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Abstract

Public housing has long been a contentious issue for cities and regions. While there is a great need for affordable housing in many communities, neighbors of low-income housing developments fret about neighborhood decay. This paper evaluates the notion that low-income housing developments damage the communities in which they are placed. The focus is on the evaluation of low-income housing tax credit (LIHTC) financed developments, and the neighborhood indicator of interest is the physical condition of nearby properties. The results of the empirical analysis suggest that proximity to LIHTC developments generally has a positive impact on neighborhood property conditions. However, extended analysis that separates LIHTC developments by type and size suggests that only small new construction developments and large rehab developments impact neighborhood property conditions. Further analysis reveals that when the model does not control for crime, the effect of proximity to LIHTC developments on property conditions is negative.

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Low-Income Housing Tax Credit Developments and Neighborhood Property Conditions

Public housing has long been a contentious issue for cities and regions. On one hand, there is an acute need for affordable housing for low- and moderate-income community members. But the massing of public or otherwise subsidized housing in disadvantaged neighborhoods has given rise to concerns that "public housing" has led to decay of these communities. The intention of this paper is to use analytical tools to evaluate the "conventional wisdom" that lower-income housing developments are somehow disadvantageous for the lower-income communities in which they generally are placed. Specifically, the analysis examines the impact of proximity to low-income housing tax credit (LIHTC) developments on the physical condition of nearby properties.

The results of the empirical analysis suggest that proximity to LIHTC developments generally has a positive impact on neighborhood property conditions. However, extended analysis that separates LIHTC developments by type and size suggests that only small new construction developments and large rehab developments impact neighborhood property conditions. Further analysis reveals that when the model does not control for crime, the effect of proximity to LIHTC developments on property conditions is negative.

The analysis is novel in several ways. First, virtually all of the existing literature that investigates the neighborhood effects of LIHTC developments, or assisted housing in general, examines nearby property values. Property values provide a very good summary measure of overall neighborhood impact, but do not provide much insight into the specific ways in which proximity to low-income housing might affect neighborhoods. For example, differences in property values may reflect impacts on crime rates, traffic congestion, physical condition of properties, school quality, or a host of other factors. There is a very limited literature on the affect of assisted housing on these factors (discussed below), but only one known to the author on the physical condition of properties.

In a study of about 13,000 properties in Phoenix, AZ, Guhathakurta and Mushikatel (2002) find that housing quality tends to decrease near Section 8 housing voucher residents except when the property was rented by a female head of household, in which case there were improvements in the physical condition of nearby housing. A critical difference between my analysis and the Guhathakurta and Mushikatel study is the type of program that is evaluated. I evaluate proximity to publicly subsidized housing *developments*, specifically those financed by low-income housing tax credits, rather than proximity to units built without public assistance (but occupied by rent-subsidized residents). Although Section 8 housing voucher recipients have been shown to cluster (Wang and Varady, 2005), LIHTC-financed developments, which are often occupied by Section 8 voucher recipients themselves, by definition concentrate low-income residents, at least within the development. In general most of the literature shows little effect on neighborhood quality from Section 8 voucher residents, and focus groups suggest that in some cases, unsubsidized neighbors do not realize they are there (Santiago et al., 2001). For this reason, a study of assisted housing developments is thought to be more likely to generate a significant impact.

A tangentially related study by Van Ryzin and Genn (1999) showed a significant decrease in the number of buildings boarded-up following a ten-year housing program in New York City begun in the 1980s, but an increase in the number of maintenance deficiencies. Their study exploited administrative data from the New York City Department of Housing Preservation and Development rather than a detailed survey of the physical condition of all properties.

Another contribution of this study is to examine differences in the neighborhood effects of publicly assisted housing by type and size of the development. In a study of St. Paul, MN, Lyons and Loveridge (1993) find that Section 8 site-based housing reduced the assessed values of nearby residential properties, but the presence of Section 8 voucher-holding tenants did not. Although a substantial literature relating proximity to assisted housing and neighborhood quality exists, few, if any, other studies examine differences in results between scattered site and

concentrated publicly assisted housing units (Galster, 2002). The presence of LIHTC developments in a wide variety of sizes in my study area allows me to do just that.

The paper proceeds as follows. Section 1 outlines the conceptual underpinnings of the analysis. Section 2 provides a brief overview of the LIHTC program, which has been the standard method of financing low-income housing since the mid-1980s. Section 3 discusses the data and methodology, followed by results in Section 4. Conclusions and policy implications are provided in Section 5.

1. Conceptual Framework

Galster (1981) develops a model where consumers maximize utility over two goods: housing and a composite of all other goods. The housing good (*H*) is a function of three attributes, the level of housing services provided (*HS*), the locational/physical attributes of the neighborhood (*HN*), and the level of "socio-psychological attachment" to the neighbors and neighborhood (*HA*). *HS* embodies the physical characteristics of the property, including both the structure and the parcel. The data I utilize on physical conditions of properties reflects *HS*. *HN* includes aspects of the neighborhood in which the property exists, including socioeconomic composition, racial composition, accessibility, environment, and so on. Finally, *HA* reflects such factors as the homeowner's identification with neighbors and the neighborhood and pride in the neighborhood.

The conceptual framework that underpins the relationship between proximity to LIHTC developments and the physical condition of neighboring properties hinges largely on the response of *HS* to changes in *HA* and *HN*. The homeowner has direct control only over HS and faces two possible strategies. The first is to make no effort to maintain or improve the condition of his property. In this case, *HS* will gradually deteriorate over time. The second option is to make a maintenance effort, which involves sacrificing non-housing consumption in favor of

additional expenditure on housing (such as painting, repairing, etc.). This effort can work to maintain the existing level of *HS* or increase the level of *HS*.[1]

Previous work by Dildine and Massey (1974) suggests that deteriorating neighborhood conditions (a decline in *HN*) would result in less expenditure on maintenance and a resulting decline in *HS*. They derive a maintenance rule that equates current marginal costs to the present value of all future rents derived from a marginal unit of maintenance input. Anything that diminishes future rents would reduce maintenance expenditure, all else equal. In contrast, Galster suggests that declining neighborhood quality should lead to *increased* maintenance/improvement expenditures for the non-elderly (for whom the opposite likely would be true). The increase in *HS* would represent an effort to compensate for the decline in *HN*. On the other hand, Galster asserts that neighborhoods experiencing "rapid population turnover, increased heterogeneity, or other factors which may erode homeowner's attachment to the neighborhood," or a decline in *HA*, should reveal lower maintenance/improvement expenditures (44).

The natural follow-up question is whether we should expect increases or decreases in *HA* and/or *HN* with the location of nearby LIHTC developments. Conceptually, either could be the case.

Most studies of this issue do find such a relationship. Van Zandt and Mhatre (2009) suggest that a commonly observed coincidence of housing voucher recipients and crime is more probably due to a lack of units that accept vouchers in areas with low crime than a proclivity on the part of those receiving housing vouchers to commit crime. But an analysis of data in Louisville, KY by Suresh and Vito (2009) suggests that low-income and Section 8 housing provide "an environment where homicides are likely to occur" (411). In another study in the same community, the authors find a higher incidence of assaults in low-income public housing (2007). Galster et al. (2002) find that a higher incidence of crime was associated with the

[1] Unlikely is an effort by the homeowner to physically reduce HS, for example, by removing a porch. Galster considers this case, however, in his analysis.

development of large (> 53 units) assisted housing developments in Denver, but not for smaller developments. The authors conclude that the crime impact occurs not because of a significant criminal element within the subsidized housing, but because the larger-scale housing provides a "pool of potential victims" and/or makes it "difficult for the neighborhood to maintain collective efficacy" (311).

