Does Federally Subsidized Rental Housing Depress Neighborhood Property Values?

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Abstract

Few communities welcome federally subsidized rental housing, with one of the most commonly voiced fears being reductions in property values. Yet there is little empirical evidence that subsidized housing depresses neighborhood property values. This paper estimates and compares the neighborhood impacts of a broad range of federally subsidized rental housing programs, using rich data for New York City and a difference-in-difference specification of a hedonic regression model. We find that federally subsidized developments have not typically led to reductions in property values and have, in fact, led to increases in some cases. Impacts are highly sensitive to scale, though patterns vary across programs. © 2007 by the Association for Public Policy Analysis and Management

INTRODUCTION

Few communities welcome federally subsidized housing. Indeed, community opposition to such rental housing projects can be fierce, with one of the most commonly voiced fears being reductions in property values. Yet there is little empirical support for the notion that these federal housing developments depress neighborhood property values, and economic theory offers uncertain predictions about whether constructing subsidized housing should trigger increases or decreases in surrounding property values.

In this paper, we examine the neighborhood spillover effects of housing units built under four different federally subsidized rental housing programs—the Public Housing Program, the Section 8 New and Substantial Rehabilitation Program, the Section 202 Program for the Elderly, and the Low Income Housing Tax Credit (LIHTC)—using the case of New York City. Collectively, these four programs house roughly 4.3 million households around the country.

Despite the clear policy significance, this is one of the few papers that estimate and compare the neighborhood impacts of federally subsidized housing programs. Moreover, in contrast to earlier papers, our empirical work relies on longitudinal, geo-coded data. Specifically, we have detailed information on 430,000 property sales in New York City between 1974 and 2002. We link these data to information on 77,000 federally subsidized rental housing units that were built in the city's five boroughs between 1977 and 2000. We use these data to estimate a difference-in-difference specification of a hedonic regression model. We include census tract fixed effects to control for idiosyncratic characteristics of the micro-neighborhoods in

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which subsidized housing is sited. We allow impacts to change over time and to vary with housing type and scale.

We find that these subsidized, rental housing programs had very different effects on surrounding communities. While the evidence points to negative impacts for certain kinds of developments, at least in the short term, we find positive impacts for others. The magnitudes of the impacts depend upon scale, typically suggesting diminishing marginal impacts, with patterns differing markedly between the programs.

The next section of this paper provides an overview of the features of the four federal housing programs we study, both nationally and in New York City in particular. The following section offers a theoretical background and a review of relevant literature. We then provide a description of the model and empirical strategy and data, followed by results and a summary of the key findings and implications for public policy.

FEDERAL RENTAL HOUSING PROGRAMS

Program Features

All four of the federal programs that we examine in this paper deliver apartments at subsidized rents to low-income tenants. Yet they differ from one another in several respects. For one thing, ownership differs. Public housing is owned and operated by the government, Section 202 developments are owned by nonprofits, while Section 8 and LIHTC projects are owned by a mix of nonprofit and for-profit developers.

For another, while all the programs are means-tested, tenant characteristics differ. Public Housing for the elderly and Section 202 developments are reserved for elderly residents, with a very small share set aside for the disabled. Moreover, the programs targeted to families also target different income levels. The Public Housing Program tends to serve the lowest income families, followed by the Section 8 program (Olsen, 2003). According to calculations using HUD's Picture of Subsidized Households data, the mean household income among tenants in public housing in New York City in 1998 was $13,300, while the average household income in the Section 8 program was $10,400.[1] Although there is little data on tenant incomes for the LIHTC program, rent levels suggest that the program tends to serve a more moderate income population (Cummings & DiPasquale, 1999; General Accounting Office, 1997; Stegman, 1991). The subsidies provided by the program are simply not deep enough to house families as poor as those typically found in public housing or receiving vouchers. In some cases, moreover, additional units are included in the LIHTC developments that rent at market rents.[2]

The paragraphs below offer a brief description of each program:

- *The Public Housing Program*. Congress authorized the Public Housing Program in 1937. Under the program, participating jurisdictions would create a public housing authority pursuant to state law, which would build housing for low-income households. The federal government paid for all of the capital costs of public housing. In return, the local government was required to follow federal rules governing admissions and rents. Beginning in 1969, ten-

[1] The per capita incomes of public housing tenants may be even lower relative to other programs, because household sizes tend to be larger in public housing programs (Olsen, 2003).
[2] That said, over 80 percent of LIHTC units in our data set were targeted explicitly to low-income tenants.

ant rents were capped at 25% of income, with the limit later increased to 30%. Shortly thereafter, Congress authorized the payment of operating subsidies to cover PHA shortfalls in rental income and later provided limited modernization funds. Most of the developments built through the Public Housing Program are designed for families, but a significant minority is set aside for the elderly.

- *The Section 202 Program.* The Section 202 Program was created by Congress in the Housing Act of 1959. Under the act, housing for the elderly and disabled was financed by direct government loans. These loans were typically made at favorable interest rates tied to 30-year treasury bonds. Only nonprofit corporations or cooperatives were eligible to participate in the program, which funded both the construction and substantial rehabilitation of housing. In the late 1970s, most Section 202 loans were linked to Section 8 subsidies, to make the housing affordable to low- and moderate-income households. In 1990, Congress changed the Section 202 Program to focus exclusively on the elderly. This housing is designed to meet the special physical needs of the elderly and is typically accompanied by supportive services. Instead of direct loans, HUD began funding projects with capital advances and rental assistance.
- *The Section 8 New Construction and Substantial Rehabilitation Programs.* These two programs were authorized by Congress as part of the Housing and Community Development Act of 1974, the same law that created Section 8 housing vouchers. Unlike housing vouchers, the Section 8 New Construction and Substantial Rehabilitation Programs are project-based and subsidize private developers who build or rehabilitate housing for low- and moderate-income households. The subsidy is typically the difference between 30% of a tenant's income and a fair market rent for the housing unit. The fact that the owner was, in effect, guaranteed a flow of income by the government provided a strong incentive to construct housing. Appropriations for new units under these two programs were, for the most part, ended in 1984, at least partly because of their expense. Nevertheless, housing construction and rehabilitation on units in the pipeline continued through 1990.
- *The Low Income Housing Tax Credit (LIHTC).* The LIHTC was authorized by Congress in 1986 as part of the Tax Reform Act of 1986. In that law, Congress removed many of the accelerated depreciation and tax credit provisions that favored housing production and substituted in their place a tax credit that is allocated to states based upon population. Taxpayers who invest in LIHTCs are typically entitled to credits of approximately 9% of the capital costs of housing to be applied against their income tax liability each year for ten years. Only housing that is affordable to low- and moderate-income housing is eligible for the tax credit although some developments mix low- and moderate-income housing with market-rate housing. Housing may be built by nonprofit or profit-motivated developers. In the case of nonprofit developers, the tax credits are typically syndicated to for-profit investors through partnerships created by two intermediaries—the Local Initiatives Support Corporation (LISC) and the Enterprise Foundation.

FEDERALLY ASSISTED HOUSING IN NEW YORK CITY, 1977 TO 2000

New York City is a particularly appropriate site in which to study the relationship between federally subsidized rental housing and neighborhood outcomes. No city in the country has as much federally subsidized housing, with close to 300,000

housing units receiving some form of federal assistance. The number of tenants living in New York's public housing outnumbers the entire populations of such cities as St. Paul, Minnesota, and Buffalo, New York (Ellen & O'Flaherty, 2006).

Of course, the lessons learned here may not be applicable to all federally subsidized housing around the country. In New York City, subsidized housing was built in an urban environment—on urban renewal sites, vacant lots, or sites with dilapidated housing. Thus, results may not be generalizable to subsidized housing in outlying areas. And other features of the New York City housing market—its diversity, its density—may make impacts atypical. That said, the large number and diversity of the city's neighborhoods allow us to examine the effects of subsidized housing in a variety of settings to assess the sensitivity of the results to neighborhood settings.

