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The Role of Cities in Providing Housing Assistance:
A New York Perspective

Abstract

In recent years, the federal government has increasingly relied upon states and cities to create and administer social policy. This paper examines available theory and evidence regarding the appropriate role of different levels of government, focusing in particular on the role of cities. Exploring the case of New York City, the paper also offers new empirical evidence on the extent to which investments in affordable housing can help to eliminate externalities and rebuild inner city communities.

We conclude that although cities should play a major role in administering housing programs, they should only fund them under a limited set of circumstances. Redistribution of income, a major objective of most housing subsidy programs, should generally be paid for by the federal government, not cities. In contrast, cities should consider funding housing production programs when they are part of a comprehensive strategy either to remove negative externalities or to generate positive spillovers. Our empirical analysis of New York City's investment in new housing suggests that housing programs can generate significant external benefits to their neighborhoods. Thus, our results point to a potentially important role for cities, based upon the spillover effects of housing construction and rehabilitation in distressed neighborhoods.

The current debate over housing policy in the United States takes place against a backdrop of devolution. In recent years, the federal government has increasingly relied upon states and cities to create and administer social policy. Thus, as this devolution continues, it is useful to consider how the responsibility for housing programs and policies should be divided among federal, state, and local governments and, given the severity of urban housing problems, city governments in particular. This paper examines available theory and evidence regarding the appropriate role of different levels of government, focusing in particular on the role of cities. Studying the case of New York City, the paper also offers new evidence on the extent to which investments in affordable housing can help to eliminate externalities and rebuild inner city communities.

The paper is organized as follows. In Part 1 we review relevant theoretical and empirical literature to distill an understanding of whether and under what conditions cities are the appropriate level of government to fund and/or administer housing subsidy programs.[1] In brief, we conclude that although cities should play a major role in administering housing programs, they should be wary about actually funding them. Redistribution of income, a major objective of most housing subsidy programs, should generally be paid for by the federal government, not cities. In contrast, cities should consider funding housing production programs when they are part of a comprehensive strategy either to remove negative externalities or to generate positive spillovers. In Part 2, we estimate the impact that the new housing units developed through New York City's

Ten Year Plan have had on property values in immediately surrounding areas. Our estimates suggest that the city's investment in new housing generated significant external benefits. Thus, although we conclude that the federal government should play the central role in funding housing programs aimed at redistribution, our results also point to a potentially important role for cities, based upon the spillover effects of housing construction and rehabilitation in distressed neighborhoods.

Part 1: Searching for the appropriate role for cities in housing assistance

The provision of housing assistance in a federal system

Housing assistance in the United States is provided by overlapping governments whose relationship to each other is subject to a continual process of adjustment and redefinition. At the federal level, housing subsidies are provided by the U.S. Department of Housing and Urban Development as well as indirectly, through favorable provisions of the tax code, by the Internal Revenue Service. In recent years, the federal government has increasingly relied upon states and cities to create and administer housing policy. As shown in Quigley (2000), the net budget authority for all housing aid administered by HUD declined sharply during the 1980s - from about $55 billion in 1980 to a little more than $10 billion in 1990 - and has remained at relatively low levels ($10 - $20 billion) throughout the last decade.

Many American cities have responded by creating new and innovative programs

to promote the production of housing. In addition, community-based nonprofit organizations and private developers have stepped into the void, piecing together a variety of subsidies and funding sources to create affordable housing. The various roles played by cities in providing housing assistance to their residents are briefly summarized below:

- Revenue generation. Some cities fund housing subsidies out of their own revenues. According to Basolo (1999, p. 442) among 209 cities surveyed with populations of 50,000 or more, slightly over one-quarter of all expenditures for housing were funded by internal sources. The sources of city revenue dedicated to housing are varied. Some spend money solely from annual tax collections; others borrow funds in the capital market. Dedicated sources of revenue have also become more commonplace in recent years. Cities such as San Francisco and Boston have created trust funds for housing with money provided by linkage fees on new development. Chicago and Houston use tax increment financing to pay for programs to rehabilitate housing in particular neighborhoods.
- Program creation. Cities, even those that do not fund housing assistance out of their own revenues, nonetheless often create housing programs to meet their own particular needs. The funding typically comes from flexible federal block grant programs such as HOME or the Community Development Block Grant. These programs might include grants and loans to community development corporations to build housing or

municipal provision of infrastructure improvements. Some cities, in partnership with their states, also use money from the TANF block grants to fund an array of housing programs (Wright et al. 2001).

- Program administration. Cities and other public authorities administer programs that are funded and created by higher levels of government. For example, the public housing program is typically administered by public housing authorities which are usually coterminous with cities and whose board members are often selected by the Mayor and/or City Council. All of the capital costs for building the housing and virtually all of the operating subsidies are paid for by HUD which also prescribes detailed rules and regulations to guide program operation.

The role of cities

Government intervention in providing housing assistance has been justified on a wide variety of grounds, some related to equity, some to efficiency. One reason that government might provide housing subsidies is to address inequities in the distribution of income that leave many families unable to afford adequate housing. Although not all housing subsidies seek to transfer income from higher to lower income households, this is probably the most frequent justification offered for rental housing programs.[2] As Tobin (1970) has noted, although Americans typically accept inequality in most aspects of life, there is a rough consensus that 'certain specific scarce commodities should be distributed

less unequally than the ability to pay for them.'

Yet earmarked subsidies and in-kind redistribution are generally inefficient, both because many households would not choose to spend each additional dollar of income on housing consumption (Polinsky and Ellwood 1979) and because administrative costs for housing programs can be extremely high. Certainly, if redistribution were the sole objective of housing policy, a more cost-effective approach would be lump-sum income transfers.

Nevertheless, while recipients may be best served by unrestricted cash transfers, taxpayers may prefer that their tax dollars be used to subsidize someone's shelter rather than other consumption. The knowledge that people are not living in desperately deteriorated and unhealthful accommodations may itself bring taxpayers positive utility and therefore serve as a consumption item for the donors rather than the recipients (Aaron 1972; Schill 1990; Olsen 2001). It is also possible that the interests of recipients are in fact better served as well. First, people who prefer other goods and services to a minimum level of shelter may lack sufficient information or be unable to assess rationally the true worth of decent housing, thereby justifying societal paternalism. Furthermore, efforts to provide a minimum level of housing consumption may be justified as necessary to protect children from irresponsible (or poorly informed) parents.