Another potential negative impact of proximity to subsidized housing is a deleterious effect on schools. There is surprisingly little research on this issue. Students living in subsidized housing have been shown to perform less ably on standardized tests than other students, even within the same school (Schwartz et al., 2010; see also Duke-Lucio et al., 2010). Moreover, peer performance has been shown to influence students' performance (Epple and Romano, 1998). The possibility exists, then, that poor performance of subsidized housing residents could generate diminished performance on the part of existing students. Nevertheless, the limited literature to date does not support that view. In a study of LIHTC developments in Dallas, Texas, Di and Murdoch (2010) find no relationship with school performance.

Other potential negative (from some owners' perspectives) neighborhood impacts of proximity to subsidized housing have also permeated the conventional wisdom – specifically, racial and income transition. Nevertheless, in reviewing the literature, Freeman and Botein (2002) find that the development of subsidized housing generally does not lead to neighborhood racial transition. Although existing studies generally have found a relationship between the development of subsidized housing and poverty concentration (Freeman and Botein, 2002), the more methodologically sound and generalizable study by Freeman (2003) finds no such relationship.

Finally, yet another factor is the "putative character defects" of tenants in public housing (Freeman and Botein, 2002, 362). If these character defects are in some way more severe than those of residents in the neighborhood more generally, the effect would be to diminish neighborhood quality. Such a result would not require public housing tenants to have character defects, but merely for that to be the perception of them. A similar thought process could be

applied to the maintenance of property. The perception of character defects on the part of tenants may lower the status of the neighborhood, and hence the pride in which people view their neighborhoods. Ellen *et al*. (2007) provide some indirect support for this view. They find that assisted housing for seniors had a more positive initial effect on nearby property values than did assisted housing for low-income people, while the most negative effects on nearby property values were associated with the lowest income residents.[2]

Subsidized housing may also change the status of and attachment to the neighborhood. Freeman and Botein (2002) note that "one's home, including its neighborhood characteristics, is a key marker of social status in America" (361). They further note that such status relies in large part on exclusivity. The presence of assisted housing is perceived by many to diminish the exclusivity and status of a neighborhood (Schively, 2007). By its nature, assisted housing allows residents into the neighborhood who otherwise would not be able to afford it. Moreover, affordable housing is perceived by many to house largely poor, minority people who are thought to be more prone to crime (Tighe, 2010). Residents near assisted housing may in some sense care less about their property knowing it commands less status than otherwise.

Conceptually, LIHTC developments may also generate benefits to the neighborhood, increasing *HN* and *HA*. Baum-Snow and Marion (2009) note that to the extent they replace vacant buildings or unsightly empty lots, they may represent amenity improvements. Santiago *et al*. (2001) find a positive effect of scattered-site subsidized housing on property values in Denver, which they attribute to "the replacement of a negative externality generator with a positive externality generator" (83). Specifically, they note a typical acquisition of vacant, small-scale properties and subsequent rehabilitation, as well as "consistently good management, tenant monitoring, and property upkeep" (83). Ezzet-Lofstrom and Murdoch (2006) find a small, positive significant effect on the price of single family homes near LIHTC developments in Dallas, Texas. They also note that acquisition and rehabilitation of existing housing likely

[2] Nevertheless, they did find a positive impact on nearby property values of proximity to LIHTC developments specifically.

played a significant role in their findings, as 94 percent of LIHTC developments in Dallas fit that characterization. Schwartz et al. (2006) suggest "disamenity removal" was an important factor in their finding of positive effects of proximity to low-income housing in New York City (703).

The ambiguity in the likely neighborhood effects of proximity to low-income housing on *HN* and *HA*, along with mixed expectations on the response of *HS* to changes in *HN*, logically lends itself to an empirical investigation. The remainder of the paper investigates the impact of LIHTC developments on a novel characteristic of neighborhood quality: the physical condition of properties.

2. Overview of the LIHTC Program

While an extended discussion of the LIHTC program is beyond the scope of this paper, some description is important for providing context to the results. The low-income housing tax credit program was created under the *Tax Reform Act of 1986* as an alternative way of financing the development of affordable rental housing. The program replaced a variety of existing tax provisions and became the principal federal subsidy for producing affordable rental housing for low-income people. The program authorizes selected state and local agencies to issue federal tax credits for the construction, acquisition, or rehabilitation of affordable rental housing. The credits cover either 30 percent or 70 percent of the present value of qualified costs. Since the credit is allocated over a 10 year period, this results in an annual credit of either 4 percent (for 30 percent projects) or 9 percent (for 70 percent projects) for investors (McClure, 1990). The 30 percent tax credit is given to projects that use tax free bond financing or acquire existing buildings, while the 70 percent tax credit is provided for new construction or projects with no other subsidies. The credits are utilized by outside investors, who provide developers with initial funds in return. These outside investors cannot claim the credit unless the development meets LIHTC requirements, which provides a strong incentive for the outside investor to ensure compliance with program requirements.

Income and expenditure thresholds are based on HUD's fair market rent calculations. To qualify for the low-income housing tax credit, at least 20 percent of the units must be affordable to households that earn 50 percent or less of the area median income, or 40 percent of the units must be affordable to households that earn 60 percent or less of the area median income. A household qualified for a particular unit must spend no more than 30 percent of its income on rent in order for the unit to be considered affordable.

In addition to being largely controlled by private investment, LIHTC developments differ from more traditional public housing, such as Section 8, in terms of the location of projects and households served. For example, LIHTC developments are more likely to be located outside the urban core than other public housing developments (Freeman, 2004). LIHTC developments are also more likely to be built where land costs are lower relative to market rate rents set by HUD. This enables development owners to capture a greater amount of revenue relative to project costs than if these units were located in higher cost areas. Finally, residents living in LIHTC developments are more likely to be employed and less likely to receive public assistance than Section 8 residents. LIHTC households have higher incomes on average than Section 8 households (Buron et al., 2000).

From its inception through 2007,[3] over 31 thousand LIHTC developments were placed into service in the United States, totaling more than 1.8 million affordable units for occupancy. The average number of units per development has been steadily rising, from only about 59 units per development in 1995 to almost 79 units per development in 2007 (Abt Associates, undated). Substantively all of these units are qualified; that is, they meet the income limits to receive tax credits. Developers often maximize the number of qualified units because that ensures the largest subsidy to construct the development. Units placed into service in the United States have consistently averaged around 2 bedrooms in size since 1995.

[3] As of August, 2011, the time window of the latest available data ends in 2007.

LIHTC developments built in Kansas City, Missouri, which is the subject of this study, are slightly different than the ones built nationally (U.S. Department of Housing and Urban Development, undated). From 1998 on, new developments in Kansas City were substantially larger (at 87 units) than those in the United States (at 72). The qualifying ratio was also higher in Kansas City. In many years, the qualifying ratio was almost 100 percent, although this has declined slightly in recent years. Finally, the average number of bedrooms per unit was higher in Kansas City. In the late 1990s, which is the relevant time period for this study, the average unit in Kansas City was more likely to have three bedrooms than two. However, since 2001 the average number of bedrooms has been more consistent with national averages – 1.9, compared to 1.7 nationally.

3. Data and Methodology

Data

The analysis in this paper seeks to determine the relationship between property conditions in Kansas City, Missouri and proximity to LIHTC housing developments in a systematic way. The primary data set used in this analysis is derived from a GIS-based survey of property conditions for approximately 82,000 parcels in Kansas City, Missouri. The survey was conducted in 2000 by the Center for Economic Information at the University of Missouri – Kansas City. These 82,000 parcels represent about 45 percent of all Kansas City parcels, but are concentrated in the relatively low-income area east of Troost Boulevard and south of the Missouri River (Figure 1). Most of the LIHTC developments located in Kansas City are located in this study area, as are most HUD-subsidized housing developments.