During the period of our study, 1977 to 2002, New York City's housing policy was in transition. While federal programs still dominated the city's subsidized housing production landscape in the first decade of this period, the number of units built each year was only a fraction of the units produced in the preceding two decades. By the mid-1980s, two of the biggest federal programs—the Public Housing Program and the Section 8 New and Substantial Rehabilitation Program—were winding down, although new construction of units already in the pipeline continued. In place of these programs, the city began its own capital program, the Ten Year Plan for Housing, which would fund the construction or rehabilitation of over 200,000 units of housing by 2002. These efforts have been studied elsewhere (Schwartz, Ellen, Voicu, & Schill, forthcoming; Ellen & Voicu, 2006). In this paper, our focus is on the rental units subsidized through federal programs.[3]

The nature of the developments built during this period differed from earlier decades. Unlike federally subsidized developments built during the height of the program in the 1950s and 1960s, most buildings were low scale (three to four stories) and had moderate densities. Moreover, in the case of the LIHTC program, the Section 8 program, and a few public housing developments as well, housing units were created through the gut rehabilitation of dilapidated, abandoned buildings rather than through new construction. Thus, the design of the subsidized housing built during this period was far more likely to fit into the existing fabric of a neighborhood than in earlier decades.

Table 1 shows the distribution of federally assisted housing units built in New York City between 1977 and 2000, by program and completion year. In total, at least

Table 1. Distribution of subsidized units by program and completion year.

Completion Year	Program				
	Public Housing for Seniors	Public Housing for Families	Section 8 NC/SR	Section 202	LIHTC
1977–1980	1,298	1,700	9,839	778	
1981–1985	1,701	2,714	20,971	5,592	
1986–1990	993	3,685	1,413	2,563	
1991–1995	87	1,543		2,900	6,504
1996–2000		384			16,494
Total	4,079	10,026	32,223	11,833	22,998

[3] There is some overlap between the city-assisted and federally subsidized programs. In particular, beginning in the early 1990s, much of the rental housing rehabilitated through city-assisted programs also utilized tax credits.

10,000 housing units were built through each program during our time period. We divide the Public Housing units into 10,026 units for families and 4,079 units for the elderly, because their effects may differ. The timing of development varies, with the early period dominated by Section 8 and the later years by the LIHTC.

Comparing the Characteristics of Neighborhoods of Federally Subsidized Housing

In general, these developments were not built in areas that were expected to appreciate. In almost all cases, these housing developments were sited on land owned by the City of New York. The public housing projects, for instance, were typically built on urban renewal land that the city's housing agency, the Department of Housing Preservation and Development (HPD), had condemned as blighted, using its power of eminent domain. In some instances, they were built on urban renewal land that had languished in city ownership for years. Other public housing and most of the housing subsidized through the LIHTC was built on *in rem* housing sites—housing that the city had taken ownership of through tax foreclosure proceedings. This housing was typically located in distressed neighborhoods in the Bronx, central Brooklyn, and Harlem.

In some programs, developers chose sites. For Section 202, citywide nonprofit groups as well as local churches and synagogues would identify city-owned sites that they wanted to build on, get site control from HPD, and then apply to HUD for funding. If the funding request was granted, HPD would sell the property to the groups for nominal amounts. These nonprofits were not looking for neighborhoods that were likely to appreciate.

The decision as to where to site Section 8 housing was, in most instances, also dependent upon the decisions of private developers. They would either identify city-owned parcels that they would like to develop, or come to HUD with their own land. It seems unlikely that developers would choose to develop Section 8 housing, which locked them into regulated rents for an extended period, in areas that held great potential for future appreciation.

The projects likely to be located on the most promising sites were the New York State-allocated credits. These credits were often used by profit-motivated developers, sometimes on privately owned land. For-profit developers were also typically beneficiaries of the 4% tax credits that were utilized in a variety of mixed-income developments financed by tax-exempt bonds. These developments were often located in some of the city's most desirable neighborhoods.

Table 2 shows the average characteristics of census tracts in which units under each of the four programs were built or rehabilitated during the period 1977 to 2000, and compares those figures with averages for the city as a whole. We use 1980 tract characteristics in the case of the public housing, Section 202, and Section 8 developments, since Table 1 shows that the vast majority of these units were built during the 1980s. We use 1990 tract characteristics in the case of LIHTC developments, since these were built during the 1990s.[4] Thus, the table largely captures characteristics of the tracts *before* the housing developments were built.

Overall, the table shows that these projects were located in distressed areas. Public housing developments for families were located in the most distressed areas—in

[4] The 1990 income is adjusted to 1979 dollars using the CPI-U series (Consumer Price Index for All Urban Consumers) in Chairman of the Council of Economic Advisors (2004). The adjustment is done to facilitate comparison with the neighborhood income for the other programs, which comes from the 1980 Census.

Table 2. Characteristics of census tracts in which assisted housing units are located.

	Mean Family Income[1]	Mean Poverty Rate	Mean Percentage Non-Hispanic Black	Mean Percentage Hispanic	Number of Tracts[2]
All tracts in New York City, 1980	$20,889	19.5%	24.3%	18.8%	2114
All tracts in New York City, 1990	$27,848	18.4%	26.2%	21.9%	2138
Public housing					
—for seniors	$14,074	32.3%	41.3%	33.3%	22
—for families	$10,445	46.8%	53.2%	39.6%	69
Section 8 NC/SR	$12,541	37.5%	46.0%	36.7%	207
Section 202	$16,902	28.3%	29.6%	26.9%	126
LIHTC	$27,805	30.3%	36.8%	29.9%	232

Notes: The statistics for all programs except LIHTC are based on the 1980 Census; the statistics for LIHTC are based on the1990 Census since LIHTC units were built during the 1990s.
The statistics in this table, except those for all New York City tracts, are weighted by the number of units in the tract.
Tracts with fewer than 200 persons are excluded from the samples on which these statistics are based.
Subsidized units with missing completion year or location are excluded from these statistics.
Only subsidized units completed post 1976 are included in these statistics.
1) 1990 Census-based income for all NYC and for LIHTC was transformed in 1979 dollars to adjust for the inflation in the inter-census period.
2) The number of tracts on which the NYC mean family income and poverty rate are based is somewhat smaller since some tracts have missing values for these variables.

neighborhoods with the lowest mean family incomes, the highest poverty rates, and the highest proportion of non-Hispanic Black and Hispanic populations. Differences from the citywide averages are striking. The mean income in 1980 for tracts in which family public housing would be built was half the mean income of tracts citywide; the difference in poverty rates, 46.8% vs. 19.5%, is even more striking. Section 8 housing developments were located in the second-most distressed set of neighborhoods, with a mean income that was 40 percent below the citywide mean in 1980. Poverty rates for tracts with Section 8 housing were far above citywide rates, as were proportions of racial and ethnic minorities.

The housing for the elderly was located in somewhat less distressed communities, although these neighborhoods were still disadvantaged relative to the rest of the city. They were also located in communities with fewer racial and ethnic minorities. This was especially true in the case of Section 202 housing. Finally, neighborhoods in which LIHTC developments were built exhibit the highest mean income of any of the four programs, due to the 80/20, mixed income developments that relied on state-allocated credits and were built in some of the most desirable neighborhoods in Manhattan. Nevertheless, poverty rates in LIHTC neighborhoods were much higher than in the city as a whole, as were the proportions of racial and ethnic minorities.

