circle of local productivity and environmental amenities, akin to the model of spatial equilibrium in Roback (1982).

In the short-run, particularly when slum clearance was a requirement for public housing construction, one might imagine that new and relatively high-quality public housing increased local property values. This could be an immediate and mechanical effect, through removing the lowest quality housing and perhaps shrinking total housing supply, or a more indirect effect working through the channels touted by early public housing supporters (Muth 1973).[15] Employment rates and wages might also rise in the short-run if the implementation of a public housing program raised local labor demand without inducing an offsetting in-migration of labor (Meehan 1979, Grigsby 1963). The investment in higher-quality structures (relative to what was demolished) and the removal of slums might also lead to long-lasting effects on the surrounding area through a reduction of disamenities and powerful housing market externalities (Rossi-Hansberg, Sarte, and Owens 2010, Schwartz, Ellen, Voicu, and Schill 2006).

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[14] There were several changes from the way the program ran prior to 1973. Funds were made available to localities based on a formula that included measures of population, poverty, substandard housing, and the rental vacancy rate. Initially Congress planned to approve funds for the construction of 30,000 to 50,000 additional units annually from 1976 to 1981, but the actual numbers were far from the target (Weicher 1980). The relative size of the public housing program declined rapidly in the 1970s. Public housing made up approximately 96 percent of housing assistance in 1970. This declined to approximately 37 percent in 1980.

[15] Early in the federal public housing program, it was a common belief that public housing projects would raise nearby property values. At a hearing of the Subcommittee of the Committee of Appropriations in 1948, Congressman A.S. Monroney argued that "…the establishment of a housing project in a city raises the assessed valuation for blocks around it…" (Fisher 1959, p. 195).

This could work directly through increased neighborhood property values, or indirectly through stimulating local economic growth.

However, it is also possible that in the short-run public housing had negative effects on communities. Initially, public housing may have led to an increased supply of low-income housing (Sinai and Waldfogel 2005). If this increase in supply was not accompanied by a shift in demand (i.e., in-migration of low-income families), then property values in the community would mechanically fall. Public housing might also negatively affect property values if the constructed projects created disamenities that lowered the values of surrounding areas (Lee, Culhane, and Wachter 1999, Ellen et al. 2007, Lyons and Loveridge 1993, Goetz et al. 1996) and therefore lowered county-level aggregates. This could be due to the poor architectural design of projects (e.g., mega-blocks and high rises (Bauer 1957, Ellen et al. 2007)), or through the increased concentration of poor residents that may have been associated with increased crime rates (McNulty and Holloway 2000). Public housing could also create perverse work, income, human capital, and marriage incentives by setting income ceilings and setting rent as a proportion of income (Yelowitz 2001, Jacob and Ludwig 2012). Additionally, to the extent public housing increased the geographic concentration of poor residents, it could increase the strength of negative peer effects within low-income neighborhoods (Katz, Kling, and Liebman 2001, Cutler and Glaeser 1997, Massey and Denton 1993, Collins and Margo 2000, Ananat 2011), affecting the educational outcomes for the children growing up in public housing (e.g., Kling, Liebman, and Katz 2007) and producing additional negative spillover effects to the rest of the locality.

In the long-run, when migration and capital investment and depreciation are possible, public housing could have negative effects on communities through additional channels as well. First, a locality with a high volume of conditionally subsidized housing could not only create negative incentives for local residents, but also attract low human capital migration from places with less generous provisions (Painter 1997, Meyer 2000, Moffitt 1992), akin to the rural-urban model of Harris and Todaro (1970). In this scenario, a limited availability of public housing units could lead to an influx of poor, low-skilled families who hope to receive public housing. Second, the very nature of public housing in which no one has a

direct ownership stake, combined with the rules on rental income and maintenance expenditures, could lead to under-investment in maintenance and caretaking, even relative to the private slum conditions that prevailed elsewhere (Jones, Kaminsky, and Roanhouse 1979, Salisbury 1958, Meehan 1979, Ellen 2007). These negative effects could lead to increases in crime, taxes, or other disamenities, which in turn could spur outmigration by the better-off (Cullen and Levitt 1999). This would induce a negative circle as opposed to the virtuous one suggested by early proponents. Whether the spillovers from public housing's expansion were positive or negative, and whether any such spillovers were of sufficient magnitude to detect at the local level, require empirical investigation.

2. Data

To assess the effects of public housing on local economic outcomes, I exploit variation in public housing across counties. I create a comprehensive new dataset of public housing units from the program's beginning in 1933 up to President Nixon's moratorium in 1973, based on information from HUD's *Consolidated Development Directory* (1973, henceforth *CDD*). The *CDD* contains detailed information on the years of construction and availability of low-rent housing projects, the number of units available, and the program under which projects were funded. The dataset includes *all* active projects developed by HUD for low-rent housing use. It includes projects constructed under the PWA, the Housing Act of 1937, and the Housing Act of 1949, leased and turnkey housing, and war and defense housing that was converted to low-rent use.[16]

I consolidate the *CDD* data to the county level because public housing was a widespread phenomenon, distributed across more than 1,400 counties by 1970. By doing this, I am able to include data on all projects in all counties.[17] I link the county-level public housing aggregates to county-level data from the 1940, 1950, 1960, and 1970 censuses (Haines 2004). I also add data from the 1952 *Survey*

[16] Leased housing is included in my analysis and makes up approximately 6 percent of the public housing in my dataset. Results are robust to the exclusion of leased units. Housing units operating under the Indian housing program are reported in the *CDD*, but excluded from this analysis.

[17] Limiting the dataset to cities would omit the vast majority of the program's projects, leaving a sample of only approximately 400 cities, as opposed to nearly 3,000 counties.

of Churches and Religious Bodies (Haines 2004) and 1940 presidential election results (Leip 2009) to help control for heterogeneity in social and political environments.[18] Summary statistics are reported in Appendix Table A.1.

The rise of public housing is shown in detail in Figure 1, which maps the level of public housing in each county from 1940 to 1970. Counties are shaded by public housing intensity, expressed as a percentage of total occupied housing units in each county. Few counties had public housing in 1940 and 1950, but participation in the program took off in the 1950s and 1960s, following the Housing Act of 1949. By 1970, over 1,400 counties had public housing and nearly a quarter of the existing public housing stock was located in non-metropolitan areas.[19] There is clearly a great deal of variation across counties, even within states, which will serve as a basis for the econometric analysis below.

3. The Effects of Public Housing Circa 1970

3.1 Empirical Strategy and Basic Results

To assess the impact of public housing on communities, I start by running regressions of a variety of county-level economic outcomes (Y) on public housing intensity (PH), an extensive set of pre-program community characteristics ($\mathbf{X}$), and state fixed effects (Γ).

$$(1) \qquad Y_{county,1970} = \alpha + \beta PH_{county,1970} + \mathbf{X}'_{county,1940}\boldsymbol{\gamma} + \Gamma_{state} + \varepsilon_{county,\,1970}$$

My main variables of interest, $Y_{county,\,1970}$, are the log of median owner-occupied property values, the log of median family income, the percent of families with low income, and the log of population density. The concentration of public housing, $PH_{county,1970}$, is measured as the percentage of occupied dwelling units comprised of public housing. The pre-program control variables, $\mathbf{X}_{county,1940}$, are extensive and include

[18] Counties were merged in cases in which there were significant boundary changes between 1940 and 1970. The majority of these cases occurred in Virginia, were many cities became independent during this period. Additional details are provided in Appendix A.

[19] Metropolitan/urban areas are defined using 1950 SMA codes.

housing stock characteristics (percent owner occupied, median persons per room in rental units, percent of units in good condition, percent of units with electricity, percent of units with water, log median value), population characteristics (percent urban, male median schooling, log population density, percent black and percent black squared), economic characteristics (percent of the labor force employed in manufacturing, percent of the labor force employed in agriculture, the per capita value of World War II contracts between 1940 and 1945, the per capita value of war facilities projects between 1940 and 1945), and some social and political characteristics that could underpin differences in support for public housing programs (the percentage of votes for Roosevelt in 1940 and percentages of Baptists and Catholics in 1950).[20] State fixed effects account for unobservable differences at the state level and standard errors are clustered by state.