The survey classifies each parcel by structure type (intended use), use type (actual use), residential type (single-family detached, duplex, etc.), and structure profile (e.g., number of stories). Then, for each parcel, ratings are provided for a variety of structural features (e.g., roof, foundation, exterior paint), grounds features (e.g., litter, lawn), and infrastructure features – 15 in total. The ratings range from 1 = severely deteriorated to 5 = excellent. An average score was

computed for each feature category – structure, grounds, and infrastructure – and these were again averaged to generate a composite score, which was used in the analysis. For parcels on which there is no structure, the composite score was taken as the average of the grounds and infrastructure scores. The mean composite property condition in the study area was 4.2, with a standard deviation of 0.5. The pattern of property conditions, even within neighborhoods, showed substantial variation (Figure 2).

To account for proximity to LIHTC housing developments, I geocoded all developments within the Kansas City area and, using GIS, established rings for 500 feet distances from the developments. Parcels were then identified as proximal to LIHTC developments if they fell within the 500-foot boundaries (Figure 3). I also recorded proximity to LIHTC developments by program (new construction or acquisition and rehabilitation) and by small (< 5 units) or large (5 or more units) size. Roughly 18 percent of parcels were within 500 feet of a LIHTC development (Table 1). Finally, parcels were identified by their proximity to HUD-sponsored housing developments (6.9 percent of parcels), schools, churches, hospitals, major highways, parks, and public transit routes. Blocks, block groups, Census tracts, neighborhoods, and City Council districts also were associated with each parcel. There were 343 LIHTC developments placed in service in the study area by 2000, with an average size of 21 units.

An important control variable included in the model is the average property condition in the block in which the parcel is located (exclusive of that specific parcel) to pick up any contagion effects. That is, social problems, once they have reached some threshold, have been shown to spread throughout neighborhoods (Crane, 1991; Galster et al., 2000).

The mechanism with which this contagion could occur is illustrated well in a psychology experiment in which Zimbardo (1968) parked an automobile without license plates and with its hood up in affluent Palo Alto, CA (the same was done in Bronx, NY). The car was untouched for a week until Zimbardo seriously damaged it with a sledge hammer, after which the car was

"utterly destroyed within a few hours."[4] Kelling and Wilson (1982) related the story in their familiar article expounding the "broken windows" theory. The theory is based on the concept that once one window is broken in a structure, if it goes unrepaired, others tend to get broken very quickly thereafter. Kelling and Wilson note that "vandalism can occur anywhere once communal barriers – the sense of mutual regard and the obligation of civility – are lowered by actions that seem to signal that nobody cares." Their article spoke specifically to the role that community policing, by establishing public order, could reduce crime. But a similar argument can be applied to the tendency to maintain or improve the condition of real property. That is, residents are more likely to maintain their properties when the neighborhood surrounding them is well-maintained.[5]

Most of the other data used in the analysis as controls were collected at the block, Census block group, or Census tract level and are described, along with sources and sample statistics, in Table 1. A block group is a combination of Census blocks and a subdivision of a Census tract. Block level data include crimes reported to the Kansas City, MO Police Department and some Census data, such as demographics and basic household characteristics. Most other neighborhood characteristics were collected from the Census at the block group or tract level.

Empirical Strategy

Ideally, in addition to the 2000 survey data, I would have data on the condition of properties prior to the location of any LIHTC developments. I would then evaluate changes in property conditions over time as LIHTC developments were located proximal to some parcels and not to others. Unfortunately, surveys of the property conditions of individual parcels within a large area are exorbitantly expensive, and a complete property survey is available for Kansas City only for the year 2000. Therefore, I evaluate the condition of the parcels in 2000 as a

[4] Most criminal scientists who refer to Zimbardo's experiment remark mostly on the speed with which the car was vandalized in the Bronx and the fact that the car was unscathed in Palo Alto, at least for the week before Zimbardo damaged it.

[5] Some limited evidence of this proclivity exists. For example, Brown and Werner (1985) find that residents are more likely to set out Halloween and Christmas decorations on blocks where other homes are decorated. Galster et al. (2000) find an endodynamic relationship in neighborhood poverty rates. Once a neighborhood reaches a threshold poverty rate (54 percent in their analysis), poverty grows at an accelerated rate.

function of their proximity to LIHTC developments that existed at the time. The basic model is written as

$$(1) \qquad C_i = \alpha + \beta P_i + \mathbf{\Gamma}'\mathbf{Z} + \varepsilon_i ,$$

where C_i is the property condition for parcel *i*; P_i is a binary variable which takes a value of unity if parcel *i* is within 500 feet of an LIHTC development and zero otherwise; **Z** is a vector of other variables thought to affect the condition of parcel *i*; and α, β, and $\mathbf{\Gamma}$ are parameters to be estimated.

Consistent estimation of (1) requires that the residual ε_i be uncorrelated with the explanatory variables. With my data limitations, however, this condition is likely to be violated. The concern arises because the conditions of surrounding properties influence the initial location decision for LIHTC developments. To account for this endogeneity, I first estimate P_i with a linear probability model[6]

$$(2) \qquad P_i = \mathbf{\Delta}'\mathbf{X} + u_i ,$$

where the vector $\mathbf{X} = [\mathbf{W} \quad \mathbf{Z}_1]$, **W** is a vector of predetermined variables independent of C, $\mathbf{Z}_1$ is a subset of **Z**, and $\mathbf{\Delta}$ is a vector of parameters. I then include the predicted values of P_i ($\hat{P}_i$) as the regressor in (1):

$$(3) \qquad C_i = \alpha + \beta \hat{P}_i + \mathbf{\Gamma}'\mathbf{Z} + \nu_i .$$

The empirical strategy requires the inclusion of a variable(s) in the first stage that is uncorrelated with property condition for parcel *i* but is correlated with the probability of a LIHTC development being located within 500 feet of parcel *i*. The primary instrument

[6] Although many researchers would argue that a probit or logit model is more appropriate in the first stage in this approach, the linear probability model is best (Angrist and Krueger, 2001). Consistency of the second-stage estimates does not depend on correct specification of the functional form in the first stage (see also Kelejian, 1971), and estimates from a linear first-stage regression generate consistent estimates in the second stage even with a binary endogenous variable. Indeed, "using a nonlinear first stage to generate fitted values that are plugged directly into the second-stage equation does not generate consistent estimates unless the nonlinear model happens to be *exactly* right, a result which makes the dangers of misspecification high" (80).

employed is whether or not the parcel is in a Census tract designated by the U.S. Department of Housing and Urban Development as a Qualified Census Tract (QCT). LIHTC developments in Qualified Census Tracts are eligible for 30 percent higher tax credits. Qualified Census Tracts are those where 50 percent or more of households are eligible to rent a LIHTC unit, based on income, with the proviso that no more than 20 percent of metropolitan area tracts can be so designated. In cases where more than 20 percent of tracts meet the criterion, tracts are ordered by the share of households meeting the LIHTC eligibility criterion. Then, from highest to lowest, tracts are designated as Qualified Census Tracts until the 20 percent limit is reached. Baum-Snow and Marion (2009) utilize a similar identification strategy in estimating the impact of LIHTC developments on housing values. They identify a discontinuity in the number of LIHTC units at the QCT threshold and find that discontinuity is "driven by the number of applications by developers rather than state housing authorities' acceptance rate of proposed projects" (655).