BACKGROUND: THEORY AND LITERATURE

One of the key justifications of the 1937 act that established the public housing program was to eliminate slums and substandard housing and replace them with

decent, safe, and sanitary dwellings. There was much optimism about the potential of the program, both for tenants and their neighbors (Fisher, 1959). At a 1948 Congressional hearing, Congressman A. S. Mike Monroney made the case that communities benefit from the construction of public housing, specifically arguing that "the establishment of a modern housing project in a city raises the assessed valuation for blocks around it" (Fisher, 1959; p. 195).

More than 50 years later, it is hard to imagine a member of Congress making a similar argument. The conventional view today is that federally subsidized housing developments, if anything, help to accelerate neighborhood decline. It is perhaps not surprising, then, that recent papers on this subject have virtually all been framed to ask whether these subsidized housing developments reduce surrounding property values.[5]

In fact, however, there are theoretical reasons to expect positive as well as negative effects on the value of surrounding properties, depending on the circumstances. At the most general level, because housing is immobile, any changes generated by the new subsidized housing—for example, shifts in population, changes in physical landscape, etc.—should be capitalized into local property values, and these capitalization effects may be positive or negative.

Understanding the Spillover Effects of Subsidized Housing

Building on Schwartz et al. (forthcoming), we identify five general mechanisms through which subsidized housing might affect the value of neighboring properties: the removal effect; the physical structure effect; market effects; the population growth effect; and population mix effects. Each of these is explained briefly below.

- *Removal Effect*. Subsidized housing investment can affect property values simply because of what it removes. If subsidized housing replaces a disamenity, such as an abandoned, boarded-up building or a littered, vacant lot, then the removal effect would likely be positive. If, instead, the new housing replaces a desirable use, like a park or an attractive set of older buildings, then removal effects would be negative.
- *Physical Structure Effect*. The physical design of the new housing may affect the value of neighboring homes. If a subsidized project is viewed as unsightly or out of context with the existing character of a community—for example, the project may be a high-rise or built at higher densities than surrounding housing—then physical structure effects may be negative. Alternatively, an attractive, high-quality, new building that fits in nicely with the design of existing properties might increase the value of surrounding homes.
- *Market Effects*. Subsidized housing investment may yield spillover effects because it captures the benefits of collective action in large-scale investments. While small investments in a blighted neighborhood may not have been profitable, public subsidies may serve to spur simultaneous investments by multiple investors at a scale sufficient to overcome the threshold necessary for neighborhood revitalization. Moreover, if market rate units are included, developments may also attract additional investment by signaling to developers that the area is viable. On the other hand, the creation of new subsidized

[5] The only paper we found that actually considers whether federally subsidized housing might deliver benefits to the surrounding neighborhood is Hugh Nourse's paper, which was published way back in 1963, almost 10 years before the demolition of Pruitt Igoe, when attitudes about subsidized housing differed.

housing may also have a depressing effect on neighboring properties by glutting the local market with low-rent housing.

- *Population Growth Effect*. Programs that create new housing are likely to lead to some growth in the local population. Such growth might lead to increases in property values through the promotion of new commercial activity, a greater sense of safety, and general economic growth. At the same time, growth might lead to congestion and, therefore, depress surrounding values.
- *Population Mix Effects*. People seem to care a great deal about who lives near to them and generally voice a preference for higher-income neighbors. Thus, the effects of rental housing may depend crucially on the occupants and their incomes; existing residents may simply resist new residents who are poorer than they are. Alternatively, the concentration of poverty may be critical. Below some threshold, changes in poverty may have little effect, while high concentrations of poverty may be detrimental to a neighborhood's quality of life.

Expected Impacts in New York City

These effects are likely to vary across federal programs and even particular projects, depending on what is replaced, the size and design of the new development, the characteristics of the tenants, housing market conditions, and the characteristics of the surrounding neighborhood. In general, we would expect larger projects to have more dramatic effects, either positive or negative, on a community. However, because scale effects may be nonlinear, it is possible that effects would be moderated or magnified for larger projects. That is, marginal impacts may diminish or increase in magnitude with the number of units.

As noted, in New York City, all of these programs typically built on city-owned sites that had been taken over through urban renewal designation or tax foreclosure proceedings. Most of these new housing developments, in other words, were replacing undesirable uses, such as abandoned or dilapidated buildings or vacant lots, implying positive removal effects in all cases.

Differences in impacts across the four programs are likely, however, due to differences in physical design, market effects, and tenant characteristics. For example, while Section 8 and LIHTC developments were typically built out of existing structures and facades, public housing and Section 202 developments were typically new construction projects, and as such, represented a more radical change in the community, which could be either welcomed or disliked. In addition, differences in ownership, i.e., public, nonprofit, for-profit, suggest different incentives, which may in turn lead to different decisions regarding construction and maintenance, for example.

As for market effects, developments built through the tax credit program probably hold the greatest potential to attract additional private investment since many developments include some mix of market rate units. Note, however, that the impact of this market effect on the price per unit of housing is, in the long run, ambiguous. To the extent that new LIHTC units spur private developers to invest in the neighborhood, increasing the supply of housing units, a new equilibrium price of housing per unit in the neighborhood might emerge which is lower than the pre-completion price—although property values would still be higher. Alternatively, it may lead developers to upgrade the existing housing stock, raising prices.

Finally, these programs housed somewhat different tenants. Most obviously, Section 202 developments, as well as 30 percent of the public housing developments, were targeted to elderly tenants, who typically engender less fear and anxiety

among existing community residents.[6] As noted, among the family developments, public housing serves the lowest income tenants on average, followed by the Section 8 program.

Timing of Impacts

If all impacts are immediately and accurately capitalized into property values, all impacts would emerge at the time of project announcement. There is, however, a great deal of uncertainty in the construction of subsidized housing. Thus, while an initial change in local property values may occur at the time the project is announced, there may be a further change when construction actually begins, at which point the prior use will be eliminated and people can see the project is actually happening. Property values might then increase or decrease upon project completion, when neighbors see the finished project and new occupants begin to move in. Finally, property values may continue to rise or fall in the years after completion, as the new population spurs further neighborhood changes, or perhaps as the project either exceeds or fails to live up to expectations.

Prior Evidence on the Externalities of Housing Investment

Contrary to the conventional wisdom, empirical research is inconclusive evidence about the nature of spillover effects generated by federally subsidized rental housing. Data limitations further complicate the interpretation of past literature, making it difficult to establish the direction of causality. Most of these past studies either rely on cross-sectional data or do not have access to project completion dates and, therefore, cannot determine whether subsidized housing is systematically located in weak/strong neighborhoods, or whether subsidized housing leads to neighborhood decline/improvement (see, for example, Green, Malpezzi, & Seah, 2003; Lee, Culhane, & Wachter, 1999; Lyons & Loveridge, 1993).[7]

Recently, several studies have attempted to identify causal impacts by comparing price changes of properties within the vicinity of new housing to price changes citywide, while controlling for neighborhood fixed effects. Briggs, Darden, and Aidala (1999), for instance, use a census tract fixed effects model to examine price changes surrounding seven scattered-site public housing developments on property values in neighborhoods in Yonkers, New York. They find no effect on the surrounding area. Santiago, Galster, and Tatian (2001) use a similar model to estimate the impact of the Denver Housing Authority's scattered site public housing program on the sales prices of surrounding single-family homes. Testing for both changes in price levels and trends after completion, they find that proximity to dispersed public housing units is, on average, associated with modest increases in single-family home prices.

These two recent studies provide strong evidence that scattered-site public housing has negligible, or even positive, effects on surrounding communities. They do not tell us, however, about the neighborhood impacts of the more traditional, sub-

[6] Racial differences in tenant mix may have compounded the difference in reactions. In 1998, roughly 90 percent of Section 8 and Public Housing tenants in New York City were minorities, as compared to just two-thirds of those living in Section 202 housing.

