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Housing Production Subsidies and Neighborhood Revitalization: New York City's Ten-Year Capital Plan for Housing

1. Introduction

A perennial question in housing policy concerns the form that housing assistance should take. Although some argue that housing assistance should be thought of as a form of income support and advocate direct cash grants to needy households, others favor earmarked assistance—but they differ over whether subsidies should be given to the recipients as vouchers or to developers as production subsidies.

The appropriate composition of housing assistance has recently taken on particular import. In 2000, Congress created the Millennial Housing Commission and gave it the task of evaluating the "effectiveness and efficiency" of methods to promote housing through the private sector. As part of its mandate, the commission is examining changes to existing programs as well as the creation of new production programs to increase affordable housing.

This paper reexamines the debate over the appropriate form of housing assistance. First, we briefly summarize and evaluate arguments in favor of demand-oriented housing subsidies (such as Section 8 vouchers) and supply-oriented housing subsidies (such as production subsidies). We conclude that although demand-oriented subsidies are preferable to supply-oriented subsidies on a number of grounds, government support for production may, at least theoretically, be justified as a way to promote positive spillover effects and neighborhood revitalization. Whether sufficient spillovers exist is, in the end, an empirical question. Although much of the existing research finds little evidence of spillover effects, our findings on the New York City experience suggest that spillovers may be significant and large enough to justify government support for production.

Next, we describe the most extensive experiment in the United States in which a city used supply-oriented subsidies to rebuild neighborhoods—New York City's Ten-Year Capital Plan for Housing (the "Ten-Year Plan"). Born out of the necessity to rebuild communities devastated by years of abandonment and arson, the program, launched by New York

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City in 1986, ultimately led to the investment of more than $5.1 billion in housing in many of the city's poorest neighborhoods.

Finally, we describe the results of several empirical studies we have recently completed on the effect of the Ten-Year Plan on property values in New York City. Our results suggest that the use of production subsidies can indeed generate positive spillovers and contribute to neighborhood revitalization. Furthermore, by comparing and contrasting New York City's experiences with those of other cities, we explain why New York was so successful, and identify aspects of its program that could be transplanted to other cities.

2. Justifications for Housing Assistance: Revisiting the Supply-versus-Demand Debate

Although housing subsidies have become commonplace in the United States, it is still worthwhile to consider whether household financial assistance might be tied to housing rather than just provided as unrestricted cash grants. If the only housing-related problem facing Americans was insufficient income among poor families to purchase adequate housing, then a strong argument could be made that unrestricted cash grants would be best. In a liberal society dedicated to free choice, allowing individuals to make their own decisions with respect to consumption would generally seem desirable. Furthermore, considerable evidence suggests that unrestricted cash grants would lead to increases in housing consumption that fall short of the grant amount (Polinsky and Ellwood 1979). The implication is that earmarking subsidies for housing would be a less efficient way than cash grants to enhance household welfare. Finally, earmarked housing assistance carries an additional inefficiency—the cost of administration necessitated by the requirement that the money be spent on a specific good.

Despite the inefficiency, since the end of World War II, federal, state, and city governments have repeatedly tied subsidies to housing consumption. A number of justifications might be offered for this. First, consumers may have incomplete information about the benefits and importance of adequate housing, leading them to spend too little on it. People who choose other goods and services before a minimum level of shelter may do so because they lack sufficient information or are unable to assess rationally the true worth of decent housing, thereby justifying societal paternalism. Second, efforts to provide a minimum level of housing consumption may be necessary to protect children from irresponsible parents, who would, without government intervention, provide inadequate housing for their children. Third, taxpayers may derive utility merely from the knowledge that people are not living in desperately deteriorated and unhealthy accommodations (Aaron 1972; Schill 1990; Olsen 2001). Thus, taxpayers may prefer that their tax dollars subsidize someone's shelter directly, since it yields a greater increase in housing consumption per public dollar spent than do cash transfers, even if housing subsidies are less useful to the recipient than cash transfers.

In addition to achieving redistributive and/or paternalistic goals, earmarked housing assistance may be preferable to cash transfers in addressing other economic and social objectives. Such goals might include lessening adjustment lags in supply and demand, ameliorating the impact of discrimination in the housing market, improving the locations in which families live, and promoting positive spillovers and neighborhood redevelopment (see Ellen, Schill, Schwartz, and Voicu [2001]).

The observation that earmarked housing assistance may further some or all of these objectives does not, however, suggest what form this assistance should take. In the remainder of this section, we examine what we have learned about the relative merits of different approaches. In particular, we discuss the advantages and disadvantages of supply- and demand-oriented housing subsidy programs.

According to recent estimates, the federal government provides housing assistance to roughly 5.2 million renter households. An additional 9 million households qualify for assistance but do not receive it because housing subsidies are neither an entitlement nor a fully funded social welfare program (U.S. General Accounting Office 2001). This scarcity of subsidies makes efficient deployment of government resources crucial. Thus, it is important to begin by noting that virtually every empirical study performed over the past twenty-five years has found that demand-oriented subsidies (that is, vouchers and certificates) are more cost-effective than supply-oriented programs that subsidize the production of housing (including the public housing program, the Section 8 new construction program, and the low-income housing tax credit).[1]

A 2001 study by the U.S. General Accounting Office (GAO), for example, compared the cost, both in total and in the amount borne by the federal government, of housing vouchers over a thirty-year period with the cost of housing built using the low-income housing tax credit, the HOPE VI program, Section 202, Section 811, and Section 515. According to the analysis, the total per-unit costs for housing production

programs ranged from 12 percent to 27 percent more than the cost of voucher programs (U.S. General Accounting Office 2001, p. 2). In terms of the cost to the federal government, the production programs were between 15 percent and 38 percent more expensive.[2]

In addition to being cheaper than production programs, housing vouchers have typically led to better locational (neighborhood) outcomes. Supply-oriented programs operate with a built-in contradiction: programs that try to target scarce resources to the neediest recipients (such as the public housing program) end up creating intensely concentrated poverty. And there is growing and persuasive evidence that concentrations of poverty are related to a wide variety of social problems, including high crime, dropout, welfare receipt, and teenage pregnancy rates.[3] Programs with less effective targeting (such as HOPE VI or the low-income housing tax credit) foster more economically integrated environments—but the cost is vertical inequity.