While these arguments help to justify some government intervention in housing markets on redistributive grounds, cities are generally not the appropriate governmental entity to fund redistribution efforts, in part, because they typically lack the fiscal capacity of other levels of government. Because of state constitutional limitations, cities typically

have fewer sources of revenue to call upon as compared to states and the federal government. In addition, cities are usually subject to debt limitations which, at least as compared to the federal government, further constrain their ability to raise revenue.

Perhaps most importantly, the mobility of both people and capital threatens to undermine any effort to redistribute income at the local level. This feature of our federal system has long been recognized and is well-documented in both the economic (Tiebout 1956) and political science (Peterson 1981) literature. Middle and higher income taxpayers as well as the owners of mobile capital will have a strong incentive to exit or not enter a municipality that raises taxes for programs that do not generate corresponding benefits. This will leave the city with fewer resources and make further redistribution infeasible. At the same time cities with generous redistributive programs may become a magnet for needy households from other locations, further intensifying the problem.

Thus, although there are many reasons that housing programs whose sole or primary purpose is redistribution might be better administered or even designed by local or regional governments (e.g., local governments can tailor programs to match the particular needs of their residents), there are strong reasons against these governmental entities funding these initiatives.

What about economic efficiency? Three main arguments are typically made to justify government housing assistance based upon economic efficiency objectives.[3] First, government intervention might be justified as a way to address adjustment lags in supply and demand. Because housing takes significant time to construct, there is generally a time lag between exogenous increases in demand and supply (Aaron 1972). In some

cities the problem is systemic and the result of regulatory barriers to entry, such as zoning, rent controls, and building codes (Salama, Schill and Stark 1999). Direct provision of housing by government may theoretically solve both the short-run and systemic barriers to supply problem since governmental bodies are frequently not subject to the same regulations as private market actors, but using government housing programs to solve problems caused by barriers to supply seems analogous to killing a fly with a shotgun. To the extent that the core problem is excessive regulation, a more direct solution would be the removal of regulatory barriers rather than programs to circumvent them.

Second, government intervention might also be warranted to address discrimination in the housing market.[4] Discriminatory treatment may increase search costs, drive up the cost of housing for its victims, and interfere with optimal residential location decisions. In principle, discrimination can be eliminated or, at least avoided, by direct provision of housing by government. Unfortunately, some of most blatant acts of discrimination by landlords in the United States have been those committed by government agencies and some of the most segregated housing developments in the nation are owned by public housing authorities (Hirsch 1983). Further, even if governments could be relied upon to operate in a non-discriminatory manner, it is unclear whether earmarked housing assistance would be the most effective method to ameliorate the effects of housing discrimination. Instead, more vigorous enforcement of the laws outlawing housing discrimination may be preferable (Schill and Friedman 1999).

We think the best efficiency-based argument for intervention rests on the presence

of externalities. Because housing is fixed in space, its condition influences the value of neighboring properties. The existence of a dilapidated structure, for instance, can reduce the value of neighboring homes and may lead to disinvestment in the neighborhood. Similarly, a high quality building might generate positive spillovers and increase values and confidence in the area. 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.

Another potential external benefit delivered by new housing in particular is the increase in population it typically invites. More people can improve neighborhood safety by increasing street traffic and providing labor for community watches. More residents can also fuel demand for retail services and promote economic development. Finally, some types of housing programs, especially those that promote homeownership, may increase neighborhood stability and provide residents who will have strong economic incentives to become active in neighborhood organizations and political affairs.

There are likely to be informational externalities too. Developers of housing, like most people, may be risk averse and prone to investing too little in some neighborhoods because of a concern that a project will fail to overcome local disamenities. Part of the problem relates to a lack of information about the neighborhood as well as the difficulty disparate actors encounter in coordinating their activities. If an entrepreneur could be assured that her investment, together with those of other developers and the city, would be spatially concentrated, this risk would be minimized. Government, through subsidies

and planning, may be able to promote the flow of information about particular communities, reduce the difficulties of coordination and thereby reduce risk (Caplin and Leahy 1998).

Despite their theoretical appeal, spillovers generated by government housing assistance programs have been difficult to document empirically. As Mills and Hamilton write, researchers 'have almost uniformly failed to find significant and consistent effects of neighboring activities on property values'(1994, p. 253). This has left many economists skeptical about this justification for earmarked housing assistance. Further, public investments in housing, even those carefully planned to eliminate negative externalities or promote positive spillovers in targeted communities, can have the opposite effect on other neighborhoods. The construction of new housing may promote filtering -- cities with high vacancy rates and relatively stable or declining populations may see demand for housing at the bottom weakening, as households move out of their existing units for newly vacated units of better quality, possibly leading to disinvestment, abandonment, and the generation of new negative externalities (Mills and Hamilton 1994).

But to the extent we believe government housing programs can in fact produce positive spillovers, cities would seem to have a comparative advantage. Certainly, there is strong justification for these programs being created and administered by local governments. It is highly doubtful that the federal government or, for that matter, even states or regional governments, would have the in-depth knowledge required to identify neighborhoods where targeted investments would promote neighborhood revitalization.

Indeed, the growth of community-based housing organizations was, in part, a reaction to the concern that even city governments were too distant from the streets of inner city communities.

Furthermore, for a neighborhood revitalization strategy to be successful, it should be part of a comprehensive effort that involves more than just housing. Targeted condemnations by municipal redevelopment authorities, code enforcement by housing inspectors, infrastructure and transportation improvements by the city and increased attention to crime prevention and education all need to be coordinated. Each of these functions is typically located within local governments. Still, the question remains as to whether local governments can finance neighborhood revitalization strategies without falling prey to the forces that constrain redistributive policies.