[7] Green, Malpezzi, and Seah (2003) estimate a repeat sales model and utilize an interesting gravity measure of distance to LIHTC development sites. Nonetheless, they do not have access to project completion dates, which makes it impossible to interpret their coefficients on distance as impact measures. To do so, one has to assume that the coefficient on distance to LIHTC sites was 0 before project completion.

sidized housing developments that we focus on in this paper. Focusing on a single program, they also reveal little about differences in impacts across different types of programs.

Three earlier studies do consider differences across federally subsidized housing programs, and all arrive at different conclusions. Lyons and Loveridge (1993) find that public housing is associated with higher property values within a half-mile radius, while Section 8 new construction projects and, surprisingly perhaps, Section 202 elderly developments are linked to lower property values. Lee, Culhane, and Wachter (1999), meanwhile, find just the opposite, at least with respect to Section 8 and public housing; they find that proximity to public housing is associated with lower property values, while proximity to Section 8 developments is associated with higher property values. They do not examine Section 202 housing, and their results for the LIHTC developments are mixed. Finally, Goetz, Lam, and Heitlinger (1996) find that proximity to both public housing and federally subsidized, privately-owned rental housing is associated with lower property values. Interestingly, they find that proximity to rental housing developed by not-for-profit organizations is associated with significantly higher property values.

It is possible that these differences in results reflect underlying differences in program impacts across the three locations they study, Philadelphia, Minneapolis, and suburban Minneapolis. But note that none of these three studies examines housing prices in the vicinity of subsidized developments *before* their selected developments were built. Thus, their conflicting results may say more about differences in siting practices across the three locations they study than about differences in actual program impacts. In sum, there is still much to be learned about the neighborhood impacts of federally subsidized rental housing developments.

DATA AND METHODOLOGY

Methodology

Our analysis centers on a hedonic regression model that explains the sales price of a property as a function of its structural characteristics, such as building age and square footage, and its neighborhood surroundings. Using this model, we compare the sales prices of properties that are within 2,000 feet of subsidized housing sites to prices of comparable properties that are outside this 2,000-foot ring, but still located in the same neighborhood. Then we examine whether the magnitude of this difference has changed over time, and if so, if the change is associated with the completion of a new housing unit. Such a difference-in-difference approach helps to control for any differences between the neighborhoods where subsidized housing was built and those where it was not. It also helps us to differentiate between the specific effects of the housing investments and the many other changes occurring in the same neighborhoods.

Specifically, we estimate the following regression model:

$$\begin{aligned} \ln P_{icdt} = \alpha + \beta X_{it} + \delta_c W_c + \gamma^{PHs} R_{it}^{PHs} + \gamma^{PHf} R_{it}^{PHf} + \gamma^{S8} R_{it}^{S8} + \\ \gamma^{S202} R_{it}^{S202} + \gamma^{LIHTC} R_{it}^{LIHTC} + \gamma^{O} R_{it}^{O} + \rho_{dt} I_{dt} + \varepsilon_{it}, \end{aligned} \quad (1)$$

where $\ln P_{icdt}$ is the log of the sales price of property i in census tract c, in community district d, and in quarter t and X_{it} is a vector of property-related characteristics, W_c are a series of census tract fixed effects, R_{it} are vectors of ring variables described below, and I_{dt} are a series of dummy variables indicating the quarter and

community district of the sale. The coefficients to be estimated are α, β, δ, γ, and ρ, and ε is an error term.[8] Since housing prices are entered as logarithms, the coefficients are interpreted as the percentage change in price resulting from an additional unit of the independent variable. In the case of a dummy variable, the coefficient can be understood as the percentage difference in price between properties that have the attribute and those that do not.[9]

The property related characteristics, X_{it}, include structural characteristics of the properties, including building age, building size, the number of buildings on the lot, and a set of dummy variables distinguishing 18 different building classifications, such as single-family detached or two-family home. To control for unobserved, time-invariant features of different neighborhoods, we include census tract fixed effects, W_c. To control for underlying price trends in neighborhoods, we include a series of neighborhood-specific time dummies, I_{dt}, one for each quarter in each year of the study period, for each of the 48 community districts used in the analysis.[10] A joint test of significance of census tract-specific time dummies indicated that they contributed little explanatory power over the community district time dummy variables, and thus we chose this latter, more parsimonious alternative.

For each federal program, we include a set of ring variables, R_{it}, that capture the impact of proximity to federally subsidized rental housing developments.[11] For public housing, we distinguish between developments that are targeted to elderly residents and those that house families by including two sets of ring variables, one for each tenant type.

We begin by including dummy variables that indicate whether the sale occurred within 2,000 feet of a particular kind of subsidized site between 0 and 2 years prior to project completion and between 2 and 5 years pre-completion, respectively.[12] We divide up the pre-completion period into these two windows in order to distinguish between the baseline or pre-announcement period, which we proxy by the window of time between 2 and 5 years before project completion, and the construction period, which we assume takes place during the 2 years before project completion. The definition of the construction period follows from discussions with city officials and developers, suggesting that community residents typically knew about impending projects about 2 years in advance of completion; moreover, construction would take place within this window. The coefficient on the Pre Ring, 2–5 years variable

[8] Note that there might be spatial autocorrelation in the errors. Unfortunately, the large sample size makes the use of more rigorous methods of addressing possible spatial correlation computationally prohibitively demanding. Indeed, to our knowledge, there is no publicly available statistical software that can effectively perform tests and corrections for spatial autocorrelation for sample sizes as large as ours. However, our use of census tract fixed effects may alleviate this problem, by removing potential spatial correlation between properties located in different tracts.

[9] The coefficient on a dummy variable should in fact be interpreted as the difference in log price between properties that have the attribute and those that do not. The difference in log price, however, closely approximates the percentage difference in price when the differences are small, as they are in this paper.

[10] The city is divided into a total of 59 community districts, each of which has a community board whose members are appointed by the borough president and by the city council members who represent the district.

[11] We also include similar sets of ring variables (R_{it}^{O}) that control for proximity to other types of subsidized housing, because it is possible that the location of these other types of units is correlated with that of the federally subsidized units that we focus on. These include city-sponsored projects and housing units sponsored through older federal programs (such as Section 236, BMIR, and public housing and Section 8 units completed prior to 1977).

[12] Initially, we estimated a specification with separate dummies for each of the 5 pre-completion years; however, F-tests indicated that the years could be grouped into two sub-periods (0–2 and 2–5 years prior to completion) with little loss of explanatory power.

provides an estimate of price levels in the ring of subsidized housing prior to project announcement and construction relative to prices of comparable properties in the same neighborhood that will not have subsidized housing built so nearby.

We limit the specification of our Pre Ring variables to a 5-year period before completion because of the large number of property sales that were within 2,000 feet of sites that would hold different types of subsidized housing at some point in the distant future. Reducing the pre-completion period to a 5-year window greatly reduces the overlaps across programs, while leaving a sufficient number of years to arrive at sound estimates of baseline prices.[13] Moreover, we believe that this 5-year window, particularly the 2–5 years before window, should provide an accurate picture of baseline price levels in the vicinity of subsidized housing sites before the housing is built. Note that there was no discernible trend in prices in the ring relative to the surrounding neighborhood during the pre-completion time period. As a result, it is not necessary to control for pre-completion price trends as done in Santiago, Galster, and Tatian (2001).

We include a set of Post Ring dummy variables that take on a value of 1 if the sale is within the ring of some number of *completed* subsidized units produced through a particular program. The differences between the coefficient on Post Ring and the coefficients of the Pre Ring variables provide the simplest impact estimates.[14] We interpret the difference between the Post Ring and Pre Ring, 2–5 years coefficients as the total project impact; we view the difference between the Post Ring and Pre Ring, 0–2 years coefficients as the effects that the actual completion and occupancy of the new housing generate *above and beyond* any pre-completion impacts.

