AMERICAN PUBLIC HOUSING'S ORIGINS AND EFFECTS

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INTRODUCTION

The United States built approximately 1.1 million public housing units between 1933 and 1977 (HUD 1977). 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 (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 slums. Participation in the program was widespread and by 1970, nearly half (over 1,400) of the counties in the United States had built public housing.

By the mid-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 (Hirsch 1983, Hunt 2001, Husock 2003, Meehan 1979, von Hoffman 2000). The prevailing view of public housing had shifted away from the optimistic tone of the early advocates, and many believed that public housing projects *encouraged* crime and vice, established negative employment incentives, and intensified the negative effects of poverty and segregation by concentrating the poor geographically. The federal government halted funding for new public housing projects and created a system of rent vouchers for low-income families ("Section 8"). By this time, the federal government had funded the construction of over 1 million units in the United States.

Some of the most notorious large-scale public housing projects have been demolished in recent years, but most of the original public housing projects are still in operation today.[1]

There is still much to learn about this extraordinary and long-lived effort to improve housing conditions and neighborhood environments for the poor. The origins and diffusion patterns of public housing have not been well documented, let alone studied in a multivariate context, and the effects of public housing are not well understood, especially earlier on.[2] Understanding the rise and (slow) fall of the American public housing program is important for understanding the economic history of cities and their high levels of residential segregation by race and income, the economic status of racial minorities, and the economics and history of public policy responses to perceived shortages of "decent" and "affordable" housing.

This dissertation documents the diffusion and effects of public housing during the period of the program's expansion, from 1933 to 1973.[3] I begin with a historical account

[1] Since the 1970s, many cities have torn down public housing high rises (Philadelphia has torn down 21, Chilcago, 79, Baltimore, 21). Atlanta, for example, recently announced its plans to tear down all of its projects and replace them with mixed income housing (Brown 2009). New York announced its plan to knock down its first public housing high rise project in 2010 (Fernandez 2010).

[2] Recent work has examined the effects of public housing on the concentration of poverty (e.g. Carter, et al 1998, Massey and Kanaiaupuni 1993), property values (e.g. Lee, et al. 1999, Rabiega, et al. 1984), education (e.g. Currie and Yelowitz 2000, Jacob 2004), intra-urban mobility (e.g. Painter 1997), crime (e.g. Farley 1982, McNulty and Holloway 2000, Roncek, et al. 1981), and labor supply (e.g. Yelowitz 2001). However, much of this work is for the 1990s or later and often for large cities. There is a large historical literature on public housing during this period, but most of it is also city-specific. Fuerst (2003), Hirsch (1983), and Venkatesh (2000) focus on Chicago, Williams (2004) focuses on Baltimore, and Meehan (1979) focuses on St. Louis. Weaver (1948) discusses African American housing issues of the North. King (1996) discusses the impact of federal housing policies on African Americans.

[3] I end my analysis in 1973 for two reasons. The first is that immediately after President Nixon placed a temporary moratorium on public housing construction in 1973, Section 8 vouchers were introduced. Vouchers represented a major policy shift away from project-based subsidies toward tenant-based subsidies, and they allowed for the diffusion of residents throughout localities in a more complex way than assignment to specific projects did. The second reason is more practical. The 1973 version of the *Consolidated Development Directory* was the most long-run,

of the origins and details of the public housing program (Chapter II). I then compile a comprehensive dataset of public housing diffusion covering the entire United States between 1940 and 1970 (Chapter III). I find a great deal of inter- and intra-regional variation in the adoption and intensity of public housing programs during this period. The Northeast and (perhaps surprisingly) the South were clear leaders in public housing participation, however participation in the Midwest and West also grew throughout the period. Chapter IV takes a closer look at the diffusion of public housing by empirically assessing the pre-existing community characteristics that were associated with rapid public housing adoption. I find that early public housing adoption and public housing intensity is positively correlated with large urban populations and poor housing conditions. More Democratic communities and communities with larger African American populations were also more likely to adopt public housing quickly and with greater intensity.

Chapter V assesses the effects of public housing intensity on county-level outcomes in 1970, at the peak of the public housing program. Conditional on state fixed effects and an extensive set of pre-program observable characteristics, I find that communities with high densities of public housing had significantly worse economic outcomes in 1970 in several dimensions: lower median family income, lower median property values, lower population densities, a higher percentage of families with low income, and a higher percentage of female-headed households. A variety of further tests (assessing the potential scope for omitted variable bias, employing fixed effects for areas

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comprehensive dataset on public housing availability that I could locate. Communication with John Goering, a former research director at HUD, indicated that HUD did not keep up with this dataset and communication with HUDUSER indicated that they kept no archives of *CDD* publications nor did they maintain other historical project or city-level public housing data.

much smaller than states, and using an instrumental variable) suggest that these empirical links are causal.

Next, I assess whether these public housing effects worked through a "human capital channel" and whether similar effects were present in 1950 or 1960 (Chapter VI). I find that public housing intensity is correlated with lower human capital in 1970 and that controlling for 1970 education does explain part, but not all of the public housing effect. However, I find no correlation between public housing intensity and the in-migration of low-human capital residents. Interestingly, I find no evidence of negative public housing effects in 1950 or 1960, implying that long-run negative effects only became apparent in the 1960s, or that decade-specific factors interacted with public housing in a way that intensified negative local spillovers.

I continue my analysis of public housing effects in Chapter VII by assessing the effects of public housing exposure on women's childbearing and household headship decisions. By increasing the availability of low-cost housing and imposing certain incentives regarding income limits, the public housing program might have encouraged young women to have children out of wedlock and head their own households. Controlling for individual- and MSA-level characteristics, I find that local public housing intensity is associated with a slightly higher probability that young black women are single mothers in 1950 and 1970. This relationship becomes stronger when looking only at individuals with less than a high school degree. The link between public housing and female household headship is weaker, but consistent with public housing exposure increasing the probability of household headship for females with less than a high school degree. I conclude my analysis in Chapter VIII.

CHAPTER II

A BRIEF HISTORY OF AMERICAN PUBLIC HOUSING

The federal public housing program began in the 1930s after decades of concern over 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. For example, as early as 1911, Edith Elmer Wood, a Washington, DC public housing advocate, argued that the private sector would not provide housing for the poor because it was too difficult to make profits while meeting sanitation requirements and keeping the units affordable. Before a Senate subcommittee investigating inhabited alleyways in the District of Columbia, she argued that "private philanthropy has had from the beginning of time until now to solve the problem of housing the poor and it has never done so in any place at any time" (Radford 1996, p. 36). According to this logic and in the presence of assumed externalities, it was up to the government to provide better housing for the poor.

American municipal reformers and city planners were influenced by the active policies of European governments that sought to subsidize affordable housing for low and middle-income residents. After World War I, several European cities bought land on their peripheries and developed low-rent housing in an attempt to curb land speculation that increased the cost of housing. This movement accelerated over time and between World War I and 1933, European countries had built over 4.5 million units of such housing (Radford 1996). In light of the perceived success of the European programs,

American reformers pushed for "constructive housing reform" both privately and through Congress.[4]

1. From World War I to New Deal Legislation

Dislocations associated with World War I brought housing concerns to the forefront of US domestic policy. In particular, the surge of industrial demand for labor in urban areas led to a housing shortage. The capital demands of expanding industry and war finance made it difficult for developers to obtain financing for residential construction. The number of newly constructed residential units fell by half between 1916 and 1917, and fell by half again between 1917 and 1918 (Radford 1996). In 1918, the government restricted "nonessential" construction but approved the construction of housing for war workers. The Labor Department created the U.S. Housing Corporation (USHC) and gave it the authority to build 25,000 family dwellings, but by the end of the war, the USHC had completed fewer than 6,000, and these were sold off to private buyers. The U.S. Shipping Board was also authorized to build family housing for war industry workers, and it established the Emergency Fleet Corporation (EFC) to build temporary housing for approximately 9,000 families (Radford 1996). Together, the EFC and the USHC completed approximately 15,000 family units and nearly an additional 15,000 units for single males (Fisher 1959). While the temporary housing eased the

[4] Housing reformers were instrumental in encouraging labor unions to build low-rent residential developments for their members. In 1925, the International Ladies Garment Workers Union, along with a consortium of other New York needle trade unions, began work on a cooperative apartment building in the Bronx. The United Workers Union and the Amalgamated Clothing Workers of America also built housing for its members in the 1920s. The American Federation of Hosiery Workers in Philadelphia built units for its members using loans from the PWA in 1933 (Radford 1996).

shortage felt by the war industries, vacancy rates were extremely low in large cities by the end of the war.

When the ban on "nonessential" construction was lifted, residential construction took off and continued to grow throughout the mid-1920s. However, the active real estate market of the 1920s did not provide housing directly to poor families. An increasing percentage of new housing built in the 1920s was aimed at the high-income end of the market and, on average, builders spent 21 percent more per unit in 1929 than they had in 1922 (Radford 1992).[5] To the extent that the poor benefitted from the housing boom, it was through a process of "filtering down" of older housing stock. The housing situation for blacks in the North, in particular, was made worse by the migration of approximately 1.75 million blacks from the South between 1910 and 1940. Most relocated in large urban areas and because black residential areas were often circumscribed by strong discriminatory norms, this put a great strain on the supply of existing housing stock.[6]

Bolstering the post-World War I efforts of housing reformers, the American Federation of Labor promoted the direct involvement of government in the construction of low-cost housing in the 1920s, but federal policymakers were not swayed. In 1926,

[5] The evolution of financial markets, such as the creation of mortgage bonds, in the 1920s made it easier for developers to get financing for large- and up-scale projects. This encouraged a focus on high-end developments, where profits were highest (Radford 1996).

[6] As early as 1915, there was a large increase in the demand for housing for African Americans, but housing construction came to a halt with the United States' entry into World War I. By the 1920s, many whites were moving to the suburbs but blacks were still limited to black areas of the city and as the Black Belts reached full capacity, many landlords remodeled black apartments to create much smaller kitchenette apartments, many without their own bathroom. Even during the Great Depression when unemployment was high and black unemployment was even higher, blacks continued to migrate to the Northern urban centers, exacerbating the growing housing shortage. By 1940, Chicago's main black community housed 50,000 more people than its capacity (Weaver 1948). The extreme overcrowding and poor construction of smaller, make-shift apartments lead to rapid deterioration of the existing housing stock.

Benjamin Rosenthal, a housing reformer in Chicago, said "the situation in Chicago is worse than ever," and Elizabeth Hughes, director of the Bureau of Social Research for Chicago, said that "the tenants instead of the landlords should be paid because of the constant risk to health and limb which the houses force on their occupants daily." These sentiments were echoed in other cities, and in 1929, Bleecker Marquette, director of the Cincinnati Better Housing League, acknowledged that despite their reform efforts of 25 years, "little progress… has been made in getting rid of what is commonly called slum conditions" (Radford 1996).

The Great Depression brought an extraordinary expansion of federal activity and a long-lived swing of political power toward the Democratic Party. This re-orientation allowed public housing to become a significant and entrenched federal policy. Mary Kingsbury Simkhovitch, the head of the National Public Housing Conference, and Father John O'Grady, Secretary of the National Conference of Catholic Charities, pleaded with Senator Robert Wagner (NY) to add public housing to the National Industrial Recovery Act (NIRA) bill of 1933.[7] The NIRA legislation was passed quickly even with the addition of public housing, which is likely due to large changes in the composition of the Congress in 1932. Seats in the House of Representatives were reapportioned for the first time in twenty years, and the Congress voted into office in 1932 represented twenty years of demographic change. Congress was flooded with Northern, urban, and liberal Democrats, as Democrats gained 90 seats in the House and 13 seats in the Senate. Non-Southern Democrats represented a working majority in the House, making it comparatively easy for the NIRA legislation, including public housing, to pass (Radford

[7] The National Public Housing Conference (NPHC) was established in 1931 to promote a permanent public housing program.

1996).[8] Between 1933 and 1937, the Public Works Administration (PWA) built 21,640 units in 36 metropolitan areas (Coulibaly et al. 1998). One-third of the units were occupied by African Americans, and 60 percent of the units were located in the South.

Initially, the Housing Division of the PWA primarily built public housing on slum-clearance sites that they either purchased or condemned, as they were authorized to do under the NIRA. In 1935, however, a district court and the Sixth Circuit of Appeals decided in *United States v. Certain Lands in the City of Louisville* that the federal government did not have the power of eminent domain for slum clearance or public housing. They argued that the federal government could only implement the use of eminent domain if the land was going to be used by a public agency performing a statutory or constitutional purpose (Garvin 2002). Afterwards, the Housing Division proceeded to build projects on vacant land. In 1936, however, a New York court decided in the case of *New York City Housing Authority v. Muller* that *local* authorities did have the right to use the power of eminent domain in the construction of public housing and further use of slum sites for public housing therefore depended on the degree of local participation in the program (Fisher 1959).

Support for public housing continued to grow in social activist and urban planner circles after the NIRA was passed. Catherine Bauer, a leading supporter of public housing during this time, began writing her book *Modern Housing* in 1933, in which she

[8] The first national plan for federally funded low-income housing was created in 1932, when President Hoover gave the Reconstruction Finance Corporation (RFC) the power to make loans to limited-dividend corporations to provide housing for low-income families. President Roosevelt transferred the program from the RFC to the Public Works Agency (PWA) in 1933, but ultimately the rents were expected to be too expensive for low-income families and the program was terminated in 1934. While several states passed the necessary enabling legislation for participation in the program, New York was the only state with limited-dividend corporations and the RFC only financed one project (Weicher 1980).

wrote about the "success" of the European public housing programs (e.g., comprising over 70 percent of new residential construction between World War I and 1933). She believed that housing was a political issue and that the government should build housing not just for low-income families, but for middle-income families, as well. Bauer became the executive secretary of the Labor Housing Conference (LHC) in 1934 and played an active role in gaining the support of unions in the housing movement (Radford 1996).[9]

2. The Expansion of Public Housing, 1937-1949

Between 1935 and 1937, Congress tried to create and pass additional public housing legislation. Builders and labor unions, public health officials, urban reformers, and many housing analysts lobbied in favor of public housing construction.[10] The labor unions argued that it would increase employment and stimulate the economy, while public health officials and urban reformers believed that slum clearance would have health and social benefits. 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 a public housing bill (Fisher 1959). The National Association of Real Estate Boards was concerned that

[9] The Labor Housing Conference was first organized in 1934 by supporters of trade unionists in the Philadelphia area who supported a large-scale program of worker-initiated housing developments. In its first year, the LHC made a resolution to the American Federation of Labor that proposed local, state, and federal financing for large-scale housing developments that were to be constructed and administered with help from worker and consumer groups (Radford 1996).

[10] Educational, labor, public welfare, religious, and veterans' groups also supported public housing. Support came from the American Association of University Women, AFL-CIO, 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).

renting from the government would be so attractive that it would push out the private market. Others argued that it would only offer housing to a privileged few, that it would not create housing for the poorest families, and that public housing could face an unlimited demand and destroy market incentives (Fisher 1959). The Lumber Dealers, however, primarily 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).

Senator Wagner was influential in the construction of housing bills in 1935, 1936, and 1937. The Labor Housing Conference began working directly with Wagner in 1935 by critiquing the proposal and then helped rewrite the proposal in both 1936 and 1937 (Radford 1996). In 1937, Congress passed the Wagner-Steagall Act (the Housing Act of 1937) which established the public housing program and replaced the Housing Division of the PWA with the United States Housing Authority (USHA). However, by the time it was passed, amendments had weakened the bill.[11] Construction costs were required to be very low, public housing was only to be available to the lowest income groups, and it was required that for every unit of housing that was built, an another unit of slum housing must be removed (Radford 1996).[12]

The goals of the 1937 Housing Act 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,*

[11] In the 1960s, Charles Abrams, a long-time advocate of public housing, said that "in retrospect, I believe that the compromises that were made in the 1937 debate on the public housing measure lastingly impaired it and will ultimately contribute to its demise" (Radford 1996, p.190).
[12] The Labor Housing Conference, which helped Wagner write the bills, did not want public housing limited to the very poor, but wanted moderately-priced housing for the middle class as well (Radford 1996).

and for the reduction of unemployment and the stimulation of business activity, to create a United States Housing Authority, and for other purposes" (Housing and Home Finance Agency 1964).[13] The Wagner-Steagall Act delegated the clearance and construction of projects to local Public Housing Authorities (PHAs) and the USHA then assisted the PHAs by giving them loans to cover up to 90 percent of the costs of constructing the public housing projects and by giving them annual subsidies to make up the difference of the operating and amortization costs of the projects and the rent revenue (Coulibaly et al. 1998).[14] Rents were supposed to cover the operating costs of a unit, and tenant income was required to be large enough to cover these costs but limited to five times the rental value (Weicher 1980). The Housing Act of 1937 also introduced the equivalent-elimination requirement, which required that a number of unsafe or insanitary units equal to the number of new public housing units be "eliminated" either through demolition, condemnation, effective closing, or repair and improvement (Fisher 1959).[15]

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[13] Preliminary paragraphs that were removed from the final draft stated that "*There exist in urban and rural communities throughout the United States slums…accompanied and aggravated by an acute shortage of decent, safe, and sanitary dwellings within the financial reach of families of low income. These conditions are inimical to the general welfare of the Nation by (a) encouraging the spread of disease…; (b) increasing the hazards of fires (and) accidents…; (c) subjecting the young to bad influences; (d) increasing the violation of the criminal laws of the United States…; (e) impairing industrial and agricultural productive efficiency; (f) lowering the standards of living of large portions of the American people; (g) necessitating a vast…expenditure of public funds…for crime prevention, punishment and correction, fire prevention, public health service, and relief…"* (Fisher 1959).

[14] In 1968, loans were increased to cover 100 percent of the costs (Weicher 1980). Once a PHA was established, it had to get project proposals approved federal government, and in some cases the local government (depending on state legislation) before construction could begin (Bingham 1975). Under the "conventional bid method", local public agencies must first apply for a program reservation and the federal government must approve this application. Next, the PHA and the federal government agree on a preliminary loan contract for surveys and planning. The PHA and HUD must then agree on an annual contributions contract, the PHA acquires the site(s), and advertises and awards construction contracts. Construction then begins and finally the housing project is fully opened (Aiken and Alford 1970, Woodbury 1940, p.2).