One additional instrument is included in the first stage of the model. Access to transportation is an important consideration in determining the location of LIHTC developments. Access to a major highway (within ½ mile) is expected to influence the location of LIHTC developments, but should have no influence on the physical upkeep of property. Access to public transit and major roads also are included in the first stage, but these variables are allowed to influence the physical upkeep of property as well, and hence are also included in the second stage of the model. Proximities to schools and parks also are included in both stages of the model, but the variables reflects a shorter distance (500 feet versus ¼ mile) in the second stage than in the first stage.

Other included variables in the first stage (and second stage) of the model are proximity to apartment buildings, measured at 500 feet; the share of female-headed households,[7] the share of households with children under 18, and crime rates, determined at the block level; vacancy

[7] Census data are from 1990.

rates, determined at the block group level; and tract median income and median contract rent. While assisted housing typically is located in relatively low-income areas, many LIHTC developments have been located in middle-income or even higher-income neighborhoods in an effort to reduce residential concentrations of low-income people (McClure, 2006). Variable choice, including the choice of instruments, was based in large part on personal communication with agents involved in LIHTC development location decisions in Kansas City at the city's largest syndicate, the Kansas City Equity Fund. In addition to these explanatory variables, neighborhood identifiers were included in the first stage (and second stage) of the model to account for unobserved heterogeneity across the neighborhoods in which the parcels are located. Kansas City has 249 distinct neighborhoods, 72 of which are located in the study area.

The two-stage estimator will provide a consistent estimate of β, but v is non-spherical. To ensure an efficient estimate, I estimate (3) with bootstrap regression. This methodology involves using the sample data as a population from which repeated samples are drawn. Given the original sample of size n, I generate $R = 500$ bootstrap samples, each time selecting n values with replacement from among the observations in the original sample. The regression estimator is then computed for each bootstrap sample $r \in R$. Reported parameter estimates are the bootstrap means, and the bootstrap standard errors are used to generate confidence intervals for the parameters. Asymptotic efficiency in the case of this two-step estimator does not require that the equations be jointly estimated (Pagan, 1984).

First Stage Results

Results from the first-stage linear probability model are provided in Table 2. Given a lack of literature modeling the location decision for LIHTC developments, the results from the first stage are discussed in some detail here.[8]

Most critically, the probability that any parcel is near a LIHTC development was shown to be higher in Qualified Census Tracts than in non-qualified tracts having similar characteristics.

[8] Oakley (2008) examines the locational pattern of LIHTC developments in four metropolitan areas.

The relationship was statistically significant at the 99 percent confidence level. Specification tests showed no correlation between QCT and the residuals of the second-stage regression. A regression of the second-stage residuals on all first-stage and second-stage variables revealed an adjusted R^2 of 0.0010.

Results regarding household composition were mixed compared to expectations. A concentration of female-headed households is positively associated with the location of LIHTC developments, which reflects generally greater eligibility for housing subsidies among female-headed households (Haurin and Kamara, 1992). A negative relationship between LIHTC location and the share of households with children under 18 was surprising given the needs for affordable housing among this cohort (Khadduri and Nelson, 1992). However, Fischer and Sard (2008) note that 31 percent of households in LIHTC developments are elderly, while 20 percent are disabled, suggesting that many LIHTC developments are not targeted to families with children. More importantly, holding the number of female-headed households constant, as was done in this model, a greater share of households with children under 18 would represent a greater share of two-parent or male-headed households with children, which rarely reside in assisted housing.

City Council districts were found to be unrelated to LIHTC location, suggesting that LIHTC developers have faced little pressure from local policymakers in Kansas City in making location decisions. A majority of the neighborhood boundaries were found to be statistically significant, however. Some of the unobserved neighborhood heterogeneity may include the strength of political power among neighborhood associations. This result is consistent with Eriksen and Rosenthal (2010), who find a statistically significant relationship between the share of residents in a 10-mile area that voted for the sitting governor of their state and the concentration of LIHTC developments in that area 10-mile area.

Median income was found to be positively related to LIHTC development location, but the effect was quite small economically. Although one might naturally assume that housing designated for low-income people would be concentrated in low-income areas, LIHTC

developments generally tend to be built in mixed income areas (Pendall, 2000, 882). Industry representatives in Kansas City suggested that LIHTC developments typically are not located in the lowest income-neighborhoods there as well. Given that the study area is largely restricted to broad low-income areas in Kansas City, the result is not too surprising.

Industry representatives noted that developers and funders prefer to locate LIHTC developments in relatively safe and attractive places within a broader low-income community, which is consistent with the positive relationship between LIHTC proximity and income above. In addition, the probability of being located near an LIHTC development is negatively associated with property vacancy and positively associated with the average property condition on the block in which the parcel is located.

As expected, proximity to public transit and parks is associated with a greater probability of a LIHTC project being located near a given parcel, reflecting the role of access to transportation and low-cost amenities in location decisions. Contrary to expectations, proximity to major highways was not. Indeed, proximity to a major highway made proximity to an LIHTC development less likely. The result may reflect less reliance on automobile transport for lower income people relative to higher income people, especially in urban core neighborhoods (Pugh, 1998).

4. Empirical Results

Results from five different variations of the model represented by equations (1) and (3) are presented in Table 3. Models 1 – 2 consider LIHTC developments as a whole as the subject of interest, whereas model 3 categorizes the developments by type of development (new construction or rehabilitated), and models 4 – 5 categorize developments by type of development and by size (small or large).

Model 1 is an single-stage ordinary least squares regression and is identical in structure to model 2, which is a two-stage bootstrap regression. The inclusion of model 1 results in the table

is an effort to reveal the effects of utilizing a two-stage model to estimate the parameters. Models 3 – 5 are all two-stage bootstrap regressions.

Proximity to LIHTC Developments

The results of the empirical analysis suggest that proximity to LIHTC developments generally has a positive impact on neighborhood property conditions, whether the developments are new or rehab projects (models 1 – 3). However, extended analysis that separates LIHTC developments by type and size suggests that only small new construction developments and large rehab developments impact neighborhood property conditions (model 4). Further analysis reveals that when the model does not control for crime (model 5), the effect of proximity to LIHTC developments on property conditions is negative.

In model 1, which does not account for endogeneity, the effect of proximity to LIHTC developments on property conditions is positive, but very small in magnitude. Specifically, proximity increases the average property condition score by 0.016 point, or from 4.16 to about 4.18.[9] This effect would, of course, be hardly noticeable. The result is substantially larger when the location of LIHTC developments is allowed to be endogenous, however.[10] Thus, failure to account for local property conditions when and where LIHTC developments are initially sited biases the effects of proximity downward. One possible explanation for the bias is that developers seek out relatively inexpensive land in the general area in which they wish to site a development. Such an explanation is more likely than one having developers siting projects in locations specifically because they have poor surrounding property conditions.

[9] The value 4.16 is the average of the predicted values for property condition when there is no LIHTC development within 500 feet (for model 1).

[10] The proximity variable was generated from the linear probability model in the first stage, so it is not a binary variable and should not be interpreted as such. That is, unlike in model 1, in model 2 the statement that proximity to a LIHTC development increases the average condition score by 0.25 point would not be correct. Rather, the correct interpretation is that the average difference in condition scores between two similar parcels with probabilities of zero and one is 0.25. In the specific case of model 2, the former interpretation is close, as the parcel with the highest likelihood of being proximal to a LIHTC development is 0.76, and the lowest value is – 0.24 (a linear probability model can result in a negative "probability"). For models 3 – 5, however, the ranges of the probabilities are much tighter.