Note that because we control for the number of completed units within the ring of a sale, the difference between Post Ring and Pre Ring coefficients should be viewed as the fixed impact of a housing development subsidized through a particular program, independent of project size. The coefficients on the number of completed units within the ring of the sale and its square show the marginal effects of additional subsidized units.

Finally, to allow the impact to vary over time, we include a post-completion trend variable, Tpost, and its square. Specifically, Tpost equals the number of years between the date of sale and the project completion date for properties in the 2,000-foot ring.[15]

Summary of Data

To estimate our models, we utilized data from a variety of sources. We obtained address-specific data from HUD User on the number of units created through the Section 8 project-based, Section 202, and the LIHTC programs. These data cover completions through 2000 for LIHTC developments and completions through 1995 for the other programs. The data set indicated the actual year of completion for the LIHTC projects but not for the other types of developments. For these other proj-

[13] Because limiting the pre-completion period does not completely eliminate the overlaps, we also estimated our model using a sample that excluded all sales that were in a ring with two or more types of federally subsidized housing. We obtained similar results, which are available upon request from the authors.

[14] If a sale was within 2,000 feet of more than one project, we use the completion date of the first completed.

[15] Specifically, Tpost equals 1/365 if a sale is located within the ring of a subsidized unit and occurs the day after its completion; it equals 1 if the sale occurs one year after the unit completion; and so on.

ects, we identified completion year by matching the subsidized housing addresses to the building characteristics, including year built and year of major alteration, provided by the RPAD file described below.

We secured address-specific data on all public housing developments from the New York City Housing Authority (NYCHA). The data include the number of units, whether units are slated for families or elderly tenants, and completion year. Finally, HPD provided data describing all of the city-assisted housing built between 1977 and 2000, which we include as controls in our regressions.[16] For each housing project, this data set indicates its precise location (down to the tax lot level), the date the project was completed, the type of building structure, the number of units that were built or rehabilitated, the type of work (that is, new construction or rehabilitation), and whether units are rental or owner-occupied.

We linked these data on housing investments to a transactions data set that includes sales prices for all apartment buildings, condominium apartments, and single-family homes selling in the city between 1974 and 2002.[17] Our sample includes 432,984 property sales, spread across 1,639 census tracts, which is considerably larger than the samples used in previous studies examining the impacts of federally subsidized housing. We obtained information about the characteristics of these properties through the RPAD file, which is compiled by the New York City Department of Finance for the purposes of computing property tax assessments. The RPAD data contain little information about the characteristics of individual units in apartment buildings (except in the case of condominiums), but these building characteristics explain variations in prices surprisingly well.[18]

Finally, we used GIS techniques to measure the distance from each property sale in our database to all subsidized housing sites and, from these distance measures, we created a set of variables that identified whether properties were within 2,000 feet of housing investments of different types.[19]

Table 3 shows summary statistics for the properties sold. The first column describes the characteristics of our full sample of transacting properties and the subsequent columns describe the attributes of properties that were located or would be located in the next 5 years within 2,000 feet of a unit that received federal subsidies under a given program. As shown, most of the sales in our sample were located in Brooklyn and Queens, largely because those boroughs include a relatively large share of smaller properties, which sell more frequently than apartment buildings. Two-thirds of all buildings sold were either one- or two-family homes, and 83

[16] We also control for proximity to housing created through older programs, such as the Section 236 and BMIR programs.

[17] We limited the analysis to properties that are located within the 48 community districts (of the total 59) where there were more than 100 subsidized new rental units developed. Note that sales of cooperative apartments are excluded from the data set because they are not considered to be sales of real property. We also excluded any sale that occurred on the same block as a subsidized development if the sale was of a building that was constructed after the subsidized units had been completed, to ensure we did not include sales of subsidized units themselves.

[18] We use RPAD data from 1999. While it is possible that some building characteristics may have changed between the time of sale and 1999, most of the characteristics that we use in the regressions are unlikely to change over time (for example., corner location, square feet, presence of garage). Moreover, when comparing RPAD data from 1990 and 1999, we identified very few differences, and even among these apparent differences, city staff suggested that a majority are corrections, rather than actual changes.

[19] We used the "Geosupport File" to link each tax lot in our data set to an x,y coordinate (that is, latitude, longitude using the U.S. State Plane 1927 projection). We are able to assign x,y coordinates and other geographic variables to over 98 percent of the sales. For federal housing units, we used a coordinate conversion software (PROLAT) to convert the latitude and longitude coordinates—available from HUD—into x,y coordinates.

percent were single-family homes, two-family homes, or small apartments.[20] Nearly one-third of the transacting properties had garages and more than three-quarters were built prior to World War II. A very small share of properties were vandalized or otherwise abandoned. Finally, more than one-third of the transacting properties

Table 3. Characteristics of properties sold.

	Percentage of All Property Sales	Percentage of Sales Within 2000 Feet of:[1]				
		Public Housing Site[3] for Seniors	Public Housing Site[3] for Families	Section 8 NC/SR Site[3]	Section 202 Site	LIHTC Site
Borough						
Manhattan	12.6	40.2	28.1	22.4	21.8	36.9
Bronx	13.5	12.9	21.5	12.4	23.1	10.3
Brooklyn	42.5	32.5	50.4	56.2	42.4	48.5
Queens	19.5	9.6	0.0	5.9	10.1	0.9
Staten Island	11.8	4.8	0.0	3.0	2.6	3.5
Building Class						
Single-family detached	20.9	6.1	1.9	9.7	10.9	4.9
Single-family attached	12.9	5.7	3.8	6.5	7.6	4.2
Two-family	30.9	23.8	26.1	29.0	28.7	23.3
Walk-up apartments	18.1	33.1	43.0	31.9	29.8	28.7
Elevator apartments	1.2	2.7	2.9	2.8	2.1	1.3
Loft buildings	0.1	0.2	0.1	0.2	0.3	0.1
Condominiums	12.0	23.8	16.1	13.6	15.8	31.3
Mixed-use, multifamily (includes store or office plus residential units)	0.4	0.6	0.7	0.8	0.7	0.8
Built pre–World War II	77.3	92.4	96.6	94.0	90.4	94.7
Vandalized	0.0	0.3	0.3	0.1	0.1	0.2
Other abandoned	0.1	0.5	0.5	0.3	0.3	0.3
Garage	29.2	8.9	8.7	13.4	16.6	6.5
Corner location	6.8	6.0	6.7	7.3	6.6	4.7
Major alteration prior to sale	3.1	9.6	8.8	7.0	6.4	5.2
Within 2000 Feet of[1,2]						
Any federally subsidized site	147,249					
Any completed federal project	117,137					
N	432,984	14,246	25,831	85,441	77,843	46,071

Notes: Universe = all sales in community districts with at least 100 units in federal and 10 Year Plan rental categories combined.
1) Sales which occur more than 5 years prior to project completion are excluded.
2) Only sales in ring with public housing, Section 8 NC/SR, Section 202, or LIHTC units are included here.
3) Excludes projects completed prior to 1977.

[20] Most of the apartment buildings in our sample are rent-stabilized, but given that the rent ceilings were not binding in most neighborhoods in the city, we do not believe that their inclusion biases our results (Pollakowski, 1997).

were located within 2,000 feet of a federally assisted housing site, while 27 percent of the properties sold were within 2,000 feet of at least one *completed* federally assisted housing unit.