[15] The provision did not specify when the units needed to be "eliminated", but specific contracts usually specified a timeline of one to two years (Fisher 1959).

State enabling legislation was required for a local government to form a PHA. Due to the lack of legislation, some local governments were initially unable to apply for federal housing dollars, although most states passed the legislation quickly. Ohio was the only state to pass the necessary legislation by 1933, but 30 states had passed enabling legislation by 1937 and 44 states passed the legislation by 1949.[16] By 1966, all states except for Utah and Wyoming had passed the necessary legislation (Aiken and Alford 1970).

The public housing program of the USHA was short-lived and was suspended in 1941. All federal housing agencies were reorganized, and in 1942, the Federal Public Housing Authority (FPHA) replaced the USHA, although the FPHA maintained all of the rights given to the USHA under the Wagner-Steagall Act. During the war, the government mandated that some public housing units be transferred to the War and Navy Departments, but by 1945 local public housing agencies were responsible for returning both original public housing and some new war housing units to civilian use (Coulibaly et al. 1998). Between 1937 and 1949, a total of 160,000 units were built under the Housing Act of 1937, most of which were built during World War II to house war workers, some regardless of income (Weicher 1980).

[16] Only IA, OK, UT, and WY did not pass the enabling legislation within the first 20 years of the program. According to Fisher, "*Aside from the political traditions of the legislatures in these states, their inaction might be expected to the extent that the four states lie west of the Mississippi River…Three-fourths of the eastern states passed the necessary enabling laws by 1937. Three-fourths of the western states did so only by 1950. Another factor probably contributing to inaction concerns the marked above-national-average preference for single-family nonfarm dwellings within the four states. Opposition to public housing with its multifamily renter-occupied structures is often greatest among areas where single-family owner-occupied homes predominate. Other possible deterrents may arise from below-national-average percentages in nonwhite population and urban population (except Utah)"* (Fisher 1959, p.109).

3. From the Housing Act of 1949 to Section 8 Vouchers

The Housing Act of 1949 was the next major piece of housing legislation and was the most far-reaching. Although the public housing provisions remained virtually unaltered from the Housing Act of 1937 (e.g. the laws on loans and subsidies remained the same), an additional 810,000 units of public housing were approved for construction in increments of 135,000 over the next six years (Bingham 1975). The goal of 810,000 was not met quickly, however, and as late as 1961, only 321,405 had been contracted or completed (Coulibaly et al. 1998). 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 nonfarm projects and urban projects built on slum sites were exempt (Committee on Banking and Currency, 1949).[17]

The historical literature suggests that the average "quality" of public housing tenants decreased over time with changes in the eligibility requirements.[18] In the late 1940s and 1950s, the federal housing agency forced local housing agencies to enforce income limits, removing some of the better-off tenants (von Hoffman 2000). The Housing Act of 1949 also influenced the pool of potential public housing tenants by liberalizing homeownership requirements, thereby reducing the demand for public

[17] For areas that were still required to eliminate units, the Housing Act of 1949 amended the equivalent elimination requirement, stating that no financial assistance (other than preliminary loans) would be given to localities unless they agreed to eliminate the proper number of units within five years after the completion of the project. Unlike in the Housing Act of 1937, an unsafe or insanitary unit that housed multiple families could be counted as the number of families accommodated. For areas with "an acute shortage of decent, safe, and sanitary housing available to families of low income", the required elimination of units could be postponed longer than five years (Committee on Banking and Currency, 1949).

[18] Many public housing agencies viewed it as a temporary place of residence for the working poor and most public housing tenants in the 1930s were working-class families (Quercia and Galster 1997, von Hoffman 2000). In Chicago, Fuerst notes that tenants were screened in the 1940s and 1950s. Rent had to be paid on time, trash had to be disposed of properly, damage to apartments had to be paid for, etc. There was a decline in the quality of residents and management in the 1960s (pp. 3-4, 2003).

housing by the working and lower-middle class, and by displacing very poor families through Urban Renewal and highway construction, and relocating them into public housing (Jones et al. 1979).[19] Congress altered the tenant population further in 1956, by allowing single elderly persons and remaining tenant family members who were previously excluded, into public housing (Fisher 1959).

It is likely that changes in the rental structure also influenced the characteristics of the tenant pool. As established in the Housing Act of 1937, rent was set to approximate the cost of operating the unit. Tenants were limited to those able to pay that amount, but with incomes no greater than five times the rent.[20] The Housing Act of 1959 changed this, by allowing local housing authorities the right to set their own income limits and rents (Weicher 1980). 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. This may have put additional downward pressure on the income and "quality" of public housing tenants throughout the 1960s. 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

[19] 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).

[20] According the Housing Act of 1937, families with three or more dependent children could have an income of up to six times the rent. The Housing Act of 1949 amended this, however, subjecting all tenants to the 5-1 income-rent ratio.

nonwhite residents increased from 38 to 52 percent, and the number of single-parent families increased from 19 to 31 percent (Silverman 1971).[21]

By the 1960s, public housing was the target of a great deal of criticism from both its original supporters and long-standing skeptics (Friedman 1966). In 1957, Catherine Bauer wrote an article in *Architectural Forum* entitled "The Dreary Deadlock of Public Housing". Bauer stated that the poor architectural design of public housing projects (most projects were designed as "islands," cutting themselves off from the surrounding community) makes it obvious that each houses "the lowest income group." Additionally, the income limits cause 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 claims 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 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).

[21] 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).

On January 8, 1973, President Nixon announced that all housing programs would be suspended pending a thorough policy review (Orlebeke 2000). Nixon subsequently created the National Housing Policy Review (NHPR), which would make recommendations of ways to improve the current policy. The NHPR recommended switching from capital, or supply-side, subsidies to rent, or demand-side subsidies. This marked a sea change in public housing policy. Congress quickly 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. One major difference between Section 8 and the earlier public housing program is that Section 8 allowed recipients to make up to 80 percent of the locality's median income, which was much higher than most public housing income limits. Section 8 subsidies began being dispersed in 1975 and by the end of 1976, there were over 110,000 recipients (Weicher 1980).

In 1976, Congress reactivated construction under the traditional public housing program, using part of the funds allocated to Section 8. There were several changes from the way the program ran in 1973, however. PHAs were only to buy new projects from private developers unless they got special permission from HUD and 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. However, the actual numbers were far from the target and by 1979, only 34,000 new units had been started (Weicher 1980).[22]

4. Summary

Public housing advocates began pushing for a larger government role in housing in the early twentieth century, but this did not translate into policy until the industrial demands of World War I put unsustainable pressure on cities' housing supply. While the federal government did ease the war shortage with the construction of housing for manufacturing workers, this involvement was temporary until the onset of the Great Depression. The first true public housing built for low-income residents was built under the Housing Division of the NIRA in the 1930s, and this was subsequently amplified by the Housing Acts of 1937 and 1949. Various amendments to the early Housing Acts were passed in the 1950s and the 1960s, ultimately changing the character of public housing tenants from predominantly working class families to single mothers who were chronically dependent on welfare. The federal government continued to financially support the construction of low-income housing projects throughout the 1960s, despite a growing consensus that public housing was ultimately becoming the slums it was meant to replace. In 1973, a fundamental change in policy altered the way that new units were made available to the poor and there was a major shift away from unit-based subsidies toward Section 8 housing vouchers. However, the majority of the more than one million units of public housing built by the mid-1970s are still in use today.

[22] In 1977, HUD approved funds for 23,000 units but only 5,400 units were started. In 1978 and 1979, HUD approved approximately 45,000 units each year, but only started 6,700 units in 1978 and 22,000 in 1979 (Weicher 1980).

CHAPTER III

A NEW DATASET FOR DESCRIBING THE DIFFUSION OF PUBLIC HOUSING

To better understand the diffusion of public housing in the United States, I have created a comprehensive dataset of public housing from its beginnings under the New Deal in 1933 to 1973 using information from the *Consolidated Development Directory* (henceforth *CDD*), published by HUD in 1973. The *CDD* contains detailed information on the years of construction and availability of public housing projects, the number of units available, and the program under which projects were funded. I converted these data from microfiche into electronic format and, to the best of my knowledge, this is the first dataset that comprehensively traces public housing from its inception in 1933 to its peak in the 1970s.

The data for each project include its state and locality; project code; years of contract, construction, initial and full occupancy; the number of total and elderly units planned and completed; and information on the type of program under which the project was developed (e.g., conventional bid, turnkey, leased, war or defense, etc.). There are data on approval dates for some projects in the *CDD*, however there are more data for completion dates, and these dates of full availability will primarily be used in the analysis. I have not found comprehensive data on city or county-level public housing figures in sources other than the *CDD*. However, HUD did publish state-level counts of public housing for 1977 in the *HUD Statistical Yearbook 1977* (HUD 1977). The *HUD Statistical Yearbook 1977* reports over 1.1 million public and Indian housing units and

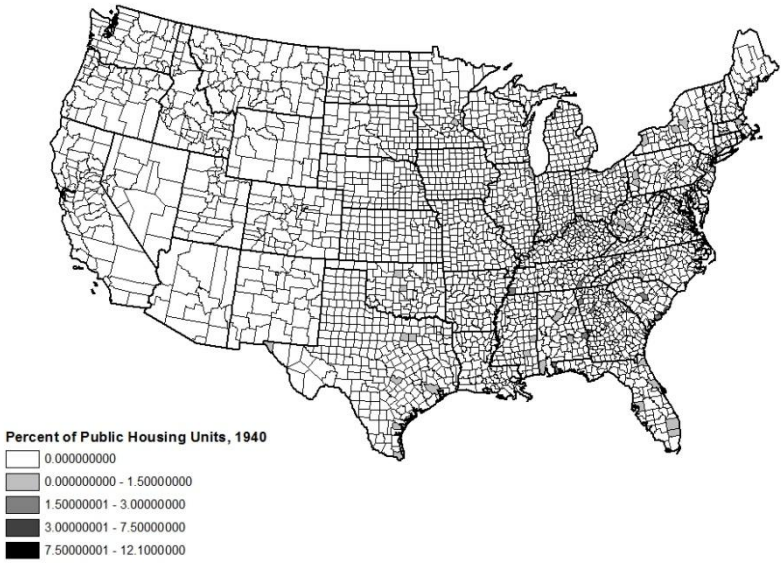
the 1973 *CDD* includes information on 91.2 percent of these units. (The *CDD* includes data on over 1.01 million units.) I aggregate data from the *CDD* at the state level and compare the state-level totals of public and Indian housing reported in the *HUD Statistical Yearbook* in 1977 with those reported in the *CDD* in 1973. The correlation is 0.998.

For the purpose of this analysis, I have consolidated the *CDD* data to the county level. Public housing was a widespread phenomenon, distributed across over 1,400 counties by 1970. By analyzing data at the county level, I am able to include data on *all* projects in *all* counties. Limiting the dataset to cities would omit the vast majority of the sample's projects, leaving a sample of fewer than 500 cities, as opposed to nearly 3,000 counties.

1. Regional Variation in Public Housing

The rise of public housing is shown in detail in figure 3-1, 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, there is clearly a great deal of variation across counties, even within states, which will serve as a basis for the econometric analysis in future chapters.

1940



1950

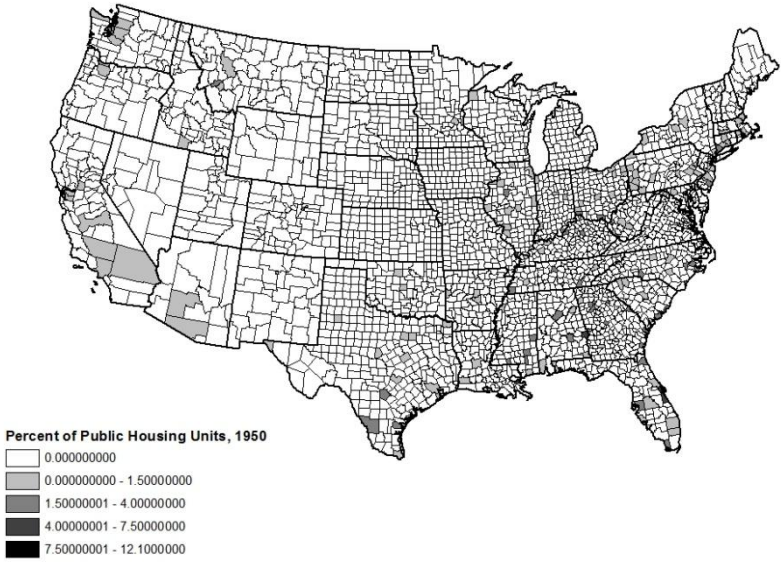
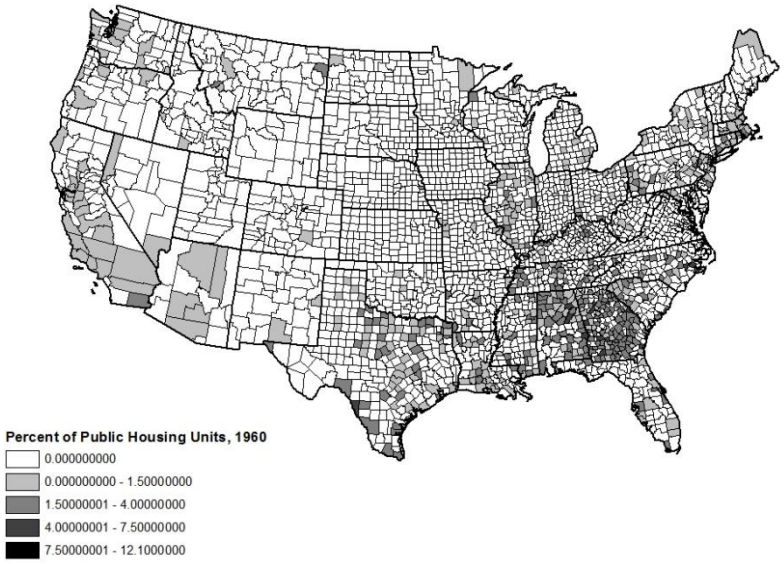


Figure 3-1: The Diffusion of Public Housing, 1940-1970

NOTE: Percent of public housing reported is calculated as the number of public housing units / total occupied units x 100.

1960



1970

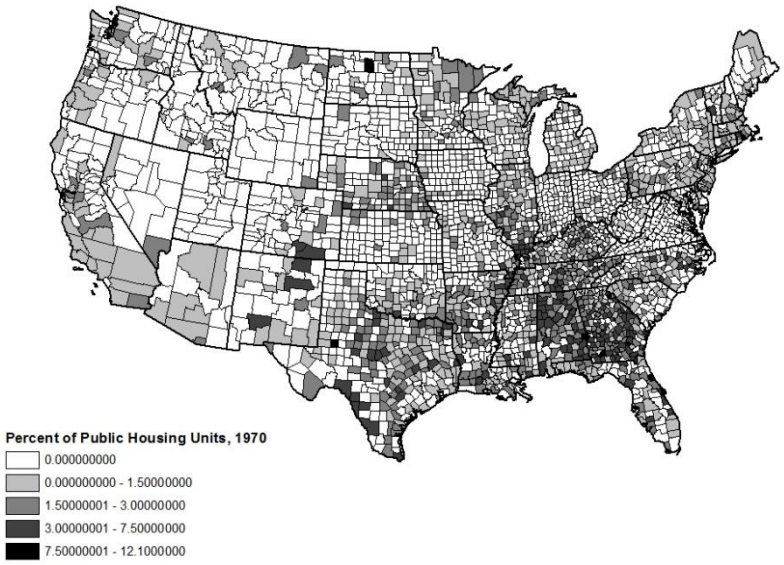


Figure 3-1, continued

NOTE: Percent of public housing reported is calculated as the number of public housing units / total occupied units x 100.

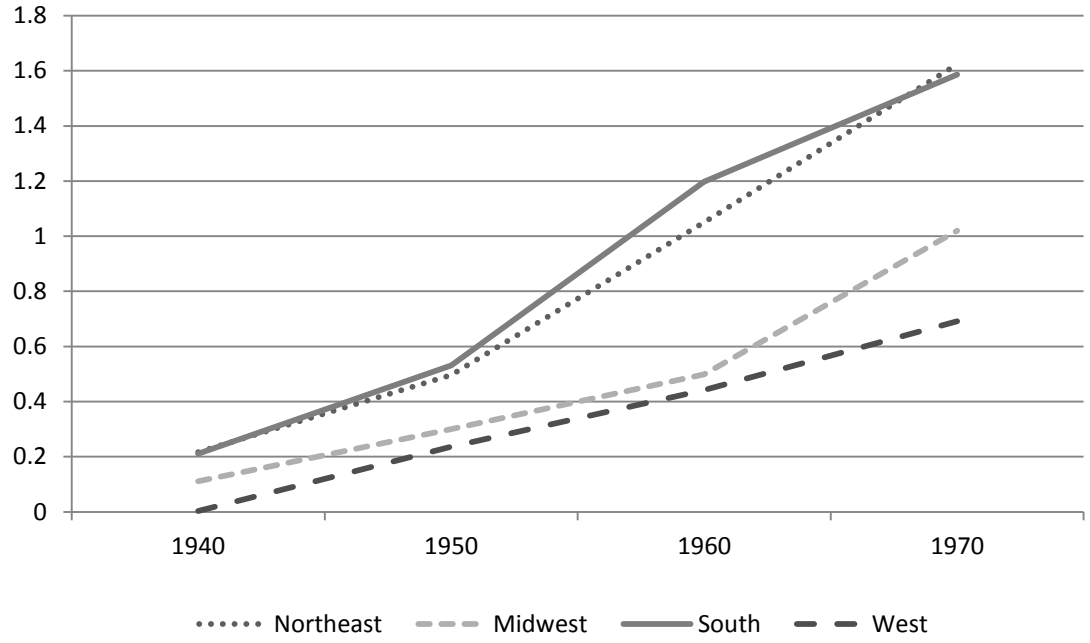


Figure 3-2: Public Housing Intensity by Region

Notes: Public housing intensity 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) and are aggregated from county-level data.