The coefficient of interest, β, is identified from within-state variation in *PH*, adjusting for observable characteristics in 1940. Therefore, the estimated coefficient could be interpreted as a causal effect of public housing if, within-state, there are no omitted variables that are correlated with public housing intensity and that influence the outcome variables of interest. Public housing, of course, was not randomly distributed across counties, and so one should hesitate to assign a causal interpretation to the coefficient. Nonetheless, the rich set of pre-program control variables and the existence of idiosyncratic variation in local public housing intensity within states (e.g., due to local politics surrounding the issue) may allow some scope for uncovering public housing effects. Further investigation into the robustness of the results to omitted variable bias is discussed below and suggests that the relationship between public housing and 1970 community-level characteristics might well be causal.

Table 1 reports the estimation results of equation (1). Controlling for $\mathbf{X}_{county,\,1940}$ and state-fixed effects, counties with relatively high levels of public housing in 1970 also had relatively high concentrations of low-income families, as well as lower median family income, median property values,

[20] The Democratic platform can be found at www.presidency.ucsb.edu/ws/index/php?pid=29597. The Republican platform did not mention housing policy specifically but it did stress the problems with New Deal deficit spending and the Republican nominee, Wendell Willkie, was in favor of reducing both the government deficit and government spending http://www.presidency.ucsb.edu/ws/index.php?pid=29640).

and population density. A one-percentage-point increase in public housing concentration is associated with a 0.46 percentage point increase in families with less than $3,000 income (compared to an average level of 16.7 percent) and is statistically significant at the one percent level.[21] The same increase in public housing intensity is also correlated with a 2.1 percent decrease in median property values, a 1.8 percent decrease in median family income, and a 4.4 percent decrease in population density (all at a one percent level of statistical significance).

3.1.1 Results with State-Economic-Area Fixed Effects

The potential for unobservable shocks and trends *within* states threatens the credibility of the identification strategy in equation (1). One can imagine counties that are observationally similar circa 1940, but distant from one another within the state, and therefore subject to different shocks. With this in mind, I test the sensitivity of the base results by running the regressions again, replacing the state fixed effects with a much larger set of State Economic Area (SEA) fixed effects. SEAs are comprised of contiguous counties with similar economic characteristics around 1950, as defined by the Census Bureau.[22] There are 506 SEAs in my sample, and the median SEA contains four counties. Because SEAs are composed of economically similar counties in close proximity, counties within a given SEA should experience similar economic trends or shocks.

Results identified from within-SEA variation in *PH* are reported in Table 2. I still find that public housing intensity in 1970 is significantly correlated with relatively low median property values, median family income, and population density, and relatively high percentage of low-income families in 1970. The magnitudes of the point estimates are somewhat smaller (by approximately one-third relative to Table

[21] The mean public housing intensity of all counties in 1970 is 0.81. This rises to 1.75 when the sample is limited to counties with public housing.

[22] The 1950 Census describes the classification of SEAs as follows: "In the establishment of State economic areas, factors in addition to industrial and commercial activities were taken into account. Demographic, climatic, physiographic, and cultural factors, as well as factors pertaining more directly to the production and exchange of agricultural and nonagricultural goods, were considered. The net result is a set of areas, intermediate in size between States, on the one hand, and counties, on the other, which are relatively homogeneous with respect to a large number of characteristics" (Volume I, p. xxxvi).

1), but are statistically significant at the one percent level and consistent with public housing having economically significant negative effects on local outcomes. While some scope for omitted variable bias still exists, the strong empirical links between public housing and local outcomes even within-SEAs (and conditional on pre-program characteristics) are striking.

3.1.2 Results with Pre-1940 Population Trends

The results presented thus far control for a large set of 1940 pre-program characteristics and geographic fixed effects. However, these variables control for counties' characteristics at a fixed point in time and may not pick up differences in underlying growth. The majority of my 1940 controls are not available for previous years, however I do have information on the total population, black population, and number of dwelling units in each county in 1900, 1910, 1920, and 1930. If counties were building public housing as a response to changes in population (not simply 1940 population levels), then adding controls for changes in these variables would reduce the public housing coefficient. I run the regressions again with state fixed effects, adding controls for the percent change in total population, black population, and number of dwelling units between 1900-1910, 1910-1920, 1920-1930, and 1930-1940. Adding these controls leaves me with a somewhat reduced sample (2323 observations compared to 2973), so I run the base regression without trends again with the limited sample, for comparison. Results are reported in Table 3. While my sample size is somewhat reduced, the magnitude and statistical significance of my public housing coefficients remain virtually unchanged. For example, in a regression of log median property values on public housing intensity, 1940 controls, pre-1940 population and dwelling unit trends, and state fixed effects, the public housing coefficient is -0.020, compared to -0.022 for the same sample without controlling for pre-program trends, and -0.021 using the original sample (reported in Table 1, also without trend controls). Results are similar for the other outcomes as well, and this pattern is robust to the inclusion of SEA fixed effects.

3.1.3 Observables, Unoberservables, and Causal Interpretation

The robustness of the results to SEA fixed effects and to pre-program population trends suggest that public housing may indeed have had negative effects on outcomes in 1970. However, omitted variables might still confound the estimated correlation between public housing and outcomes. For example, a county declining in ways that are unobservable to an econometrician might experience a fall in income and an increase in demand for (and supply of) public housing. In this scenario, the cross-place variation of PH is not driven by quasi-random, idiosyncratic local factors, but rather by unobserved negative trends.

To assess how strong such unobserved factors would have to be for the true causal link between *PH* and *Y* to be zero, I use a procedure formulated by Altonji, Elder, and Taber (2005).[23] The Altonji et al. approach centers on a comparison of coefficient estimates from regressions with and without controls for observables. In theory, if the variable of interest were essentially randomly distributed (i.e., there is no selection based on observable or unobservable characteristics), then the coefficient estimated with and without control variables for observables would be the same. In practice, therefore, one might be less concerned about *unobservables* if adding extensive controls for observables does not diminish the coefficient on the variable of interest. On the other hand, if the coefficient of interest is substantially diminished in magnitude when controls for observable characteristics are added, then one might be particularly concerned that the coefficient estimate would move even closer to zero if one could actually control for additional, unobservable characteristics.

To be more precise, assume that an outcome variable is a function of public housing intensity and an index of community characteristics that may be correlated with public housing. Also assume that the index of community characteristics is a linear function of observable characteristics (**X**) and unobservable characteristics. The probability limit of an estimated $\hat{\beta}$ is the sum of the true value of β, denoted β_0, and the omitted variable bias. In a regression without controls, $\hat{\beta}_{NC}$ (where *NC* stands for "no controls") is

[23] Bellows and Miguel (2009) make use of the Altonji et al. (2005) procedure and adapt it to a linear framework.

equal to β_0 plus the total omitted variable bias (from both observable and unobservable characteristics). Similarly, in a regression with controls for observable characteristics **X**, the probability limit of $\hat{\beta}_C$ is equal to β_0 plus the portion of the total omitted variable bias that is not controlled for by **X**. The difference between $\hat{\beta}_{NC}$ and $\hat{\beta}_C$ is therefore equal to the portion of the total omitted variable bias that *can* be explained by **X**.

If the true effect of public housing intensity on outcomes is zero ($\beta_0 = 0$), then the value of $\hat{\beta}_{NC}$ is simply equal to the total omitted variable bias, and the value of $\hat{\beta}_C$ is the portion of the omitted variable bias attributable to unobservables. Therefore, if the true value of β is zero, then the ratio of the bias explained by unobservables and the bias explained by X (later referred to as the "sensitivity ratio") can be calculated as $\hat{\beta}_C / (\hat{\beta}_{NC} - \hat{\beta}_C)$. If the addition of controls diminishes the point estimate by less than half, the sensitivity ratio is greater one. Altonji et al. (2005) argue that "…the ratio of selection on unobservables relative to selection on observables is likely to be less than one…(p. 176-177)", implying that it is unlikely that the inclusion of unobservables would reduce the point estimate by a greater amount than the inclusion of observables. Therefore, if the addition of controls diminishes the point estimate by less than half (i.e., the sensitivity ratio is greater than one), then the true value of β is not likely to be zero. [24]

I use this technique to assess the direction and strength of selection on unobservables that would be necessary for the true effect of public housing to be equal to zero. Of course, this cannot rule out omitted variable bias in the point estimate, but it allows some appraisal of the plausibility that unobservables drive the basic results. I run regressions with and without controls for **X** with my state fixed effects specification and report the results and estimated sensitivity ratios in Table 4. "With controls" results simply replicate those from Table 1 for ease of comparison. Without controls for **X**, public housing intensity is positively correlated with 1970 log median property values, log median family income, and log population density and negatively correlated with the percent of families with low

[24] See Appendix B for a more thorough discussion and derivation.

income within states. In fact, it is the addition of my extensive set of controls that causes the public housing coefficient to become negative (or positive in the case of the percent of low-income families) and statistically significant. While the majority of the estimates without controls are not statistically significant, they suggest that, if anything, county-level selection into public housing on observables was apparently positive.