Housing vouchers resolve this contradiction. Because the voucher recipient can rent housing in the private market (restricted only by maximum fair market rents), the more narrowly a voucher program is targeted to the poor, the more likely it is that deconcentration will occur. Indeed, research has typically shown that the neighborhood outcomes of voucher recipients dominate those who live in housing supported by production subsidies; voucher recipients see greater improvement in their neighborhood conditions than do public housing recipients. As an example, using data from the 1990 census, Newman and Schnare (1997) conclude that project-based assistance programs "do little" to improve the quality of recipients' neighborhoods (and, in the case of public housing, "appear to make things significantly worse"), while certificate and voucher programs reduce the probability that a family will live in the most economically and socially distressed areas (pp. 726-7). They provide a powerful argument in favor of vouchers.

In some housing markets, however, vouchers may not live up to their promise. In markets with extremely low vacancy rates, such as New York City in the late 1990s, voucher recipients might experience significant difficulties identifying standard-quality housing with rents below federally prescribed maximum levels.[4] Although this imbalance of supply and demand might be a short-term phenomenon caused by a sudden exogenous increase in demand for housing, it might be chronic and attributable to barriers (including regulatory barriers) in the housing market (Salama, Schill, and Stark 1999).

In such tight housing markets, production subsidies can, in principle, enable households to obtain housing faster and more cheaply than vouchers can. In practice, however, government-supported development is frequently slowed by bureaucratic delays, neighborhood opposition, and political pressure. Moreover, if regulatory barriers are the problem, direct government provision is hardly the ideal response—instead, a much better solution would be to remove the barriers that interfere with the smooth operation of the housing market.

Subsidizing production can also, again in principle, be justified as a method of eliminating or ameliorating the effects of discrimination in the housing market.[5] Discriminatory treatment may increase search costs, drive up the cost of housing for its victims, and interfere with optimal residential location decisions. Since government provision should be nondiscriminatory, direct provision of housing by government may be proposed as a partial solution to the problem of housing discrimination. Unfortunately, some of the most blatant acts of discrimination by landlords in the United States have been committed by government agencies and some of the most segregated housing developments in the nation are owned by public housing authorities (Hirsch 1983). Furthermore, even if government could be relied upon to operate in a nondiscriminatory manner, it is unclear whether production programs would be the most effective way to ameliorate the effects of housing discrimination. Instead, more vigorous enforcement of antidiscrimination laws may be more effective and preferable.

Although production programs do not have a comparative advantage over vouchers in cost-effectiveness or improving locational outcomes, and the case for relying upon them to deal with market failures such as adjustment lags and discrimination seems weak, production programs may be justified by their ability to promote neighborhood development. Production programs may generate positive external benefits to the neighborhoods in which they are located above and beyond the benefits received by the housing consumers themselves.

Because housing is fixed in space, its condition influences the value of neighboring properties. A dilapidated structure, for instance, can reduce the value of neighboring homes and may lead to disinvestment in the neighborhood. Introducing a high-quality building might, however, generate positive spillovers and increase values and confidence in the area. Adding new housing might also bring new people to a neighborhood, which may, in turn, improve neighborhood safety and fuel demand for retail services. If building owners do not bear all of the costs (or benefits) generated by their properties, the private sector will underinvest in housing. Public intervention, such as slum clearance or rehabilitation assistance, may therefore be appropriate.

Similarly, production programs may generate informational externalities. Housing developers may be averse to investing in distressed urban neighborhoods because they have little information about the demand for new housing in the area. Housing investment in distressed neighborhoods, then, may be delayed or be insufficient because each developer hesitates to make the first move. Government, through subsidies and planning, can, in principle, encourage developers to make the first move, provide information, and thereby reduce risk (Caplin and Leahy 1998).

If any form of housing subsidy is likely to be capable of generating positive spillovers and catalyzing neighborhood development, it would seem to be production subsidies rather than vouchers. Indeed, the key shortcoming of production subsidies—their concentration in spatially defined areas—becomes an advantage when it comes to neighborhood revitalization. Although vouchers increase demand and may well stimulate a supply response (including both new units and/or housing rehabilitation to meet minimum standards), their reliance upon individual decisionmaking limits their effectiveness in achieving spatially targeted goals. Individual voucher recipients choosing where to rent housing do not take into account the effect their choice will have on the surrounding neighborhood and thus are unlikely to choose the locations where external benefits are maximized. Housing agencies and community-based nonprofit organizations responsible for locating and implementing production programs, however, are more likely to consider the interests and needs of entire communities rather than just individual tenants.

It is unclear whether or not public officials and nonprofit developers do, in fact, successfully deploy production subsidies to create housing that generates positive spillover effects. As the remainder of this paper demonstrates, until recently, there has been little evidence that government housing programs generate positive spillover effects and successfully promote neighborhood revitalization. Nevertheless, our analysis of New York City's Ten-Year Capital Plan for Housing, specifically designed to revitalize neighborhoods devastated by years of abandonment, has yielded strong evidence that these spillover effects may be significant.

3. New York City's Ten-Year Capital Plan for Housing

The results of our research on the spillover effects of affordable housing investment differ substantially from those of earlier studies. To some extent, these differences derive from the particular circumstances and features of the programs composing the Ten-Year Plan. Thus, this section describes these programs, paying particular attention to those features that may have been especially important in driving spillover effects.