In summary, redistributive goals are likely to be best addressed at the federal level, and many of the market failures found in housing markets (i.e., discrimination; supply barriers) may be addressed through other means than direct provision. The strongest argument to justify local provision of housing subsidies, then, is the presence of externalities. Housing programs designed to promote neighborhood revitalization have the potential for creating spatial externalities - improving local economic conditions and generating wealth for city residents. The key question, then, is largely empirical - are these spatial externalities large enough to justify intervention? In Part 2 of this paper, we turn now to answering this question based upon the New York City experience, exploring whether the housing created through New York City's Ten Year Plan for Housing generated spillover effects on neighboring properties, and whether these spillovers were

of sufficient magnitude to justify the subsidies provided. First, however, it is important to review the existing literature and the evidence amassed to date.

Part 2: The spillover effects of local housing programs: evidence from New York City

Past literature

Prior studies provide inconclusive evidence about the nature of spillover effects generated by investments in affordable housing. Nourse (1963) and Rabiega, Lin and Robinson (1984), for instance, find that newly developed public housing can have modest, positive impacts on neighboring property values, while Lyons and Loveridge (1993), Goetz, Lam and Heitlinger (1996), and Lee, Culhane and Wachter (1999) find small negative effects, at least associated with certain types of federally-subsidized housing. Cummings, DiPasquale and Kahn (2000) study two place-based homeownership developments in Philadelphia and find little evidence of spillover effects of any kind. Equally troubling is that these studies share data limitations that make it difficult to pinpoint the direction of causality. Are subsidized sites systematically located in weak (strong) neighborhoods, or does subsidized housing lead to neighborhood decline (improvement)?

A few more recent studies have made strides to overcome this causality problem with variants of neighborhood fixed effects models. 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 little effect on the surrounding area.

Santiago, Galster and Tatian (2001) use a similar fixed effects model to study whether the Denver Housing Authority's scattered site public housing program influenced the sales prices of surrounding single-family homes. These authors test for both changes in price levels and trends after completion, and find that proximity to dispersed public housing units is, if anything, associated with an increase in the prices of single-family homes.[5] Ellen et al.(2001) and Schill et al. (2001) use a neighborhood fixed effects model to study the impacts of selected New York City housing programs, and they too find evidence of significant, positive spillover effects. In short, while there is little consensus about the spillover effects of subsidized housing investments, these recent works, which adopt more conservative methodologies, seem to emerge with more optimistic findings.

Notice that spillover benefits may well differ with the type of housing investment. Ownership housing may yield higher spillover benefits than rental housing. Similarly, multi-family housing may be destructive to communities, while single-family homes are beneficial. Finally, benefits may differ between rehabilitation and new construction programs. There is little empirical work addressing any of these questions. Indeed, most of the past work has examined the impact of a single program -- typically limited to federally-supported, new construction rental programs.[6] Two exceptions are noteworthy. Lee, Culhane and Wachter (1999) report that ownership projects are associated with

higher surrounding property values, but they cannot determine whether this is simply because they are sited in higher value neighborhoods. Schill et al. (2001) find no statistically significant difference between the impact of ownership and rental programs, but their study included newly created housing units as well as apartments and homes getting far more modest subsidies for renovation.

Finally, as for scale effects, there is some suggestive evidence that added units magnify effects (Lyons and Loveridge 1993; Santiago, Galster and Tatian 2001; Ellen et al. 2001; Schill et al. 2001), but more work needs to be done to understand the nature of these marginal effects.

Evidence on spillovers from New York City

In 1985, Mayor Edward I. Koch made a commitment of over $4 billion to build or rehabilitate more than 100,000 housing units over a period of five years. The initiative, commonly referred to as the "Ten Year Capital Plan," or the "Ten Year Plan" ultimately resulted in the expenditure of more than $5 billion and the construction or rehabilitation of over 182,000 units over a period of more than fifteen years, making it the largest municipally supported housing program in the history of the United States. The Ten Year Plan encompasses a wide variety of programs to stimulate the production and rehabilitation of housing (see Schill et al. 2001 for more detail). In this section, we focus on estimating the spillover effects of the 66,000 new units that have been produced through the program (either through new construction or the gut rehabilitation of vacant

buildings).

Because these units represent a diversity of housing types, we also explore whether impacts vary with the type of housing. In particular, we compare the effects of ownership and rental housing, multifamily and single-family housing, and finally, newly constructed units versus those that were created through the rehabilitation of formerly vacant and uninhabitable buildings (gut rehabilitation). Before turning to data and results, we describe the methodology used.

Methodology

At the heart of our empirical work is a hedonic regression model that explains the sales price of a property as a function of its structural characteristics (such as lot size and building age) and its neighborhood surroundings. We use this model to compare the prices of properties that are within 500 feet of Ten Year Plan sites to prices of comparable properties that are outside this 500-foot ring, but still located in the same census tract, or neighborhood. Then we estimate 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. This approach weeds out any systematic differences between the neighborhoods chosen for these city housing investments and other locations around the city, and allows us to disentangle the specific effects of the housing investments from the myriad other changes occurring across neighborhoods and properties in the city. At the end, we combine these estimates with information on costs

to gain some insight into the magnitude of the net benefit of these projects.

Note that caution should be exercised in interpreting the parameters of hedonic regression models as the effects of amenity changes. As discussed in Quigley (1979), 'it does not follow in general that estimates of changes in aggregate property values accurately reflect the market return to public policies that affect amenity levels,' even if all consumers are identical in their demands for housing characteristics (p. 402). In practice, changes in property values can be induced by a variety of forces, both inside and outside a particular neighborhood, consumers differ from one another, and the benefits of the housing investment may stretch beyond the neighborhood boundaries. Our difference-in-difference methodology controls for many of the confounding factors, using census tract-quarter fixed effects, and thus it is less likely that the estimates will reflect the influence of these other forces.