Ex ante, the concern was that if the addition of control variables diminished the public housing coefficients, then it is plausible that the inclusion of omitted variables would push the estimates even closer to zero. However, the addition of controls actually *strengthen* my results and the estimated sensitivity ratios are negative. In order for the true effect of public housing to be zero, including the relevant unobservable characteristics would have to push the public housing coefficient in the opposite direction as my extensive set of observable characteristics and do so in a similar magnitude. It therefore seems unlikely that omitted variable bias explains away the entire effect of public housing.

3.2 Rural and Urban Counties

Given that most of the criticism of public housing predominantly focuses on large cities, it is possible that the experiences of urban areas were different from those of rural areas. To assess these differences, I estimate equation (1) again, separating my sample by urban status. I define "rural" counties as counties with no more than 25 percent urban population in 1940. The remaining counties are classified as "urban". Because my urban definition is broad, I also run the regressions with a more restricted sample of counties in a Standard Metropolitan Area (SMA) in 1950. Results are reported in Table 5. The results suggest that public housing had negative effects in urban and rural counties. The point estimates for the log median property value and log median income regressions are somewhat smaller for rural counties (-0.017 and -0.017 for rural counties, compared to -0.021 and -0.020 for urban counties, respectively), but remain statistically significant at the one percent level. The effects of public housing are larger for counties in SMAs in 1950 for all outcomes. For example, the point estimate for log population density is -0.096 for counties in SMAs, compared to -0.036 for counties with more than 25 percent urban

population. The point estimate for log median property values is -0.023 for counties in SMAs, compared to -0.021 for urban counties.

4. The Effects of Public Housing over Time

4.1 Effects of Public Housing in 1950 and 1960

Public housing appears to have had negative effects on adoptive communities in 1970, but it is unclear whether these effects existed in earlier periods. It is possible that public housing, when relatively new and under the original rules of tenant selection, had no negative effects (or potentially positive effects) on local communities. However, given the disappointment many supporters of the program felt with public housing as early as the late 1950s, these negative effects may have been present earlier. To assess whether the negative relationship between public housing and community outcomes was in place prior to 1970, I estimate equation (1) for similar outcome measures in 1960 and 1950, using public housing intensity measures that are specific to those years. The set of 1940 control variables are the same as for the earlier analysis and state fixed effects are included.

Results are reported in Table 6, and they suggest that public housing did *not* have negative effects on adoptive communities before 1970. Public housing was not statistically significantly correlated with log median property values, log median income, the percent of families with less than $3,000 income, or log population density in 1960. Public housing was also not statistically significantly correlated with log median property values, the percent of families with low income, or log median income in 1950. The coefficient on public housing is statistically significant in the log population density regression for 1950, however the coefficient is positive.

Several hypotheses might account for this pattern of results. One possibility is that there were changes in the types of counties adopting or expanding public housing over time. Counties with negative unobservable characteristics could have rapidly adopted or expanded public housing in the 1960s, causing public housing to be correlated with poor community outcomes. Of course, the variety of robustness checks presented above (using SEA fixed effects, controlling for pre-program trends, and assessing the

necessary relative size of the omitted variable bias) suggest that negative selection does *not* explain the negative public housing effects in 1970.

Another possibility is that the type (e.g., high rise, low rise, scattered site) or quality of public housing built could have varied by decade of construction. If higher density or lower quality public housing was built in the 1960s, then the public housing built during this decade may have led to larger negative effects than older, higher-quality, less densely populated public housing. On the other hand, the negative effects may have nothing to do with public housing built in the 1960s specifically, but could be due to the long-run deterioration of projects like Salisbury (1958) observed in New York City. Even though the process of decay started decades earlier in some places, it may have taken until the 1960s for local economies to adjust and for these effects to be detectible at the county level. Yet another explanation is that it was the interaction of public housing with events that occurred in the 1960s (such as the spread of drugs, violence, crime, riots, or changes in family structure) that caused places with public housing to have worse economic outcomes in 1970. In this scenario, public housing may have amplified the negative effects of these other forces on communities.

4.2 Effects of Public Housing in 1970, by Date of Construction

4.2.1 Effects of Public Housing Built Pre- and Post-1960

It is difficult to empirically distinguish between all these possibilities, but because my dataset includes information on the year in which all public housing became available, I can explore whether a rapid expansion of public housing during the 1960s can explain the base results. If public housing built in the 1960s is largely driving my results, then the proportion of housing units composed of public housing built before 1960 should not be negatively correlated with 1970 outcomes. This would be consistent with either negative decade-specific selection into the program, or "worse" public housing built in the 1960s.

To assess whether public housing built in the 1960s is driving my 1970 results, I run two additional sets of regressions. The first specification is similar to equation (1), but uses the proportion of the 1970 housing stock composed of public housing built by 1960 as the key independent variable. The

second specification divides 1970 public housing intensity into two measures: the proportion of the 1970 housing stock composed of public housing built by 1960 (as in the first specification) and the percent of the 1970 housing stock composed of public housing built between 1961 and 1970. This allows for public housing built before and after 1960 to have different effects. Results for both specifications are reported in Table 7.

There is a strong and negative relationship between the 1960 public housing stock and economic outcomes in 1970. For my first specification (in which I include a measure of 1960 public housing, reported in Panel A), my point estimates are similar to those reported in Table 1. For example, a one percentage point increase in the percent of housing composed of 1960 public housing is correlated with a 1.5 percent decrease in median property values (statistically significant at the five percent level), compared to a 2.1 percent decrease found in Table 1. A similar increase in the percent of housing composed of 1960 public housing is correlated with a 1.8 percent decrease in median family income, compared to the 1.8 percent decrease found in Table 1 (also statistically significant at the five percent level). Results in the regressions of the percent of low income families, and log population density are also similar to those reported in Table 1. These results are robust to the inclusion of a separate control for public housing built in the 1960s (panel B), as the point estimates of 1960 public housing (as a percentage of 1970 housing units) remain virtually unchanged when the control for later public housing construction is added. The estimated coefficient on the intensity of public housing built in the 1960s is similar to the estimated coefficient on the intensity of public housing built before 1960 for population density, the percent of low-income families, and median family income. However, public housing built in the 1960s appears to have a larger effect on median property values than public housing built earlier on. A one percentage point increase in the intensity of public housing built in the 1960s is correlated with a 2.3 percent decrease in median property values, compared to a 1.5 percent decrease for public housing built before 1960.

4.2.2 Effects of Public Housing Built in the 1930s, 1940s, 1950s, and 1960s

While public housing built before and after 1960 appear to have similar effects on most 1970 outcomes, it is possible that public housing built in different decades had varying effects on outcomes. To better understand these effects, I allow public housing to have different effects by decade of construction. It is possible that old units have large effects on outcomes because of long-run deterioration of the buildings or because the units have had a longer time to create negative spillovers large enough to be measured in county-level aggregates. On the other hand, it is possible that newer units had a larger effect on outcomes, as more high rises became more common and the quality of construction is rumored to have decreased. I estimate equation (1) again, allowing for separate effects of public housing built in the 1930s, 1940s, 1950s, and 1960s. Public housing built in each decade is measured as the percent of total occupied units in 1970 composed of public housing units built in that particular decade.