Figure 3-2 provides a view of public housing intensity that is aggregated to the regional level. The Northeast and the South were clearly the leading regions by 1940, and their lead widened up to 1960. After 1960, the Midwest kept pace with the Northeast and South, while the West continued a slower but steady climb in public housing intensity. In 1970, about 69 percent of all public housing was located in the Northeast and South, compared to about 55 percent of all occupied dwelling units.[23]

[23] In 1970, 31, 22, 37, and 9 percent of public housing was located in the Northeast, Midwest, South, and West, respectively. For comparison, these regions possessed 25, 28, 30, and 17 percent of the occupied housing stock in 1970.

This inter-regional variation could be due to either (or both) differences in county participation (the extensive margin) or differences in intensity of participation (the intensive margin). Figure 3-3 shows that the inter-regional differences in public housing concentration persist when I reduce the sample to include only counties with at least some public housing, implying that the intensive margin was important. The South and Northeast have higher concentrations of public housing than the West and Midwest.

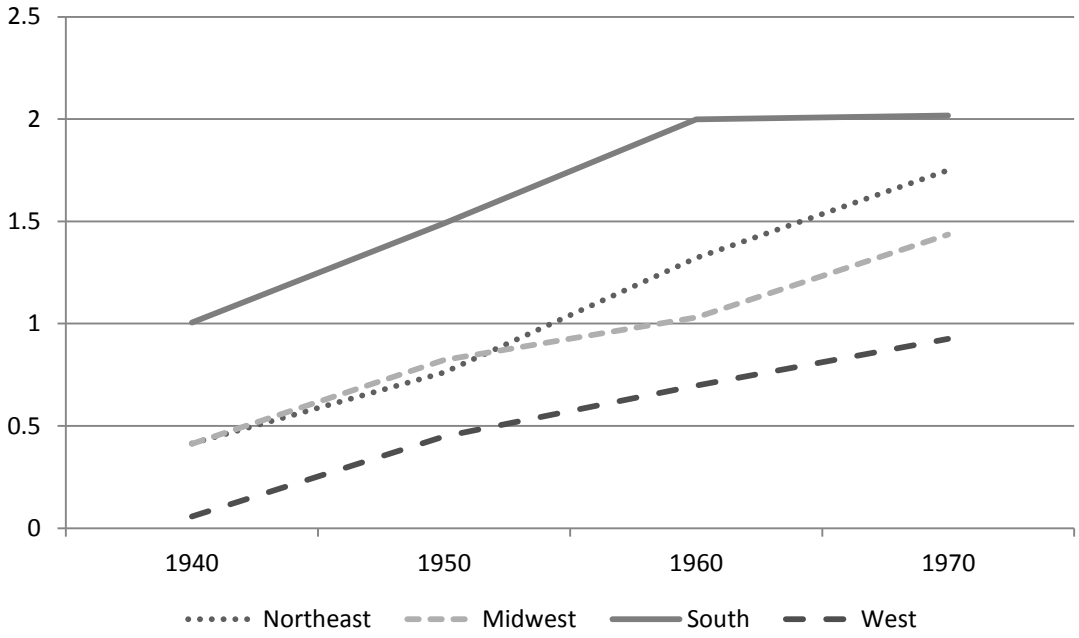


Figure 3-3: Public Housing Intensity by Region, Including Only Counties with Public Housing

Notes: Public housing intensity 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) and are aggregated from county-level data.

There was also inter-regional dispersion in the timing of adoption of public housing. Figure 3-4 shows the percentage of counties in each region with public housing.

In 1940, public housing participation was the most wide-spread in the Northeast, with over 12 percent of counties having some amount. By 1970, nearly 63 percent of counties in the Northeast and over 57 percent of counties in the South had adopted public housing. The West and the Midwest had participation rates of 24 and 33 percent by 1970, respectively.

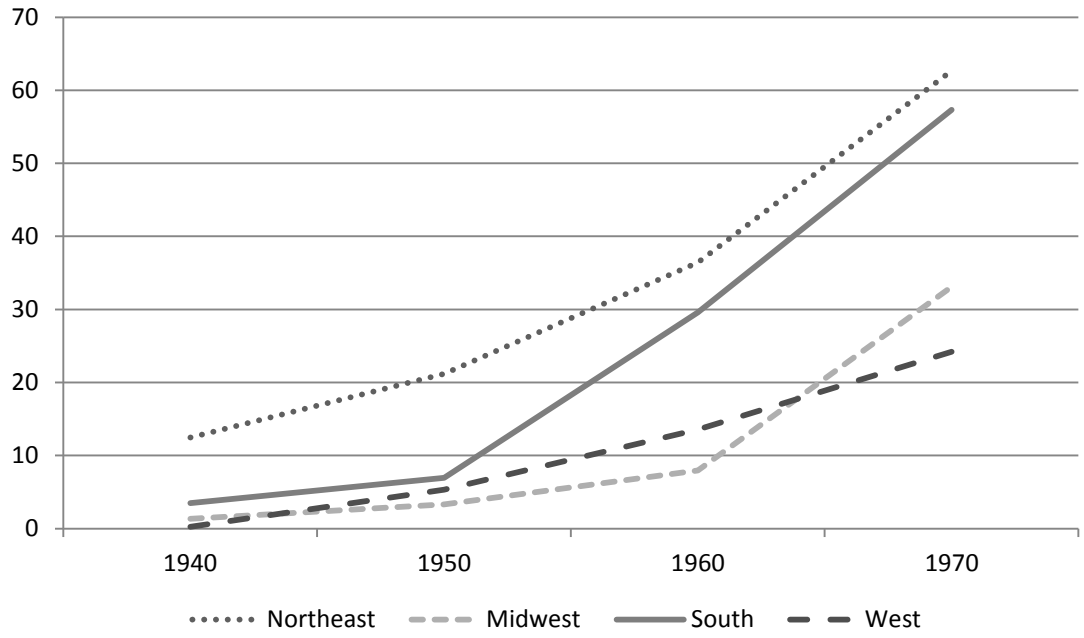


Figure 3-4: Percent of Participating Counties by Region

Sources: Public housing data are from the *Consolidated Development Directory* (HUD 1973).

2. Urban-Rural Variation

There is also substantial intra-regional variation in public housing intensity between metropolitan and non-metropolitan areas. Using 1950 Census codes indicating whether or not a county is in a Statistical Metropolitan Area, I separate counties in each

region into metropolitan (urban) and non-metropolitan (rural) groups and analyze inter- and intra-regional variation in public housing concentration across these groups.

Figure 3-5 plots the percent of total occupied units comprised of public housing in Northeast, Midwest, South, and West metropolitan and non-metropolitan areas between 1940 and 1970. In every period, the metropolitan South has the highest concentration of public housing and the metropolitan Northeast has the second highest concentration. The non-metropolitan South has a higher concentration than non-metro areas of the other regions and has a higher concentration of public housing than the metropolitan West in 1960 and 1970. With the exception of the South, all other non-metropolitan areas have

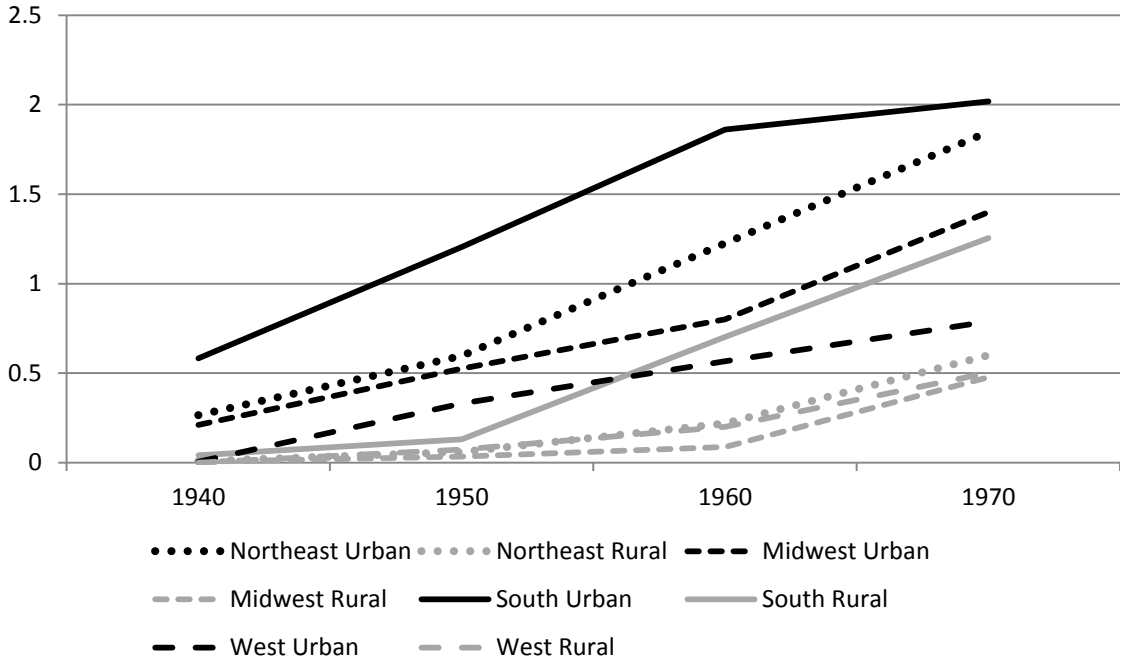


Figure 3-5: Public Housing Intensity by Region-Urban Status

Notes: Public housing intensity 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) and are aggregated from county-level data.

lower concentrations of public housing than all of the metropolitan areas. The non-metropolitan areas of the Northeast, Midwest, and West also show little increase in public housing concentration until the 1960s whereas the other region-metropolitan groups experience growth in public housing concentration throughout the entire period.

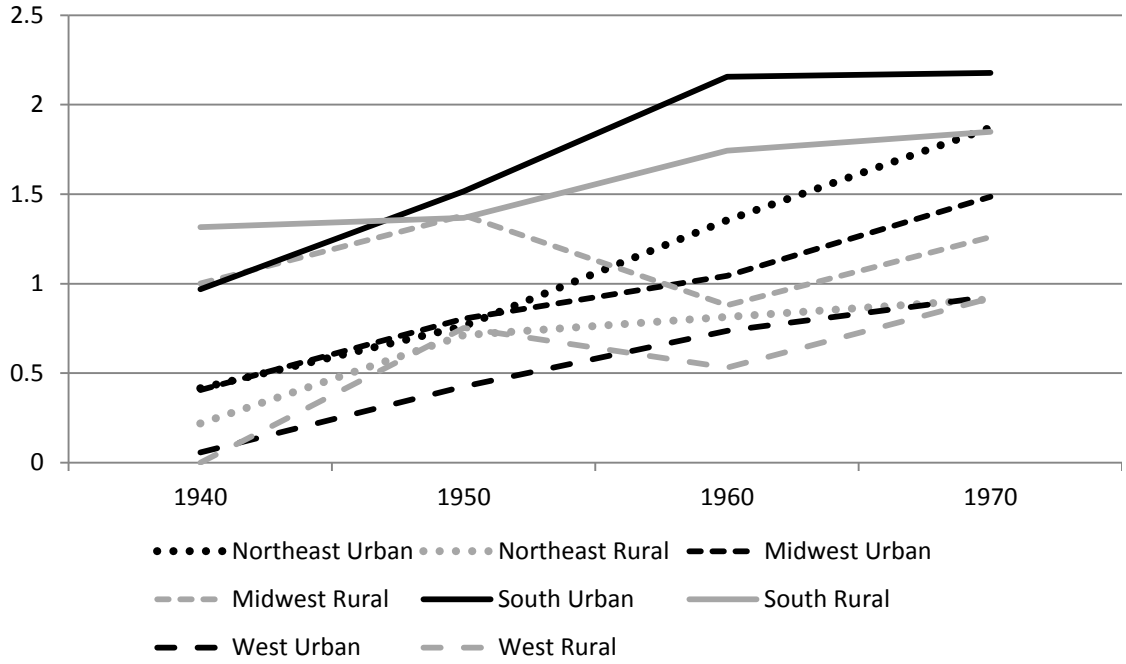


Figure 3-6: Public Housing Intensity by Region-Urban Status, Only Including Counties with Public Housing

Notes: Public housing intensity 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) and are aggregated from county-level data.

I limit the sample to counties with at least some public housing in figure 3-6. The metropolitan South still has the highest concentration of public housing units, but now the non-metropolitan South has the second highest concentration in nearly every period. The metropolitan Northeast is third, and the metropolitan Midwest is fourth. When limiting

the sample to only counties with public housing, the non-metropolitan Midwest and Northeast have higher concentrations of public housing than the metropolitan West after 1960 and there is no noticeable difference in concentrations between the metropolitan and non-metropolitan West by 1970.

Finally, figure 3-7 graphs the percent of counties with public housing in each region-metropolitan status group between 1940 and 1970. In 1940, more than one-third of metropolitan counties in the Northeast and South have some public housing and by 1970, approximately 80 and 96 percent of the metropolitan counties have public housing in the Northeast and South, respectively. While there is a higher concentration of public housing in participating metropolitan counties in the Northeast than the Midwest, a larger fraction of metropolitan counties participate in public housing in the Midwest by 1970.

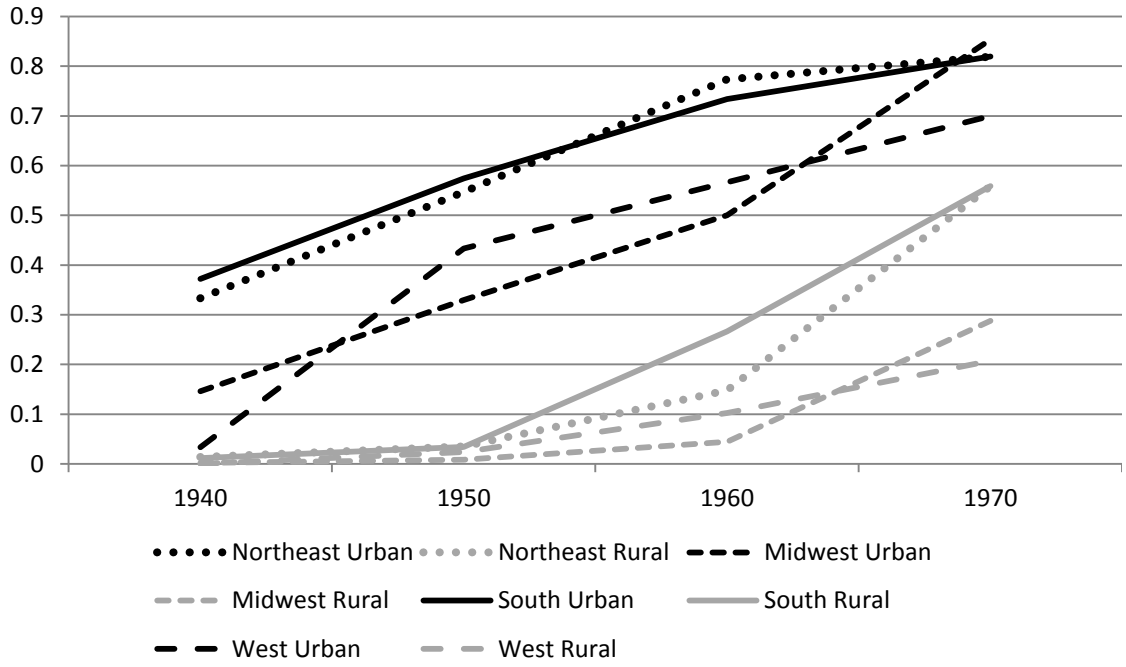


Figure 3-7: Percent of Participating Counties by Region-Metropolitan Status

Sources: Public housing data are from the *Consolidated Development Directory* (HUD 1973).

There is also a clear separation between metropolitan and non-metropolitan regions, indicating that a smaller percentage of non-metropolitan counties in all regions participate in public housing in each period than do metropolitan counties in any region. In 1940, less than two percent of non-metropolitan counties in any region had public housing and by 1950, less than five percent had adopted public housing. However, by 1960 there was variation in participation rates, and the South and Northeast were ahead of the Midwest and the West.

3. Summary

While public housing is often associated with select large cities, participation in the program is widespread and by 1970, over 1,400 counties had adopted it. Early adopters of the program were primarily located in the Northeast and the South. By 1960, public housing participation and intensity was growing rapidly in the Midwest and the West as well, but the Northeast and the South were still the clear leaders in 1970. This regional difference in public housing intensity is due to differences in the percent of counties participating in the program, as well as differences in the relative intensity of the programs in participating counties. When dividing regions by metropolitan status, it is clear that counties in metropolitan areas both participated more frequently and participated more intensively than counties in non-metropolitan areas. However, participation in rural areas was growing over time.

CHAPTER IV

AN ECONOMETRIC VIEW OF THE DIFFUSION OF PUBLIC HOUSING, 1933-1973

To understand the rise of public housing better, it is useful to identify the characteristics of places that were eager to adopt it early on. In some regions, the number of counties with public housing more than doubled between 1950 and 1960, and again between 1960 and 1970. In this chapter, I econometrically assess the characteristics of communities that adopted public housing early on and in high intensities. I first adopt hazard models to identify the community characteristics that led some places to adopt public housing more quickly than others. Then, I use OLS regression analysis to quantify the strength of the correlation between community characteristics and public housing intensity (i.e., public housing as a proportion of all local housing). These analyses are largely descriptive, but a number of interesting hypotheses about the nature and strength of pro- and anti-public housing forces can be examined in this context.

There are two key works from the political science literature that quantitatively address the diffusion of public housing: Aiken and Alford (1970) and Bingham (1975). Both Aiken and Alford and Bingham address the question of what types of communities adopted public housing by calculating correlations between various measures of public housing adoption and city-level characteristics for cities with at least 25,000 residents.

This chapter goes beyond the previous literature in two main ways. First, it develops and uses a comprehensive dataset of public housing availability that spans the entire rise of public housing, from 1933 to 1973, when President Nixon put a freeze on

the approval of additional public housing projects and subsequently switched to a system based primarily on vouchers. It includes *all* counties and *all* public housing projects built in the United States during this time period and can be examined year by year. Second, I use modern econometric techniques to measure the links between local characteristics and the growth of the public housing stock in a multivariate setting. In this context, issues of causality can be more carefully assessed and qualified than previously.