More formally, we estimate a regression model of the sales price of a property that can be expressed as follows:

$$\ln P_{ict} = \alpha + \beta X_{it} + \gamma Z_{it} + \sum \rho_{ct} I_{ct} + \varepsilon_{it}$$

where $\ln P_{ict}$ is the log of the sales price of property i in census tract c in quarter t, X_{it} is a vector of property-related characteristics, including age and structural characteristics, Z_{it} is a vector of locational attributes (specifically, local housing investment within 500 feet of the property), and I_{ct} are a series of dummy variables indicating the quarter and census tract of the sale. The coefficients to be estimated are α, β, γ and ρ, and ε is an error term. Notice that the ρ_{ct} will vary across census tracts and across time, which allows us to control for neighborhood conditions and local public services common to all properties

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Proximity to Ten Year Plan units: We include several different variables in our regression model to capture the impact of proximity and number of units created through the Ten Year Plan. We begin by including a variable (In Ring) that indicates whether the property sold would at any time be located within 500 feet of a unit created through the Ten Year Plan. (We used GIS techniques to measure the distance from each sale in our database to all Ten Year Plan and other housing sites and, from these distance measures, created a variable that identified properties within 500 feet of housing investments of different types.[7]) As discussed, these subsidized units may have been constructed in particularly distressed neighborhoods, and so we want to control for this baseline effect as fully as possible.

Several variables capture the impact of the actual completion of new Ten Year Plan units on property values in the 500-foot ring. Our 'Post Ring' dummy variables indicate if the sale is within 500 feet of some number of completed new units.[8] In addition, we include variables indicating the number of completed new units within 500 feet of the sale and the number of units squared. These terms allow us to measure the marginal effects of additional new subsidized units.

To capture any post-completion trend, we include Tpost, a continuous variable that indicates, for properties in the 500 foot ring, the number of years between the date of sale and the project completion date. For instance, the variable equals 1/365 if a sale is located within 500 feet of a new unit and occurs the day after its completion; it equals one if the sale occurs one year after the unit completion; it equals two if the sale occurs two years after completion, and so on. The Tpost coefficient will be positive if after

completion, prices in the rings continue to rise relative to prices in the census tract. We also interact Tpost with number of completed units in the ring at the time of sale, to test whether this time trend depends on project scale.

Proximity to other subsidized housing: We also include a set of variables that control for proximity to other subsidized housing, since it is possible that the location of these other types of units is correlated with that of the new Ten Year Plan units. These include pre-1987 city-sponsored projects, housing units sponsored by the federal government (such as Section 202 and Section 8 units), and occupied units that received other rehabilitation subsidies through the Ten Year Plan. In each case, we control for both selection effects and post-completion effects.

Extension of the model

As noted above, different types of projects may yield significantly different impacts. Thus, in a second model, we also include variables indicating the proportion of the completed units in the ring that are multifamily units (as opposed to 1-4 unit homes), the proportion that are rental (as compared to ownership), and the proportion that were created through new construction (rather than through the gut rehabilitation of vacant buildings).[9]

In the third and fourth models, we add a number of additional 'In Ring' variables to control more precisely for selection effects and therefore arrive at more precise impact estimates in turn. In particular, we allow the initial prices in the rings surrounding Ten

Year Plan sites to vary for homeownership and rental projects by including separate 'In Ring' variables for properties within 500 feet of new owner units (but no new rental units), properties within 500 feet of new rental units (but no new owner units), and properties that are within 500 feet of both new owner and new rental units. (Note these are mutually exclusive categories.) It may be, after all, that rental units were systematically sited in more distressed neighborhoods than ownership units. Since it also may be true that large projects were systematically sited in more distressed locations than smaller projects, the fourth model includes separate 'In Ring' variables for (1) properties within 500 feet of a site that ultimately received at least 100 units and (2) properties within 500 feet of a site that ultimately received less than 100 units.[10] Thus, in the fourth model, we end up with six mutually-exclusive 500-foot rings:

- rings with fewer than 100 units in ownership projects (and no rental projects)
- rings with at least 100 units in ownership projects (and no rental projects)
- rings with fewer than 100 units in rental projects (and no ownership projects)
- rings with at least 100 units in rental projects (and no ownership projects)
- rings with fewer than 100 units (mix of ownership and rental projects)
- rings with at least 100 units (mix of ownership and rental projects)

Comparing costs to benefits

Although a fully satisfying cost-benefit analysis is outside the scope of this paper, we have made some effort to compare the magnitude of the external benefits delivered by

these housing investments to their approximate costs. Specifically, we estimate the aggregate benefits that all new housing units built through the Ten Year Plan units generated within their immediately surrounding communities (again, measured as a 500-foot radius). Note that these do not provide a full accounting of the benefits derived from each new housing unit. As discussed above, the external benefits of the housing investments may not be fully capitalized into land values. Spillover benefits may also extend beyond 500-feet – in fact, our past work suggests that they do (Ellen et al. 2001). Benefits may also extend to nearby commercial properties, and residents of more distant neighborhoods may also receive "warm glow" benefits from the knowledge that there is better housing in New York City. Moreover, the actual occupants of these subsidized housing units clearly receive benefits from the housing investment. These are not counted here since we focus exclusively on external, rather than private, benefits.

To simulate the aggregate benefits for all Ten Year Plan housing developments, we first identify all the residential properties within 500 feet of Ten Year Plan housing units and then assign them to one of the six rings defined above. We then assign to each property a pre-completion price, that is, an average per unit price based on the ring type and the year of earliest project completion.[11]

We then use this pre-completion price, the number of units in each property, and our post-completion coefficients, to estimate the increase in value enjoyed by all the properties. The sum of all of these property benefits should amount to the total benefit that all the Ten Year Plan housing delivered to residential properties located within 500 feet of new units. Formally, the total benefit is computed using the formula:

$$Benefit = \sum_{i=1}^{N} u_i \overline{P}_i \left[\exp\left(\hat{\gamma}\mathbf{Z}'\right) - 1\right]$$

where i indexes properties, N is the total number of properties in 500-foot rings, u_i is the number of units for property i, $\overline{P}_i$ is the pre-completion price assigned to property i, Z' is the vector of post-completion variables, and γ' is the vector of their corresponding coefficient estimates.