Results are reported in Table 8. Public housing built in the 1940s generally has the largest effects on outcomes. For example, a one percentage point increase in the intensity of public housing built in the 1940s is correlated with a 4.7 percent decrease in median property values (compared to a 2.1 percent decrease in Table 1). These large effects of 1940s public housing are consistent with these units having increased time that the units had to affect community outcomes or, by 1970, being of lower quality due to prolonged lack of maintenance.

Public housing built in the 1960s has the second largest effects. A one percentage point increase in the intensity of public housing built in the 1960s is correlated with a 2.4 percent decrease in median property values. Similar increases in the intensity of public housing built in the 1940s and 1960s are correlated with a 3.5 and a 1.9 percent decrease in median family income, respectively. The magnitude of the point estimates for public housing built in the 1950s are consistent with it having negative effects on 1970 median income, population density, and the percent of low-income families, although the estimates for median income and the percent of low-income families are not statistically significant. However, the estimated coefficient on the effects of 1950s public housing construction on median property values is very low. The results are also weaker for public housing built in the 1930s. This could be due to

selection into the program, as only 88 of my 2973 counties completed public housing projects before 1940.

It is unclear why the results are weaker for public housing built in the 1950s, particularly given the criticism that many of the projects in large cities received during this decade. Because much of the criticism focused on high rises, which were concentrated in large cities, it is possible that these negative effects exist in metropolitan areas but are being suppressed by the non-metropolitan counties in my sample. To assess whether this pattern is also present in metropolitan areas, I estimate these regressions again, limiting my sample to counties within Standard Metropolitan Areas (SMAs) in 1950. Results are reported in Table 8. For this sample, public housing built in every decade appears to have an adverse and statistically significant effect on median income and the percent of low-income families. The results are also consistent with public housing built in the 1940s, 1950s, and 1960s having similar negative effects on median property value, however these coefficients are not statistically significant. The point estimate on public housing built in the 1930s is positive, although it also is not statistically significant.

5. Potential Mechanisms of Public Housing

5.1 Public Housing and Occupancy Tenure

It is difficult to decipher the channels through which public housing may have negatively affected outcomes in 1970, however one possibility is that the effects stem from an increase in the number of rental units. If public housing increases the supply of housing and this increase is not accompanied by an increased demand for housing, then property values could mechanically fall. Also, to the extent that homeowners are willing to pay a premium to live near other homeowners, public housing may lower property values if it decreases the share of owner-occupied units (Glaeser and Shapiro 2002). To assess whether the effects of public housing on property values are being driven by a change in rental housing, I first run equation (1) again, using the percent of owner-occupied housing in 1970 as my dependent variable. Next, I run the regressions for log median property values, log median family income, the percent of low-income families, and log population density again, controlling for the percent of owner-

occupied housing in 1970 (as well as pre-program characteristics and state fixed effects). The percent of owner-occupied housing in 1970 is likely endogenous to public housing, and so the coefficient on *PH* should not be interpreted as a causal effect of public housing intensity when the 1970 control is included. However, observing how the coefficient on public housing changes with the addition the endogenous control will shed light on whether the change in owner-occupied housing is driving the results in Table 1. If public housing negatively affected property values and other outcomes through increasing the share of rental units, then controlling for the percent of owner-occupied units will absorb the public housing "effect".

Results are reported in Table 9. Results in column 1 suggest that public housing is negatively correlated with the percent of owner-occupied units in 1970. A one percentage point increase in public housing intensity in 1970 is correlated with a 0.46 percentage point decrease in the percent of owner-occupied units in 1970 (statistically significant at the one percent level). I also find that the change in the percent of owner occupied units cannot explain the effects of public housing. Columns 2 through 5 report results for regressions of median property values, median income, the percent of low-income families, and population density, which control for the percent of owner-occupied housing in 1970. When I include this control, the point estimates for log median property value and log population density actually increase, and the point estimates of log median income and the percent of low-income families remain virtually unchanged. This suggests that the effects of public housing are not simply due to an increase in the supply of rental units.

5.2 Public Housing and Local Human Capital

Public housing may also affect outcomes by changing the characteristics of the population. While I cannot observe the characteristics of tenants living in public housing, differential changes in county education levels may give some insight into whether the effects worked through changes in the composition of the local population. First, I assess whether public housing is negatively associated with the 1970 education level of county residents, conditional on observables and state fixed effects (equation

(1)). Next, I assess whether public housing's negative correlation with economic outcomes is accounted for by variation in the local population's educational attainment, which could in turn be driven by differential changes in the education of local youth or by selective migration.

Results are reported in Table 10. In column 1, public housing has a strong negative conditional correlation with the percent of high school graduates in 1970. A one percentage point increase in public housing intensity is associated with a 0.57 percentage point decrease in the percent of high school graduates (statistically significant at the one percent level). Subsequent columns add the 1970 percent of high school graduates variable as a control in to the base regressions for property values, median income, low income, and population density. Controlling for 1970 educational composition reduces the coefficient on public housing by between one-third and one-half. For log median property values, controlling for the educational composition of the 1970 population causes the coefficient on public housing to fall from -0.021 (in base regression) to -0.011 (in Table 10), while the coefficient in the log median family income regression falls from -0.018 to -0.0012. The coefficient falls from 0.46 to 0.28 for the percent of families with low income, and falls from -0.044 to -0.029 for log population density. This pattern suggests that part, but not all, of the estimated effects of public housing on the outcome variables of interest might work through effects on the educational attainment of the local population.

5.2.1 Public Housing and Selective Migration

There are several ways in which public housing may have negatively affected educational attainment. As discussed earlier, it is possible that public housing lowered human capital by creating perverse education and labor market incentives for local residents. Or, public housing may have influenced human capital through selective migration, either by encouraging low education residents to move into the locality, or by encouraging high education residents to move out. To better understand the relationship between public housing and human capital, I assess whether places that adopted public housing had relatively larger (smaller) populations of high school dropouts (graduates) in 1970. If public housing created negative incentives for locals and/or encouraged the in-migration of low-human capital

residents, then the number of high school dropouts may be positively correlated with public housing. On the other hand, if public housing was simply encouraging the out-migration of high-human capital residents, then the number of high school dropouts need not be positively correlated with public housing. However, in this case public housing would be negatively correlated with high school graduates.

To assess the relationship between public housing and the population of low- and high-human capital residents, I run equation (1) again, using the log number of high school graduates and dropouts as my variables of interest. Results are reported in Table 11. The point estimates on public housing intensity in the regressions of the log number of high school graduates and the log number of high school dropouts in 1970 are -0.044 and -0.022, respectively (statistically significant at the one and five percent levels). This suggests that a one percentage point increase in public housing intensity is correlated with a 4.4 percent decrease in the population of high school graduates, but only a 2.2 percent decrease in the number of high school dropouts. I run the regressions again, this time controlling for the log number of high school graduates (dropouts) in 1960. The point estimates fall by approximately half, however both remain negative and statistically significant and the coefficient for the number of high school graduates is more than twice the magnitude of the coefficient for the number of high school dropouts. This is consistent with public housing encouraging the out-migration of both high- and low-education residents, however the low-education residents appear to leave more slowly than the high-education residents.

6. Conclusions

Federally-funded low-income public housing originated as a response to decades of concern about the quality of housing for the nation's poor. The program was controversial from its inception in the 1930s, and in the mid-1970s, construction of new public housing was temporarily halted as policy shifted toward a voucher system. It was widely believed that public housing projects had deteriorated into the slums that they were meant to replace. Nonetheless, most of the projects are still in operation, and a better understanding of their effects on adoptive communities would be valuable.

Using new data from the *Consolidated Development Directory*, I am able to estimate the effects of public housing on population and housing market outcomes for localities in the period up to 1970, before the major policy shift away from public housing construction. I find public housing to be negatively associated with 1970 county-level outcomes such as median income, median property values, the percent of low-income families, and population density. Further tests suggest that these results are causal. These effects are largest in metropolitan areas, however public housing appears to have negative effects on rural counties as well.