Columns 2–5 of the table uncover some clear differences between the transacting properties located close to federally assisted housing sites and those that are not. Properties located near subsidized housing are much more likely to be in Brooklyn, Manhattan, and the Bronx than in Staten Island or Queens. They are also older, less likely to be single-family homes, more likely to be walk-up apartments, and less likely to have garages. However, there seem to be few differences in property characteristics across rings with different housing programs. Just a few notable differences stand out: (1) properties in rings with family public housing are more likely to be walk-up apartments; (2) those in rings with Section 8 and Section 202 housing are more likely to be single-family homes and to have garages; (3) those in rings with Section 202 and elderly public housing are somewhat newer; (4) those in rings with tax credit housing and public housing for the elderly are more likely to be condominiums—probably because they are more likely to be located in Manhattan.

The table also shows that the rings around Section 8 or Section 202 sites account for most of the properties sold within 2,000 feet of federal housing. By contrast, the rings around public housing contain the fewest sales. This is, in part, because we have relatively few public housing developments in our data set, because most of the public housing in New York City was built before 1977. In addition, public housing tends to be built in high density neighborhoods where few properties turn over. Finally, public housing developments usually consist of relatively large buildings concentrated in the same area, and thus, there are typically fewer other properties in their immediate vicinity. Nonetheless, in all cases, we have a reasonably large number of sales sold before and after completion of projects built through all of our programs.

RESULTS

Average Impacts

Before presenting the results from our model in Equation 1, we examine estimates from a simple model that does not distinguish between the different programs, and thus, provides an estimate of the average impact of the federally subsidized rental housing. Key coefficients and their standard errors for this model are shown in Table 4. Full results, which include coefficients on structural variables and proximity to other forms of subsidized housing, are available upon request from the authors.

Several results are worth noting here. First, the small, negative, and significant Pre Ring coefficients suggest that subsidized housing sites were located in areas which were, on average, slightly more depressed than the already distressed census tracts encompassing them. Two to 5 years prior to completion, properties located within 2,000 feet of subsidized sites sold for 1.9 percent less than comparable properties located elsewhere in the census tract. As discussed above, the difference between the two Pre Ring coefficients yield an estimate of the extent to which impacts emerge prior to completion—that is, after announcement and during construction. Perhaps surprisingly, the estimates suggest no evidence of such pre-completion impacts.

The differences between the Post Ring and Pre Ring coefficients provide estimates of the fixed component of the project effect—that is, the portion of the

Table 4. Selected regression results—average impacts.

Federally subsidized rental housing	
Pre Ring, 2–5 years	–0.0193***
	(0.0034)
Pre Ring, 0–2 years	–0.0156***
	(0.0039)
Post Ring	–0.0083**
	(0.0039)
TPost	0.0020***
	(0.0008)
$TPost^2$	4.2E-05
	(3.6E-05)
Number of units at the time of sale	–1.1E-05
	(1.2E-05)
Number of units at the time of $sale^2$	–1.8E-08***
	(6.3E-09)
R^2	0.8589
N	432,984

Notes: This table shows only the ring variables for the federal rental housing projects completed after 1976. The regression includes ring variables for other types of subsidized housing, census tract and CD-quarter dummies and the full set of building controls. Standard errors in parentheses.
*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

impact that is independent of the number of completed units immediately after completion. This difference is positive and statistically significant, although its magnitude is small—the gap between prices in the ring and in the census tract after completion is only 1.1 percentage points lower than the 2 to 5 years pre-completion baseline. It is interesting that this impact appears to grow over time, albeit at the slow pace of 0.2 percentage points per year, as indicated by the positive and significant TPost coefficient. Project size seems to make little difference, on average.

These results suggest that the widespread belief that contemporary federally subsidized housing investments diminish the value of surrounding properties is unjustified. On average, federally subsidized housing is constructed on distressed sites located in distressed neighborhoods. But the evidence suggests that the creation of new federally subsidized housing in an urban setting is, if anything, associated with small increases in the value of surrounding properties. Of course, these average impact estimates may mask significant variation in external effects across programs.

Differences Across Programs

To investigate the impacts of individual programs, we turn to the model described by Equation 1. The key coefficients and their standard errors for this model are shown in panel A of Table 5.[21] To begin, the Pre Ring coefficients are negative and significant for all programs except LIHTC. Thus, before completion of the development, the prices of properties located within 2,000 feet of public housing, Section 8, or Section 202 sites were lower than the prices of comparable properties located outside the 2,000-foot ring but still in the same census tract. This ring-tract price gap is particularly large for family-oriented public housing—13.1 percentage

[21] Full results are available from the authors upon request.

points, in the 2- to 5-year period before completion. In other words, our estimates imply that these investments—and especially public housing—were made in the more distressed areas of already distressed neighborhoods. In contrast, prices in the rings around LIHTC sites are slightly *higher* than those outside of the rings prior to the project completion.

Consistent with our findings from the simple model, the estimates by program suggest neglible announcement or construction start effects; that is, the difference between prices 2–5 years before completion and prices within a two-year window before completion, are small or nonexistent. As shown in panel B of Table 5, these impacts are statistically significant only for Section 8 and Section 202, and, even then, the magnitude of the effect is rather small; for Section 8, the ring-tract price gap increases by 1.8 percentage points between the two pre-construction periods, and for Section 202, the gap decreases by 1.1 percentage points. The implication is that for public housing and LIHTC projects, there was little, if any, impact on property values prior to completion—either because removal effects were small or because the market anticipated little effect before completion, perhaps due to market imperfections that limited market foresight.

The difference between the Post Ring coefficient and either of the two Pre Ring coefficients is not statistically significant for family public housing and Section 202, suggesting that the completion of small projects had a negligible effect. The Post Ring coefficient for Section 8 is negative and larger in magnitude than both Pre Ring coefficients; however, only the difference between the Post Ring and Pre Ring, 2–5 years coefficients is statistically significant. In other words, the completion of a small Section 8 project has little impact over and above the drop in prices in the 2-year window before completion noted earlier.

The completion of LIHTC projects, on the other hand, is associated with an immediate positive and significant fixed impact, indicating that prices surrounding the tax credit housing rise more than prices in the larger neighborhood. Specifically, the price premium associated with proximity to LIHTC sites rises by 3.8 percentage points after project completion. An even larger, fixed positive effect of 11.6 percentage points is felt after the completion of public housing reserved for elderly tenants.

Forming a complete picture of project impacts requires looking beyond the single fixed effect to consider the marginal effect of additional units. The fixed component of the impact may be substantively offset—or magnified—by the scale effects. Our results suggest scale effects differ by program—building more public housing or Section 8 units generally appears to be detrimental to neighborhood property values, while building more Section 202 or tax credit units seems to be beneficial. However, for each of the programs, the marginal effect of another unit declines as the total number of units increases.

As for changes in impacts over time, the positive, significant coefficient on Tpost for family public housing and Section 8 implies that the impacts of these housing programs become more positive or less negative over time. The opposite is true for Section 202 and LIHTC housing, though the coefficient is quite small in the case of Section 202. Further, for each program except public housing for the elderly, the coefficient on Tpost-squared is statistically significant and opposite in sign from the Tpost coefficient, suggesting that the impact of another year diminishes, and may even reverse, as time goes by. As for public housing for the elderly, its impact is sustained over time, as indicated by the statistically insignificant Tpost and Tpost-squared coefficients.