For this chapter's analysis, 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 of Churches and Religious Bodies* (Haines 2004) and the 1940 presidential election results (Leip 2009) to help control for heterogeneity in social and political environments.

1. The Timing of Public Housing Adoption

Hazard models are designed to estimate "time to failure" and in this case, "failure" is the adoption of a county's first public housing project (Kiefer 1988). This is defined as the initial year of full availability for a county's first project. I first set the "initial period" to 1933, the year that the Housing Division of the PWA was established. I control for county-level variables, primarily from 1940, to capture local characteristics near the beginning of the federal public housing program.

1.1 Empirical Strategy

The hazard function can be written as $h(t) = h_0(t)\, e^{X\beta}$, where $h(t)$ describes the rate at which counties adopt public housing and $h_0(t)$ is the baseline hazard function. The coefficient of interest is β, which is an estimate of the effect of county-level

characteristics on the length of time it takes a county to adopt public housing. I estimate both Weibull and Cox hazard models. The Weibull specification assumes that $h_0(t) = pt^{p-1}e^{X\beta}$, where p and β are estimated by maximum likelihood. The coefficient p estimates changes in the baseline hazard model over time. If $p > 1$, the baseline hazard rate increases over time, suggesting that counties are more likely to adopt public housing as time progresses, given their characteristics. The Cox specification is semiparametric and makes no assumption about the form of $h_0(t)$. Whereas the Weibull model takes variation in the timing of adoption into account, the Cox model only looks at the order.

The vector of county-level characteristics, X, includes data on population characteristics (the percent of the population that is urban, log population density, the percent of the labor force that works in manufacturing, the percent of the labor force that works in agriculture, the median number of years of schooling for males, the percent of population that is black (non-linearly)), housing stock characteristics (the percent of units that are owner occupied, median persons per rental unit, the percent of units in good condition, the percent of units with electricity, the percent of units with water, and log median value of owner occupied housing), the percent of votes for Roosevelt in the 1940 Presidential election, and religious variables (the percent of the population that is Baptist and Catholic). Summary statistics are reported in appendix A.

Public housing is often associated with urban areas so I include the percent of urban population and log population density to reflect this relationship. The percent of the labor force working in manufacturing is meant to capture post-war trends in employment growth. The transition from the manufacturing belt to the Rust Belt may have influenced demand for public housing during the period. The median number of

years of schooling for males may also be correlated with demand for public housing. Counties with low levels of educational attainment and income may have a larger demand for public housing (especially if non-local agencies are paying much of the bill), and therefore may adopt it sooner.

Demand for public housing may be higher in areas with dilapidated housing. Therefore, I include the percent of dwelling units that are in good condition, that have electricity, and that have water, as well as the log median value of owner-occupied housing. Areas with more crowded rental units (higher median persons per rental unit) may also have higher demands for public housing. Areas with a higher percentage of owner occupied units may experience a smaller demand for public housing and this may delay adoption.

Ex ante, it is unclear what significance the percent of the population that is black will have on public housing adoption. Both public housing and African Americans are concentrated in the South, and African Americans are also more likely to live in public housing than whites. In 1976, 62 percent of public housing residents in the South were black, compared to 34.5 percent that were white (HUD 1976). However, the median white voter may not support public housing if that voter thinks that it will disproportionately help African Americans. The economics literature on public goods finds that heterogeneity of preferences tends to lead to lower community participation and lower provision of public goods (Alesina et al. 1999, Alesina and Ferrara 2000, Alesina et al. 2001).[24] While there appears to be a positive correlation between blacks

[24] Alesina, Baqir and Easterly (1999) look specifically at the effect of ethnic divisions on the provision of public goods and find that the provision of public goods, such as education, roads, and sewers, is inversely related to a county's ethnic fragmentation, even after controlling for socioeconomic and demographic characteristics.

and public housing, it is unclear what this relationship will be once I control for income and housing characteristics.

I use votes for Roosevelt in 1940 as a proxy for political orientation. Public housing was a political issue and supported by the Democratic Party. In 1940, the Democratic Party platform addressed slum clearance and public housing, saying: *"We have launched a soundly conceived plan of loans and contributions to rid America of overcrowded slum dwellings that breed disease and crime, and to replace them by low-cost housing projects within the means of low-income families. We will extend and accelerate this plan not only in the congested city districts, but also in the small towns and farm areas…"* (Woolley and Peters 2011).[25]

Finally, Catholic and Protestant groups were early supporters of the public housing program (Fisher 1959, p. 76). Communities with relatively more Catholics and Protestants may have had relatively more support for the program and adopted public housing relatively quickly. To control for this, I include the percent of a county's population that is Baptist, as a proxy for Protestants, and the percent of a county's population that is Catholic.

1.2 Results

The Weibull and Cox model hazard ratio estimates are reported in table 4-1. The hazard model assumes that $h(t) = h_0(t)\, e^{X\beta}$, and the estimated hazard ratio of each

[25] 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 (Woolley and Peters 2011). Although many other issues distinguished the party platforms, it is reasonable to hypothesize that counties that were more inclined to vote for Roosevelt were also more likely to be more supportive of public housing, and therefore more likely to adopt public housing earlier.

characteristic can be calculated as e^{β}. If the ratio is positive, an increase in the value of that variable is associated with faster adoption of public housing. I report estimated hazard ratios of the Weibull and Cox models in columns 1 and 2, respectively. For columns 3 and 4, I run the hazard models again, this time adding an additional control for the year that state enabling legislation was passed. Data on the timing of legislation is from Aiken and Alford's GUAD dataset (1972) and are reported in appendix B. The sample used in this regression excludes Utah and Wyoming since the year of their legislation is not in the dataset.[26] The Weibull and Cox estimates are very similar and for brevity, the Weibull results are discussed in detail below.

A convenient feature of the Weibull model is that its results can be reported in an Accelerated Failure Time (AFT) specification. AFT assumes that $ln(t) = X\beta + z$, where t is survival time. The estimated βs can then be interpreted as survival time elasticities. I re-run the Weibull hazard model described above, adopting the AFT specification and report these results in table 4-2. An important distinction between the hazard ratios reported in table 4-1 and the AFT coefficients reported in table 4-2 is that the hazard ratios refer to *time to failure*, while the AFT coefficients refer to *survival time*. Hazard ratios greater than zero imply earlier *failure* (shorter survival time) while AFT coefficients greater than zero imply longer *survival* (later failure). In this framework, *survival* is time before public housing adoption and a negative estimated coefficient is associated with earlier adoption of public housing.

Column 1 of table 4-2 is comparable to column 1 of table 4-1. Column 2 includes a control for the year of state enabling legislation and the sample excludes Utah and

[26] The data on state enabling legislation was compiled in 1966 and by that time Utah and Wyoming had yet to pass such legislation.

Table 4-1: Weibull and Cox Hazard Model Results

	(1) Weibull	(2) Cox	(3) Weibull	(4) Cox
Percent votes for Roosevelt 1940	0.01138	0.01065	0.01277	0.01222
	(0.00438)***	(0.00429)**	(0.00471)***	(0.00459)***
Percent pop Baptist 1950	0.00583	0.00623	0.00698	0.00744
	0.00547	0.00549	0.00528	0.00528
Percent pop Catholic 1950	0.00468	0.00395	0.00596	0.00524
	0.00295	0.00286	(0.00313)*	(0.00302)*
Percent pop urban 1940	0.01696	0.017	0.01602	0.01593
	(0.00343)***	(0.00351)***	(0.00361)***	(0.00372)***
Percent of lf in manufacturing 1940	-0.00081	-0.00049	-0.00019	0.00002
	0.00471	0.00459	0.00472	0.0046
Percent of lf in agriculture 1940	-0.00441	-0.00714	-0.00651	-0.00955
	0.00653	0.00683	0.00684	0.00709
Median years schooling, males 1940	-0.09255	-0.08448	-0.1106	-0.10365
	0.06786	0.07118	0.06762	0.07256
Percent black 1940	0.01858	0.02063	0.01893	0.02102
	(0.01097)*	(0.01153)*	(0.01099)*	(0.01164)*
Percent black squared 1940	-0.00064	-0.00066	-0.00067	-0.00069
	(0.00016)***	(0.00017)***	(0.00017)***	(0.00019)***
Percent units owner occupied 1940	-0.03734	-0.03643	-0.03733	-0.03618
	(0.00881)***	(0.00873)***	(0.00876)***	(0.00866)***
Median persons per rental unit 1940	-0.0206	0.03831	-0.06391	-0.00752
	0.17241	0.17493	0.15917	0.16002
Percent units good 1940	-0.00336	-0.00426	-0.00105	-0.00169
	0.00296	0.00295	0.00279	0.00279
Percent units electricity 1940	-0.02178	-0.02033	-0.02421	-0.02305
	(0.00503)***	(0.00501)***	(0.00527)***	(0.00533)***
Percent units water 1940	0.01572	0.01366	0.01498	0.01307
	(0.00573)***	(0.00567)**	(0.00627)**	(0.00629)**
Log median property value 1940	-0.06527	-0.03696	-0.02126	0.0097
	0.12918	0.13255	0.12514	0.12783
Log density 1940	0.41596	0.35972	0.41578	0.36357
	(0.06932)***	(0.07140)***	(0.05958)***	(0.06168)***
Year of state enabling legislation	-0.02407	-0.02542		
	(0.01183)**	(0.01252)**		
Census Division F.E.	y	y	y	y
Utah & Wyoming?	n	n	y	y
Observations	2929	2929	2979	2979

NOTES: Hazard ratios are reported. Standard errors are clustered by state. The starting period is 1933. See text for data sources. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

Wyoming. Column 3 uses column 1's specification (no control for state enabling legislation) but is limited to the sample used in column 2 (excludes Utah and Wyoming). Coefficients from the three specifications are similar and I discuss results from column 2 in detail.

The percent of population that is urban and log population density are both positively correlated with public housing adoption (i.e., have negative AFT β estimates). A ten percentage point increase in the urban population is correlated with a 5.7 percent decrease in time until adoption (statistically significant at the one percent level) and a ten percent increase in population density is correlated with a 1.4 percent earlier adoption time (statistically significant at the one percent level). The coefficient on median schooling is 0.031, although never statistically significant. This is consistent with a one year increase in median schooling increasing years without public housing by approximately three percent.

The percent of the population that is black has a non-linear relationship with the timing of public housing adoption. The percent of the population that is black is positively related to public housing adoption, however its square is negatively correlated. This implies that, at the sample mean, a ten percentage point increase in the share of the black population would accelerate the adoption of public housing adoption by 1.3 percent.

The percent of owner occupied housing units and the log median property value are both correlated with slower public housing adoption, although the coefficient on log median property value is not statistically significant. A ten percentage point increase in owner-occupied housing is associated with a 12.6 percent slower adoption. The percent

Table 4-2: Weibull Hazard Model Results, Using Accelerated Failure Time Specification

	(1)	(2)	(3)
Percent votes for Roosevelt 1940	-0.00431	-0.00382	-0.00443
	(0.00162)***	(0.00152)**	(0.00163)***
Percent pop Baptist 1950	-0.00236	-0.00196	-0.00228
	0.00184	0.00189	0.00186
Percent pop Catholic 1950	-0.00201	-0.00157	-0.00186
	(0.00103)*	0.00097	(0.00100)*
Percent pop urban 1940	-0.00541	-0.0057	-0.0054
	(0.00132)***	(0.00126)***	(0.00132)***
Percent of lf in manufacturing 1940	0.00007	0.00027	0.00016
	0.00159	0.00158	0.0016
Percent of lf in agriculture 1940	0.0022	0.00148	0.00219
	0.00231	0.0022	0.00231
Median years schooling, males 1940	0.03733	0.0311	0.03677
	0.02338	0.02335	0.02387
Percent black 1940	-0.00639	-0.00624	-0.00638
	(0.00366)*	(0.00364)*	(0.00368)*
Percent black squared 1940	0.00023	0.00022	0.00022
	(0.00006)***	(0.00005)***	(0.00006)***
Percent units owner occupied 1940	0.0126	0.01255	0.01238
	(0.00312)***	(0.00312)***	(0.00319)***
Median persons per rental unit 1940	0.02157	0.00692	0.0148
	0.05397	0.05802	0.05499
Percent units good 1940	0.00035	0.00113	0.0004
	0.00095	0.001	0.00095
Percent units electricity 1940	0.00817	0.00732	0.00813
	(0.00183)***	(0.00179)***	(0.00184)***
Percent units water 1940	-0.00506	-0.00528	-0.00526
	(0.00216)**	(0.00197)***	(0.00213)**
Log median property value 1940	0.00718	0.02193	0.00406
	0.04234	0.04364	0.04198
Log density 1940	-0.14035	-0.13977	-0.14102
	(0.02218)***	(0.02507)***	(0.02293)***
Year of state enabling legislation		0.00809	
		(0.00395)**	
Census Division F.E.	y	y	y
Utah & Wyoming?	y		
Observations	2979	2929	2929

NOTES: Accelerated Failure Time coefficients are reported. Standard errors are clustered by state. The starting period used is 1933. See text for data sources. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

of units in good condition and the percent of units with electricity are also correlated with a longer period before public housing adoption. This is consistent with faster adoption in locations with a more dilapidated housing stock. The percent of units with running water is a positive predictor of early adoption. However, the coefficient on the percent of units with electricity is of larger magnitude than the coefficient on the percent of units with water. To the extent that these variables are collinear, the net effect of housing quality on public housing adoption is negative.

The percent of votes for Roosevelt in 1940 is negative and statistically significant at the five percent level. The estimate implies that a ten percentage point increase in votes for Roosevelt in 1940 would decrease survival time (or speed up public housing adoption) by four percent. This suggests that "liberal places" were likely to adopt public housing earlier, conditional on all the other observable local characteristics.

To an extent, it appears that places with a larger need for public housing adopted it more quickly. Densely populated communities with low property values and a larger percentage of housing units in poor condition were more likely to adopt public housing early on in the program. Communities with a larger share of African Americans and a larger share of Democrats were also more likely to adopt public housing quickly.

2. Public Housing Concentration

It is unclear whether places that adopted public housing earlier on also adopted relatively more public housing by the end of the program's expansion in 1970. To shed light on the community characteristics that are correlated with high concentrations of public housing, I run an OLS regression of public housing intensity in 1970 on pre-

program community-characteristics. Unlike above, the focus here is on the quantity of public housing, not the timing. The variable of interest is the percent of occupied units that are public housing, which is measured as public housing units in 1970 divided by total occupied units in 1970, multiplied by 100. The set of control variables and their expected correlates are the same as above. I also include state fixed effects. Results are shown in table 4-3.

The percent of the population that is urban and log population density are both positively correlated with public housing intensity (statistically significant at the one percent level). A ten percentage point increase in the percent of the urban population is correlated with a 0.11 percentage point increase in public housing intensity (compared to a mean of 0.81 percent). A ten percent increase in population density is correlated with a 0.0134 percentage point increase in public housing intensity (also statistically significant at the one percent level).

The percent of owner-occupied units and log median property values are negatively correlated with public housing intensity. The coefficient on the percent of owner-occupied units is -0.024, which suggests that a ten percentage point increase in owner-occupied units is correlated with a 0.24 percentage point decrease in public housing intensity (statistically significant at the one percent level). Other measures of housing stock quality, such as the percent of units in good condition, the percent of units with electricity, and the percent of units with water, are also negative predictors of public housing intensity. This is consistent with public housing being built intensively in areas of most need.

Median years of schooling for males is negatively correlated with public housing

Table 4-3: 1970 Public Housing Intensity

	Public Housing Intensity 1970
Percent of lf in manufacturing 1940	-0.00522
	(0.00300)*
Percent of lf in agriculture 1940	-0.00517
	0.00448
Percent pop urban 1940	0.01121
	(0.00208)***
Percent units owner occupied 1940	-0.02359
	(0.00368)***
Median persons per rental unit 1940	-0.28574
	(0.12266)**
Percent units good 1940	-0.00723
	(0.00209)***
Percent units electricity 1940	-0.00871
	(0.00345)**
Percent units water 1940	-0.0012
	0.0026
Log median property value 1940	-0.064
	0.06197
Median years schooling, males 1940	-0.01709
	(0.00379)***
Log density 1940	0.13419
	(0.03388)***
Percent black 1940	0.02482
	(0.01051)**
Percent black, squared 1940	-0.00048
	(0.00012)***
Percent votes for Roosevelt 1940	0.00522
	(0.00239)**
Percent pop Baptist 1950	0.00035
	0.00487
Percent pop Catholic 1950	0.00476
	(0.00133)***
Observations	2979
R-squared	0.4

Notes: Standard errors are clustered by state. State fixed effects are included. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively. County census data are from Haines (2004). Election results from 1940 are from Leip (2009). Public housing data are from HUD(1973).

intensity. A one year increase in median schooling is correlated with a 0.017 percentage point decrease in public housing intensity. Public housing also increases with black population, although it does so at a decreasing rate. The percent of the labor force employed in manufacturing and the percent of the labor force employed in agriculture are both negatively correlated with public housing intensity and have coefficients of -0.005, although the coefficient on the percent of labor in agriculture is not statistically significant.

The percent of votes for Roosevelt in 1940 is also positive predictor of the concentration of public housing and significant at the five percent level. A ten percentage point increase in votes for Roosevelt is associated with a 0.05 percentage point increase in the proportion of units that are public housing. The religious variables, percent Baptist and Catholic, have positive coefficients however the Baptist coefficient is not statistically significant.

3. Summary

By 1973, the United States funded the construction of over 1.1 million units of public housing in over 1,400 counties nationwide. Using both hazard model and OLS analysis, I find that counties with large urban populations were more likely to adopt public housing quickly and tended to accumulate more public housing per capita by 1970.

The percent of owner-occupied housing in a county in 1940 is a negative and statistically significant predictor of public housing adoption and is negative and significantly correlated with public housing concentration. Counties with a higher percentage of high quality housing (i.e., units in good condition, with electricity, etc.)

were less likely to adopt public housing early on and less likely to have high public housing intensity in 1970.