I also find that public housing had no measurable negative effect on outcomes in 1950 or 1960, suggesting that either long-run negative effects only began to emerge at that time, or that something specific about the 1960s interacted with public housing in a way that intensified negative spillovers to the locality. While it is difficult to decipher the exact channels through which public housing affected communities, I assess whether these public housing effects work through increases in the supply of rental housing or through changes in the educational composition of the population. I find that public housing is correlated with a slight decline in the percent of owner-occupied housing in 1970, however this change cannot account for the negative effects. I also find that public housing was negatively correlated with educational attainment in 1970 (controlling for 1940 levels), and that these compositional changes in the population account for a sizable fraction, but not all, of the public housing effect on other economic outcomes. This link does not appear to work through the attraction of low human-capital migrants. Further research will be necessary to uncover the nature of the strongly negative turn in public housing's association with local outcomes during the 1960s.

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Appendix A: Data

1. Data Sources

Public housing data comes from the *Consolidated Development Directory (CDD)*, published by the U.S. Department of Housing and Urban Development (1973). The *CDD* contains project-level information on the state and locality (generally this is the name of a city, although it is occasionally reported at the county level); project number; type of program at the latest stage of construction (e.g., Acquisition, Conventional new construction, Leased housing, Turnkey, PWA, Housing Act of 1937, National Defense housing (converted for low-income use), etc.); total and elderly units planned; total and elderly units completed; dates of initial and full occupancy. Housing built under the Indian Housing Program is included in the *CDD*, but excluded from the analysis. I assign each project to its county and aggregate the data in 1940, 1950, 1960, and 1970 by summing the total units of low-income housing in projects with full occupancy on or before those years.

The data for population density, median family income, median property values, and the percent of low-income families are from the 1947, 1952, 1962, and 1972 *County Data Book* files compiled by Haines (2004, file numbers 70, 72, 74, and 76). These files also include data for the percent of owner-occupied housing units in 1940 and 1970, median persons per room in rental units, percent of units in good condition, the percent of units with electricity, percent of units with water, percent urban, male median schooling, percent black, percent of the labor force in agriculture and manufacturing in 1940, the value of World War II contracts and facilities projects between 1940-1945, Standard Metropolitan Area (SMA) status and State Economic Area (SEA) in 1950, and the percent of high school graduates in 1960 and 1970.[25] Data for the percent of Baptists and Catholics comes from the 1952 *Survey of Churches and Church Membership* (Haines 2004, file number 57). Data for the percent of votes of Roosevelt in 1940 come from Leip (2009). Data on the population, black population, and number of dwelling units in 1900, 1910, 1920, and 1930 come from the 1900, 1910, 1920, and 1930 Census (Haines 2004, file numbers 20, 22, 24, and 26).

2. Boundary Changes and Data Merging

There were several instances in which there were significant county boundary changes between 1940 and 1970. For these cases, I combined counties (or independent cities and counties) to form consistent boundaries. Most of the cases occurred in Virginia, as a number of cities became independent cities during this period. A detailed description of combined localities is below.

<u>Virginia</u>

- Bedford City into Bedford County (1970): Bedford City became independent from Bedford County in 1968. I combined Bedford City and Bedford County in 1970.
- Colonial Heights City into Chesterfield County (1950, 1960, 1970): Colonial Heights City became independent from Chesterfield County in 1948. I combined Colonial Heights City and Chesterfield County in 1950, 1960, and 1970.
- Covington City into Alleghany County (1960, 1970): Covington City became independent from Alleghany County in 1952. I merged the two in 1960 and 1970.
- Emporia City into Greensville County (1970): Emporia City became independent from Greensville County in 1967. I merged the two in 1970.

[25] I use the percent of the labor force working on farms as a proxy for the percent of the labor force in agriculture in 1940.

- Fairfax City into Fairfax County (1970) and Falls Church City into Fairfax County (1950, 1960, 1970): Falls Church City and Fairfax City were both part of Fairfax County in 1940. Falls Church City became independent in 1948 and Fairfax City became independent in 1961. I merged Falls Church City and Fairfax County in 1950 and 1960 and merged Falls Church City, Fairfax City, and Fairfax County in 1970.
- Franklin City into Southampton County (1970): Franklin City became independent from Southampton County in 1961. I merged Franklin City and Southampton County in 1970.
- Lexington City into Rockbridge County (1970): Lexington City became independent from Rockbridge County in 1965. I merged the two in 1970.
- Norton City into Wise County (1960, 1970): Norton City became independent from Wise County in 1954. I merged the two in 1960 and 1970.
- Virginia Beach into Princess Anne County (1960, 1970): Virginia Beach became independent from Princess Anne County in 1952. In 1963, Princess Anne County was consolidated into Virginia Beach. I assigned Princess Anne to Virginia Beach in 1940 and 1950 and merged the two in 1960.
- Salem City into Roanoke County (1970): Salem City became independent of Roanoke County in 1968. I merged the two in 1970.
- South Boston City into Halifax County (1960, 1970): South Boston City became independent from Halifax County in 1960. I merged the two in 1960 and 1970.
- Waynesboro City into Augusta County (1970): Waynesboro City became independent of Augusta County in 1948. I merged the two in 1950, 1960, and 1970.
- Chesapeake City, Norfolk County, and South Norfolk City (1940, 1950, 1960): The City of South Norfolk and Norfolk County were consolidated to form Chesapeake City in 1962. Norfolk County and South Norfolk were merged in 1940, 1950, and 1960 and assigned to Chesapeake City.
- Newport News City and Warwick County (1940, 1950): Warwick County was consolidated with Newport News in 1958. I merged the two in 1940 and 1950.
- Galax City, Carroll County, and Grayson County (1940, 1950, 1960, 1970): Galax City became an independent city in 1954 and was formed from parts of Carroll and Grayson Counties. All three were merged for every period in the dataset.
- Warwick County and Newport News City (1940, 1950): Warwick County was consolidated into Newport News City in 1958. I merged Warwick County and Newport News in 1940 and 1950.

<u>New Mexico</u>

- Los Alamos County, Santa Fe County, Sandoval County (1940, 1950, 1960, 1970): Los Alamos County was formed in 1949 from parts of Santa Fe and Sandoval Counties. All three were merged for every period in the dataset.

<u>Large Cities</u>

- New York City reports public housing at the city level, and is located in Bronx County, Kings County, New York County, Queens County, and Richmond County. I merged these 5 counties for my analysis for all years.

- Kansas City, MO reports public housing at the city level, and is located in Cass County, Clay County, Jackson County, and Platte County. I merged these 4 counties for my analysis for all years.

Details on Merging:
When consolidating counties, I used the weighted average of the counties' values. For example, I weighted median owner-occupied property values by the number of owner-occupied units, median family income and the percent of low-income families by the number of families, the percent of the population 25 and up with a high school degree by the population 25 years and up, and the percent of owner-occupied units by total occupied units. Data for the variables used as weights come from the *County Data Books* (Haines 2004).

Table A.1: Summary Statistics

	Mean	standard deviation
Percent of public housing units 1970	0.8085	1.246
Percent of public housing units 1960	0.3230	0.7960
Percent of public housing units 1950	0.07604	0.3758
Ln median property value 1970	9.275	0.3580
Ln median family income 1970	8.888	0.2530
Percent of families with <$3,000 income 1970	16.67	8.396
Percent of female-headed households 1970	8.999	3.201
Ln density 1970	3.487	1.499
Percent of high school grads 1970	44.64	12.54
Percent of lf in manufacturing 1940	10.64	10.54
Percent of lf in agriculture 1940	23.31	13.18
Percent pop urban 1940	23.08	24.55
Percent units owner occupied 1940	49.94	11.67
Median persons per rental unit 1940	3.476	0.4067
Percent units good 1940	68.22	12.70
Percent units electricity 1940	53.64	24.22
Percent units water 1940	40.74	24.22
Ln median property value 1940	7.225	0.5807
Median years schooling, males 1940	7.750	2.037
Ln density 1940	3.377	1.311
Percent black 1940	10.66	17.78
Percent votes for Roosevelt 1940	60.50	20.25
Percent pop Baptist 1950	10.15	11.49
Percent pop Catholic 1950	11.11	15.73
Total Major War Supply Contracts ($000s) 1940-1945 per capita	0.3925	1.800
Total Major War Facilities Projects ($000s) 1940-1945 per capita	0.1750	0.7347
Observations	2973	

Appendix B: Sensitivity of OLS Results to Omitted Variable Bias

I assess the sensitivity of my results to omitted variable bias by adopting a technique formulated by Altonji, Elder, and Taber (2005). In Altonji, et al. (2005), the authors adopt a bivariate normal framework and assess the sensitivity of their results to omitted variables by running regressions with and without observable controls. The basic idea is that if the coefficient of the variable of interest is not sensitive to the inclusion (exclusion) of observable controls, then it is unlikely that the coefficient is sensitive to the inclusion (exclusion) of *unobservable* controls. Bellows and Miguel (2009) adapt this framework to fit a linear model.