Throughout the twentieth century, New York City has been among the leading innovators in housing policy. In 1935, New York was the first city in the United States to build public housing. New York's Fair Housing Practices Act of 1957 was the first law to make illegal discrimination against racial minorities by private landlords. In addition, the Act's Mitchell-Lama Middle Income Housing Program became a model for Congress when it passed the first below-market interest rate programs, in the 1960s.

Thus, New York City Mayor Ed Koch's announcement of the Ten-Year Plan in 1985 was not entirely unprecedented. Indeed, many of the programs that would be encompassed in the plan were already in existence in 1985, albeit at substantially lower rates of activity. The rough contours of the plan were first announced in the Mayor's State of the City Speech (Koch 1985, p. 8). The goal was to renovate or build 252,000 units and make a financial commitment of $5.1 billion (City of New York 1988). To fund the program, Koch proposed using money from the World Trade Center to finance approximately $1 billion in bonds. Other revenues would come from the city's Housing Development Corporation and its capital budget.

Certainly, a principal objective of the Ten-Year Plan was to create additional housing opportunities for low- and moderate-income families as well as the homeless. In addition, a focus on neighborhood revitalization was evident from the beginning of the plan. According to the mayor, "first, we intend to undertake a major effort to rebuild entire neighborhoods of perhaps 15 to 25 square blocks throughout the City . . . it is anticipated that such concentrated revitalization would provide the hub for further development" (Koch 1985, p. 11). A 1989 report by the New York City Department of Housing Preservation and Development (HPD) made the point even more explicitly: "We're creating more than just apartments—we're re-creating neighborhoods. We're revitalizing parts of the city that over the past two decades had been decimated by disinvestment, abandonment, and arson."

In New York City's Ten-Year Plan, the location of housing investments was, to some extent, dictated by where the city owned property. During the late 1970s, the city had taken ownership of more than 100,000 vacant and occupied apartments as a result of tax foreclosure. This so-called *in rem* housing, named after the legal action that vested title in the city, would provide the raw material for the lion's share of the program.

Over time, HPD created a vast array of programs that enlisted a wide variety of actors. Because neighborhood

preservation and revitalization were important objectives of the plan, the city implemented programs that made community-based nonprofit organizations the major stakeholders in housing production. According to Felice Michetti, a former HPD commissioner and one of the principal architects of the plan, "when the Ten-Year Plan began, there were about twelve not-for-profits in the City of New York that were actively involved in housing . . . . By the time I left HPD, there were over a hundred not-for-profits involved in the Ten-Year Plan, and involved not in the traditional federal role of sponsoring projects, but actively involved [in development]" (New York City Department of Housing Preservation and Development 2000, p. 25). For-profit housing developers were also active participants, attracted by the development fees or the promise of long-term property value appreciation. Local financial institutions and intermediaries were active participants as well.

Over the course of the Ten-Year Plan, the city utilized at least 105 programs, many of which produced only a handful of units. Although the majority of these programs involved renovation of occupied housing, our focus in this paper is on the 66,147 *new* housing units created—through either new construction or the gut rehabilitation of formerly vacant buildings.[6] In most instances, the city's subsidy for housing was not limited to capital dollars. Most newly constructed or rehabilitated housing also qualified for property tax abatements and/or exemptions.[7] We divide these programs into four categories, based on whether they involved new construction or gut rehabilitation and whether they were slated for homeownership or rental use. Table 1 shows the distribution of Ten-Year-Plan units across these four categories. The bulk of the units were rental, created from the gut rehabilitation of formerly vacant buildings.

TABLE 1
Distribution of Ten-Year-Plan New Housing Units by Program Class

	Units	
Program Class	Number	Percentage of Total
Owner-oriented programs		
Rehabilitation of vacant buildings	2,801	4.2
New construction	16,813	25.4
Total owner-oriented programs	19,614	29.7
Renter-oriented programs		
Rehabilitation of vacant buildings	41,484	62.7
New construction	5,049	7.6
Total renter-oriented programs	46,533	70.3
Total—all classes	66,147	100.0

Note: Figures include all Ten-Year-Plan new housing projects in the New York City Department of Housing Preservation and Development database.

4. Evidence of Spillover Effects: New York City and Elsewhere

Here, we review the results of our recent empirical work on the effect of the New York City's Ten-Year Capital Plan for Housing on property values in the city. We compare and contrast New York City's experiences with those of other cities to explain why New York was so successful as well as which aspects of its program might be successfully transplanted to other cities.

4.1 Evidence from New York City

Using a unique administrative data set, we have completed a series of studies on New York City's Ten-Year Capital Plan for Housing (Ellen, Schill, Susin, and Schwartz 2001; Schill, Ellen, Schwartz, and Voicu 2001; Ellen, Schill, Schwartz, and Voicu 2001). Although each of our studies has differed in focus, our core objective was to examine whether investments in place-based housing programs have an effect on the value of homes in surrounding neighborhoods and to derive estimates of the sign and significance (both substantive and statistical) of these effects. All three studies found evidence of positive and significant spillover effects.

Our first study explored the effects of the Nehemiah Plan and the New Homes Program of the New York City Partnership, both of which subsidize the development of affordable, owner-occupied homes in distressed urban neighborhoods (Ellen, Schill, Susin, and Schwartz 2001). In the second study, we expanded the analysis to consider the effects of a wider range of housing subsidized through the Ten-Year Plan; for instance, we analyzed the effects of rental and homeownership programs and renovation and rehabilitation as well as new construction programs (Schill, Ellen, Schwartz, and Voicu 2001). For the third study, we restricted our analysis to the effects of newly created units, investigated differences in spillover effects across types of housing programs, and provided some evidence to suggest how the magnitude of the spillover benefits generated by these units compared with their approximate costs (Ellen, Schill, Schwartz, and Voicu 2001).