In the North, the Great Migration of African Americans to its urban centers is associated with the deterioration of the housing stock in the first part of the twentieth century. However, once urban, political, and housing stock characteristics are controlled for, the increase in African Americans appears to have had a positive effect on the adoption of public housing. Counties with more votes for Roosevelt in 1940 also adopted public housing quickly and had higher concentrations of public housing at the end of the study.

APPENDIX A

Summary Statistics for County-level Variables

	Mean	Standard deviation
Percent of public housing units 1970	0.809	1.244
Percent of lf in manufacturing 1940	10.644	10.524
Percent of lf in agriculture 1940	23.307	12.182
Percent pop urban 1940	23.099	24.616
Percent units owner occupied 1940	49.921	11.729
Median persons per rental unit 1940	3.476	0.407
Percent units good 1940	68.238	12.706
Percent units electricity 1940	53.661	24.249
Percent units water 1940	40.759	24.267
Log median property value 1940	7.226	0.583
Median years schooling, males 1940	7.750	2.036
Log density 1940	3.383	1.330
Percent black 1940	10.625	17.761
Percent votes for Roosevelt 1940	60.472	20.231
Percent pop Baptist 1950	10.131	11.471
Percent pop Catholic 1950	11.133	15.765
Observations	2979	

Notes: Public housing intensity is defined as public housing units in 1970 / total occupied units in 1970 * 100.
Sources: County population, housing, and religion data are from Haines (2004). Public housing data are from the *Consolidated Development Directory* (HUD 1973). Election results from 1940 are from Leip (2009).

APPENDIX B

Year of Public Housing State Enabling Legislation

State	Year of Enabling Legislation	State	Year of Enabling Legislation
AL	1935	MT	1935
AZ	1939	NE	1935
AR	1937	NV	1943
CA	1938	NH	1941
CO	1935	NJ	1938
CT	1936	NM	1939
DE	1934	NY	1934
DC	1937	NC	1935
FL	1937	ND	1947
GA	1937	OH	1933
ID	1939	OK	1965
IL	1934	OR	1937
IN	1937	PA	1937
IA	1961	RI	1935
KS	1957	SC	1934
KY	1934	SD	1950
LA	1936	TN	1935
ME	1949	TX	1937
MD	1937	VA	1938
MA	1935	VT	1937
MI	1934	WA	1939
MN	1947	WV	1934
MS	1938	WI	1935
MO	1939		

NOTES: Data from Aiken and Alford's GUAD dataset (1972) and were compiled in 1966. Alaska and Hawaii are excluded because they are not used in this chapter's analysis. Utah and Wyoming are excluded because they had not passed such legislation by 1966.

CHAPTER V

THE LOCAL ECONOMIC EFFECTS OF PUBLIC HOUSING, CIRCA 1970

Early support for public housing was based on the belief that public housing would not only improve living conditions for the poor, but would also create positive spillover effects for local economies. However, by the early 1970s, disappointment with the program was so widespread that President Nixon placed a moratorium on new public housing construction. While there is an extensive empirical literature that examines the effects of public housing on labor market outcomes, children's education, local property values, 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.[27] The understanding of how and when things went wrong with 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.

The goal of this chapter 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. The analysis is undertaken with county-level data, and so the effects that I attempt to identify pertain to the locality rather than specifically to individuals who reside in public housing. In part, this level of aggregation

[27] For labor market outcomes, see Popkin et al. 1993, Rosenbaum 1995, Yelowitz 2001, Oreopoulos 2003, Jacob and Ludwig 2008. For children's education, see Jacob 2004, Currie and Yelowitz 2000. For local property values, see Lee et al. 1999, Nourse 1963, Rabiega et al. 1984, Ellen et al. 2007, Lyons and Loveridge 1993, Goetz et al. 1996. For concentration of poverty, see Massey and Kanaiaupuni 1993.

reflects data constraints, but it is a useful perspective for highlighting the broader economic implications of having relatively intensive local public housing programs. 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.[28] Therefore, a better understanding of the rise and fall of public housing may shed light on other important social phenomena.

More specifically, this chapter seeks to assess whether places that engaged more intensively in the public housing program subsequently had worse economic outcomes in 1970 than other places and, if so, if there is evidence that this correlation can be given a causal interpretation. To address this, I start with simple regressions of county level outcomes on pre-program control variables and geographic fixed effects. I find that public housing had strongly negative associations with median family income, median property values, the percent of families with low income, population density, and the percent of female-headed households in 1970. I test the robustness of these basic results by adopting small geographic fixed effects, assessing the amount of omitted variable bias that would be required to account for the estimated effects, and by adopting an instrumental variable strategy.

[28] 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.

1. How Might Public Housing Affect Communities?

A priori, it is unclear how the expansion of public housing would affect community-level economic 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 the 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).[29] 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).[30] 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,

[29] 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).

[30] Meehan (1979) argues that the primary goals of the housing acts of 1937 and 1949 were actually unemployment and slum clearance (p. 17).

Sarte, and Owens 2010, Schwartz, Ellen, Voicu, and Schill 2006). This could work directly through increased neighborhood property values, or indirectly through stimulating local economic growth (either by attracting businesses, or by preventing them from leaving).

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 the housing stock would likely filter down, lowering the property values in the community. Public housing might also negatively affect property values if the constructed projects created disamenities that lowered the values of surrounding areas (Lee et al. 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). Also, in an environment where conditionally subsidized housing is available, some local residents (those born and raised locally) could immediately face perverse work, income, human capital, and marriage incentives (Yelowitz 2001, Jacob and Ludwig 2008). By placing income limits on tenants and calculating rental payments as a proportion of income, the provision of public housing might encourage some families to keep their income low. To the extent public housing increased the geographic concentration of poor residents, it could also increase the strength of negative peer effects within low-income neighborhoods (Katz et al. 2001,

Cutler and Glaeser 1997, Massey and Denton 1993, Collins and Margo 2000, Ananat 2009), 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 a variety of channels. 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).[31] In this scenario, a limited availability of public housing units could lead to an influx of poor, low-skilled families who wait for a chance to receive public housing. Second, the very nature of public housing (in which no one has a direct ownership stake), could lead to under-investment in maintenance and caretaking, even relative to the private slum conditions that prevailed elsewhere (Jones et al. 1979, Salisbury 1958, Meehan 1979, Ellen 2007).[32] 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), inducing 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

[31] In Harris and Todaro (1970), high-wage, formal sector jobs attract workers from rural to urban areas. There are a limited number of formal sector jobs, however, so people continue moving based on their expected wage despite unemployment.

[32] In a field study published by HUD in 1979, Jones, Kaminsky and Roanhouse divide the problems facing public housing into four major groups: financial problems (rising expenses and low rental income), physical problems (inadequate maintenance, design flaws), managerial problems, and social problems (crime and drug use, negative neighborhood conditions).

whether any such spillovers were of sufficient magnitude to detect at the local level, require empirical investigation.

2. Empirical Strategy

To assess the impact of public housing on the economic outcomes of communities that adopted it, 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 (X), and state fixed effects (Γ).

$$Y_{county,1970} = \alpha + \beta PH_{county,1970} + \gamma X_{county,1940} + \Gamma_{state} + \varepsilon_{county,\ 1970} \quad (1)$$

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, the log of population density, and the percent of female-headed households. 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, $X_{county1940}$, are extensive and include 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 value of World War II contracts between 1940 and 1945, the 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).[33] State fixed effects account for unobservable differences at the state level.

The coefficient of interest 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 given a causal interpretation.

2.1 Basic Results

Table 5-1 reports the estimation results of equation 1. The standard errors are clustered by state. In 1970, controlling for $X_{county,\ 1940}$ and state-fixed effects, counties with relatively high levels of public housing also had relatively high concentrations of

[33] Summary statistics are reported in appendix C. The Democratic platform can be found at www.presidency.ucsb.edu/ws/index/php?pid=29597 (Woolley and Peters 2011). 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 (Woolley and Peters 2011).

Table 5-1: County-Level Economic Outcomes and Public Housing in 1970, with State Fixed Effects

	Log median property value	Log median family income	Percent of families with <$3,000 income	Log population density	Percent of female-headed households
Percent of public housing units	-0.02104*** (0.00482)	-0.0181*** (0.00281)	0.45699*** (0.10707)	-0.0450*** (0.00622)	0.2806*** (0.04203)
Observations	2979	2979	2979	2979	2979
R-squared	0.68	0.76	0.77	0.95	0.75

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, the value of war facilities projects 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. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.
Sources: County population and housing data are from Haines (2004). Public housing data are from the *Consolidated Development Directory* (HUD 1973).

low-income families and female-headed households, as well as lower median family income, median property values, and population density. A one-percentage-point increase in public housing concentration is associated with a 0.46-percentage-point increase in families with an income of less than $3,000 (compared to an average level of 16.7 percent) and with a 0.28-percentage-point increase in female-headed households (compared to an average of 9.0 percent), both coefficients are statistically significant at

the one percent level.[34] 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 4.5 percent decrease in population density (all at a one percent level of statistical significance).

2.2 Robustness to State-Economic-Area Fixed Effects

The potential for unobservable shocks and trends *within* states threatens the credibility of the identification strategy in table 5-1. 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.[35] There are 507 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 5-2.

[34] I use the percent of families with less than $3,000 income as a proxy for poverty because I use similar variables for 1950 and 1960 to examine the effects of public housing at earlier points in time. I run regressions using the percent of families with income less than the poverty level and the percent of families with income less than 125 percent of the poverty level for 1970 (similar variables for 1950 and 1960 are not in the Haines (2004) dataset). The estimates are 0.4877 and 0.6346, respectively. Both are statistically significant at the one percent level and are consistent with my estimates of the effect of public housing on families with less than $3,000 income.

[35] 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).

Table 5-2: County-Level Economic Outcomes and Public Housing in 1970, with SEA Fixed Effects

	Log median property value	Log median family income	Percent of families with <$3,000 income	Log population Density	Percent of female-headed households
Percent of public housing units	-0.01346*** (0.00334)	-0.01195*** (0.00222)	0.34252*** (0.07175)	-0.02674*** (0.00615)	0.24164*** (0.04201)
Observations	2979	2979	2979	2979	2979
R-squared	0.79	0.85	0.84	0.97	0.81

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 5-1 or text for a list of the independent variables. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.
Sources: County population and housing data are from Haines (2004). Public housing data are from the *Consolidated Development Directory* (HUD 1973).

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 percentages of low-income families and female-headed households in 1970. Again, all the estimates are statistically significant at the one percent level. The magnitudes of the point estimates are somewhat smaller (by approximately one-third relative to table 5-1), but they are consistent with public housing having economically significant negative effects on local outcomes. Some scope for omitted variable bias still exists, of course, and identifying the channels through which any such effects worked demands further investigation. Nonetheless, the strong empirical links between public housing and local outcomes even within-SEAs (and conditional on pre-program characteristics) are striking.

2.3 Observables, Unobservables, and Causal Interpretation

The basic regressions control for many relevant community characteristics that may have influenced 1970 community outcomes and been correlated with public housing adoption, but 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. Given the results in table 5-1, how strong would such unobserved factors have to be for the true causal link between PH and Y to be zero?

I pursue this question by using a procedure formulated by Altonji, Elder, and Taber (2005) and extended by Bellows and Miguel (2009). 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 adding controls for observable characteristics, 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. [36]

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. The index of local characteristics can be thought of as two separate sub-indices of observable characteristics (X) and unobservable characteristics. Let β_C be the coefficient of public housing intensity in a regression with controls for X, and let β_{NC} be the coefficient in a regression without controls. 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. $\hat{\beta}_{NC}$ is equal to β_0 plus the total omitted variable bias, and $\hat{\beta}_C$ 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 the total omitted variable bias, and the value of $\hat{\beta}_C$ is simply the portion of the omitted variable bias attributable to unobservables. The ratio of the portion of the bias explained by unobservables and the portion of the bias explained by X (later referred to as the "sensitivity ratio") can be calculated as $\hat{\beta}_C / (\hat{\beta}_{NC} - \hat{\beta}_C)$.[37]

In sum, given regression results with and without controls for X, I can 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. Regression results with and

[36] Bellows and Miguel (2009) make use of the Altonji et al. (2005) procedure and adapt it to a linear framework. They give a thorough derivation in their Online Supplementary Appendix A.
[37] See appendix D for a more thorough discussion and derivation.

without controls and the implied sensitivity ratios are reported in table 5-3, where the "with-controls" results simply replicate those from table 5-1 for ease of comparison.

Table 5-3: Regressions with and without Controls and Omitted Variable Sensitivity Ratios

	Log median property value	Log median family income	Percent of families with <$3,000 income	Log population density	Percent of female-headed households
			OLS Results, No Controls		
Percent of public housing units	0.00802 (0.01321)	0.00217 (0.00875)	-0.02062 (0.31028)	0.27210*** (0.05198)	0.67217*** (0.08184)
			OLS Results, With Controls		
Percent of public housing units	-0.02104*** (0.00482)	-0.0181*** 0.00281)	0.45699*** (0.10707)	-0.0450*** (0.00622)	0.2806*** (0.04203)
RATIO	**-0.72**	**-0.89**	**-0.96**	**-0.14**	**0.72**

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 for regressions with and without controls. Standard errors are reported in parentheses and are clustered by state. See notes to table 5-1 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. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.
Sources: County population and housing data are from Haines (2004). Public housing data are from the *Consolidated Development Directory* (HUD 1973).

Without controls for X, public housing intensity is weakly *positively* correlated with 1970 log median property values and log median family income and *negatively* correlated with the percent of families with low income within states. The addition of

control variables tends to reverse the sign and increase the magnitude of the coefficients. In this sense, county-level selection into public housing on observables was apparently positive. (The only relationship that does not change sign when pre-program characteristics are omitted is that between public housing intensity and female-headed households.)

In the Altonji et al. framework, for omitted variable bias to account for the unfavorable coefficient estimates on public housing (table 5-1), the index of unobservables would not only have to be strongly correlated with public housing, it would also have to be negatively correlated with the index of observable controls. For example, the sensitivity ratio for the percent of low-income families in 1970 is -0.96, which implies that the covariance of the omitted variables index and public housing intensity must be equal to -0.96 times the covariance between the index of controls and public housing intensity. Thus, even if the index of unobservables was an important determinant of 1970 outcomes *and* correlated with public housing intensity, it would also have to be strongly and negatively correlated with the index of observables to account for the basic results. Specifically, for the true effect of public housing on median family income, median property values, and the percent of low-income families to be zero, the correlation between public housing intensity and the index of unobservables would have to be approximately 72 to 96 percent of the magnitude of the correlation between public housing intensity and the index of observables, and with the opposite sign. Given the direction and magnitudes of the sensitivity ratios, it seems unlikely that omitted variable

bias explains away the entire effect of public housing.[38]

2.4 Instrumental Variable Analysis

For an alternative approach to measuring the causal effect of public housing on adoptive communities, I use variation in the timing of state enabling legislation in an instrumental variable framework. Before a community could apply for federal dollars to build public housing, state enabling legislation had to be in place. This legislation allowed for the creation and operation of local housing agencies, which could plan and carry out local public housing projects. If some local communities were constrained by the lack of enabling legislation in their state, then the timing of this legislation might provide plausibly exogenous variation in public housing intensity. It is unlikely that the enabling legislation influenced 1970 outcomes independently of its influence on public housing, and so the validity of the instrument hinges primarily on whether variation in the IV is uncorrelated with omitted variables that did influence local outcomes.

I instrument for public housing with the number of years in which communities in each state could participate in public housing ("years of eligibility"), which is calculated as 1970 minus the year that state enabling legislation was passed. My outcomes of interest and control variables are consistent with the OLS estimates presented earlier in the paper. I include Census division fixed effects and cluster standard errors by state (state fixed effects are infeasible given the nature of enabling legislation). The instrument has the expected sign and an F-statistic of 4.28 in the first stage, which is

[38] It is more difficult to rule out the role of omitted variable bias for log population density and the percent of female-headed households. The sensitivity ratio for log population density is -0.14 and the sensitivity ratio for the percent of female-headed households is 0.72.

consistent with the legislation affecting the intensity of local public housing.[39] Given the size of the first stage F-statistic, however, it is possible that the IV estimates are inconsistent and biased in the direction of the OLS estimates due to weak instrument bias (Staiger and Stock 1997, Stock et al. 2002, Bound et al. 1995). The second stage results are reported in table 5-4.

Table 5-4: County-Level Economic Outcomes and Public Housing in 1970
IV Results, National Sample

	Log median property value	Log median family income	Percent of families with <$3,000 income	Log population density	Percent of female-headed households
Percent of public housing units	-0.06097 (0.07849)	-0.07271 (0.05654)	2.02550 (2.01962)	0.23394 (0.16809)	-0.21629 (0.42839)
Observations	2979	2979	2979	2979	2979

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. The instrument is years of potential public housing participation, which is defined as 1970 – the year in which state enabling legislation was passed. See notes to table 5-1 of text for independent variables. Regional fixed effects are included. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.
Sources: County population and housing data are from Haines (2004). Public housing data are from the *Consolidated Development Directory* (HUD 1973). State enabling legislation data are from *GUAD* (Aiken and Alford 1972).

The coefficients on public housing intensity have large standard errors, but the point estimates are consistent with public housing having a negative effect on the log of median property values, the log of median family income, and the percent of families with low income. The point estimates from the IV regressions are also two to four times larger in magnitude than the OLS estimates. For example, the coefficient on public

[39] First stage results are reported in appendix E.

housing intensity for log median property values is -0.021 in the OLS estimate and -0.061 in the IV estimate. The only estimates that are not consistent with the OLS results are the coefficients for log population density and the percent of female-headed households.

For another view, I run the IV regressions with a sample that is limited to counties west of the Mississippi River, where there was considerable variation in the timing of enabling legislation.[40] In the reduced sample, the F-statistic of the excluded instrument in the first stage is considerably larger than above (7.57).[41] I further investigate the viability of the instrument by running the first stage with and without the extensive set of controls. Ideally, the years-of-eligibility IV would be (essentially) randomly assigned to counties. In this case, the relationship between the IV and PH would be invariant with respect to observable pre-program characteristics. When controlling only for regional fixed effects, years-of-eligibility for public housing has a coefficient of 0.020 (statistically significant at the one percent level). When including the large set of pre-program controls, the coefficient on years-of-eligibility is 0.017 (p-value of 0.012). The robustness of the coefficient estimate is consistent with the interpretation that the IV is quasi-randomly distributed from the perspective of counties. I report the IV results for the west-of-Mississippi sample in table 5-5.