Assume that 1970 community outcomes, Y_{1970}, are a function of public housing intensity, *PH*, and community characteristics, **Z**. I would like to estimate the function

$$Y_{1970} = \alpha + \beta PH + \mathbf{Z}'\boldsymbol{\lambda} + \varepsilon. \tag{B.1}$$

Suppose, however, that instead of observing **Z**, I can only observe **X**, where

$$\mathbf{Z} = \mathbf{X}'\boldsymbol{\theta} + \mathbf{Z}_{unobs}. \tag{B.2}$$

Instead of estimating equation (B.1), I estimate

$$Y_{1970} = \alpha + \beta_C PH + \mathbf{X}'\boldsymbol{\lambda} + \varepsilon. \tag{B.3}$$

The probability limit of $\hat{\beta}_C$ (where "$_C$" indicates a regression run with controls for X) is equal to the true value of β plus the omitted variable bias from the exclusion of Z_{unobs}:

$$\text{plim } \hat{\beta}_C = \beta + \gamma \text{ cov}(PH,\mathbf{Z}_{unobs}) / \text{var}(PH). \tag{B.4}$$

If I run the following regression with no controls,

$$Y_{1970} = \alpha + \beta_{NC} PH + \varepsilon, \tag{B.5}$$

then the probability limit of $\hat{\beta}_{NC}$ (where "$_{NC}$" indicates no controls) is equal to the true value of β plus the omitted variable bias from the exclusion of **Z**:

$$\text{plim } \hat{\beta}_{NC} = \beta + \gamma \text{ cov}(PH,\mathbf{Z}) / \text{var}(PH). \tag{B.6}$$

When I estimate equation (B.5) with no controls, the total omitted variable bias due to the exclusion of **Z** is equal to the sum of the omitted variable bias from the exclusion of **X** and the omitted variable bias from exclusion of $\mathbf{Z}_{unobs}$:

$$\gamma \text{ cov}(PH,\mathbf{Z}) / \text{var}(PH) = \gamma \text{ cov}(PH, \mathbf{X}'\boldsymbol{\lambda}) / \text{var}(PH) + \gamma \text{ cov}(PH,\mathbf{Z}_{unobs}) / \text{var}(PH). \tag{B.7}$$

While I cannot rule out omitted variable bias when I estimate β_C in equation (B.3), I would like to know how strong the covariance between *PH* and $\mathbf{Z}_{unobs}$ would have to be in order for omitted variable bias to be able to explain away the entire point estimate. To assess this, I do the following thought experiment:

Suppose that the true value of β is 0. If $\beta = 0$, then

$$\text{plim } \hat{\beta}_C = \gamma(\text{cov}(PH,\mathbf{Z}_{unobs}) / \text{var}(PH)). \tag{B.8}$$

The difference between plim $\hat{\beta}_{NC}$ and plim $\hat{\beta}_C$ can be written as:

$$\text{plim } \hat{\beta}_{NC} - \text{plim } \hat{\beta}_C = \gamma \text{ cov}(PH,\mathbf{Z}) / \text{var}(PH) - \gamma \text{ cov}(PH,\mathbf{Z}_{unobs}) / \text{var}(PH)$$

$$= \gamma \text{ cov}(PH, \mathbf{X}'\boldsymbol{\lambda}) / \text{var}(PH), \qquad \text{(B.9)}$$

and dividing both sides of equation (B.8) by equation (B.9) yields

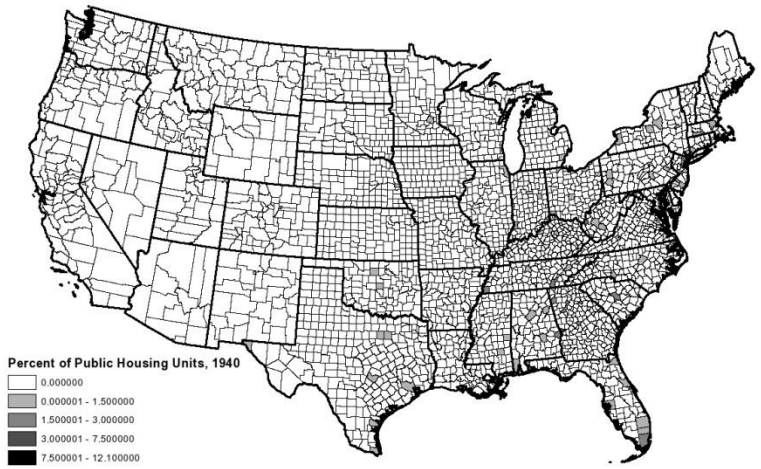
$$\text{plim } \hat{\beta}_C \text{ / (plim } \hat{\beta}_{NC} - \text{plim } \hat{\beta}_C) = \text{cov}(PH,\mathbf{Z}_{unobs}) / \text{cov}(PH, \mathbf{X}'\boldsymbol{\lambda}), \qquad \text{(B.10)}$$

which I refer to as the sensitivity ratio. The left-hand side can be estimated using estimated $\hat{\beta}$s from regressions with and without controls. The right-hand side is a measure of the necessary relative size of the covariance between *PH* and the *unobservable* portion of **Z** to the covariance between *PH* and the *observable* portion of **Z** (**X**) in order for the true effect of *PH* to be zero. More simply, it is the ratio of selection on *unobservables* relative to selection on observables, if the true effect of *PH* is zero (Altonji, et al. 2005, p. 177).

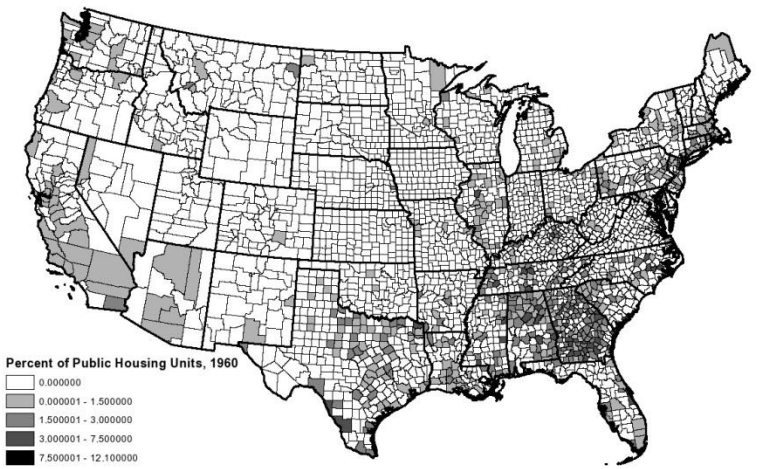
Altonji, Elder, and Taber (2005) argue that "…the ratio of selection on unobservables relative to selection on observables is likely to be less than one…(p. 176-177)". Therefore, if the sensitivity ratio is between zero and one, it is possible that selection on unobservables can explain the result. On the other hand, if the sensitivity ratio is *greater* than 1, then it is unlikely that omitted variable bias can explain the entire result.

The intuition behind this technique is that if the addition of observable controls largely diminishes the coefficient of interest, then it is possible that the addition of unobservable controls may diminish the coefficient even further. On the other hand, if the addition of observable controls does not influence the coefficient of interest, then it is unlikely that the addition of unobservable controls would push the coefficient all the way to zero. In my regressions, I find that the addition of controls does *not* diminish the estimated coefficient on public housing. In fact, the addition of controls causes the coefficient to change signs and become statistically significant. In order for the true effect of public housing to be zero, the addition of unobservables would have to push the coefficient of public housing in the *opposite* direction as my large set of control variables, and do so in a similar magnitude. I argue that this is unlikely, and therefore the true effects of public housing are not likely to be zero.