Summary of data

To undertake the analysis outlined above, we have linked three geocoded data sources. First, we obtained data on all of the new housing created through the Ten Year Plan from HPD.[12] For each housing project, this data set indicates the geographic location, the year the project was completed, the type of building structure, the number of units that were built or rehabilitated, if units were newly constructed or created from the gut rehabilitation of vacant buildings, and if units are rental or owner-occupied. In addition, HPD staff also provided us with approximate city and state costs for each type of HPD project. Finally, HPD provided us with data on federal housing built or rehabilitated in New York City during the 1980s and 1990s and on other city-subsidized housing projects, completed prior to 1987.

We supplemented our data on housing investments with data from two other city sources. First, through an arrangement with the New York City Department of Finance, we obtained a confidential database that contains sales transaction prices for all apartment

buildings, condominium apartments and single-family homes over the period 1980-1999.[13] In order to insure that we did not include the sales of Ten Year Plan developments themselves, we attempted to exclude any sales that could potentially be part of a development. Unfortunately, the RPAD and homes sales data do not identify whether a particular property received city subsidies, so we excluded any sale that occurred on the same block as a Ten Year Plan development if the sale was of a building that was constructed after the Ten Year Plan units had been completed.[14] Our final sample includes 293 803 property sales, spread across 1612 census tracts.[15] Because of the long time span of the data, and New York City's size, this is a large sample size compared with much of the literature.

Second, data on building characteristics were obtained from an administrative data set gathered for the purpose of assessing property taxes (the RPAD file). Unfortunately, the RPAD data contains little information about the characteristics of individual units in apartment buildings (except in the case of condominiums). Nonetheless, these building characteristics explain variations in prices surprisingly well, suggesting the data are rich enough for estimating hedonic price equations.[16]

Table 1 shows summary statistics from the RPAD data. The first column shows the characteristics of our full sample of property sales; the second column shows the characteristics of sales that at some point would be located within 500 feet of a new unit created through the Ten Year Plan. As shown, most sales 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. Nearly two thirds of all

buildings sold were either one- or two-family homes, and 81 per cent were single-family homes, two-family homes, or small apartments. Almost a third of the transacting properties had garages and more than three quarters were built before the Second World War. Only a handful of buildings were vandalized or otherwise abandoned. Finally, 14 per cent of the properties would at some point be located within 500 feet of a new Ten Year Plan unit. Finally, 5 per cent of the properties are within 500 feet of a completed Ten Year Plan unit.

---------- Insert Table 1 here ----------

The second column of Table 1 reveals some systematic differences between properties located close to Ten Year Plan sites and those that are not. Properties located within the 500 foot ring are far more likely to be in Brooklyn and far less likely to be in Staten Island and Queens. Properties in the 500-foot ring are also much older, much less likely to be single-family homes, more likely to be walk-up apartments, and consistent with these differences, much less likely to have garages.

Table 2 shows gives a sense of the type of subsidized housing built in these rings. Using the mutually exclusive categories described above, the table shows that these properties are fairly evenly distributed among rings with new owner units (but no new rental units), new rental units (but no new owner units), and both new owner and new rental units. In terms of size, most of the properties within 500 feet of a Ten Year Plan site are located in rings where fewer than 100 units will ultimately be built.

---------- Insert Table 2 here ----------

Regression results

Table 3 shows the key coefficients and their standard errors for the ring variables for the basic model in column 1. Column 2 shows the model in which we control for the mix of units in the ring – the proportion that are multifamily units (as opposed to 1-4 unit homes), the proportion that are rental (as compared to ownership), and the proportion that were created through new construction (rather than through the rehabilitation of vacant buildings). In this way, we allow the impacts to vary depending on the mix of housing created in a particular ring. The coefficients on the structural variables are not shown here, but as in Ellen et al. (2001), they have the expected signs, which, combined with relatively high R^2s (of roughly 0.87), suggest that these variables provide adequate controls for the characteristics of the houses sold.[17]

---------- Insert Table 3 here ----------

The first point to make here is that the In Ring coefficient is negative and statistically significant. Specifically, the coefficient indicates that before completion of a project, the properties located within 500 feet of a Ten Year Plan site sold for roughly 7.5 per cent less than comparable properties located in the same census tract, but beyond 500 feet of an investment site. In other words, our estimates imply that the HPD investments tended to be made in the most distressed locations within already distressed census tracts.

In terms of project impacts, the coefficient on Postring in column 1 is statistically insignificant, indicating that on average, the Ten Year Plan units do not appear to have generated significant external benefits. But as we see in column 2, when we control for

project mix, we find a positive impact, suggesting that certain types of projects do generate significant positive benefits on surrounding properties.

Consider the three "share" variables in model two. These variables indicate the mix of completed, city-subsidized units within 500 feet of a property sale. The coefficient on the share of units that are rental is negative and statistically significant, indicating that rental projects have significantly smaller effects than ownership projects. The coefficients on the variables showing the share of units that are in multifamily structures (as compared to 1-4 unit buildings) and the share of units that were built through new construction (as opposed to gut rehabilitation) are not statistically significant. In other words, after controlling for tenure, there is no apparent difference between the spillover impacts of units in multifamily structures vs. 1-4 unit structures and between new construction and rehabilitation projects.

Recall that the model also includes Tpost variables (post completion time trends) to test whether these impacts change over time. While the coefficient on Tpost is insignificant, indicating that the effects are sustained over time, the coefficient on Tpost interacted with the number of units is negative and marginally significant, providing modest evidence that the impacts of large projects do erode somewhat over time.

Model extensions

Although the results in model 2 suggest that ownership units generate greater spillover effects, this may be the artifact of selection. It may be that is, that owner-occupied are

located in less distressed neighborhoods to begin with. To identify the differential impacts of ownership and rental units, we therefore include three mutually exclusive 'In Ring' variables -- one indicating properties within 500 feet of new owner units (but no new rental units), one showing properties within 500 feet of new rental units (but no new owner units), and another showing properties that are within 500 feet of both new owner and new rental units. The results are shown in the first column of Table 4 (model 3).