Given the large number of coefficients, simulations help to summarize results. Figures 1A–1E show the ring-tract price gap by year relative to project completion

Table 5. Selected regression results—impacts by program.
A. Coefficient estimates

Public Housing for seniors		*Section 202*	
Pre Ring, 2–5 years	–0.0567***	Pre Ring, 2–5 years	–0.0276***
	(0.0125)		(0.0043)
Pre Ring, 0–2 years	–0.0569***	Pre Ring, 0–2 years	–0.0167***
	(0.0141)		(0.0052)
Post Ring	0.0594**	Post Ring	–0.0245***
	(0.0270)		(0.0062)
TPost	–0.0011	TPost	–0.0024**
	(0.0020)		(0.0011)
$TPost^2$	–5.8E–05	$TPost^2$	2.7E–04***
	(8.4E–05)		(5.5E–05)
Number of units at the time of sale	–0.0012***	Number of units at the time of sale	4.3E–04***
	(2.7E–04)		(6.1E–05)
Number of units at the time of $sale^2$	2.4E–06***	Number of units at the time of $sale^2$	–9.6E–07***
	(6.3E–07)		(1.9E–07)
Public Housing for families		*LIHTC*	
Pre Ring, 2–5 years	–0.1314***	Pre Ring, 2–5 years	0.0170***
	(0.0095)		(0.0049)
Pre Ring, 0–2 years	–0.1218***	Pre Ring, 0–2 years	0.0105*
	(0.0100)		(0.0054)
Post Ring	–0.1223***	Post Ring	0.0489***
	(0.0096)		(0.0073)
TPost	0.0126***	TPost	–0.0115***
	(0.0017)		(0.0034)
$TPost^2$	–3.1E–04***	$TPost^2$	0.0015***
	(7.3E–05)		(3.9E–04)
Number of units at the time of sale	–2.2E–04***	Number of units at the time of sale	9.3E–05***
	(5.0E–05)		(2.3E–05)
Number of units at the time of $sale^2$	2.8E–07***	Number of units at the time of $sale^2$	–6.0E–08***
	(6.0E–08)		(1.7E–08)
		R^2	0.8593
		N	432,984
Section 8 NC/SR			
Pre Ring, 2–5 years	–0.0079		
	(0.0052)		
Pre Ring, 0–2 years	–0.0263***		
	(0.0060)		
Post Ring	–0.0370***		
	(0.0062)		
TPost	0.0116***		
	(0.0011)		
$TPost^2$	–4.1E–04***		
	(4.9E–05)		
Number of units at the time of sale	–1.8E–04***		
	(2.4E–05)		
Number of units at the time of $sale^2$	4.9E–08**		
	(2.4E–08)		

Notes: This table shows only the ring variables for the federal rental housing projects completed after 1976. The regression includes ring variables for other types of subsidized housing, census tract and CD-quarter dummies, and the full set of building controls. Standard errors in parentheses.
*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 5. *Continued*.
B. Differences between key coefficients

Public Housing for seniors		
Pre Ring, 0–2 years — Pre Ring, 2–5 years	–1.8E-04	
Post Ring — Pre Ring, 0–2 years	0.1163	***
Post Ring — Pre Ring, 2–5 years	0.1161	***
Public Housing for families		
Pre Ring, 0–2 years — Pre Ring, 2–5 years	0.0096	
Post Ring — Pre Ring, 0–2 years	–4.6E-04	
Post Ring — Pre Ring, 2–5 years	0.0091	
Section 8 NC/SR		
Pre Ring, 0–2 years — Pre Ring, 2–5 years	–0.0184	***
Post Ring — Pre Ring, 0–2 years	–0.0106	
Post Ring — Pre Ring, 2–5 years	–0.0290	***
Section 202		
Pre Ring, 0–2 years — Pre Ring, 2–5 years	0.0109	*
Post Ring — Pre Ring, 0–2 years	–0.0078	
Post Ring — Pre Ring, 2–5 years	0.0031	
LIHTC		
Pre Ring, 0–2 years — Pre Ring, 2–5 years	-0.0065	
Post Ring — Pre Ring, 0–2 years	0.0385	***
Post Ring — Pre Ring, 2–5 years	0.0319	***

Notes. The statistical significance of the difference between coefficients is determined using an F-test. *** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level

for the average-sized project in each program, which ranges from 121 units for Section 202 to 276 units for the tax credit program.[22]

The figures suggest that an average-sized public housing development for the elderly has almost no effect on surrounding property values, while a family public housing development of average size leads to a significant decrease in the value of surrounding property values immediately after completion. In particular, prices within 2,000 feet of family public housing sites start out 13.1 percent lower than prices in the surrounding tract. After completion of the public housing, this initial ring-tract gap grows by 2.8 percentage points, to 15.9 percent. The gap declines with time, however, and less than 3 years after completion, it falls back to its pre-completion level.

A similar, but even more dramatic, pattern obtains for the Section 8 program. Two to 5 years before the completion of a Section 8 project of average size (259 units), prices inside and outside the 2,000-foot ring around the site are almost the same; prices in the ring then start to fall relative to the larger neighborhood and end up 2.6 percent lower than prices in the larger neighborhood in the 2 years prior to completion, and 8 percent lower immediately after completion. As with public housing,

[22] The "average-size" project is computed as the average number of subsidized units (in a given program) within 2,000 feet of a sale.

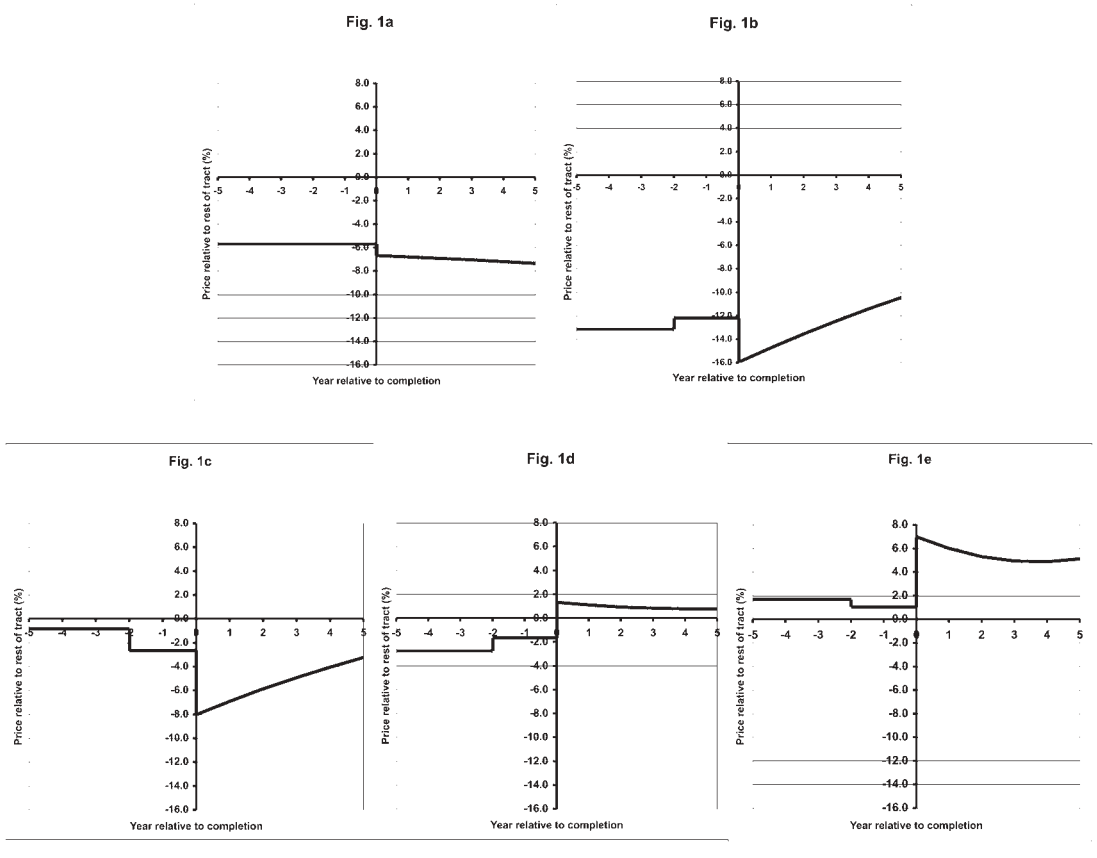

Figure 1. (a) Price trends within 2000 ft. of the average Public Housing project for seniors (172 units). **(b)** Price trends within 2000 ft. of the average Public Housing project for families (232 units). **(c)** Price trends within 2000 ft. of the average Section 8 NC/SR project (259 units). **(d)** Price trends within 2000 ft. of the average Section 202 project (121 units). **(e)** Price trends within 2000 ft. of the average LIHTC project (276 units).