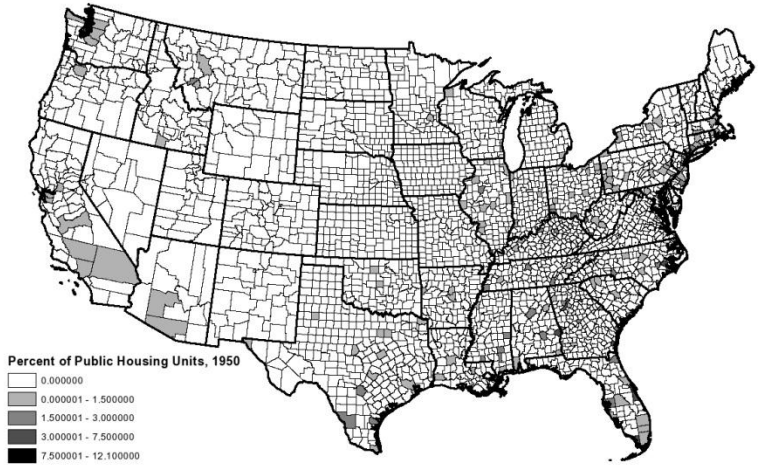
Figure 1: The Diffusion of Public Housing, 1940-1970



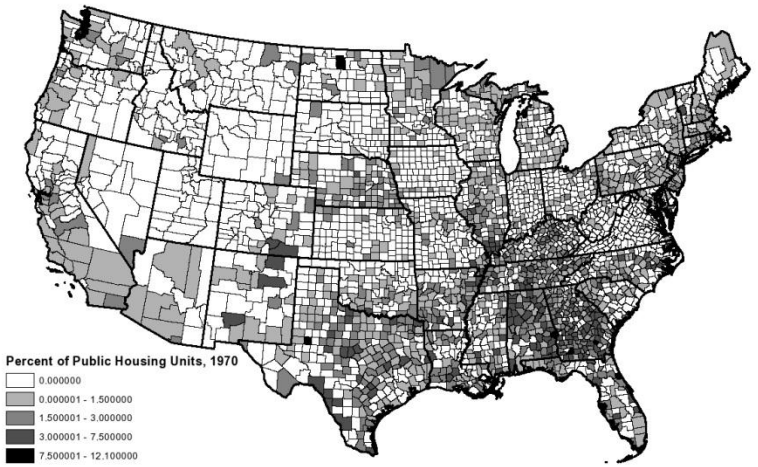
1940



1960



1950



1970

Notes: Percent of Public Housing Units is defined as public housing units / total occupied units * 100 for each year.
Sources: Public housing data are from the *Consolidated Development Directory* (HUD 1973). Total occupied units are from the Census of Housing (Haines 2004).

Table 1: County-Level Economic Outcomes and Public Housing in 1970, with State Fixed Effects

	Ln median property value	Ln median family income	Percent of families with <$3,000 income	Ln population density
Public Housing Intensity	-0.02079***	-0.01843***	0.4637***	-0.04361***
	(0.004805)	(0.002836)	(0.1073)	(0.006382)
Observations	2973	2973	2973	2973
R-squared	0.68	0.76	0.77	0.95

Notes: Each column reports results from a separate regression. Public housing intensity is defined as public housing units in 1970 / total occupied units in 1970 * 100. Standard errors are reported in parentheses and are clustered by state. I control for 1940 housing stock characteristics: percent owner occupied housing, median persons per room in rental units, percent of units in good condition, percent of units with electricity, percent of units with water, log median value;1940 population characteristics: percent urban, male median schooling, log population density, percent black and percent black squared; 1940 economic characteristics: percent of the labor force employed in manufacturing, percent of the labor force employed in agriculture, the value of World War II contracts between 1940 and 1945 per capita, the value of war facilities projects per capita between 1940 and 1945; and some social and political characteristics: the percentage of votes for Roosevelt in 1940 and percentages of Baptists and Catholics in 1950. State fixed effects are included in all the regressions.
Sources: County population and housing data are from Haines (2004). Data on 1940 presidential election results are from Leip (2009). Public housing data are from the *Consolidated Development Directory* (HUD 1973).

Table 2: County-Level Economic Outcomes and Public Housing in 1970, with SEA Fixed Effects

	Ln median property value	Ln median family income	Percent of families with <$3,000 income	Ln population density
Public Housing Intensity	-0.01344***	-0.01229***	0.3496***	-0.02648***
	(0.003307)	(0.002217)	(0.07165)	(0.005752)
Observations	2973	2973	2973	2973
R-squared	0.79	0.85	0.84	0.97

Notes: Estimated coefficients on public housing intensity (defined as public housing units in 1970 / total occupied units in 1970 * 100) are reported in each column. State Economic Area fixed effects are included. Standard errors are reported in parentheses and are clustered by state. See notes to Table 1 or text for a list of the independent variables.
Sources: County population and housing data are from Haines (2004). Data on 1940 presidential election results are from Leip (2009). Public housing data are from the *Consolidated Development Directory* (HUD 1973).

Table 3: County-Level Economic Outcomes and Public Housing in 1970,with Pre-Program Trends

	Ln median property value	Ln median family income	Percent of families with <$3,000 income ($2,000 in 1950)	Ln population density
Public Housing Intensity, 1970	-0.01965***	-0.01984***	0.5213***	-0.03942***
	(0.005392)	(0.003183)	(0.1125)	(0.007656)
1900-1940 trends	Y	Y	Y	Y
Obs.	2322	2322	2322	2322
R-squared	0.72	0.79	0.80	0.96
Public Housing Intensity, 1970	-0.02217***	-0.01960***	0.4942***	-0.04614***
	(0.005454)	(0.003022)	(0.1127)	(0.007284)
1900-1940 trends	N	N	N	N
Obs.	2322	2322	2322	2322

Notes: Estimated coefficients on public housing intensity (PH units 1970 / total occupied units 1970 * 100) are reported in each column. State fixed effects are in each regression. Standard errors are reported and are clustered by state. See Table 1 or text for a list of independent variables.
Sources: County population and housing data are from Haines (2004). Data on 1940 presidential election results are from Leip (2009). Public housing data are from the *Consolidated Development Directory* (HUD 1973).

Table 4: Regressions with and without Controls and Omitted Variable Sensitivity Ratios

	Ln median property value	Ln median family income	Percent of families with <$3,000 income	Ln population density
		OLS Results, No Controls		
Public Housing Intensity	0.007052	0.002288	-0.02480	0.2168***
	(0.01305)	(0.008755)	(0.3104)	(0.04077)
		OLS Results, With Controls		
Public Housing Intensity	-0.02079***	-0.01843***	0.4637***	-0.04361***
	(0.004805)	(0.002836)	(0.1073)	(0.006382)
RATIO	**-0.75**	**-0.89**	**-0.95**	**-0.17**

Notes: Estimated coefficients on public housing intensity (defined as public housing units in 1970 / total occupied units in 1970 * 100) are reported in each column. State fixed effects are included. Standard errors are reported in parentheses and are clustered by state. See notes to Table 1 or text for a list of the independent variables. Ratios are calculated as β_C / (β_{NC} - β_C), where β_C is the estimated coefficient of the percent of public housing units in 1970 in a regression with controls and β_{NC} is the estimated coefficient of the percent of public housing units in 1970 in a regression with no controls.
Sources: County population and housing data are from Haines (2004). Data on 1940 presidential election results are from Leip (2009). Public housing data are from the *Consolidated Development Directory* (HUD 1973).

Table 5: Urban and Rural County Regressions

	Ln median property value	Ln median family income	Percent of families with <$3,000 income	Ln population density
Rural Counties				
Public Housing Intensity	-0.01652***	-0.01727***	0.4877***	-0.03931***
	(0.004860)	(0.003884)	(0.1252)	(0.006217)
Observations	1747	1747	1747	1747
R-squared	0.58	0.70	0.73	0.93
Urban Counties				
Public Housing Intensity	-0.02096***	-0.02041***	0.5084***	-0.03586***
	(0.005988)	(0.002921)	(0.1010)	(0.01308)
Observations	1226	1226	1226	1226
R-squared	0.75	0.79	0.79	0.96
Counties in SMA in 1950				
Public Housing Intensity	-0.02339*	-0.02905***	0.8558***	-0.09629***
	(0.01195)	(0.007086)	(0.1937)	(0.02864)
Observations	266	266	266	266
R-squared	0.81	0.85	0.86	0.95

Notes: Estimated coefficients on public housing intensity (PH units 1970 / total occupied units 1970 * 100) are reported in each column. "Rural"("Urban") is defined as having less (more) than 25 percent urban population in 1940. State fixed effects are in each regression. Standard errors are reported and are clustered by state. See Table 1 or text for a list of independent variables.