---------- Insert Table 4 here ----------

The 'In Ring' coefficients suggest that the ownership projects were built in somewhat less distressed neighborhoods. In fact, after controlling for this difference in initial conditions, the coefficient on the share of rental units falls in magnitude and is no longer statistically significant. While the value of properties surrounding completed homeownership projects are higher, this appears to be because homeownership projects are sited in areas with higher property values to begin with. When including these separate in-ring variables, the estimated impact falls slightly. The post-ring coefficient falls from 0.038 to 0.030, suggesting that the initial gap between prices in the ring and in the larger census tract falls by 3.0 percentage points after completion.

It may also be true that large projects were systematically sited in more distressed locations than smaller projects, which could bias our estimates of marginal impacts. Thus Model 4 includes separate 'In Ring' variables for small and large projects within each of our three ring-types. The coefficients on the 'In-Ring' variables show that larger projects were indeed located in microneighborhoods that were relatively more distressed, especially in rings where only rental housing was constructed. When controlling for these

selection effects, the magnitude of the coefficient on the number of new units in the ring almost doubles, and that of the coefficient on the number of new units squared increases by 50 per cent. Using these coefficient estimates, the marginal impact of the 10^{th} city-subsidized unit increases significantly to 0.0631 percentage points (i.e., $100[(6.5x10^{-4}) +2(-9.3x10^{-7})10]$), and that of the 100^{th} unit grows to 0.0464 percentage points (i.e., $100[(6.5x10^{-4}) +2(-9.3x10^{-7})100]$). We believe that this final model provides the most precise estimates of impacts. Therefore, in estimating total program benefits, we use these parameters.

Note that the fixed component of the effect (the portion of the impact that is independent of the number of completed units) is far larger than the marginal effect of additional units. (As noted above, the "fixed" component of the effect is estimated to be 3.0 percentage points.) One interpretation of this relatively large effect is that one new housing unit is all it takes to eliminate much of the negative impact of an eyesore (whether blighted properties or land).

A preliminary investigation of the costs and benefits housing investments

As noted above, we do not include a wide array of benefits associated with the programs - most notably the benefits delivered to actual residents who are able to move into the new subsidized housing. On the cost side, we use high cost estimates in order to be conservative, but we do not include the value of federal rent subsidies that some residents receive, nor do we include the foregone revenues to the city as a result of tax abatements

and exemptions that all new and rehabilitated properties receive. In addition, for some of the rental properties, the value of low income housing tax credits is omitted.

In Table 5, we present the aggregate costs of all housing units built through the Ten Year Plan and compare them to the estimated benefits these units have delivered to their immediately surrounding communities (500-foot rings). In the first two columns, we assume that none of the loans provided by the city are paid back. (Virtually all the subsidies provided by the city were in the form of long-term loans.) In the second set of columns, we assume a 30 per cent repayment rate. Looking at the first row, we see that even if we assume no repayment, the benefits generated in the 500-foot ring actually exceeded the city's investment. We think this is quite remarkable, given that we are only counting the external benefits generated within 500 feet of a project and we've ignored the value of any private benefit enjoyed by the residents of the new city housing.

---------- Insert Table 5 here ----------

Note that when we consider total government subsidies (and include state and federal dollars too), the benefits generated in the 500-foot ring do not fully exceed costs. If we assume a 30 per cent repayment ratio, however, these benefits exactly match the costs. Looking at the bottom two rows, the table seems to suggest that homeownership programs are a better bargain for the city. This is not because their spillover effects are larger (recall regression results above). It is because the subsidies delivered to them are thinner -- occupants of ownership housing, given their higher incomes, are able to shoulder a larger share of actual housing cost.

While we think these estimates are striking, it is worth stressing again that they are only meant to be suggestive. Clearly, the results of the cost-benefit calculation are sensitive to the many assumptions we have made in estimating the costs and benefits.

Conclusion

In this paper we have sought to shed light on the appropriate role of cities in providing housing assistance to their residents. Our analysis of the existing theory and evidence suggests that although cities should assume an important role in administering housing subsidy programs, they should only fund them under a limited set of circumstances. Redistribution of income, an important goal of most housing subsidy programs, is likely to be best addressed at the federal, rather than local level. Also, many of the market failures present in housing markets may be better addressed by initiatives to remove the causes of the failures rather than by spending programs. Cities can, however, use housing assistance programs to promote neighborhood revitalization objectives by removing negative externalities and generating positive spillovers.

Our empirical investigation of the new construction and gut rehabilitation programs of New York City's Ten Year Plan suggest that housing programs can indeed generate positive spillover effects. We estimate that these programs were associated with higher sales prices of housing in surrounding blocks. But the existence of statistically significant, positive impacts on sales prices does not necessarily mean that the benefits generated by the development initiatives exceed their substantial costs to the city. Our

preliminary analysis which compares one set of benefits (the external benefits delivered to the 500-foot ring) to one set of costs (the subsidies provided) suggests that the benefit/cost calculus for the city might well be positive. When state and federal subsidies are netted out of the cost estimates, these benefits exceed the costs by a substantial amount, especially for the homeownership programs. Thus, using city revenues to fund housing programs such as those created in the Ten Year Plan is particularly attractive when non-city sources of financing are available. Since New York City used state and federal funds to build some of the Ten Year Plan units, the positive external benefits seem large compared to the city's own investment.

In the absence of an external source of subsidy, would a city such as New York wisely spend its own funds to finance housing development? In future research we will expand upon the rudimentary benefit/cost analysis we have presented here. Specifically, we will seek to derive estimates concerning the imputed value of the housing to residents, the effects of the housing on property values beyond 500 feet and the tax expenditures of the city and federal governments.

Endnotes

[1] Our focus in this paper is on housing assistance or subsidy programs. Cities also regulate housing markets in a number of ways including zoning ordinances, building and housing codes and rent regulation. Although these functions are vital and affect the supply of housing in many ways (Salama, Schill and Stark 1999), they are not the focus of this paper.

[2] Typically, the beneficiaries of housing assistance programs must earn incomes that are less than 80 per cent of the metropolitan area median, and in practice beneficiaries have incomes that are considerably lower. The key exceptions are several provisions of the Internal Revenue Code such as the deduction for home mortgage loan interest, the deduction for property taxes, and the favorable treatment of capital gains on the sale of a home can be thought of as subsidies for homeowners.