For consistency with other analyses (which typically focus on new units) and for brevity, we mainly review the methods and results of our most recent study of newly created units. Our basic empirical strategy in all of these studies, however, was the same: we used a difference-in-difference model to compare the sales prices of properties within 500-foot rings of Ten-Year-Plan sites to the prices of comparable properties in the same census tracts (but outside the rings). We then compared the magnitude of this difference before and after the completion of a Ten-Year-Plan project to estimate the effect of the housing investment on property values.

More formally, we used a fixed-effects hedonic price model, adapted from Galster, Tatian, and Smith (1999), which controls for structural characteristics of the property. In this model, the fixed effects are specified as census tract, quarter-specific fixed effects.[8] In other words, we effectively included a separate dummy variable for each census tract for each of the seventy-nine quarters in our data.[9] This allowed us to control for neighborhood-specific price changes over our time period.

The core equation we estimated is shown below, where lnP_{ict} is the log of the sales price (per unit) of property i in census tract c in quarter t; X_{it} is a vector of property-related characteristics, including age and structural characteristics (square footage, lot size, garage); and Z_{it} is a vector of locational attributes—specifically, a set of what we call "ring" variables: whether a sale is within 500 feet of a Ten-Year-Plan site, whether any units are completed within this distance, and, if so, the number and mix of the completed units. Finally, I_{ct} are a series of dummy variables indicating the quarter and census tract of the sale.[10]

$$(1) \qquad lnP_{ict} = \alpha + \beta X_{it} + \gamma Z_{it} + \Sigma \rho_{ct} I_{ct} + \varepsilon_{it}.$$

To help explain our identification strategy, Table 2 provides a list of ring variables. First, we include a series of in-ring dummy variables, which indicate whether a property sold is within 500 feet of a particular type of Ten-Year-Plan project, whether completed or not. Because different kinds of projects

Table 2
Main Ring Variables

Variable	Definition
In ring, new units, owner but not renter	
1-100 units	1 if the property sold is within 500 feet of 1-100 homeownership new units, whether completed or not, but not of rental new units; 0 otherwise
101+ units	1 if the property sold is within 500 feet of more than 100 homeownership new units, whether completed or not, but not of rental new units; 0 otherwise
In ring, new units, renter but not owner	
1-100 units	1 if the property sold is within 500 feet of 1-100 rental new units, whether completed or not, but not of homeownership new units; 0 otherwise
101+ units	1 if the property sold is within 500 feet of more than 100 rental new units, whether completed or not, but not of rental new units; 0 otherwise
In ring, new units, owner and renter	
1-100 units	1 if the property sold is within 500 feet of 1-100 homeownership and rental new units, whether completed or not, but not of rental new units; 0 otherwise
101+ units	1 if the property sold is within 500 feet of more than 100 homeownership and rental new units, whether completed or not, but not of rental new units; 0 otherwise
Post ring, new units	1 if the property sold is within 500 feet of any completed new units; 0 otherwise
Number of new units at time of sale	Number of completed new units within 500 feet of the property sold
(Number of new units at time of sale)^2	Squared number of new units at time of sale
Share of multifamily new units at time of sale	Share of completed new units within 500 feet of the property sold that are in multifamily buildings
Share of rental new units at time of sale	Share of completed new units within 500 feet of the property sold that are rentals
Share of new construction units at time of sale	Share of completed new units within 500 feet of the property sold that are in newly constructed buildings
Tpost, new units	Years since earliest completion of new units within 500 feet of the property sold; 0 if no new units were completed before sale
*Tpost**(number of new units at time of sale)	Interaction term

Note: "New units" is defined as newly constructed units and rehabilitated (formerly) vacant units.

may have been located in different kinds of neighborhoods, we defined six mutually exclusive in-ring variables—properties within 500 feet of large homeownership projects, small homeownership projects, large rental projects, and so on. Second, we included a post-ring variable that indicates if there are any *completed* units within 500 feet of the sale. The coefficient on this variable indicates the extent to which, after the completion of a development of any size, sales prices rise in the vicinity relative to the average increase in the larger census tract. Third, we controlled for the number of completed units within this distance and the share of completed units that were in multifamily structures, were rentals, and were in newly constructed buildings. Finally, we include *Tpost*, which indicates the years since completion, and *Tpost* interacted with number of completed units to see if the effect changed over time and whether this change was shaped by the size of the project.

To estimate this model, we used a combination of three geocoded administrative data sets. First, we used detailed data on the location (down to the block level) of all housing built or renovated through the Ten-Year Plan. Second, through an arrangement with the New York City Department of Finance, we obtained a database that contains sales transaction prices for all apartment buildings, condominium apartments, and single-family homes over the 1980s and 1990s.[11] We used GIS techniques to measure the distance from each sale to all Ten-Year-Plan sites. Our final sample in the three studies ranges from 234,000 to 294,000 property sales, a very large sample size compared with much of the literature.

Third, we supplemented these transaction data with building characteristics from an administrative data set gathered for the purpose of assessing property taxes (the RPAD file). The RPAD data contain information about buildings but do not contain much information about the characteristics of individual units in apartment buildings (except for condominiums). Nonetheless, these building characteristics explain variations in prices surprisingly well (our final R^2s exceeded 0.87), suggesting that the data are rich enough for estimating hedonic price equations.

Our results consistently show that the completion of new housing units under the Ten-Year Plan was associated with increased sales prices of nearby properties. For example, Charts 1 and 2 show the regression-adjusted percentage difference between prices in the ring and prices in the larger census tract, before and after the completion of a project. Specifically, Chart 1 shows how prices in the ring changed after completion of a Ten-Year-Plan homeownership project of three different sizes. The first set of bars shows that before the completion of a ten-unit homeownership project, the sales price of a property located within 500 feet of a future site was on average 6.8 percent lower than the price of a comparable property sold in the same quarter in the same census tract. After completion, the gap shrunk so that prices in the ring were only 3.1 percent lower than prices in the larger census tract.