The results are again consistent with public housing intensity having a negative effect on log median property values, and log median income, and a positive effect on the percent of families with low income. As in the full-sample results, the coefficient on public housing intensity for log population density is positive and the coefficient on

[40] The independent variables are the same as for the entire sample, with the exception of the war contracts variables which have been removed from this sample to allow the number of clusters to exceed the number of instruments.
[41] First stage results are reported in appendix F.

public housing intensity for the percent of female-headed households is negative. Of course, the results in table 5-5 pertain only to areas west of the Mississippi, and they do not necessarily imply similar effects in other parts of the country.

Table 5-5: County-Level Economic Outcomes and Public Housing in 1970
IV Results, West-of-Mississippi Sample

	Log median property value	Log median family income	Percent of families with <$3,000 income	Log population density	Percent of female-headed households
Percent of public housing units	-0.03528	-0.06002*	0.42053	0.24510*	-0.86035*
	(0.06892)	(0.03533)	(1.12952)	(0.14593)	(0.47486)
Observations	1452	1452	1452	1452	1452

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. The instrument is years of potential public housing participation, which is defined as 1970 – the year in which state enabling legislation was passed. See notes to table 5-1 of text for independent variables. Regional fixed effects are included. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.
Sources: County population and housing data are from Haines (2004). Public housing data are from the *Consolidated Development Directory* (HUD 1973). State enabling legislation data are from *GUAD* (Aiken and Alford 1972).

3. Summary

Public housing originated as a response to concerns over the living conditions for the poor. Many early supporters believed that by cleaning up slums and providing better housing for the poor, they could generate positive spillover effects to the community at large. By the early 1970s, there was a widely held belief that public housing was not only not living up to expectations, but that it was becoming the slums it was meant to replace. While there is a relatively large literature that studies various effects of public housing, there is essentially no empirical literature that assesses the effects of public

housing on the communities that adopted it during the period of the program's expansion. Using data from the *Consolidated Development Directory* (HUD 1973), I find that communities that participated intensively in the public housing program ended up with relatively worse economic outcomes in 1970. Conditional on state fixed effects and an extensive set of pre-program observable characteristics, I find that communities with high densities of public housing had lower median family income, lower median property values, lower population density, a higher percentage of families with low income, and a higher percentage of female-headed households. A variety of further tests, including assessing the potential scope for omitted variable bias, employing fixed effects for areas much smaller than states, and using an instrumental variable, suggest that these empirical links are causal.

APPENDIX C

Summary Statistics of County-level Characteristics

	Mean	standard deviation
Percent of public housing units 1970	0.809	1.244
Percent of public housing units 1960	0.322	0.790
Percent of public housing units 1950	0.075	0.371
Log median property value 1970	9.276	0.360
Log median family income 1970	8.888	0.253
Percent of families with <$3,000 income 1970	16.665	8.398
Percent of female-headed households 1970	9.003	3.212
Log density 1970	3.492	1.513
Percent of high school grads 1970	44.648	12.559
Percent of lf in manufacturing 1940	10.644	10.524
Percent of lf in agriculture 1940	23.307	12.182
Percent pop urban 1940	23.099	24.616
Percent units owner occupied 1940	49.921	11.729
Median persons per rental unit 1940	3.476	0.407
Percent units good 1940	68.238	12.706
Percent units electricity 1940	53.661	24.249
Percent units water 1940	40.759	24.267
Ln median property value 1940	7.226	0.583
Median years schooling, males 1940	7.750	2.036
Log density 1940	3.383	1.330
Percent black 1940	10.625	17.761
Percent votes for Roosevelt 1940	60.472	20.231
Percent pop Baptist 1950	10.131	11.471
Percent pop Catholic 1950	11.133	15.765
Total Major War Supply Contracts ($000s) 1940-1945	60118.45	409607.3
Total Major War Facilities Projects ($000s) 1940-1945	8728.26	34053.36
Observations	2979	

Sources: County population, housing, and religion data are from Haines (2004). Public housing data are from the *Consolidated Development Directory* (HUD 1973). Election results for 1940 are from Leip (2009).

APPENDIX D

Sensitivity of OLS Results to Omitted Variable Bias

Altonji et al. (2005) assess the sensitivity of results to omitted variable bias using a bivariate normal structure. Bellows and Miguel (2009) adapt Altonji et al.'s framework to fit a linear model. The following derivation is borrowed from Bellows and Miguel (2009).

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

$$Y = \alpha + \beta PH + \lambda CCI + \varepsilon.$$

However, I cannot control for CCI. If I estimate β using OLS, excluding CCI from the regression, then the estimate will suffer from standard omitted variable bias, which can be written as:

$$\text{plim } \hat{\beta}_{NC} = \beta + \gamma(\text{cov}(PH,CCI) / \text{var}(PH)),$$

where NC denotes "No Controls". I assume that CCI is composed of observable controls, X, and an unobservable component, CCI_{unobs}, such that

$$CCI = \theta X + CCI_{unobs}.$$

I can estimate Y using the new equation,

$$Y = \alpha + \beta PH + \lambda X + e.$$

This equation will have omitted variable bias equal to:

$$\text{plim } \hat{\beta}_{C} = \beta + \gamma\ (\text{cov}(PH,CCI_{unobs}) / \text{var}(PH)).$$

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

$$\gamma \, (\text{cov}(PH, \lambda X) / \text{var}(PH)).$$

I would like to know how sensitive my results are to omitted variable bias, or, when I control for X, how large the remaining omitted variable bias must be relative to the portion of the observed variable bias that can be explained by observables in order for omitted variable bias to explain away my results. The null hypothesis is that public housing intensity has no effect on community outcomes and β is zero. If this is correct, then plim $\hat{\beta}_{C}$ can be written as $\gamma(\text{cov}(PH, CCI_{unobs}) / \text{var}(PH))$. I divide $\hat{\beta}_{C}$ by $(\hat{\beta}_{NC} - \hat{\beta}_{C})$ to remove unknown parameters and estimate the relative size of the omitted variable bias compared to the portion of the bias that can be explained by X:

$$\text{plim } \hat{\beta}_{C} \, / \, (\text{plim } \hat{\beta}_{NC} - \text{plim } \hat{\beta}_{C}) = \text{cov}(PH, CCI_{unobs}) / \text{cov}(PH, \lambda X).$$

In Altonji et al. (2005) and Bellows and Miguel (2009), the estimates with and without controls are very similar and the calculated ratios are large. They find ratios in the magnitude of 1.5-5 and argue that it is implausible that omitted variable bias can explain away the results. In this paper, the coefficient on PH changes signs when controls are added. While the ratios are not of the same magnitude as Altonji et al. (2005) and Bellows and Miguel (2009), the ratios are negative. I argue that it is improbable that the covariance between the index of unobservable characteristics and PH has a magnitude of 72-96 percent of the covariance between PH and the index composed of observables *and* of the opposite sign.

APPENDIX E

Public Housing and Enabling Legislation (IV First Stage), National Sample

Percent of lf in manufacturing 1940	-0.00531	(0.00396)
Percent of lf in agriculture 1940	-.00325	(0.00749)
Percent pop urban 1940	0.01272	(0.00268)
Percent units owner occupied 1940	-0.03199	(0.00753)
Median persons per rental unit 1940	-0.06247	(0.14634)
Percent units good 1940	-0.00791	(0.00259)
Percent units electricity 1940	-0.00862	(0.00390)
Percent units water 1940	0.00145	(0.00368)
Log median property value 1940	-0.08016	(0.09594)
Median years schooling, males 1940	-0.02379	(0.01061)
Log density 1940	0.06978	(0.03712)
Percent black 1940	0.02357	(0.00831)
Percent black 1940, squared	-.00050	(0.00010)
Percent votes for Roosevelt 1940	0.00594	(0.00364)
Percent pop Baptist 1950	0.00332	(0.00421)
Percent pop Catholic 1950	0.00350	(0.00170)
Total Major War Supply Contracts ($000,000s) 1940-1945	-0.00010	(0.00006)
Total Major War Facilities Projects ($000,000s) 1940-1945	0.00086	(0.00091)
Years of Potential Participation	0.01451	(0.00702)
Observations	2979	
F-statistic on excluded instrument	4.28	

Notes: Standard errors are reported in parentheses and are clustered by state. The instrument is years of potential public housing participation, which is defined as 1970 – the year in which state enabling legislation was passed. Regional fixed effects are included.
Sources: County population and housing data are from Haines (2004). Public housing data are from the *Consolidated Development Directory* (HUD 1973). State enabling legislation data are from *GUAD* (Aiken and Alford 1972).

APPENDIX F

Public Housing and Enabling Legislation (IV First Stage), West-of-Mississippi Sample

Percent of lf in manufacturing 1940	-0.00194	(0.00016)
Percent of lf in agriculture 1940	-0.00037	(0.00446)
Percent pop urban 1940	0.00641	(0.00248)
Percent units owner occupied 1940	-0.01625	(0.00664)
Median persons per rental unit 1940	0.21909	(0.13367)
Percent units good 1940	-0.00354	(0.00185)
Percent units electricity 1940	-0.00612	(0.00292)
Percent units water 1940	0.00252	(0.00323)
Log median property value 1940	-0.01513	(0.08775)
Median years schooling, males 1940	-0.01280	(0.01178)
Log density 1940	0.11959	(0.02813)
Percent black 1940	0.01296	(0.01178)
Percent black 1940, squared	-0.00035	(0.00016)
Percent votes for Roosevelt 1940	0.00828	(0.00359)
Percent pop Baptist 1950	-0.00653	(0.00799)
Percent pop Catholic 1950	0.00236	(0.00178)
Years of Potential Participation	0.01726	(0.00622)
Observations	1452	
F-statistic on excluded instrument	7.70	

Notes: Standard errors are reported in parentheses and are clustered by state. The instrument is years of potential public housing participation, which is defined as 1970 – the year in which state enabling legislation was passed. Regional fixed effects are included.
Sources: County population and housing data are from Haines (2004). Public housing data are from the *Consolidated Development Directory* (HUD 1973). State enabling legislation data are from *GUAD* (Aiken and Alford 1972).

APPENDIX G

OLS and IV Results for West-of-Mississippi Sample

	Log median property value	Log median family income	Percent of families with <$3,000 income	Log population density	Percent of female-headed households
OLS Results					
Percent of public housing units	-0.03248*** (0.00640)	-0.01490*** (0.00363)	0.39040*** (0.12032)	-0.04543*** (0.01153)	0.16093*** (0.04960)
Observations	1452	1452	1452	1452	1452
R-squared	0.61	0.68	0.69	0.93	0.61
IV Results					
Percent of public housing units	-0.03528 (0.06892)	-0.06002* (0.03533)	0.42053 (1.12952)	0.24510* (0.14593)	-0.86035* (0.47486)
Observations	1452	1452	1452	1452	1452

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 text for independent variables. See text for control variables. War contracts variables are included in the OLS regressions, but omitted from the IV regressions.

Sources: County population and housing data are from Haines (2004). Public housing data are from the *Consolidated Development Directory* (HUD 1973). State enabling legislation data are from *GUAD* (Aiken and Alford 1972).

CHAPTER VI

PUBLIC HOUSING, HUMAN CAPITAL, AND CHANGES IN EFFECTS OVER TIME

While my results confirm that public housing had negative effects on communities in 1970, it is unclear how or when these effects appeared. Public housing may create educational and labor market disincentives by setting rent as a proportion of income and creating a maximum income for tenants, or it may also create negative spillover effects through increasing the concentration of poverty. This chapter seeks to answer two fundamental questions. First, given that public housing had negative effects on outcomes in 1970, were these apparent effects due to changes in the composition on the population, perhaps through educational disincentives or selective migration? Second, did these apparent effects change over time, and if so, is there evidence of why this happened?

1. Public Housing and Local Human Capital

While it is difficult to decipher the channels through which public housing may have negatively affected outcomes, differential changes in county-level education levels might 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 education level of county residents, conditional on observables and state fixed effects (Chapter V, equation 1). Next, I assess whether public housing's

negative correlation with income is accounted for by variation in the local population's educational attainment, which in turn could be driven by differential changes in the education of local youth or by selective migration. If public housing negatively affected income only through changing the educational attainment of the population, then controlling for educational attainment (as measured by the proportion of high school graduates) will absorb the public housing "effect." Results are reported in table 6-1.

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 0.58 percentage point decrease in high school graduates (statistically significant at the one percent level). Subsequent columns add the high-school-graduate variable as a control in to the base regressions for property values, median income, low income, population density, and female-headed households. For log median property values, the coefficient on public housing falls from -0.021 (in table 5-1) to -0.010 (in table 6-1); for median family income, the coefficient falls from -0.018 to -0.0011; for the percent of families with low income, the coefficient falls from 0.46 to 0.27; for population density, the coefficient falls from -0.045 to -0.029; and for female-headed households, the coefficient falls from 0.28 to 0.24. 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.

1.1 Did Public Housing Encourage Selective Migration?

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

Table 6-1: 1970 OLS Results, Role of Changing Population Composition

	Percent of high school graduates	Log median property value	Log median family income	Percent of families with <$3,000 income	Log population density	Percent of female-headed households
Percent of public housing units	-0.57688*** (0.13349)	-0.01048*** (0.00417)	-0.01134*** (0.00219)	0.26573 (0.08680)	-0.02949*** (0.0055)	0.23582*** (0.03873)
Percent of high school grads 1970?	No	Yes	Yes	Yes	Yes	Yes
Base Results (table 5-1)		*-0.02104*** (0.00482)*	*-0.0181*** (0.00281)*	*0.45699*** (0.10707)*	*-0.0450*** (0.00622)*	*0.2806*** (0.04203)*

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 5-1 or text for independent variables. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.
Sources: County population and housing data are from Haines (2004). Public housing data are from the *Consolidated Development Directory* (HUD 1973).

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 assess the relationship between public housing and human capital better, I first run regressions using the log number of high school graduates and dropouts as my variables of interest to determine whether places with public housing have larger populations of high school dropouts in 1970. Next, I use the IPUMS micro-data for the 1970 Census (Ruggles et al. 2010) to assess whether areas with high concentrations of public housing cause large inflows of low-human capital residents.

1.1.1 Public Housing and the Stock of High School Graduates and Dropouts

I begin by running Chapter V, equation 1 again, using the log number of high school graduates and dropouts as my variables of interest. Results are reported in table 6-2. 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 -0.0438 and -0.0207, 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 2.1 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 move slowly than the high-education residents.

Table 6-2: Population of High School Graduates and Dropouts, 1970

	Log high school graduates	Log high school dropouts	Log high school graduates	Log high school dropouts
Percent of public housing units	-0.04377*** (0.01000)	-0.02075** (0.00990)	-0.01932*** (0.00400)	-0.00795*** (0.00237)
Log high school graduates (dropouts) 1960 included?	No	No	Yes	Yes
Observations	2979	2979	2979	2979
R-squared	0.84	0.84	0.99	0.99

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 5-1 or text for independent variables. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.
Sources: County population and housing data are from Haines (2004). Public housing data are from the *Consolidated Development Directory* (HUD 1973).

1.1.2 Public Housing and the In-Migration of Low Human Capital

To focus directly on the potential contribution of migration, I turn to the IPUMS micro-data for the 1970 Census (Ruggles et al. 2010). For each individual, one can observe the education level and migration status, in terms of whether they lived in the same place five years previously. I aggregate this information to the "county group" level for analysis. If public housing lowered local human capital measures by

encouraging low-skilled people to migrate into the community, one would expect a positive correlation between public housing intensity and the percent of the population composed of migrants without a high school degree.

I divide each county group's population into four migration-education subgroups: the percent of the population who were high school drop-out migrants (lived in a different county five years before), high school graduate migrants, high school drop-out locals (lived in same county five years before), and high school graduate locals. I then regress the percentage of each 1970 migration-education subgroup on the percent of the occupied housing stock composed of public housing in 1970 ($PH_{cg,1970}$), a measure of county-group size (log of total occupied units in 1970, $lntotunits_{cg,1970}$), and region fixed effects.[42]

$$Y_{cg,1970} = \alpha + \beta PH_{cg,1970} + \theta lntotunits_{cg,1970} + \Gamma_{region} + \varepsilon_{cg,\ 1970} \qquad (1)$$

The regression results are reported in table 6-3 and reveal that public housing intensity is *negatively* correlated with the share of low-education recent migrants in the population (coefficient = -0.31). This is not consistent with the provision of public housing encouraging the in-migration of low-education individuals, but is consistent with my earlier findings that communities with large intensities of public housing were simply losing their less educated population *more slowly* than their educated population. Of course, a limitation to this analysis is that one can only identify individuals who moved

[42] I limit my sample to adults at least 20 years of age. I identify migrants as those who definitely lived in a different county five years before (either lived abroad, in a different state, or a different county). I use region fixed effects instead of state fixed effects because county-groups often crossed state lines.

within the last five years. It is possible that public housing did induce low-skilled migration, but that this migration occurred before 1965. Further investigation of the underlying currents of migration flows and their connection to local public housing would be valuable.

Table 6-3: County-Group Population Composition and Public Housing Intensity, 1970

	Percent not HS grad and migrant	Percent HS grad and migrant	Percent not HS grad and local	Percent HS grad and local
Percent of public housing units	-0.30573*** (0.10622)	-0.89160*** (0.29243)	1.76819*** (0.44451)	-0.57085** (0.28453)
Observations	397	397	397	397
R-squared	0.26	0.27	0.38	0.53

Notes: "Migrant" ("local") is defined as someone who lived in a different (the same) county 5 years before. Standard errors are reported in parentheses and are clustered by region. I control for log total occupied units in each county-group in 1970 and region fixed effects. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.
Sources: Housing data are from Haines (2004). Public housing data are from the *Consolidated Development Directory* (HUD 1973). Population data are from Ruggles et al. (2008).

2. The Effects of Public Housing over Time

Public housing appears to have had negative effects on adoptive communities in 1970, but 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. However, it is also possible that public housing, when relatively new and under the original rules of tenant selection, did not have such negative effects at all.