[3] Two other arguments are sometimes made as well. First, subsidized housing production programs have been touted as a way to increase output and provide economic stimulus. While the evidence on this is limited, many doubt that housing subsidy programs are a very effective countercyclical policy tool (Sinai and Waldfogel 2001; Weicher 1979). In any event, macroeconomic fiscal policy-making is a role that few would consider cities capable of playing. Anoter argument made by some economists is that the market for rental housing may be monopolistically competitive. As Peter Arnott has pointed out, housing is highly heterogeneous, which he argues makes the market quite thin. This differentiated product, combined with asymmetric information and high search costs may mean that landlords have market power that they can exploit (Arnott 1995). To the extent that such monopoly power exists, it might justify public action. However, most economists view the housing market as generally competitive, with many providers (Heilbrun 1987).

[4] Recent evidence suggests that black and Latino home-seekers encounter unfavorable treatment approximately half of the time they transact in the housing market (Ondrich et al. 1999) Clearly, discrimination is troubling from an equity perspective as well, and efforts to combat discrimination have likely been motivated more by concerns about social justice than about economic costs.

[5] This method is first presented in Galster, Tatian and Smith (1999).

[6] Lyons and Loveridge (1993) and Goetz, Lam and Heitlinger (1996) examine the differential effects of a variety of federal programs, but they limit study to federal, new construction rental projects.

[7] Since all buildings in New York City have been geocoded by the New York City Department of City Planning we used a "cross-walk" (the "Geosupport File") which associates each tax lot with an x,y coordinate (i.e. latitude, longitude using the US State Plane 1927 projection), police precinct, community district and census tract. A tax lot is usually a building and is an identifier available to the homes sales and RPAD data. We are able to assign x,y coordinates and other geographic variables to over 98 per cent of the sales using this method. For most of the HPD units, we had both tax block and tax lot. If the tax lost was unavailable, then we collapsed the Geosupport file to the tax block level (i.e. calculating the center of each block) in order to assign x.y coordinates. We were unable to assign an x,y coordinate to 6 per cent of the HPD units, largely due to missing block information.

[8] In cases where a sale was within 500 feet of more than one unit, we use the completion date of the first completed.

[9] Note that homeownership units are defined in this paper as units within an owner-occupied building. Some of these units are in fact rental apartments in small, owner-occupied properties.

[10] The 100 unit cut-off point defining small vs. large projects is chosen so that no more than 35 per cent of the sales for a given ring type occur within 500 foot of projects larger than the threshold.

[11] To arrive at pre-completion prices, we estimated six simple regressions, one for each ring type. In each case, we regressed ln(price per unit) on a set of year dummies. The coefficients on the year dummies give the (unconditional) mean price (in logs) in a given year for the given ring type.

[12] For the purposes of this paper, units created under the Ten Year Plan are defined to include only those projects that were completed between January 1987 and June 2000.

[13] Because sales of cooperative apartments are not considered to be sales of real property, they are not included in the data set. 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 biases our results (see Pollakowski 1997.)

[14] To provide a margin of error with respect to the construction dates in RPAD, we also excluded sales of buildings on the same block as a Ten Year Plan unit that were built up to two years before the Ten Year Plan units.

[15] We limited the analysis to properties that are located within the 48 community districts (of the total 58) where there were more than 100 Ten Year Plan units developed that were either (1) rehabilitation of occupied, *in rem* buildings, (2) rehabilitation of vacant buildings, or (3) new construction.

[16] See Ellen et al. (2001) for more detail on the data and parameter estimates on the building characteristics in a similar model.

[17] The coefficients on control variables included in the models but not shown in Table 3 are available upon request from the authors.

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Table 1
Characteristics of Properties Sold

	Percentage of all property sales	Percentage of sales within 500 feet of Ten Year Plan new housing site
Borough		
Manhattan	14.6	17.3
Bronx	13.1	14.2
Brooklyn	29.6	51.7
Queens	31.0	14.3
Staten Island	11.8	2.4
Any borough	100.0	100.0
Building Class		
Single-family detached	25.0	10.8
Single-family attached	11.1	5.8
Two-family	27.6	29.8
Walk-up apartments	17.5	36.4
Elevator apartments	1.2	2.2
Loft buildings	0.1	0.1
Condominiums	14.4	9.2
Mixed-use, multifamily (includes store or office plus residential units)	3.1	5.8
Any building type	100.0	100.0
Other Structural Characteristics		
Built pre-World War II	77.0	94.5
Vandalized	0.0	0.2
Other abandoned	0.1	0.4
Garage	31.1	12.8
Corner location	7.1	7.7
Major alteration prior to sale	3.3	7.0
N	293,803	40,659

Note : Universe=all sales in community districts where at least 100 Ten Year Plan units were built or rehabilated (including units in renovated city-owned, occupied buildings).

Table 2
Number of Properties Sold, by Ring

	N	Percentage of all property sales
All property sales	293,803	100.0
Sales within 500 feet of:		
Any Ten Year Plan new housing site	40,659	13.8
Homeownership only site	15,614	5.3
Small homeownership site	14,816	5.0
Large homeownership site	798	0.3
Rental only site	13,893	4.7
Small rental site	12,214	4.2
Large rental site	1,679	0.6
Homeownership and rental site	11,152	3.8
Small homeownership and rental site	7,160	2.4
Large homeownership and rental site	3,992	1.4
Any completed Ten Year Plan new housing project	14,344	4.9

Note : Universe=all sales in community districts where at least 100 Ten Year Plan units were built or rehabilated (including units in renovated city-owned, occupied buildings).