As can be seen from Chart 1, the impact appears to be greater for larger projects. The second set of bars shows that, before completion of a project with 100 homeownership units, the sales price of a property located within 500 feet of the future site was, on average, 6.8 percent lower than the price of a comparable property sold in the same quarter in the same census tract.[12] After completion, prices in the ring actually ended up higher than those in the surrounding census tract. Similarly, for properties within 500 feet of homeownership sites with 200 units, the ring/census tract gap shifted from an 8.4 percent shortfall in the ring to a 3.9 percent "premium" after completion.

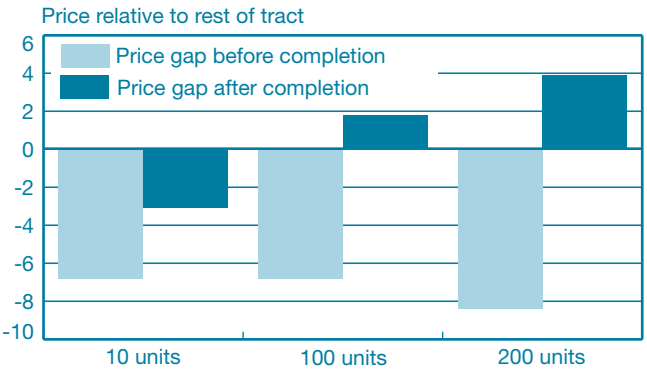
For properties within 500 feet of renter-oriented Ten-Year-Plan projects, we obtained very similar results (Chart 2). The one key difference is the very large price gap for properties located within 500 feet of a site that will ultimately hold 200 rental units. We estimated that before completion, prices of properties near such large rental project sites were a full 17 percent *lower* on average than prices of comparable properties located outside the ring, but in the same census tract. After completion, the gap decreased by more than 12 percentage points.

There are several points to highlight here. First, in all cases, quality-controlled property values were lower for properties

Chart 1

Percentage Price Differences in 500-Foot Ring and Surrounding Tracts, by Number of Units Built

Rings with Homeownership Units Only

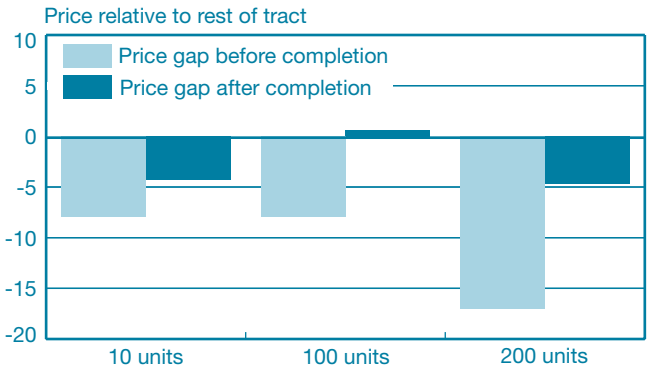


Note: Price gaps are for before and after the completion of Ten-Year-Plan new units.

Chart 2

Percentage Price Differences in 500-Foot Ring and Surrounding Tracts, by Number of Units Built

Rings with Rental Units Only



Note: Price gaps are for before and after the completion of Ten-Year-Plan new units.

located within 500 feet of Ten-Year-Plan sites than for comparable properties located beyond this distance but in the same census tract. Ten-Year-Plan housing, in other words, was typically located in the most distressed micro-neighborhoods within a census tract. Furthermore, the larger the project, the more that distressed property values tended to be in the vicinity, and rental projects appear to have been sited in even more distressed neighborhoods than homeownership projects. These projects, in other words, were not randomly located, emphasizing the need to control for these baseline conditions when estimating effects.

In addition, the value of properties near Ten-Year-Plan sites typically rose significantly relative to prices in their census tract after completion of a project, and this increase was sustained over time. (The coefficient on the post-completion time trend in the ring was statistically insignificant.[13]) A final, notable point is that the greater the number of units, the greater the effect. With this said, we found a relatively large, positive "fixed" effect common to projects of all sizes. One interpretation of this result is that much of the positive spillover effect may derive from the elimination of existing blight; the scale or size of the project is less important than the fact that at least some units were built.

Consistent with this interpretation, we found that the type of project made little difference in determining effects. We found no statistically different effects between rental and ownership projects, or between units created through the rehabilitation of vacant buildings and those built through new construction. Structure type was also irrelevant—the magnitude of the spillover effect was unchanged whether the project was made up of one-to-four-unit buildings or multifamily apartment buildings.

In summary, we found that the units created through the Ten-Year Plan generated significant and sustained positive spillover effects on neighboring properties, indeed, benefits that were quite large relative to city subsidies (Ellen, Schill, Schwartz, and Voicu 2001). We next review evidence from other cities, then speculate as to whether our positive results might be unique to New York City and the particular efforts made under the Ten-Year Plan.

4.2 Evidence on the Effects of Other Supply-Side Programs

Although several studies have attempted to quantify the spillover effects of place-based subsidized housing, few have found statistically significant effects. Some studies have found small, positive effects (De Salvo 1974; Rabiega, Lin, and Robinson 1984), yet the general conclusion has been that the development of subsidized housing has had little or no effect on surrounding neighborhoods (Nourse 1963; Schafer 1972; see Matulef [1988] and Goetz, Lam, and Heitlinger [1996] for a review of the literature). Indeed, attempts to quantify the effect of housing quality more generally on the value of neighboring properties have largely yielded insignificant results. As Mills and Hamilton (1994) write, researchers "have almost uniformly failed to find significant and consistent effects of neighboring activities on property values." Although economists have not rejected the possibility of spillover effects, they speculate that such effects operate mainly in high-density neighborhoods, are probably highly localized, and only matter when housing is badly deteriorated or abandoned (Mills and Hamilton 1994).