2.1 Econometric Strategy and Basic Results

To assess whether the negative relationship between public housing and community outcomes was in place prior to 1970, I used the data underlying figure 3-1 to estimate Chapter V, equation 1 for similar outcome measures in 1960 and 1950, using public housing intensity measures that are specific to those years.[43] The set of 1940 control variables and fixed effects are the same as for the earlier analysis.

Results are reported in table 6-4, and they suggest that public housing did *not* have negative effects on adoptive communities until the 1960s. 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 population density in 1950. The coefficient on public housing is statistically significant in the log median family income 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 characteristics 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, creating a negative correlation between public housing and poor community outcomes. Or, the type or quality of public housing built (e.g., high rise, low rise, scattered site) could have varied by decade of construction. If more high-rises were built in the 1960s, the high density of residents may have led to larger negative effects than older, less densely populated public housing.

[43] Data on the percent of female-headed households is not available for 1950 and 1960, but all other variables of interest are used (log median income, log median property values, percent of families with low income).

Table 6-4: County-Level Economic Outcomes and Public Housing in 1950 and 1960

	Log median property value	Log median family income	Percent of families with <$3,000 income ($2,000 in 1950)	Log population density
1960				
Public housing, percentage of units	-0.00173	0.00129	0.15343	-0.00670
	(0.00568)	(0.00432)	(0.19638)	(0.00643)
Obs.	2947	2973	2973	2972
R-squared	0.70	0.83	0.84	0.97
1950				
Public housing, percentage of units	-0.00341	0.01955**	-0.40795	0.00812
	(0.00911)	(0.00804)	(0.35829)	(0.00724)
Obs.	2977	2945	2979	2971
R-squared	0.84	0.87	0.89	0.99

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 5-1 or text for a list of independent variables. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.
Sources: County population and housing data are from Haines (2004). Public housing data are from the *Consolidated Development Directory* (HUD 1973).

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.

2.2 The Role of Negative Selection into Public Housing in the 1960s

It is difficult to empirically distinguish among all these possibilities, but because my dataset includes the public housing stock in each county in all years between 1940 and 1970, I can explore whether a rapid expansion of public housing in particular places during the 1960s (i.e., strongly negative decade-specific selection) drives the base results. If negative selection of counties into the public housing program after 1960 drives the 1970 results, then the percentage of public housing built before 1960 should not have a strongly negative association with 1970 outcomes.

I run regressions of 1970 economic outcomes that are similar to the base specification (Chapter V, equation 1), but use 1960 public housing (rather than 1970) in the measure of 1970 public housing intensity.[44] Results are reported in table 6-5.[45] There

[44] I measure public housing intensity as 1960 public housing / 1970 total occupied housing * 100.

[45] To determine if counties with negative unobservable characteristics began their first public housing projects in the 1960s, I also run regressions of 1970 community outcomes, limiting my sample to counties that first adopted public housing during various periods of time. I limit my sample to counties with public housing before 1950, counties who first adopted public housing in the 1950s, counties who first adopted public housing in the 1960s, and to all counties with public housing by 1970. The last sample differs from the original sample in that it includes no counties without public housing. Results are reported in appendix H. When I divide my sample by decade of first adoption, I find that public housing is negatively and statistically significantly correlated (at the ten percent level or higher) with lower median property values, lower median family income, lower population density, a higher percentage of low-income families, and a higher percentage of female-headed households in 1970 in all samples. I find no evidence of public housing having more negative effects on communities that waited to adopt public housing in the 1960s. For the percent of low-income families and the percent of female-headed households, I find that public housing has a smaller negative effect on communities that adopted public housing later during the period. The coefficients on public housing for counties adopting public housing after 1960 in the log of median property values and the log of median income regressions are slightly larger than in the regression of counties that adopted public housing in the 1950s, but are very similar to the coefficients in the regressions of counties that had public housing by 1950.

Table 6-5: 1970 OLS Results, Using 1960 Public Housing

	Log median property value	Log median family income	Percent of families with <$3,000 income	Log population density	Percent of female-headed households
Percent of 1970 units public housing built pre-1960	-0.01582**	-0.01717**	0.46840	-0.04853***	0.38511***
	(0.00663)	(0.00701)	(0.28454)	(0.01059)	(0.10331)
Observations	2979	2979	2979	2979	2979
R-squared	0.68	0.76	0.77	0.95	0.75
Percent of public housing units (from table 5-1, for comparison)	-0.02104***	-0.0181***	0.45699***	-0.0450***	0.2806***
	(0.00482)	(0.00281)	(0.10707)	(0.00622)	(0.04203)
Observations	2979	2979	2979	2979	2979
R-squared	0.68	0.76	0.77	0.95	0.75

Notes: Percent of 1970 units public housing built pre-1960 is defined as (# public housing units built by 1960 / total occupied units in 1970 * 100). Standard errors are reported in parentheses and are clustered by state. See notes to table 5-1 or text for independent variables. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.
Sources: County population and housing data are from Haines (2004). Public housing data are from the *Consolidated Development Directory* (HUD 1973).

is a strong and negative relationship between public housing in 1960 and economic outcomes in 1970. The point estimates are similar to those reported in table 5-1 (reprinted in table 6-5 for convenience), although the estimate for log median property value is slightly smaller. A one percentage point increase in the percent of housing composed of 1960 public housing is correlated with a 1.6 percent decrease in log median property values (statistically significant at the five percent level) and is slightly smaller than the 2.1 percent decrease found when using the percent of 1970 public housing. A similar increase in the percent of housing composed of 1960 public housing is correlated

This suggests that the timing of selection into the public housing program does not explain the negative 1970 results.

with a 1.7 percent decrease in log median family income, compared to the 1.8 percent decrease found in the base regression (also statistically significant at the five percent level). The point estimate on the percent of 1960 public housing in the regression of low income families is similar to the point estimate in the base regression (0.47, compared to 0.46), although this coefficient is not statistically significant. The point estimates are also similar for the regression of log population density (-0.049, compared to -0.045 in the base regression) and both are statistically significant at the one percent level. Finally, the coefficient in the regression of female-headed households is larger than in the base regression (0.39 compared to 0.28) and statistically significant at the one percent level. These results suggest that post-1960 negative selection into the public housing program is not driving the base results for 1970. As mentioned above, there are several other potential explanations for the negative turn in the public housing effect. I plan to explore those channels more thoroughly in future work.

3. Summary

By 1970, communities that adopted public housing ended up with worse economic outcomes on a variety of dimensions. It appears that differential changes in local educational attainment account for part of the negative effects of public housing, but not all. Furthermore, the link between public housing and low education does not appear to be due to the in-migration of low skilled workers. Places that participated intensively in public housing were experiencing relative declines in population, but were losing their less-educated population more slowly than their more-educated population. I also find no evidence that public housing was negatively correlated with outcomes before 1970. This

does not appear to be due to changes in county-level participation intensity or selection into participation in the public housing program. Rather, it appears that the interaction of public housing and local outcomes took a sharp negative turn during the 1960s.

APPENDIX H

1970 OLS Results by Decade of First Adoption

	Log median property value	Log median family income	Percent of families with <$3,000 income	Log population density	Percent of female-headed households
Pre-1950					
Percent of public housing units	-0.02661*	-0.01893**	0.63208**	-0.06296***	0.42238***
	(0.01390)	(0.00919)	(0.25146)	(0.02171)	(0.10641)
Observations	194	194	194	194	194
R-squared	0.84	0.88	0.90	0.98	0.87
1951-1960					
Percent of public housing units	-0.01975***	-0.02212***	0.62592***	-0.04593***	0.30768***
	(0.00647)	(0.00470)	(0.15130)	(0.00671)	(0.04902)
Observations	433	433	433	433	433
R-squared	0.75	0.82	0.8	0.93	0.78
1961-1970					
Percent of public housing units	-0.02915***	-0.02303***	0.51609***	-0.06962***	0.25368***
	(0.00889)	(0.00421)	(0.15689)	(0.01625)	(0.04659)
Observations	746	746	746	746	746
R-squared	0.77	0.82	0.82	0.95	0.80
by 1970					
Percent of public housing units	-0.02261***	-0.01966***	0.48506***	-0.05568***	0.31609***
	(0.00517)	(0.00246)	(0.10988)	(0.00749)	(0.03858)
Observations	1373	1373	1373	1373	1373
R-squared	0.77	0.82	0.81	0.96	0.79

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 5-1 or text for independent variables. Pre-1950 includes all counties with public housing in or before 1950. 1951-1960 and 1961-1970 include all counties who first adopted public housing during those periods. By 1970 includes all counties with public housing by 1970. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

Sources: County population and housing data are from Haines (2004). Public housing data are from the *Consolidated Development Directory* (HUD 1973).

CHAPTER VII

PUBLIC HOUSING, FERTILITY, AND FEMALE HEADSHIP

In this chapter, I use individual-level data from the 1950 and 1970 Censuses to assess the relationship between public housing availability and the fertility and household headship decisions of young women. Between 1950 and 1970, there was a large increase in the percent of female-headed households in the United States. The percent of women aged 18-59 who were household heads increased from 2.3 to 4.2 percent for whites, and 5.5 to 15.2 percent for blacks (Wojtkiewicz, et al. 1990). Meanwhile, the percent of public housing tenants composed of female-headed households increased from 19 to 31 percent (Silverman 1971). This change in public housing tenants may partially reflect effects of public housing if, by increasing the supply of low-income housing, public housing reduced the costs of childrearing and household headship for young females. Or, the sharp increase in female heads may simply be due to secular changes in social norms or selection of female-headed households into public housing.

Single-parent households have been linked to a variety of negative outcomes, such as increased rates of poverty among single mothers (McLanahan and Sandefur 1994), and poor child outcomes. Children growing up in single-parent homes have been shown to be more susceptible to low educational attainment, emotional problems, and behavioral problems, such as early use of controlled substances and sexual activity (Amato 2005, Aquilino 1996, Dawson 1991, Deleire and Kalil 2002, Dornbusch, et al. 1985, Flewelling and Bauman 1990). Therefore, a better understanding of the effects of public housing on

single motherhood and female headship may shed light on the effects of public housing on poverty and child outcomes as well.

Controlling for individual- and MSA-level characteristics as well as time fixed effects, I estimate the marginal effects of public housing exposure (defined as the percent of occupied housing in a metropolitan area composed of public housing) on females' decisions to become single mothers and household heads. I find that exposure to public housing is correlated with a slight increase in the likelihood that females are single mothers. This effect is larger for blacks and individuals without a high school degree. Moreover, my results are also consistent with public housing exposure increasing the likelihood of females being household heads, although the effect is small and not statistically significant. While the estimates are consistent with public housing creating negative incentives for young women, the magnitudes of the effects suggest that the spread of public housing cannot explain the rapid rise in female-headed households over the period.

1. How Would Exposure to Public Housing Influence Fertility and Household-Headship?

It is possible that the provision of public housing creates incentives for young women to become single mothers and household heads. Adopting the framework of Becker (1981), women maximize utility considering the costs and benefits of employment, marriage, and motherhood. Increased labor market opportunities for women reduce both the incidence of marriage and the incentive for childrearing. Meanwhile, decreased labor market opportunities for males reduce the pool of potentially marriageable men. Policies that reduce the cost of having children (e.g., public assistance

policies such as welfare or public housing) may increase the probability that women have children out of wedlock and start their own households.

1.1 AFDC Literature

There is a large literature that assesses the effects of Aid to Families of Dependent Children (AFDC) and Food Stamps on fertility and female headship decisions (e.g., Blau, Kahn, and Waldfogel 2004, Ellwood and Bane 1985, Hoynes 1997, Moffitt 1990, 1992, 1994, Schultz 1994). These programs potentially reduce the costs of single-motherhood and female headship by providing aid to poor families, a group predominantly composed of single mothers. The literature finds mixed results, which is partially due to changes in the empirical strategies employed over time.

Early work by Ellwood and Bane (1985) and Moffitt (1990) make use of cross-sectional differences in state-level benefits. Ellwood and Bane (1985) find positive effects of welfare on female headship for 1960 and 1970, but Moffitt (1990) finds an insignificant effect for whites and a negative effect for blacks between 1969 and 1985. One major concern with cross-sectional analysis, however, is that it is unable to control for unmeasured state-specific factors (e.g., social norms) that also influence fertility and headship decisions. Later work by Moffitt (1994) and Hoynes (1997) improves upon the earlier work by using panel data and controlling for state fixed effects. Moffitt (1994) finds either no effect or a negative effect of welfare on the likelihood of female headship, but Hoynes (1996) finds either zero or a positive effect. Of course, these estimates would not represent causal effects if there are changes in norms (or other unobservables) over time that are also correlated with changes in welfare benefits. Blau, Kahn, and

Waldfogel (2004) improve upon existing empirical strategies even further by including three waves of the Census (1970-1990) and controlling for MSA fixed effects and MSA time trends. They find positive relationships between welfare and single motherhood and headship using cross-sections, but the addition of MSA fixed effects eliminates the relationship between welfare and single motherhood. When including MSA time trends as well, they find a positive relationship between welfare and single headship of black women, but no statistically significant relationship between welfare and single motherhood, or between welfare and single headship for whites.

1.2 Potential Effects of Public Housing

In theory, the availability of low-income public housing could change fertility and headship incentives for young women. The provision of public housing may provide women with the opportunity of starting their own households, thereby increasing the percent of single mothers and female household heads. The rent structure of public housing may also create disincentives for the father to live with, and marry, the mother (also increasing the percent of female-headed households and the percent of unwed mothers). Because rent is set as a proportion of income, if a father chooses to live with the mother and children, any legal income the father earns will lead to an increase in rent. If high enough, his income may even disqualify the family from public housing. Therefore, couples may decide to not live together (at least officially) as a way of lowering housing costs.

The effects of public housing may work through less direct channels as well. To the extent that public housing increases the concentration of poverty (Massey and

Kanaiaupuni 1993), public housing may create negative peer and neighborhood effects that alter social norms and encourage out-of-wedlock births.

2. Data

I use data from the 1950 and 1970 Population Census, downloaded from the *Integrated Public Use Microdata Series* (Ruggles et al. 2010). My sample includes all women in the 1950 and 1970 Censuses who are identified as white or black, who are between the ages of 16 and 24, and who reside in a Metropolitan Statistical Area that is identifiable in the Census in both 1950 and 1970.[46] I exclude data from 1960 because data on metropolitan area of residence is not available for that year.

Summary statistics are reported in table 7-1. Single mothers represent 1.1 and 2.7 percent of the 1950 and 1970 samples, respectively. In 1950, 17 percent of the single mothers in my sample headed their own households and in 1970, that percentage increased to 47 percent. Single mothers in my sample are disproportionately black and have lower education than the sample of all young women. For example, in the 1950 sample, 31 percent of single mothers are black, compared to 12.8 percent of women in the entire sample. This fraction increased to 47 percent in 1970 (compared to 13.1 percent for the entire sample). Not surprisingly, the average age of single mothers is higher than the average age of the sample at large. The average age of single mothers in the 1950 sample is 21.4, compared to an average age of 20.1 for all women. The average age of female household heads is even higher, at 22.4.

[46] There are 108 MSAs in the sample. I aggregate data on public housing availability and total occupied housing from the county level using definitions of MSA boundaries from *Metropolitan Areas 1994* (United States Bureau of the Census 1994).

Table 7-1: Summary Statistics

	All					
		1950			1970	
	All	Single moms	Single heads	All	Single moms	Single heads
Single mom	0.0106			0.0273		
Single head	0.0018	0.1703		0.0129	0.4724	
Black	0.1276	0.3128	0.3621	0.1314	0.4684	0.4190
MSA %PH	0.7027	0.8053	0.7497	1.5288	1.5175	1.4499
Less than high school	0.8739	0.9427	0.9052	0.4188	0.5240	0.4996
Exactly high school	0.0930	0.0529	0.0862	0.3598	0.3922	0.3936
More than high school	0.0332	0.0044	0.0086	0.2214	0.0837	0.1069
Age	20.06	21.43	22.37	19.90	21.05	21.93
Observations	64,282	681	116	91,435	2,496	1,179
	Whites					
		1950			1970	
	All	Single moms	Single heads	All	Single moms	Single heads
Single mom	0.0084			0.0167		
Single head	0.0013	0.1588		0.0086	0.5176	
MSA %PH	0.6707	0.7584	0.6682	1.4956	1.3351	1.3083
Less than high school	0.8639	0.9227	0.8514	0.4032	0.4778	0.4556
Exactly high school	0.1004	0.0708	0.1351	0.3633	0.4211	0.4142
More than high school	0.0357	0.0064	0.0135	0.2335	0.1011	0.1302
Age	20.06	21.64	22.31	19.91	21.55	22.12
Observations	55,746	466	74	78,248	1,306	676
	Blacks					
		1950			1970	
	All	Single moms	Single heads	All	Single moms	Single heads
Single mom	0.0260			0.0973		
Single head	0.0051	0.1972		0.0411	0.4226	
MSA %PH	0.9301	0.9101	0.8934	1.7713	1.7231	1.6422
Less than high school	0.9403	0.9859	1	0.5236	0.5766	0.5587
Exactly high school	0.0443	0.0141	0	0.3439	0.3593	0.3664
More than high school	0.0155	0	0	0.1325	0.0642	0.0749
Age	20.06	20.953	22.48	19.80	20.49	21.67
Observations	8,201	213	42	12,011	1,169	494

Notes: The sample includes females 16-24 years of age who are defined as either black or white, and reside in an MSA identifiable in both the 1950 and 1970 Censuses. Public housing intensity is defined as public housing units in 1950(70)/ total occupied units in 1950(70) * 100. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.
Sources: MSA public housing intensity data are aggregated from public housing data from the *Consolidated Development Directory* (HUD 1973) and county-level Census housing data (Haines 2004). Individual-level data and MSA economic characteristics are from IPUMS (Ruggles et al. 2010).