The positive relationship between property conditions and proximity to LIHTC developments suggests that the benefits of proximity, such as removal of nearby blight or utilization of nearby vacant lots, outweighs the potential costs of proximity, such as neighborhood detachment or disamenities such as congestion and crime. These effects of proximity work to affect property conditions through their effects on neighborhood quality and attachment, which, in turn, influence maintenance effort. Because the neighborhoods in which LIHTC developments are located in the study area are predominantly low- and moderate-income, where abandoned and dilapidated properties are more common, disamenity removal is likely especially impactful.

A division of properties by type and size reveals more informative results. Specifically, only small new construction developments and large rehab developments positively affect the physical conditions of properties nearby. Small rehab developments and large new construction developments have no measurable impact on property conditions. There are a number of plausible explanations for this phenomenon, all of which involve the balance of positive and negative impacts on neighborhood quality (HA in the conceptual analysis) and neighborhood attachment (HN in the conceptual analysis). These effects then influence maintenance effort, which affects the physical condition of properties.

Small new construction developments usually replace vacant lots or the most severely deteriorated buildings (often houses), which are torn down. Thus, the existing lot or property that is replaced generally is a much greater disamenity than a property that is in sufficiently good condition to rehabilitate. The rehabilitation of larger complexes likely has a more significant impact than small rehab projects simply because a larger dilapidated building has a much bigger presence in its neighborhood than would a small dilapidated building, such as a house. Thus, the effects of removing a disamenity on a large parcel would likely have greater impact than on a small parcel, both in terms of breadth and degree. Similar to the cases of small developments, a large new construction project is likely to remove a greater disamenity than a large rehab project. But the deleterious effects of a new development, such as the potential for reduced neighborhood

status, an influx of subsidized renters, or increased crime, likely are much more pronounced for a new project than for a rehab project.

Existing empirical studies of the effects of subsidized housing developments on neighborhoods, which have focused almost exclusively on property values, are mixed (see reviews in Galster, 2002 and Nguyen, 2005), and thus no consensus has developed. One reason why results have been mixed across studies is that property value, the neighborhood indicator in most studies, provides a summary measure of neighborhood effects, which possibly tends toward zero. The overall effect of proximity to low-income housing on property values likely depends on which of many different neighborhood effects dominate . Property condition is a specific facet of neighborhood effects for which consistent results may be easier to derive. Further, when developments of different types and sizes are lumped together, as is the case in most studies, empirical results can vary widely depending on which types and sizes of developments are located in the study area.

A final model (model 5) examines the effects of proximity to LIHTC developments on property conditions without controlling for crime. The impacts were substantially different in that case. Indeed, the impact of the LIHTC developments on property conditions was for the most part negative and large. This result could be explained by a negative effect of LIHTC developments on crime rates. That is, if proximity to LIHTC developments is associated with increased levels of crime, and higher crime rates are associated with diminished property conditions, then proximity to LIHTC developments could lead to diminished property conditions through its effect on crime.

An extended analysis of the effects of LIHTC developments on crime rates in Kansas City is beyond the scope of this study, but the preponderance of the research cited in the conceptual discussion does point to a negative causal relationship between assisted housing and crime. The result here suggests that these negative influences of LIHTC developments on crime, to the extent they exist, may outweigh the benefits of proximity from other factors, at least as they affect maintenance efforts on nearby properties.

Control Variables

The parameters on control variables mostly aligned with expectations. Proximity to a HUD public housing project is probably the most interesting, as a comparison can be made to the LIHTC results. The empirical results show little relationship between HUD housing projects and property conditions. One might argue that the lack of significance results in part from an endogenity issue similar to that for LIHTC developments. While possible, most HUD projects were put in place well before the 1980s, and the pattern of property conditions has likely changed considerably since, over both time and space. Most HUD housing projects are comparable in size to larger LIHTC developments, and thus we might expect to see similar results. But many HUD projects have deteriorated significantly, or at least, have not been substantially rehabilitated in recent years. In contrast, in 2000, the year of this study, LIHTC developments were at most 13 years old.

An interesting variable in the analysis unique to the literature is the condition of surrounding properties. For this analysis the measure of surrounding property conditions is the average on the block. The estimated parameter in model 4 is statistically zero, but in models 1 – 3 and 5, the value is positive, statistically significant, and significant in magnitude. A positive result would be expected based on the psychology of groups, as outlined in Zimbardo (1968) and Kelling and Wilson (1982) and discussed above. The model 4 result, where LIHTC developments are broken down by size and type, appears to arise from some correlations between specific types and/or sizes of LIHTC developments, along with crime rates. Once crime rates are eliminated from the disaggregated model, block conditions becomes positive and significant again, revealing a potential negative relationship between block conditions and crime. Specifically, the result suggests that a one-point higher average of the property condition index on a block is associated with a 0.35 point higher property condition index on any given property, on average. The remainder of results will be discussed in terms of model 4, which is the most complete specification.

Results on proximity to amenities were mostly statistically significant, but were small in magnitude For example, 500-foot proximity to a park reduced the average condition score by 0.041 points, or about 0.9 percent. While expectations were not strong, this result is somewhat surprising. It may reflect the clientele in many inner city parks, which often are rundown and devoid of children. Another surprise was that 500-foot proximity to transit was positive and significant. One might expect that some commuters might be disrespectful to others' property, leave trash, and so on. This parameter was also very small in magnitude, increasing the average property condition by 0.046 points, or 1.1 percent. Proximity to schools was found to increase property condition scores by a very modest 0.6 percent.

Most of the other locational characteristics included in the model have negligible effects on property condition scores. The result on personal crime is negative and statistically significant, as might be expected given its strong influence on neighborhood attachment and quality of life. Property crime does not appear to have a measurable impact on property conditions, although the relationship with property conditions would be more direct in that case. For example, vandalism would directly reduce the condition of the property upon which the vandalism occurred.

One would think that higher incomes would allow for greater upkeep of the property, but higher incomes are associated with *lower* property condition scores. The result is difficult to explain, but is rather small in magnitude. Income fell within a relatively tight spectrum within the study area, with a standard deviation of about $9,600, compared to a mean of about $28,400.

Owner-occupants consistently have been shown to maintain properties better than renters (see, e.g., Galster, 1983). While owner-occupancy was included for the block group, one might expect that across all data, the tenure of any one property would be correlated with tenure of the block group. The empirical results here bear that out, although again, the magnitude is quite small. A five percent higher owner occupancy rate is associated with a 0.2 percent higher value of the property condition index. A higher vacancy rate on the block is associated with a lower property condition score, as expected. In that case, the magnitude is twice as large, but still

negligible. Longer tenure in households on the block was associated with lower property condition index values. Although my expectation was that transience might lead to lower values, the result may reflect the proclivity of new residents to make improvements on their house.

The parameters associated with most other determinants were statistically significant and in the expected direction, although none had a substantial impact on property condition score. Older homes tend to have lower property condition index values, as did homes in relatively low-rent areas. The number of stories of the home on the parcel, which is a proxy for size and value, was positively associated with the condition of the property. The pervasiveness of female-headed households and households with minor children had no affect on property conditions.

Across models, the variables used in the analysis, including controls for neighborhood boundaries, explained roughly 25 percent of the total variation in property condition indexes across individual parcels. The remaining variation is likely determined largely by characteristics of individual homes and homeowners, for which acquiring data is not feasible.

5. Conclusions

Public housing is a contentious issue. Clearly there is an acute need for affordable housing for low-and-moderate income community members. House prices have fallen precipitously in the last few years, but that decline follows a substantial bubble in many areas of the country, and affordability remains a problem. In many places, rents have been increasing significantly. But the massing of public or otherwise subsidized housing in disadvantaged neighborhoods has given rise to concerns that "public housing" has led to decay of these communities. This paper asks whether this conventional wisdom is true and finds that, in general, the answer is "no." Indeed, LIHTC developments positively influence property upkeep nearby in many cases. Specifically, if LIHTC developments consist of large acquisition and rehabilitation projects or small new developments, the result is likely to be a moderate boost to surrounding property conditions, all else equal. Nevertheless, extended results suggest that

crime rates associated with proximity to LIHTC developments may erode these benefits and leave a net negative impact.