During the 1990s, three studies were published suggesting that proximity to subsidized housing can affect neighboring property values, but the effects were typically negative, at least in the case of federally subsidized rental developments (Lyons and Loveridge 1993; Goetz, Lam, and Heitlinger 1996; Lee, Culhane, and Wachter 1999). Other recent studies have suggested no significant effect (Briggs, Darden, and Aidala 1999; Cummings, DiPasquale, and Kahn 2001).

One recent paper comes to a more hopeful conclusion about place-based subsidies. Santiago, Galster, and Tatian (2001) used a hedonic model with localized fixed effects to study whether the purchase and renovation of property by the Denver Housing Authority, and its conversion into subsidized housing, influenced the subsequent sales prices of surrounding

single-family homes. The authors found that proximity to dispersed public housing units was, on average, associated with a modest increase in the prices of single-family homes. But they found that these positive benefits were weakest in the poorest areas. Indeed, the effects were consistently negative in substantially black neighborhoods. This contrasts sharply with our research on New York City, which found substantial positive effects in the city's poorest neighborhoods.

4.3 Why Are New York City's Results Stronger?

We have several hypotheses for why our results suggest larger and more positive spillover effects: differences in data and methods, more favorable housing market conditions, a more favorable mix of housing, a greater level of municipal commitment, and a greater focus on neighborhood revitalization. Note that another possible difference is timing—most prior research examined large-scale federal housing programs from an earlier era. There may be common macroeconomic, sociological, or political explanations for different outcomes in those earlier periods. Thus, when comparing our results with those for other cities, we pay particular attention to six studies that have focused on more recent housing programs: Lyons and Loveridge (1993), Goetz, Lam, and Heitlinger (1996), Lee, Culhane, and Wachter (1999), Briggs, Darden, and Aidala (1999), Cummings, DiPasquale, and Kahn (2001), and Santiago, Galster, and Tatian (2001). Table 3 provides summary information on these studies.

Data and Methods

It is possible that the differences in results are rooted in differences in data and methods. Our study is based on an extraordinarily rich data set. The large number and variety of housing units built, the long time frame, and the large volume of sales data allow us to employ a data-intensive methodology that incorporates many of the best features of previous studies.

The most important methodological challenge in estimating the effect of subsidized housing is identifying the appropriate counterfactual. One approach is to compare price levels in areas receiving subsidized housing with comparable properties that have no subsidized housing. This yields an unbiased estimate of the effect if the only difference between the areas is the housing investment—which is difficult to determine. If the prices of homes tend to be lower near subsidized housing sites, is this because the development of subsidized housing depressed housing values or because the subsidized housing was located in a more distressed area? A second approach compares property values before and after housing investment, which yields an unbiased estimate of the effect if there is no

Table 3
Projects and Units in the Analyses of Assisted Housing Effects

Author	Housing Program	City	Number of Subsidized Units	Number of Projects/ Developments	Study Period	Number of Home Sales/ Residential Properties
Briggs et al. (1999)	Dispersed	Yonkers, New York	200	7	1985-96	3,101
Santiago et al. (2001)	Dispersed	Denver	118[a]	92	1987:1-1997:3	43,361
Cummings et al. (2000)	Homeownership	Philadelphia	311	2	1986-97	146,053
Lyons and Loveridge (1993)	Multiple federally assisted	Ramsey County, Minneapolis	12,864	120	1991	26,503[b]
Goetz et al. (1996)	Nonprofit developed	Minneapolis	476	23	1994	22,156
Lee et al. (1999)	Multiple federally assisted	Philadelphia	NA[c]		1989-91	18,062

[a]This is an estimate based on average number of households per site reported in the authors' Table 1, "Selected Characteristics of 1989-1997 Vintage Dispersed Housing Sites" (p. 75).

[b]This is a 25 percent sample of the 128,010 nonsubsidized residential units in Ramsey County.

[c]The authors do not report total number of units; however, they do include dummy variables for large and high-rise public housing developments. "Large" is not defined.

other force shaping the growth in property values at the same time as the housing investment. But again, there may be other forces affecting the target neighborhood that coincide with development of subsidized housing, complicating the effort to disentangle the specific effect of subsidized housing. Finally, effects can be investigated by constructing and estimating an econometric model that fully specifies the determinants of property values, including the neighborhood characteristics and housing investments. Here, unbiased impact estimates can only be obtained if the model includes all relevant neighborhood characteristics—a formidable challenge. (See Galster, Tatian, and Smith [1999] for a fuller discussion of alternative approaches to estimating impacts of subsidized housing.)

Using more detailed data and a clever methodology, Santiago, Galster, and Tatian (2001) are able to sort out causality more persuasively than the other studies, and therefore we place more weight on their results. They use a hedonic model with localized fixed effects and, in contrast to earlier research, they also control for past trends in housing prices in the immediate vicinity of a project. That is, they control for both past levels and trends in housing prices in the baseline neighborhood and therefore control for any tendency of the housing authority to develop housing in neighborhoods where prices were already rising.

We adapt their methodology in our approach, and our results are, in some sense, most comparable to theirs. As noted earlier, we estimate effects based upon the assumption that in the absence of the Ten-Year-Plan units, properties within 500 feet of the sites would have appreciated in value at the same rate as comparable properties in the same census tract, but outside of the 500-foot ring. That seems particularly reasonable given the small size of these rings. Put differently, our estimates are identified as the difference in the growth in property values before and after the housing investment relative to the growth in prices in a comparable area—outside the ring but in the same census tract. Thus, our methodology combines the best of the alternative strategies described above and, as a result, our findings are less likely to be biased. (Our estimates will be biased only if there was some force affecting property values differentially inside and outside the ring at the same time as the housing investment.)