Sources: County population and housing data are from Haines (2004). Data on 1940 presidential election results are from Leip (2009). Public housing data are from the *Consolidated Development Directory* (HUD 1973).

Table 6: County-Level Economic Outcomes and Public Housing in 1950 and 1960

	Ln median property value	Ln median family income	Percent of families with <$3,000 income ($2,000 in 1950)	Ln population density
1960				
Public Housing Intensity	-0.001532	0.0007417	0.1807	-0.005928
	(0.004948)	(0.007663)	(0.3491)	(0.007463)
Obs.	2926	2926	2926	2926
R-squared	0.70	0.83	0.85	0.97
1950				
Public Housing Intensity	0.0007526	0.02166	-0.5075	0.01664**
	(0.01018)	(0.01365)	(0.5138)	(0.007849)
Obs.	2926	2926	2926	2926
R-squared	0.85	0.88	0.89	0.99
1970, same sample, for comparison				
Public Housing Intensity	-0.02109***	-0.01852***	0.4716***	-0.04433***
	(0.004791)	(0.002763)	(0.1054)	(0.006419)
Obs.	2926	2926	2926	2926
R-squared	0.70	0.77	0.77	0.95

Notes: Estimated coefficients on public housing intensity (defined as public housing units in 1950 (60) / total occupied units in 1950 (60) * 100) are reported in each column. State fixed effects are in each regression. Standard errors are reported in parentheses and are clustered by state. See Table 1 or text for a list of independent variables.
Sources: County population and housing data are from Haines (2004). Data on 1940 presidential election results are from Leip (2009). Public housing data are from the *Consolidated Development Directory* (HUD 1973).

Table 7: 1970 OLS Results, Using 1960 Public Housing

	Ln median property value	Ln median family income	% of families with <$3,000 income	Ln population density
Panel A				
Public Housing Intensity, built pre-1960	-0.01539**	-0.01753**	0.4795*	-0.04502***
	(0.006544)	(0.006984)	(0.2789)	(0.01163)
Observations	2973	2973	2973	2973
R-squared	0.68	0.76	0.77	0.95
Panel B				
Public Housing Intensity, built pre-1960	-0.01518**	-0.01736**	0.4754	-0.04463***
	(0.006737)	(0.007262)	(0.2841)	(0.01204)
Public Housing Intensity, built 1961-1970	-0.02339***	-0.01892***	0.4583***	-0.04314***
	(0.005649)	(0.002719)	(0.07692)	(0.008191)
Observations	2973	2973	2973	2973
R-squared	0.69	0.76	0.77	0.95

Notes: Public housing intensity built pre-1960 is defined as (# public housing units built by 1960 / total occupied units in 1970 * 100). Public housing intensity built 1961-1970 is defined as (# public housing units built by 1961-1970 / total occupied units in 1970 * 100). Standard errors are reported in parentheses and are clustered by state. See notes to Table 1 or text for independent variables.
Sources: County population and housing data are from Haines (2004). Data on 1940 presidential election results are from Leip (2009). Public housing data are from the *Consolidated Development Directory* (HUD 1973).

Table 8: County-Level Economic Outcomes and Public Housing in 1970, By Decade of Construction

	Ln median property value	Ln median family income	% of families with <$3,000 income	Ln population density
Full Sample: Public Housing Intensity of Units:				
Built in 1960s	-0.02351***	-0.01900***	0.4603***	-0.04314***
	(0.005588)	(0.002711)	(0.07643)	(0.008159)
Built in 1950s	-0.006456	-0.01224	0.3206	-0.04286***
	(0.009579)	(0.01095)	(0.4035)	(0.01582)
Built in 1940s	-0.04724***	-0.03477***	1.0480***	-0.05437**
	(0.01374)	(0.006815)	(0.2946)	(0.02188)
Built in 1930s	0.006701	-0.01228	0.06543	-0.02249
	(0.03680)	(0.01423)	(0.5823)	(0.05498)
Observations	2973	2973	2973	2973
R-squared	0.69	0.76	0.77	0.95
Counties in SMA 1950: Public Housing Intensity of Units :				
Built in 1960s	-0.02687	-0.02601***	0.5895**	-0.1234**
	(0.01991)	(0.008485)	(0.2891)	(0.04686)
Built in 1950s	-0.02434	-0.03014**	0.8171**	-0.1234**
	(0.02028)	(0.01347)	(0.3475)	(0.05017)
Built in 1940s	-0.02833	-0.02720*	1.276***	-0.05497
	(0.03453)	(0.01545)	(0.3506)	(0.07329)
Built in 1930s	0.02787	-0.04962*	1.146*	0.1062
	(0.03767)	(0.02496)	(0.6301)	(0.09138)
Observations	266	266	266	266
R-squared	0.81	0.85	0.87	0.96

Notes: Public housing intensity built in each decade is defined as (# public housing units built in the 1930s (or 40s, 50s, 60s) / total occupied units in 1970 * 100). Standard errors are reported in parentheses and are clustered by state. See notes to Table 1 or text for independent variables.
Sources: County population and housing data are from Haines (2004). Data on 1940 presidential election results are from Leip (2009). Public housing data are from the *Consolidated Development Directory* (HUD 1973).

Table 9: 1970 OLS Results, Role of Tenant Structure

	Percent of Owner-Occupied Units	Ln median property value	Ln median family income	Percent of families with <$3,000 income	Ln population density
Public Housing Intensity	-0.4586***	-0.02515***	-0.01841***	0.4646***	-0.04969***
	(0.09826)	(0.004776)	(0.002792)	(0.1069)	(0.006621)
Percent owner-occupied units in 1970?	No	Yes	Yes	Yes	Yes

Notes: Estimated coefficients on public housing intensity (defined as public housing units in 1970 / total occupied units in 1970 * 100) are reported in each column. Standard errors are reported in parentheses and are clustered by state. See notes to Table 1 or text for independent variables.
Sources: County population and housing data are from Haines (2004). Data on 1940 presidential election results are from Leip (2009). Public housing data are from the *Consolidated Development Directory* (HUD 1973).

Table 10: 1970 OLS Results, Role of Changing Population Composition

	Percent of high school graduates	Ln median property value	Ln median family income	Percent of families with <$3,000 income	Ln population density
Public Housing Intensity	-0.5683***	-0.01059**	-0.01185***	0.2776***	-0.02911***
	(0.1371)	(0.004114)	(0.002187)	(0.08607)	(0.005451)
Percent of high school grads 1970?	No	Yes	Yes	Yes	Yes

Notes: Estimated coefficients on public housing intensity (defined as public housing units in 1970 / total occupied units in 1970 * 100) are reported in each column. Standard errors are reported in parentheses and are clustered by state. See notes to Table 1 or text for independent variables. Sources: County population and housing data are from Haines (2004). Data on 1940 presidential election results are from Leip (2009). Public housing data are from the *Consolidated Development Directory* (HUD 1973).

Table 11: Population of High School Graduates and Dropouts, 1970

	Ln high school graduates	Ln high school dropouts	Ln high school graduates	Ln high school dropouts
Public Housing Intensity	-0.04428***	-0.02161**	-0.01956***	-0.008431***
	(0.01123)	(0.01056)	(0.004168)	(0.002415)
Ln high school graduates (dropouts) 1960 included?	No	No	Yes	Yes
Observations	2973	2973	2973	2973
R-squared	0.83	0.82	0.98	0.98

Notes: Estimated coefficients on public housing intensity (defined as public housing units in 1970 / total occupied units in 1970 * 100) are reported in each column. Standard errors are reported in parentheses and are clustered by state. See notes to Table 1 or text for independent variables.
Sources: County population and housing data are from Haines (2004). Data on 1940 presidential election results are from Leip (2009). Public housing data are from the *Consolidated Development Directory* (HUD 1973).