Important is that the results of this analysis do not necessarily apply to higher income neighborhoods, as the study area, located in Kansas City, MO, is predominantly low- and moderate-income neighborhoods with an average median household income of $27,499 (in 1999 at the time of the study), compared to a median household income of $37,198 for the City of Kansas City at large and $46,193 for the greater metropolitan area. Similar work, although difficult given the costly nature of the data, would add more credibility to these findings.

The finding that large rehabilitation projects and small new construction projects lead to modest improvements in neighborhood quality, as measured by property conditions, is a good outcome for affordable housing advocates seeking to provide additional housing in lower-income areas. But further analysis needs to disentangle the relationship between LIHTC developments and crime. Policies could then be developed to ensure that proximity to LIHTC developments is associated with good neighborhood outcomes.

REFERENCES

Abt Associates. Undated. Updating the National Low-Income Housing Tax Credit Database: Projects placed in service through 2007." Accessed January 7, 2011 at http://www.huduser.org/portal/datasets/lihtc.html.

Angrist, J. D., Krueger, Alan B. 2001. Instrumental variables and the search for identification: From supply and demand to natural experiments. *Journal of Economic Perspectives*, 15, 69 – 85.

Baum-Snow, N., Marion, J. 2009. The effects of Low Income Housing Tax Credit Developments on neighborhoods, Journal of Public Economics, 93, 654 – 666.

Brown, B., Werner, C. 1985. Social cohesiveness, territoriality, and holiday decorations: The influence of cul-de-sacs, Environment and Behavior, 17, 539 – 565.

Buron, L., Nolden S., Heintzi K., Stewart J. 2000. Assessment of the Economic and Social Characteristics of LIHTC Residents and Neighborhoods: Final Report. Washington, DC: U.S. Department of Housing and Urban Development.

Crane, J. 1991. The epidemic theory of ghettos and neighborhood effects on dropping out and teenage childbearing, American Journal of Sociology, 96, 1226 – 1259.

Di, W., Mudoch, J. 2010. The Impact of LIHTC Program on Local Schools. Working Paper, Federal Reserve Bank of Dallas.

Dildine, L., Massey, F. 1974. Dynamic model of private incentives to housing maintenance, Southern Economic Journal, 40 631 – 639.

Duke-Lucio, J., Peck, L., Segal, E. 2010. The latent and sequential costs of being poor: An exploration of housing, Poverty and Public Policy, 2, Article 4.

Ellen, I., Schill, M., Schwartz, A., Voicu, I. 2007. Does federally subsidized rental housing depress neighborhood property values? Journal of Policy Analysis and Management, 26, 257 – 280.

Epple, D., Romano, R. 1998. Competition between private and public schools, vouchers, and peer-group effects, American Economic Review, 88, 33 – 62.

Eriksen, M., Rosenthal, S. 2010. Crowd out effects of place-based subsidized rental housing: New evidence from the LIHTC program, Journal of Public Economics, 94, 953 – 966.

Ezzet-Lofstrom, R., Murdoch, J. 2006. The effect of Low Income Housing Tax Credit units on residential property values in Dallas County, Williams Review, 1, 107 – 124.

Fischer, W., Sard, B. 2008. Preserving Safe, High Quality Public Housing Should Be a Priority of Federal Housing Policy, Center on Budget and Policy Priorities, October 8.

Freeman, L. 2003. The impact of assisted housing developments on concentrated poverty, Housing Policy Debate, 14, 103 – 141.

Freeman, L. 2004. Citing affordable housing: Location and neighborhood trends of Low Income Housing Tax Credit developments in the 1990s, Brookings Institution Census 2000 Survey Series, March.

Freeman, L., Botein, H. 2002. Subsidized housing and neighborhood impacts: A theoretical discussion and review of the evidence, Journal of Planning Literature, 6, 359 – 378.

Galster, G. 1981. A neighborhood interaction model of housing maintenance and quality changes by owner occupants, Regional Analysis and Policy, 13, 29 – 48.

Galster, G. 1983. Empirical evidence on cross-tenure differences in home maintenance and conditions, Land Economics, 59, 107 – 113.

Galster, G. 2002. A Review of Existing Research on the Effects of Federally Assisted Housing Programs on Neighborhood Residential Property Values. Report to the National Association of Realtors, September.

Galster, G., Quercia, R., Cortes, A. 2000. Identifying neighborhood thresholds: An empirical exploration, Housing Policy Debate, 11, 701 – 732.

Galster, G., Pettit, K., Santiago, A., Tatian, P. 2002. The impact of supportive housing on neighborhood crime rates, Journal of Urban Affairs, 24, 289 – 315.

Guhathakurta, S., Mushkatel, A. 2002. Race, ethnicity, and household characteristics of Section 8 housing clients and their impact on adjacent housing quality, Urban Affairs Review, 37, 521 – 542.

Haurin, D., Kamara, D. 1992. The homeownership decision of female-headed households, Journal of Housing Economics, 2, 293 – 309.

Kansas City Equity Fund. Various dates. Personal Communication. (The Kansas City Equity Fund is the dominant syndicator of LIHTC projects in the Greater Kansas City Metropolitan Area).

Kelejian, H. H. 1971. Two-stage least squares and econometric systems linear in parameters but nonlinear in the endogenous variables. *Journal of the American Statistical Association*, 66, 373 – 374.

Kelling, G., Wilson, J. 1982. Broken windows: The police and neighborhood safety, Atlantic Monthly, March.

Khadduri, J., Nelson, K. 1992. Targeting housing assistance, Journal of Policy Analysis and Management, 11, 21 – 41.

Lyons, R., Loveridge, S. 1993. An hedonic estimation of the effect of federally subsidized housing on nearby residential property values, University of Minnesota Department of Applied Economics Staff papers.

McClure, K. 1990. Low and moderate income housing tax credits: Calculating their value. Journal of the American Planning Association, 56, 363 – 369.

McClure, K. 2006. The Low-Income Housing Tax Credit program goes mainstream and moves to the suburbs, Housing Policy Debate, 17, 419 – 446.

McNulty, T., Holloway, S. 2000. Race, crime, and public housing in Atlanta: Testing a conditional effect hypothesis, Social Forces, 79, 707 – 729.

Nguyen, M. 2005. Does affordable housing detrimentally affect property values? A review of the literature, Journal of Planning Literature, 20, 15 – 26.

Oakley, D. 2008. Locational patterns of Low Income Housing Tax Credit developments: A sociospatial analysis of four metropolitan areas, Urban Affairs Review, 43, 599 – 628.

Pagan, A. 1984. Econometric issues in the analysis of regressions with generated regressors, International Economic Review, 25, 221 – 247.

Pendall, R. 2000. Why voucher and certificate users live in distressed neighborhoods, Housing Policy Debate, 11, 881 – 910.

Pugh, M. 1998. The spatial divide between jobs and welfare recipients in metropolitan areas, Brookings Discussion Paper, July.

Santiago, A., Galster, G., Tatian, P. 2001. Assessing the property value impacts of the dispersed housing subsidy program in Denver, Journal of Policy Analysis and Management, 20, 65 – 88.

Schively, C. 2007. Understanding NIMBY and LULU phenomena: Reassessing our knowledge base and informing future research, Journal of Planning Literature, 21, 255 – 266.