Equally important, our analyses are based on a rich data set including information on an extraordinarily large number of transactions and an enormous number of units. As shown in Table 3, earlier studies typically examined the effect of several hundred subsidized units, spread across a number of projects. By contrast, we examined the effect of approximately 66,000 new subsidized units, developed at different times over several years, in a wide range of neighborhoods. Thus, it is harder to believe that some other contemporaneous phenomenon was responsible for lifting property values in the proximity of the Ten-Year-Plan units while leaving properties outside the ring but in the same neighborhood unaffected. One would have to believe that this phenomenon occurred at different times in different neighborhoods at the same time as the housing investment.

Note that the small number of subsidized units examined in many of the other earlier studies has made it difficult to form sharp estimates. Although estimated effects may have been positive, standard errors are large. Briggs, Darden, and Aidala (1999) and Cummings, DiPasquale, and Kahn (2001), for instance, found that subsidized housing had a positive but statistically insignificant effect on surrounding property values. It may be that a larger number of projects would have yielded smaller standard errors and found positive and statistically significant effects. (It is also possible, of course, that expanding the number of projects would have revealed negative and significant effects.)

Housing Market Conditions

A second possible explanation for the difference in findings is that housing market conditions were simply more propitious in New York City than elsewhere. During this time, the city was gaining population largely fueled by enormous waves of immigration, in sharp contrast to Philadelphia (where two of these earlier studies were undertaken), which lost 4 percent of its residents between 1990 and 2000. Vacancy rates were also quite low in New York City during this time—the rental vacancy rate in the city fell to 3.2 percent in 1999 (Daniels and Schill 2001). Vacancy rates in the Philadelphia metropolitan area were, by comparison, more than 8 percent—and undoubtedly higher still in the city itself. As noted above, place-based housing programs are likely to be most effective in tight housing markets, where they can help to meet growing demand. Thus, the difference in findings may reflect what common sense (and economics) suggests. In cities like Philadelphia in the 1990s, with a shrinking population and high vacancy rates, housing investment is likely to have (at best) little effect on values of neighboring properties—an infusion of new housing was probably not what the city's distressed neighborhoods needed. Indeed, additional housing may have promoted filtering and the removal of buildings from the housing stock. In growing New York City, with very little vacant housing and a preponderance of structural barriers that inhibit construction of affordable, private housing (Salama,

Schill, and Stark 1999), public housing investment may have been a highly effective spur to neighborhood economic development.

Alternatively, New York's extraordinarily high density may also have contributed to the larger effects. Clearly, we would expect spillover effects to be larger in neighborhoods with higher densities. In 1990, population density was more than twice as high in New York City than in Philadelphia and three and a half times as high as it was in Minneapolis—the site of three of our comparison studies.

Mix of Housing

A third possible explanation for New York's difference concerns the type of housing built by the city. That is, the mix of housing built in New York may have been disproportionately composed of the type that would generate larger neighborhood spillover effects. Although plausible, this explanation is undermined to some extent by the fact that our research found no differences in spillover effects across different types of housing. In addition, New York's focus on income mixing may have made a difference. Rather than concentrating the very poorest households in particular neighborhoods or projects, the city generally aimed to create housing with a mix of incomes.

Level of Commitment

New York City's Ten-Year Plan may have had a greater effect than initiatives of other cities because of New York's level of commitment. Mayor Koch, in announcing the Ten-Year Plan, placed his prestige and that of his housing agency on the line in committing the city to an effort of unprecedented magnitude and scope. This commitment, together with the quality of the staff assembled at the housing agency, may have generated confidence on the part of neighborhood residents, financial institutions, and investors, encouraging them to contribute their own resources and time to revitalization activities.

Focus on Neighborhood Revitalization

Finally, the explanation may lie in New York City's explicit emphasis on neighborhood revitalization. As noted above, one of the key objectives of the Ten-Year Plan (if not *the* key objective) was to reclaim parts of the city that had been destroyed by arson and disinvestment during the 1970s. In the programs evaluated in other cities, this aim was far less central. In the scattered-site public housing initiatives, for instance, the goal was to offer housing opportunities to poor families in lower poverty communities (Briggs, Darden, and Aidala 1999; Santiago, Galster, and Tatian 2001). Therefore, it is perhaps not surprising that New York appears to have been more successful in developing housing that benefited the surrounding communities.[14]

Furthermore, New York City chose sites (either buildings or vacant land) that were extremely blighted, so that even modest improvements may have been able to generate dramatic improvements in the blocks surrounding them. Many of the cities examined by other researchers were unlikely to have faced such pockets of abandonment. If they did, the studies may not have so explicitly targeted them. Indeed, in Denver and in Yonkers, New York, the aim was to select sites in middle-class neighborhoods. These were hardly areas characterized by the same devastation as the neighborhoods studied in New York City.

4.4 Evidence on the Effects of Demand-Oriented Subsidies

Ideally, we would like to obtain estimates of the spillover effects of tenant-based vouchers to compare with the housing built under the Ten-Year Plan. Unfortunately, such estimates are unavailable. Nevertheless, for the reasons discussed above (for example, tenants are likely to be dispersed and the aim of voucher programs is typically not to revitalize neighborhoods), it is unlikely that vouchers would deliver spillover effects of the magnitude we found generated by the Ten-Year Plan.