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however, the gap starts shrinking in the years following completion. Because of the larger immediate impact, however, the gap doesn't approach its 2–5 years pre-completion level until 9 years after completion.

Turning to Section 202, prices within 2,000 feet of the future site are, on average, 2.8 percent lower than prices in the surrounding neighborhood 2 to 5 years before completion. Prices in the ring rise slightly before completion. Immediately after the completion of an average project (121 units), the prices in the ring rise further, growing to 1.3 percent *higher* than those outside of the ring. Thus, the total change in the gap due to the project completion is 4.1 percentage points. This positive effect diminishes somewhat over time, but even after 5 years, prices in the ring of the Section 202 developments remain higher relative to the larger neighborhood than they were before completion.

Finally, in contrast to the other programs, prices in the ring of LIHTC developments start out 1.7 percent *higher* than prices in the surrounding neighborhood. Immediately after the completion of a tax credit project of average size (276 units), this gap grows by 5.3 percentage points, to reach 7 percent. As with Section 202, this positive effect diminishes somewhat with time, but again, even 5 years after completion, the price gap remains significantly higher than it was at baseline.

Effects of Scale and Neighborhood

Figure 2 shows, for each program, how impacts vary with scale. The impacts are computed 3 years after completion, using the 2–5-year pre-completion price gap as a baseline. We show how impacts vary for the full range of project sizes in our sample. For each program, we set the upper limit of the number of units equal to the 95th percentile of project size, to avoid out-of-sample predictions and to eliminate potential project size outliers.

It is worth noting the similarity of the general shape of the scale function between the two types of public housing, on the one hand, and between Section 202 and the LIHTC program on the other. For public housing, the impact of small projects is positive, and, in the case of developments for the elderly, quite large. As scale increases, however, the positive impact of public housing for the elderly diminishes, vanishing at around 140 units, and an increasingly negative effect emerges; this negative effect reaches a maximum at around 240 units, after which it diminishes. The impact of family public housing has a similar U-shape in scale; however, the variation is less pronounced, and the impact remains positive over the whole scale range.

For the second pair of programs, the impacts are positive for the whole size range, and they appear to increase with scale, although only up to some point; beyond 220 units for Section 202, and beyond 770 units for LIHTC, the marginal impact of an additional unit becomes negative.[23] As for Section 8 housing, its impact varies almost linearly with scale; it is close to 0 for very small projects but becomes negative and increases in magnitude as more units are built.

We tested the sensitivity of the results first by restricting the sample to sales of 1–4 family homes, which are more common in other, lower-density cities and suburbs around the country. Results were largely unchanged. Second, we divided community districts into high-income and low-income districts and tested for differences in impacts. We found that, for the Section 8 program, the impacts were generally

[23] Note that 93 percent of our sales in the rings of tax credit developments are in rings with fewer than 770 units, and 88 percent of sales in the rings of Section 202 developments are in rings with fewer than 220 units.

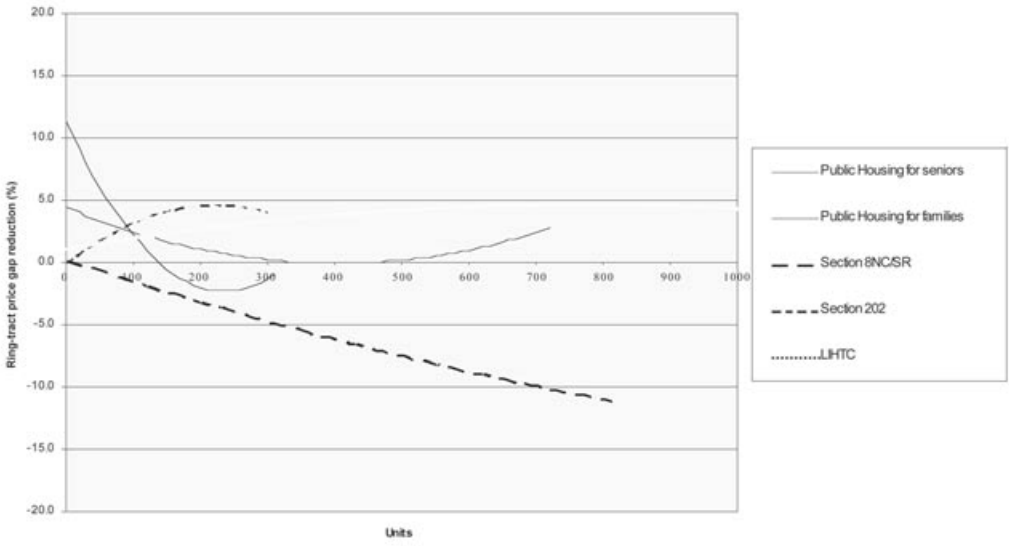

Figure 2. Impacts of program and scale (3 years, post-completion vs. 2–5 years, pre-completion).

more negative in the lower income areas. Meanwhile, Section 202 and LIHTC developments, at least beyond a certain size, seemed to have had more positive impacts in lower income areas, where the incomes of their tenants were likely more in line with those of their neighbors. That said, impacts are still positive in higher-income community districts. Unfortunately, sample sizes were insufficient to derive useful estimates for public housing developments.

CONCLUSION

These results challenge the conventional wisdom about the spillover effects of federally subsidized housing, in some ways, and confirm it in others. On the one hand, the results show that the effect of these housing developments on nearby property values is not consistently negative. Indeed, with respect to two programs—Section 202 and LIHTC—the impacts are positive and persist over time for the full range of project sizes in our sample. Additionally, small public housing projects reserved for the elderly have a significant positive effect that remains stable over time. Even in the case of public housing for families, the initially negative effects of average-sized projects appear to decline with time and dissipate within 3 years of completion. Further, while the results point to negative marginal impacts of public housing, it is interesting that the marginal impacts diminish with scale. In other words, counter to conventional wisdom, the added cost of an additional public housing unit does not grow with the size of a project.

On the other hand, the results do confirm some conventional assumptions, especially about tenant mix. First, housing for elderly residents appears, in general, to have a more positive initial effect on neighborhoods than housing for low-income families—although too large a number of senior units may also be detrimental to

the neighborhood, perhaps because the larger housing developments are viewed to be out-of-scale with the existing community. Second, the Section 8 program—one of the two family programs housing the lowest income tenants—appears to have the most negative effects.

Given that our study focuses exclusively on New York City, we are cautious in generalizing to other settings, especially those outside of urban environments. Still, we think these results should provide some reassurance to community residents about the neighborhood impacts of federally subsidized rental housing. At least in New York City, these developments have not typically led to reductions in property values and have, in fact, led to increases in many cases. Of course, impacts are highly sensitive to scale and patterns vary across programs. The construction of Section 8 projects, for example, appears to lead to reductions in surrounding property values, with larger projects having more negative effects. By contrast, and perhaps the most hopeful finding here from a policy perspective, housing units built through the Low Income Housing Tax Credit program—currently the largest producer of federally subsidized rental housing—appear to have positive impacts on their surrounding neighborhoods.

Of course, impacts on the surrounding neighborhood are only one of many factors to be considered in determining the appropriate scale and scope of subsidized rental housing developments. A full examination of the trade-offs involved in building housing developments of different sizes should also take into account costs, as well as the impacts on the tenants actually living in the subsidized housing. Further, while we focus on neighborhood impacts, housing officials should also consider the aggregate impacts of building subsidized housing developments on the city as a whole.

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