Schwartz, A., Ellen, I., Voicu, I., Schill, M. 2006. The external effects of place-based subsidized housing, Regional Science and Urban Economics, 36, 679 – 707.

Schwartz, A., McCabe, B., Ellen, I., Chellman, C. 2010. Public schools, public housing: The education of children living in public housing, Urban Affairs Review, 46, 68 – 89.

Suresh, G., Vito, G. 2007. The tragedy of public housing: Spatial analysis of hotspots of aggravated assaults in Louisville, KY (1989 – 1998), American Journal of Criminal Justice, 32, 99 – 115.

Suresh, G., Vito, G. 2009. Homicide patterns and public housing: The case of Louisville, KY (1989 – 2007), Homicide Studies, 13, 411 – 433.

Tighe, J. 2010. Public opinion and affordable housing: A review of the literature, Journal of Planning Literature, 25, 3 – 17.

U.S. Department of Housing and Urban Development (undated). LIHTC database. Accessed January 7, 2011 at http://lihtc.huduser.org/.

Van Ryzin, G., Genn, A. 1999. Neighborhood change and the City of New York's ten-year housing plan, Housing Policy Debate, 10, 799 – 838.

Van Zandt, S., Mhatre, P. 2009. The effect of housing choice voucher households on neighborhood crime: Longitudinal evidence from Dallas," Sustainable Housing Research Unit Working Paper 09-01, Texas A&M University, January.

Wang, X., Varady, D. 2005. Using hot-spot analysis to study the clustering of section 8 housing voucher families, Housing Studies, 20, 29 – 48.

Zimbardo, P. 1968. Diary of an abandoned automobile, Time, October 1.

TABLES

Table 1
Variables, Sources, and Sample Statistics

Variable	Source	Mean (Std. Dev.)	Share of Parcels (%)
Parcel property condition (range 1 – 5)	Center for Economic Information, University of Missouri – Kansas City	4.21 (0.53)	
LIHTC development within 500 feet	U.S. Department of Housing and Urban Development Low-Income Housing tax Credit database		18.4
New Construction			7.9
Large (40 + units)			0.5
Medium (5 – 39 units)			0.9
Small (< 5 units)			6.7
Rehab			12.2
Large (40 + units)			0.7
Medium (5 – 39 units)			0.9
Small (< 5 units)			9.3
HUD housing development within 500 feet	U.S. Department of Housing and Urban Development		6.9
Multi-unit structure on parcel	Center for Economic Information, University of Missouri – Kansas City		27.6
Two-story structure on parcel	Center for Economic Information, University of Missouri – Kansas City		40.1
Three-or-more story structure on parcel	Center for Economic Information, University of Missouri – Kansas City		28.8
School located near parcel	ESRI, ArcGIS		
within 500 feet			8.2
within ¼ mile			49.5
Church located near parcel (500 feet)	ESRI, ArcGIS		10.5
Park located near parcel	ESRI, ArcGIS		
within 500 feet			18.6
within ¼ mile			58.3
Transit located near parcel	Metropolitan Area Regional Commission (Kansas City, MO)		
within 500 feet			38.6
within 750 feet			70.7
Major hwy located near parcel (½ mile)	ESRI, ArcGIS		52.3
Hospital located near parcel (½ mile)	ESRI, ArcGIS		12.4
Median age on block	U.S. Census Bureau	32.8 (4.5)	
Property Offenses on block in 1998	Kansas City, MO Police Department	8.85 (10.31)	
Offenses against persons on block in 1998	Kansas City, MO Police Department	4.84 (8.12)	
Female-headed HHs in block group (%)	1990 and 2000 U.S. Census	45.8 (11.7)	
HHs with children under 18 on block (%)	1990 and 2000 U.S. Census	31.3 (11.4)	
Average HH size on block	2000 U.S. Census	2.56 (0.43)	
Live in same HH as five years ago (Census tract) (%)	2000 U.S. Census	53.6 (13.0)	

Median Income in Census tract	1990 and 2000 U.S. Census	$27,499 ($9,354)	
Owner-occupied units on block (%)	2000 U.S. Census	49.5 (18.6)	
Vacant units on block (%)	2000 U.S. Census	12.7 (7.0)	
African-American / Black	2000 U.S. Census	59.0 (36.2)	
Hispanic / Latino	2000 U.S. Census	9.66 (14.2)	
Median contract rent	1990 U.S. Census	$378 ($102)	
Qualified Census tract	U.S. Department of Housing and Urban Development		53.4

Table 2
1st Stage Results (linear probability model)
(Probability of a Parcel Being Located within 500 feet of a Low-Income Housing Development)

Variable	Parameter Estimate (Std. Err.)
Intercept	-0.089^{**} (0.038)
Households with Children Under 18	-0.237^{***} (0.026)
Female-Headed Households (block group)	0.252^{***} (0.025)
Average Household Size	-0.024^{***} (0.008)
Median Household Income (Census tract)	$2.1 \times 10^{-6***}$ (4.1×10^{-7})
Share of Homes Vacant	-0.222^{***} (0.036)
Share in Same Households as 5 Years Ago	0.043^{**} (0.020)
Average Property Condition on Block	0.052^{***} (0.006)
Share African-American / Black	0.174^{***} (0.012)
Share Hispanic	0.109^{***} (0.026)
Median Contract Rent (Census tract)	$-1.8 \times 10^{-4***}$ (2.8×10^{-5})
Crime: Personal Offenses (block)	0.002^{***} (4.4×10^{-4})
Crime: Property Offenses (block)	-0.001^{***} (2.8×10^{-4})
Schools within ¼ mile	-0.045^{***} (0.004)
Parks within ¼ mile	0.027^{***} (0.004)
Transit within 750 feet	0.068^{***} (0.004)
Major Highway within ½ mile	-0.022^{***} (0.005)
Apartments within 500′	0.066^{***} (0.005)
Qualified Census Tract	0.080^{***} (0.006)
Kansas City Council District (6 districts)	Not Reported (avail. on request)
Kansas City Neighborhood (242 neighborhoods)	Not Reported (avail. on request)
Adjusted R^2	0.166

Notes: ***, **, * indicates statistical significance at the 99 percent, 95 percent, and 90 percent confidence level, respectively.