This expectation is modestly supported by other research. Galster, Tatian, and Santiago (1999), for example, examine the effects of Section 8 tenants on neighboring properties in the suburbs surrounding Baltimore. They find, in general, that proximity to a small number of Section 8 tenants is linked to positive changes in property values. But closer inspection showed that these small positive effects were limited to properties within 500 feet of no more than six voucher holders. For properties close to larger numbers, the net effect proved to be negative, and these negative effects were quite substantial for the largest concentrations of tenants (more than fifty tenants). Moreover, when looking across different types of neighborhoods, the authors find that the positive effects were in fact limited to high-value, largely white neighborhoods, as was the case in their analysis of scattered-site public housing in Denver.

In short, the authors conclude that Section 8 demand-side subsidies can be used to generate neighborhood externalities,

but only in higher valued, appreciating, largely white communities. The irony, of course, is that these are hardly the sorts of neighborhoods where we are likely to be very concerned about improving neighborhood quality.

Two other studies examine the effect of voucher households on property values: Lyons and Loveridge (1993) find no effect on surrounding property values and Lee, Culhane, and Wachter (1999) uncover slight negative effects on surrounding property values. In short, prior research provides little support for the notion that vouchers are likely to lead to the same large, positive spillover effects on surrounding properties that we estimate were generated by the Ten-Year Plan.

5. Conclusion

Since the mid-1970s, the central debate among housing policy analysts and government officials has revolved around the relative advantages and disadvantages of housing vouchers versus supply-oriented subsidies. Study after study demonstrated the comparative advantage of vouchers on a variety of grounds—ranging from their lower cost to the better neighborhoods they enable their recipients to live in. Economic theory has suggested that production programs might do better than housing vouchers in generating positive spillovers and neighborhood revitalization, but empirical studies have never quite supported this theory.

New York City's Ten-Year Capital Plan for Housing provides advocates of production programs with more optimistic results. Our findings suggest that New York's unprecedented expenditure of $5.1 billion on housing production programs has generated substantial positive spillovers and contributed to neighborhood revitalization. The rebuilding of extraordinarily depressed neighborhoods in the South Bronx, Central Harlem, and Central Brooklyn seems to have been achieved not just as a result of a booming economy and a growing population, but also because of an innovative and massive investment of public dollars.

Although our research on the utility of production programs as a neighborhood revitalization tool in New York provides some evidence of the contributions that production programs can make in distressed neighborhoods, more research is needed. First, our study did not directly compare the spillovers generated by production programs with those that might accompany housing vouchers. Second, whether the success in New York City can be replicated elsewhere remains very much an open question. Third, production programs such as those utilized by New York City are extremely costly. Our research suggests that the benefits achieved in terms of increased property values may outweigh the costs of the subsidies, yet much more work remains to be done before that conclusion can be stated with any level of assurance.

Endnotes

1. For an overview of the theoretical and empirical evidence on the relative cost-effectiveness of housing vouchers and certificates, see Schill (1993). One recent article has made a counterargument (McClure 1998); Shroder and Reiger (2000) have challenged McClure's methodology.

2. According to the report, these estimates of the cost differential between voucher and production programs were conservative. They did not include the value of tax abatements granted by localities for new construction, nor did they include funding of capital reserves. The authors estimated that including these costs would have increased the differences between the two types of subsidy programs by about 10 percent.

3. For a summary of the literature on the neighborhood effects of concentrated poverty, see Ellen and Turner (1997).

4. A recent paper by Bahchieva and Hosier (2001) indicates that between October 1999 and June 2000, 2,263 vouchers issued by the New York City Housing Authority for nonemergency reasons were picked up by applicants. Only 1,339 applicants successfully rented a unit with their vouchers; 1,124 failed to obtain a unit before expiration of their vouchers.

5. Recent evidence suggests that black and Latino homeseekers encounter unfavorable treatment approximately half of the time they transact in the housing market (Ondrich et al. 1999).

6. In this paper, units built or rehabilitated under the Ten-Year Plan are defined to include only projects completed between January 1987 and June 2000. The January 1987 beginning date was selected because of the long lag time associated with housing construction. It is likely that buildings completed in 1986 were planned and financed long before the announcement of the plan. In addition, when we count units produced through the plan, we do not include housing units built under federal programs such as public housing, Section 8, and Section 202 housing. In certain respects, our definition of the Ten-Year Plan is therefore both under- and overinclusive. Federal housing programs that made use of city resources such as city-owned land would not be included in our totals. In addition, it is possible that completions after 1986 would be included even though planning may have begun and funding commitments for the developments may have been made before the announcement of the plan in 1985.

7. For more details on financing, see Schill, Ellen, Schwartz, and Voicu (2001).

8. Note that Galster, Tatian, and Smith (1999) include census-tract fixed effects instead, which assumes neighborhood fixed effects are constant over time—an assumption that seems unrealistic over a time period as long as ours.

9. Ellen, Schill, Susin, and Schwartz (2001) used ZIP code fixed effects.

10. In Ellen, Schill, Susin, and Schwartz (2001), we also estimate a number of alternative specifications (for instance, providing year-by-year estimates of post-completion effects), but all rely on the same fundamental difference-in-difference approach.

11. Because sales of cooperative apartments are not considered sales of real property, they are not recorded and were thus not included in our analyses. We should also note that most of the apartment buildings in our sample are rent-stabilized. Given that legally allowable rents are typically *above* market rents outside of affluent neighborhoods in Manhattan and Brooklyn, we do not think that their inclusion biased our results (see Pollakowski [1997]).

12. Our specification allowed the precompletion price gap to differ only for projects above and below 100 units.

13. In our first paper, we found that the impact of Partnership and Nehemiah homes declined over time within the 500-foot ring. Effects on properties somewhat more distant from the subsidized homes were persistent, however, suggesting that impacts may have diffused outward over time.

14. Interestingly, Goetz, Lam, and Heitlinger (1996) found that housing developed by community-based nonprofits had positive spillover effects, while that developed by the housing authority had negative effects. This may be because the community-based nonprofits they examined in Minneapolis were more sensitive to community effects.

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