Table 3
Selected Coefficients from Regression Results for Models 1 and 2
Dependent Variable=Log of Price Per Unit

	Model 1	Model 2
In Ring, New Units	-0.0752 ***	-0.0753 ***
	(0.0045)	(0.0045)
Post Ring, New Units	0.0162	0.0364 ***
	(0.0108)	(0.0125)
Number of New Units at the Time of Sale	1.7×10^{-4}	3.9×10^{-4} *
	(2.0×10^{-4})	(2.2×10^{-4})
(Number of New Units at the Time of Sale)^2	-3.4×10^{-7}	-6.4×10^{-7} *
	(3.4×10^{-7})	(3.5×10^{-7})
Share of Multi-Family New Units at the Time of Sale		-0.0013
		(0.0203)
Share of Rental New Units at the Time of Sale		-0.0439 **
		(0.0199)
Share of New Construction Units at the Time of Sale		-0.0144
		(0.0143)
Tpost, New Units	4.3×10^{-4}	0.0009
	(0.0020)	(0.0020)
Tpost*(Number of New Units at the Time of Sale)	-3.5×10^{-5}	-4.3×10^{-5} *
	(2.9×10^{-5})	(2.9×10^{-5})
Adjusted R^2	0.8712	0.8712
N	293,803	293,803

Note: Both regressions include a set of variables that control for proximity to other subsidized housing: In Ring, Rehab Occupied Units Only; Post Ring, Rehab Occupied Units; Number of Rehab Occupied Units at the Time of Sale; In Ring, Federal and Pre-1987 City Units; Post Ring, Federal and Pre-1987 City Units; and Number of Federal and Pre-1987 City Units at the Time of Sale. Both regressions include the following variables capturing characteristics of the property sold: building age and its square, log square feet per unit, the number of buildings on a lot, dummies for the presence of commercial units, extension, major alteration prior to sale, location on a block corner, vandalized buildings, other abandoned buildings, and odd shape, and a set of 18 building classification dummies ("single-family detached", "two-family home", "three-family home", "four-family home", "five/six-family home", "more than six families, no elevator", "walkup, units not specified", "elevator apartment building, cooperatives", "elevator apartment building, not cooperatives", "loft building", "condominium, single-family attached", "condominium, walk-up apartments", "condominium, elevator building", "condominium, miscellaneous", "multi-use, single family with store", "multi-use, two-family with store", "multi-use, three-family with store", and "multi-use, four or more families with store"). Unless otherwise mentioned, the ring variables are based on Ten Year Plan units. Both regressions include census tract - quarter fixed effects. Standard errors in parentheses.

*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 4
Selected Coefficients from Regression Results for Models 3 and 4
Dependent Variable=Log of Price Per Unit

	Model 3	Model 4
In Ring, New Units, Owner but not Renter	-0.0677 ***	
	(0.0053)	
In Ring, New Units, Owner but not Renter, 1-100 units		-0.0677 ***
		(0.0053)
In Ring, New Units, Owner but not Renter, 101+ units		-0.0836 ***
		(0.0219)
In Ring, New Units, Renter but not Owner	-0.0843 ***	
	(0.0063)	
In Ring, New Units, Renter but not Owner, 1-100 units		-0.0791 ***
		(0.0064)
In Ring, New Units, Renter but not Owner, 101+ units		-0.1701 ***
		(0.0165)
In Ring, New Units, Owner and Renter	-0.1015 ***	
	(0.0080)	
In Ring, New Units, Owner and Renter, 1-100 units		-0.1015 ***
		(0.0084)
In Ring, New Units, Owner and Renter, 101+ units		-0.1267 ***
		(0.0132)
Post Ring, New Units	0.0299 **	0.0299 **
	(0.0128)	(0.0128)
Number of New Units at the Time of Sale	3.9×10^{-4} *	6.5×10^{-4} ***
	(2.2×10^{-4})	(2.2×10^{-4})
(Number of New Units at the Time of Sale)^2	-6.4×10^{-7} *	-9.3×10^{-7} ***
	(3.5×10^{-7})	(3.6×10^{-7})
Share of Multi-Family New Units at the Time of Sale	-0.0014	-0.0058
	(0.0203)	(0.0204)
Share of Rental New Units at the Time of Sale	-0.0275	-0.0306
	(0.0208)	(0.0209)
Share of New Construction Units at the Time of Sale	-0.0133	-0.0201
	(0.0143)	(0.0144)
Tpost, New Units	0.0011	8.8×10^{-4}
	(0.0020)	(0.0020)
Tpost*(Number of New Units at the Time of Sale)	-4.0×10^{-5}	-3.9×10^{-5}
	(2.9×10^{-5})	(2.9×10^{-5})
Adjusted R^2	0.8712	0.8712
N	293,803	293,803

Note: Both regressions include a set of variables that control for proximity to other subsidized housing: In Ring, Rehab Occupied Units Only; Post Ring, Rehab Occupied Units; Number of Rehab Occupied Units at the Time of Sale; In Ring, Federal and Pre-1987 City Units; Post Ring, Federal and Pre-1987 City Units;

and Number of Federal and Pre-1987 City Units at the Time of Sale. Both regressions include the following variables capturing characteristics of the property sold: building age and its square, log square feet per unit, the number of buildings on a lot, dummies for the presence of commercial units, extension, major alteration prior to sale, location on a block corner, vandalized buildings, other abandoned buildings, and odd shape, and a set of 18 building classification dummies ("single-family detached", "two-family home", "three-family home", "four-family home", "five/six-family home", "more than six families, no elevator", "walkup, units not specified", "elevator apartment building, cooperatives", "elevator apartment building, not cooperatives", "loft building", "condominium, single-family attached", "condominium, walk-up apartments", "condominium, elevator building", "condominium, miscellaneous", "multi-use, single family with store", "multi-use, two-family with store", "multi-use, three-family with store", and "multi-use, four or more families with store"). Unless otherwise mentioned, the ring variables are based on Ten Year Plan units. Both regressions include census tract - quarter fixed effects. Standard errors in parentheses.
*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 5
Estimated Ratio of Benefits Generated in 500-foot Ring to Costs of Subsidies

	No loan repayment		30% loan repayment	
Project type	**City Subsidy Only**	**Total Subsidy**	**City Subsidy Only**	**Total Subsidy**
All housing units	1.11	0.72	1.59	1.02
Homeownership	2.67	1.38	3.81	1.97
Rental	0.93	0.62	1.32	0.88