I report summary statistics separately by race (also in table 7-1). The percent of white females in my sample who are single mothers doubled between 1950 and 1970. In the 1950, 0.8 percent of white females were single mothers, compared to 1.7 percent in 1970. Meanwhile, the percent of my sample of black females who were single mothers nearly quadrupled. In 1950, 2.6 percent of black females were single mothers, compared to 9.7 percent in 1970. The average age of single mothers decreased between 1950 and 1970 and the average age of black single mothers is slightly lower than the average age of white single mothers in both years. The average age of white single mothers in 1950 and 1970 is 21.64 and 21.55, respectively, compared to 20.95 and 20.49 for blacks. Average public housing exposure is higher for blacks than whites (0.93 compared to 0.67) and a similar pattern exists when looking at black and white single mothers and household heads.

3. Empirical Strategy

I use probit regression analysis to assess the impact of exposure to public housing intensity on fertility and female headship decisions. My regression of interest is

$$P(Y_{ijt} = 1) = \Phi(\beta PHexposure_{jt} + V_{ijt}\gamma_t + C_{jt}\mu + MSA_j + Year_t), \quad (1)$$

where Y is a dummy variable that indicates whether an individual i, in MSA j, in time t, is a single mother (or female household head), Φ is the standard normal cumulative distribution function, PHexposure is the percent of occupied housing in the MSA composed of public housing, V is a vector of individual characteristics (age, race, and

education dummy variables), and C is a vector of MSA-specific characteristics (the percent of adult male unemployment, the log of the average wage of adult men).[47] MSA and Year control for metropolitan area and year fixed effects. Year fixed effects control for common changes in fertility and headship patterns over time and MSA fixed effects control for differences in societal norms and other unobservable fixed effects across metropolitan areas. MSA-level employment and wage characteristics control for potential employment and marriage opportunities specific to the local economy. Because of the large sample size allotted by the Census, I am able to include flexible controls for the age and education of individuals. I include dummy variables indicating whether individuals have 0, 1-4, 5-8, 9, 10, 11, 12, 13-15, and 16+ years of completed schooling. Also, because educational attainment is dependent on age (for example, a 16 year old with 10 years of education may go on to finish high school whereas a 24 year old with 10 years of schooling likely dropped out), I include a dummy variable for each year of age (16-24).

The coefficient of interest is estimated using a basic difference-in-difference set-up that makes use of differences in public housing intensity across MSAs and over time. As mentioned earlier, MSA fixed effects control for any differences in levels that may have influenced public housing and the variables of interest, and time fixed effects control for differences in trends that were shared across MSAs. Therefore, β can be interpreted as a causal effect of public housing exposure *if* there are no MSA-specific shocks or trends that are correlated with public housing intensity and that directly influence the probability of single motherhood or single headship. Of course, public housing was not randomly distributed across counties so one should be cautious to

[47] Household head is defined as a female who is a single mother and head of household.

interpret β as a causal effect. However, several robustness checks in chapter V suggest that negative selection into the public housing program cannot explain the adverse relationship between public housing and county-level outcomes.

3.1 Results

Marginal effect estimates are reported in table 7-2. Although imprecisely estimated, I find that a one percentage point increase in MSA public housing intensity is correlated with a 0.08 percentage point increase in the probability of a female being a single mother. Similarly, I find that a one percentage point increase in public housing intensity is correlated with a 0.03 percentage point increase in the probability of being a single household head (also not statistically significant).

Table 7-2: Marginal Effects of Public Housing Intensity on Fertility and Female Headship

	Single mom	Single household head
MSA public housing intensity	0.00079	0.00025
	(0.00097)	(0.00054)
Observations	155,717	152,509

Notes: Estimated marginal effects of MSA public housing intensity (defined as public housing units in 1950(70) / total occupied units in 1950(70) * 100) are reported in each column. Standard errors are reported in parentheses. A one, five, and ten percent level of statistical significance is indicated with ***, **, and *, respectively. The sample includes females 16-24 years of age who are defined as either black or white, and reside in an MSA identifiable in both the 1950 and 1970 Censuses. Controls include individual characteristics (a dummy variable indicating whether or not an individual is black, dummy variables for each age, school dummy variables indicating whether the individual has 0, 1-4, 5-8, 9, 10, 11, 12, 13-15, or 16+ years of schooling), MSA economic characteristics (the percent of employed males age 25-54 in the MSA, the log average wage of adult males in the MSA), MSA- and year-fixed effects. I weight the sample by perwt. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.
Sources: MSA public housing intensity data are aggregated from public housing data from the *Consolidated Development Directory* (HUD 1973) and county-level Census housing data (Haines 2004). Individual-level data and MSA economic characteristics are from IPUMS (Ruggles et al. 2010).

Because public housing is credited with having a disproportionate impact on African Americans, I run regression (1) again, this time allowing for public housing exposure to have differing effects for whites and blacks. Marginal effects estimates are reported in table 7-3. The marginal effect of public housing intensity on single motherhood for blacks is 0.0023, which suggests that a one percentage point increase in public housing intensity is correlated with a 0.23 percentage point increase in the probability of single motherhood (statistically significant at the five percent level). This is nearly three times as large as the estimate in table 7-2. The marginal effect of public housing exposure for whites, however, is small and statistically insignificant. In the regression of single-headship, the marginal effect of public housing exposure for blacks is 0.00053 and the marginal effect of public housing exposure for whites is 0.00015 (neither statistically significant).

Table 7-3: Marginal Effects of Public Housing Intensity on Fertility and Female Headship, by Race

	Single mom	Single household head
MSA public housing intensity * white	-0.00047	0.00015
	(0.00090)	(0.00044)
MSA public housing intensity * black	0.00232	0.00053
	(0.00097)**	(0.00048)
Observations	155,717	152,509

Notes: Estimated marginal effects of MSA public housing intensity (defined as public housing units in 1950(70) / total occupied units in 1950(70) * 100) are allowed to differ by race and are reported in each column. Standard errors are reported in parentheses. The sample includes females 16-24 years of age who are defined as either black or white, and reside in an MSA identifiable in both the 1950 and 1970 Censuses. See table 7-2 for a list of controls. I weight the sample by perwt. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

Sources: MSA public housing intensity data are aggregated from public housing data from the *Consolidated Development Directory* (HUD 1973) and county-level Census housing data (Haines 2004). Individual-level data and MSA economic characteristics are from IPUMS (Ruggles et al. 2010).

3.2 Robustness to Changes in AFDC Benefits

These results represent causal effects of public housing if, within-MSA, there are no shocks or trends that are correlated with changes in public housing intensity and that directly influence single motherhood and headship decisions. However, it is possible that locations that experience a large increase in public housing also experience large increases in welfare benefits, and these changes in welfare benefits are driving my results. (Of course, if the generosity of such programs does not change over time, MSA fixed effects would absorb this effect.)

To assess whether changes in welfare generosity are driving my results, I estimate equation (1) (allowing for separate public housing effects by race), including the log maximum AFDC family benefit in 1970 as a control.[48] Results are reported in table 7-4. Controlling for state-level AFDC benefits in 1970 has little effect on my results. The black-specific marginal effect of public housing intensity is 0.00233 (statistically significant at the five percent level), compared to 0.00232 in table 7-3. As in table 7-3, the marginal effects on household headship are small and statistically insignificant.

3.3 Females with less than a high school degree

Because public housing was meant to help the poor, it is likely that public housing had a larger effect on individuals with low levels of education. To more specifically assess the effect of public housing on females with low human capital, I estimate equation (1) again, while limiting the sample to females with less than 12 years of schooling. Marginal effects are reported in table 7-5.

[48] AFDC benefits vary by state. In I use the maximum AFDC benefit for a family of three in July 1970. Data on state-level AFDC maximum benefits are from the Committee on Ways and Means, U.S. House of Representatives (1998).

Table 7-4: Marginal Effects of Public Housing Intensity on Fertility and Female Headship by Race, Including Maximum AFDC Benefits

	Single mom	Single household head
MSA public housing intensity * white	0.00003	0.00009
	(0.00091)	(0.00045)
MSA public housing intensity * black	0.00233	0.00035
	(0.00099)**	(0.00050)
Observations	150,197	145,962

Notes: Estimated marginal effects of MSA public housing intensity (defined as public housing units in 1950(70) / total occupied units in 1950(70) * 100) are allowed to differ by race and are reported in each column. Standard errors are reported in parentheses. The sample includes females 16-24 years of age who are defined as either black or white, and reside in an MSA identifiable in both the 1950 and 1970 Censuses. Controls include individual characteristics (a dummy variable indicating whether or not an individual is black, dummy variables for each age, school dummy variables indicating whether the individual has 0, 1-4, 5-8, 9, 10, 11, 12, 13-15, or 16+ years of schooling), MSA economic characteristics (the percent of employed males age 25-54 in the MSA, the log average wage of adult males in the MSA), MSA- and year-fixed effects. I also include the log state-level maximum AFDC benefit for 1970. I weight the sample by perwt. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.
Sources: MSA public housing intensity data are aggregated from public housing data from the *Consolidated Development Directory* (HUD 1973) and county-level Census housing data (Haines 2004). Individual-level data and MSA economic characteristics are from IPUMS (Ruggles et al. 2010). AFDC maximum benefit data from the Committee on Ways and Means, U.S. House of Representatives (1998).

When using a single measure of public housing intensity (for blacks and whites), I find a marginal effect of public housing intensity on single motherhood of 0.0027 (statistically significant at the five percent level) and a marginal effect of public housing intensity on single-headship of 0.0007 (statistically significant at the ten percent level). Next, I allow for separate effects by race and find a marginal effect of public housing on single motherhood of 0.0015 for whites and a marginal effect of 0.0037 for blacks (statistically significant at the one percent level). The marginal effect of public housing on single-headship for whites and blacks is 0.0005 and 0.0006, respectively. Results are similar when I control for changes in AFDC benefits. However, the marginal effect of

public housing exposure on single motherhood for whites (0.0018) becomes statistically significant (at the ten percent level). These results suggest that public housing exposure had relatively large effects on the probability that low-human capital females (both white and black) became single mothers in 1950 and 1970. However, the marginal effect is nearly twice as large for blacks as it is for whites.

Table 7-5: Marginal Effects of Public Housing Intensity on Fertility and Female Headship on Individuals with less than High School Degree

	Single mom	Single mom	Single head	Single head
MSA public housing intensity	0.00265 (0.00107)**	0.00261 (0.00110)**	0.00074 (0.00039)*	0.00062 (0.00041)
Includes AFDC?	No	Yes	No	Yes
Observations	94,464	91,984	90,537	87,361
MSA public housing intensity * white	0.00155 (0.00105)	0.00180 (0.00107)*	0.00052 (0.00037)	0.00045 (0.00038)
MSA public housing intensity * black	0.00374 (0.00113)***	0.00333 (0.00116)**	0.00064 (0.00040)	0.00048 (0.00041)
Includes AFDC?	No	Yes	No	Yes
Observations	94,464	91,984	90,537	87,361

Notes: Estimated marginal effects of MSA public housing intensity (defined as public housing units in 1950(70) / total occupied units in 1950(70) * 100) are allowed to differ by race and are reported in each column. Standard errors are reported in parentheses. The sample includes females 16-24 years of age who are defined as either black or white, and reside in an MSA identifiable in both the 1950 and 1970 Censuses. See table 7-4 for a list of controls. I weight the sample by perwt. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.
Sources: MSA public housing intensity data are aggregated from public housing data from the *Consolidated Development Directory* (HUD 1973) and county-level Census housing data (Haines 2004). Individual-level data and MSA economic characteristics are from IPUMS (Ruggles et al. 2010). AFDC maximum benefit data from the Committee on Ways and Means, U.S. House of Representatives (1998).

4. The Effect of Public Housing on Aggregate Changes in Single Motherhood and Female Headship

Above, I find a positive link between MSA-level public housing intensity and the probability that a young female is a single mother or a single household head. However, the public housing "effect" appears small, especially compared to the large increase in the percent of single mothers and female household heads throughout the period. To better understand the magnitudes of the estimated coefficients, I do simple, back-of-the-envelope calculations to estimate the amount of growth in single motherhood and female headship that can be explained by the growth in public housing intensity between 1950 and 1970.

To do this, I first multiply $\hat{\beta}$, the estimated coefficient on public housing exposure, by the difference in mean public housing exposure in 1970 and 1950. This can be interpreted as the growth in single motherhood (headship) due to increased public housing intensity over the period. I then divide this by the difference in the sample mean of single mothers (heads) in 1970 and 1950. This ratio approximates the fraction of growth in single mothers (heads) that can be explained by the increase in exposure to public housing.

$$\hat{\beta}\,(\overline{\text{PHexposure}}_{j70} - \overline{\text{PHexposure}}_{j50}) \,/\, (\,\overline{Y}_{ij70} - \overline{Y}_{ij50}) \qquad (2)$$

I calculate this ratio for the entire sample (allowing for one effect for whites and blacks) using the estimated $\hat{\beta}$'s from table 7-2, and again using the estimated $\hat{\beta}$'s from table 7-3 (allowing for separate effects by race). Results are reported in table 7-6. I find

Table 7-6: The Effect of Public Housing on Aggregate Changes in Single Motherhood and Female Headship

	Whites and Blacks			
	Single Moms		Single Heads	
	$\hat{\beta}\overline{PHexposure}$	Sample $\bar{Y}$	$\hat{\beta}\overline{PHexposure}$	Sample $\bar{Y}$
1950	0.00056	0.0106	0.00018	0.0018
1970	0.00121	0.0273	0.00039	0.0129
1970-1950	0.00065	0.0167	0.00021	0.0111
% Change explained by PH (0-100)	3.9		1.9	
	Blacks			
	Single Moms		Single Heads	
	$\hat{\beta}\overline{PHexposure}$	Sample $\bar{Y}$	$\hat{\beta}\overline{PHexposure}$	Sample $\bar{Y}$
1950	0.00216	0.0260	0.00050	0.0051
1970	0.00411	0.0973	0.00094	0.0411
1970-1950	0.00195	0.0713	0.00044	0.0360
% Change explained by PH (0-100)	2.7		1.2	
	Whites			
	Single Moms		Single Heads	
	$\hat{\beta}\overline{PHexposure}$	Sample $\bar{Y}$	$\hat{\beta}\overline{PHexposure}$	Sample $\bar{Y}$
1950	-0.00032	0.0084	0.00010	0.0013
1970	-0.00071	0.0167	0.00022	0.0086
1970-1950	-0.00039	0.0083	0.00012	0.0037
% Change explained by PH (0-100)	-4.7		3.2	

Notes: The sample includes females 16-24 years of age who are defined as either black or white, and reside in an MSA identifiable in both the 1950 and 1970 Censuses. The estimated coefficients used for whites and blacks are from table 7-2. The estimated coefficients used for white and blacks separately are from table 7-3. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

Sources: MSA public housing intensity data are aggregated from public housing data from the *Consolidated Development Directory* (HUD 1973) and county-level Census housing data (Haines 2004). Individual-level data and MSA economic characteristics are from IPUMS (Ruggles et al. 2010).

that changes in public housing intensity explain 3.9 percent of the increase in single mothers and 1.9 percent of the increase in female heads for whites and blacks between 1950 and 1970. When allowing for separate effects by race, I find that changes in public housing intensity explain 2.7 and 1.2 percent of the rise in single mothers and single heads for blacks, respectively. The estimated public housing coefficient on single motherhood for whites is negative (and statistically insignificant), but my results suggest that public housing explains 3.2 percent of the rise in white female heads over the period. These small fractions suggest that, while public housing may have created negative incentives for childrearing and household headship, the spread of public housing was not a major cause of the rise in single mothers and female household heads during this period.

5. Summary

Female-headed households make up a large share of public housing residents, however little work has been done on identifying the effects of public housing provision on fertility decisions. Controlling for age, education, race, and location- and time-specific trends, I find that public housing intensity increases the probability that black women are single mothers in 1950 and 1970. This relationship is small, but becomes larger when I limit my sample to individuals without a high school degree. The link between public housing intensity and female headship is not as strong, but consistent with public housing increasing the probability of female headship for individuals with less than a high school degree. Controlling for changes in relative welfare allowances does not explain my results. While my results are consistent with public housing creating

negative incentives for young females to have children out of wedlock and start their own households, the effects are small and *not* consistent with public housing explaining the sharp increase in single motherhood and female headship throughout the period.

CHAPTER VIII

CONCLUSION

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 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.

This dissertation presents the first comprehensive dataset of public housing construction and availability data for the entire United States, from public housing's beginning in 1933, to its peak in the early 1970s. There was a great deal of inter- and intra-regional variation in public housing participation and intensity. Communities in the Northeast and the South were quick to adopt public housing and participated intensively in the program between 1940 and 1970. Public housing was not as widespread in the Midwest or the West, however participation grew in both regions throughout the period.

Using hazard models and OLS regression analysis, I find that even when controlling for regional differences (and state differences in the case of the OLS analysis), more urban communities with poorer housing stock were more likely to adopt public housing quickly and to have more intensive programs in 1970. Communities with relatively high concentrations of African American and Democratic populations were also more eager to adopt public housing in large intensities.

I make use of this variation in public housing intensity to assess the effects of public housing on county-level outcomes in 1970, near the peak of the program. Controlling for pre-program characteristics, I find a negative relationship between public housing and 1970 county-level outcomes such as median income, median property values, the percent of low-income families, population density, and the percent of female-headed households. Several robustness checks suggest that these negative relationships are likely to be causal.

While it is difficult to decipher the exact channels through which public housing affected communities, I find that public housing was negatively correlated with educational attainment in 1970 (controlling for 1940 levels), and that these changes in the population's human capital 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. Instead, communities with high concentrations of public housing experienced population losses of both high school graduates and high school dropouts, although high school graduates appeared to be leaving more quickly than high school dropouts. I also find that public housing had no measurable negative effect on outcomes in 1950 or 1960. This suggests 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.

Finally, using individual-level data, I find a link between exposure to public housing and single-motherhood in women aged 16 to 24. The effect is small, but larger for black women and women with less than a high school degree. The results are

consistent with public housing creating (small) negative incentives for females to have children out of wedlock and start their own households. However, changes in public housing intensity between 1950 and 1970 cannot explain the rise in single mothers and household heads during the period.

While this dissertation links public housing to a variety of negative outcomes in 1970, further research will be necessary to better understand the mechanisms through which public housing affected communities. City- or MSA-level case studies would be useful in unveiling the channels through which public housing affected local outcomes. This type of analysis may also shed light on the strong negative turn that public housing took in the 1960s.

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