Table 3
Empirical Results

Model:	1	2	3	4	5
	Single Stage†	Two-Stage	Two-Stage	Two-Stage	Two-Stage†
Intercept	3.329*** (0.075)	3.313*** (0.079)	3.417*** (0.085)	3.494*** (0.086)	3.309*** (0.074)
LIHTC within 500′					
Any	0.016** (0.007)	0.252*** (0.070)	-	-	-
New	-	-	0.977*** (0.226)	-	-
Rehabilitated	-	-	0.192*** (0.079)	-	-
Small New	-	-	-	2.787*** (0.804)	- 1.757*** (0.405)
Small Rehabilitated	-	-	-	0.023 (0.124)	- 0.153 (0.095)
Large New	-	-	-	- 0.037 (1.370)	- 5.011*** (0.793)
Large Rehabilitated	-	-	-	2.388** (1.146)	- 3.374*** (0.676)
HUD Project within 500′	0.001 (0.018)	0.013 (0.017)	0.015 (0.017)	0.010 (0.017)	0.015 (0.016)
Average Property Condition on Block	0.198*** (0.009)	0.188*** (0.009)	0.136*** (0.017)	- 0.022 (0.065)	0.351*** (0.034)
Property Crime (block)	-1.2×10^{-4} (5.1×10^{-4})	6.7×10^{-5} (5.3×10^{-4})	1.6×10^{-5} (5.0×10^{-4})	0.002*** (6.3 x 10-4)	-
Personal Crime (block)	- 0.004*** (8.0×10^{-4})	- 0.004*** (8.4×10^{-4})	- 0.006*** (8.4×10^{-4})	- 0.010*** (0.001)	-
Median HH Income	- 0.002*** (5.3×10^{-4})	- 0.002*** (5.5×10^{-4})	- 0.002*** (5.7×10^{-4})	- 0.003*** (0.001)	8.4×10^{-4} (7.7×10^{-4})
HH w/ Children < 18yrs	- 0.212*** (0.050)	- 0.157*** (0.053)	- 0.162*** (0.049)	- 0.037 (0.187)	- 0.811*** (0.115)
Female-Headed HH	- 0.058 (0.041)	- 0.117*** (0.048)	- 0.056 (0.046)	0.002 (0.083)	0.204*** (0.061)
Median Contract Rent	8.0×10^{-5} (5.5×10^{-5})	1.3 x 10-4** (5.7 x 10-5)	2.7 x 10-4*** (7.1 x 10-5)	6.1 x 10-4*** (1.5 x 10-4)	-1.9×10^{-4} (8.9×10^{-5})
Pct. Of Homes Vacant	- 0.294*** (0.064)	- 0.254*** (0.063)	- 0.288*** (0.065)	- 0.288*** (0.081)	- 0.431*** (0.065)
Pct. Of Homes Owner-Occupied	0.132*** (0.033)	0.126*** (0.032)	0.130*** (0.033)	0.131*** (0.034)	0.124*** (0.032)
Median Home Age	- 0.003*** (0.001)	- 0.003*** (0.001)	- 0.003*** (0.001)	- 0.004*** (0.001)	- 0.003*** (0.001)
Number of Stories (parcel)	0.069*** (0.006)	0.069*** (0.006)	0.070*** (0.006)	0.071*** (0.006)	0.070*** (0.006)
HH Size	- 0.012 (0.016)	- 0.001 (0.017)	0.017 (0.018)	0.159*** (0.049)	- 0.113*** (0.030)
Same HH 5yrs Previous	4.3×10^{-4} (0.036)	- 0.007 (0.037)	- 0.088** (0.042)	- 0.155*** (0.043)	- 0.066 (0.041)
Pct. Black	0.132*** (0.022)	0.092*** (0.026)	- 0.035 (0.046)	- 0.321*** (0.119)	0.355*** (0.063)
Pct. Hispanic	0.292*** (0.057)	0.263*** (0.059)	0.346*** (0.059)	0.326*** (0.080)	0.519*** (0.064)

Transit within 500′	0.039***	0.032***	0.045***	0.046***	0.037***
	(0.007)	(0.008)	(0.008)	(0.007)	(0.007)
Major Road within 500′	0.019***	0.012*	0.015**	- 0.046**	0.069***
	(0.006)	(0.006)	(0.007)	(0.022)	(0.014)
Apartments within 500′	0.043*	0.024	0.014	- 0.093	0.193***
	(0.023)	(0.025)	(0.026)	(0.058)	(0.038)
School within 500′	0.023***	0.027***	0.030***	0.026***	0.035***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Church within 500′	4.9×10^{-4}	1.6×10^{-4}	-4.8×10^{-4}	- 0.002	- 0.004
	(0.011)	(0.010)	(0.011)	(0.011)	(0.010)
Park within 500′	- 0.044***	- 0.046***	- 0.041***	- 0.041***	- 0.044***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Adjusted R^2	0.2457	0.2460	0.2461	0.2477	0.245

Notes: *, **, and *** represent statistical significance at 90, 95, and 99 percent confidence levels; † indicates no bootstrapping

FIGURES

Figure 1: Project Study Area

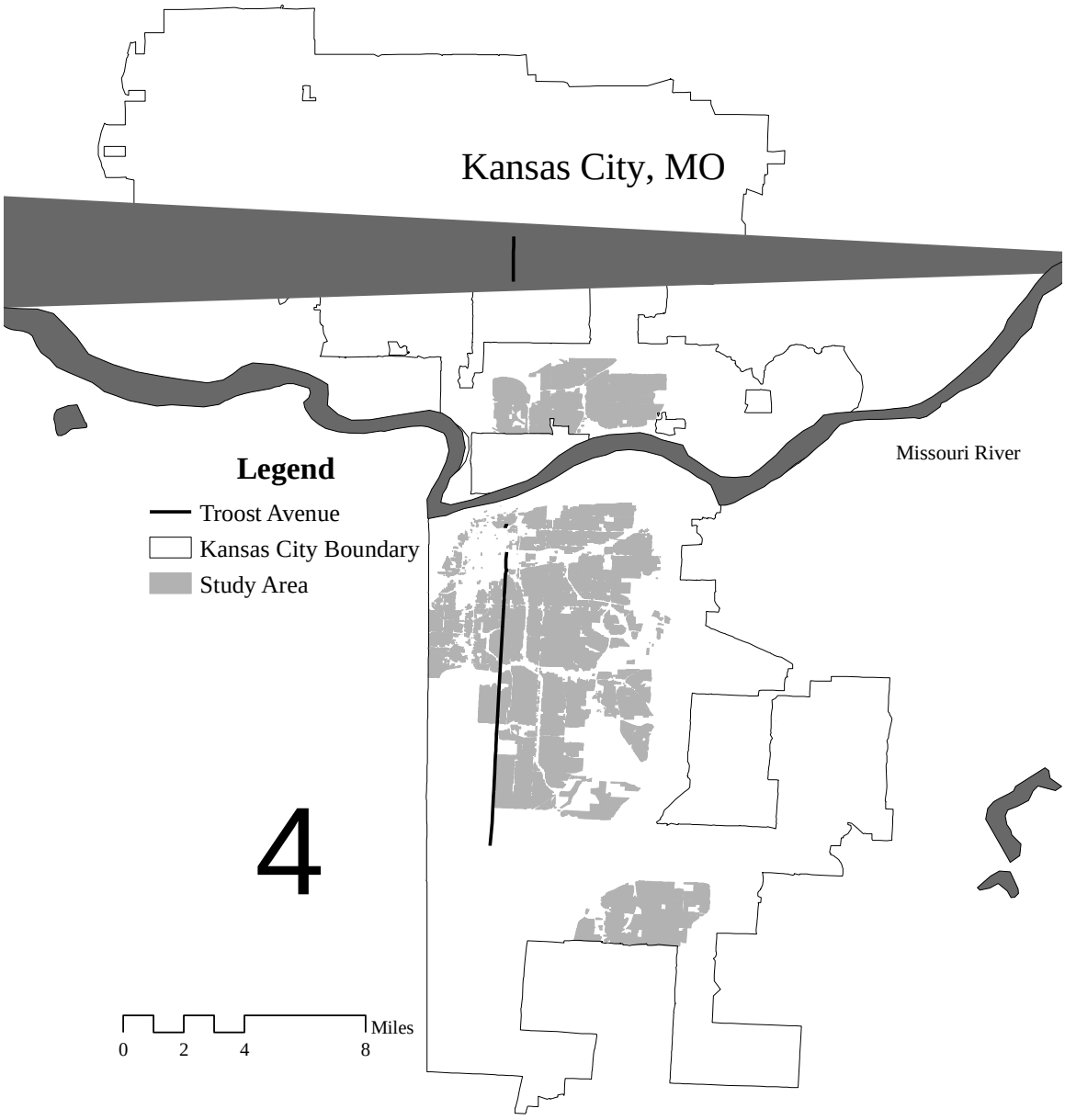

Figure 2: Property Conditions, Ivanhoe Southeast Neighborhood, Kansas City, MO

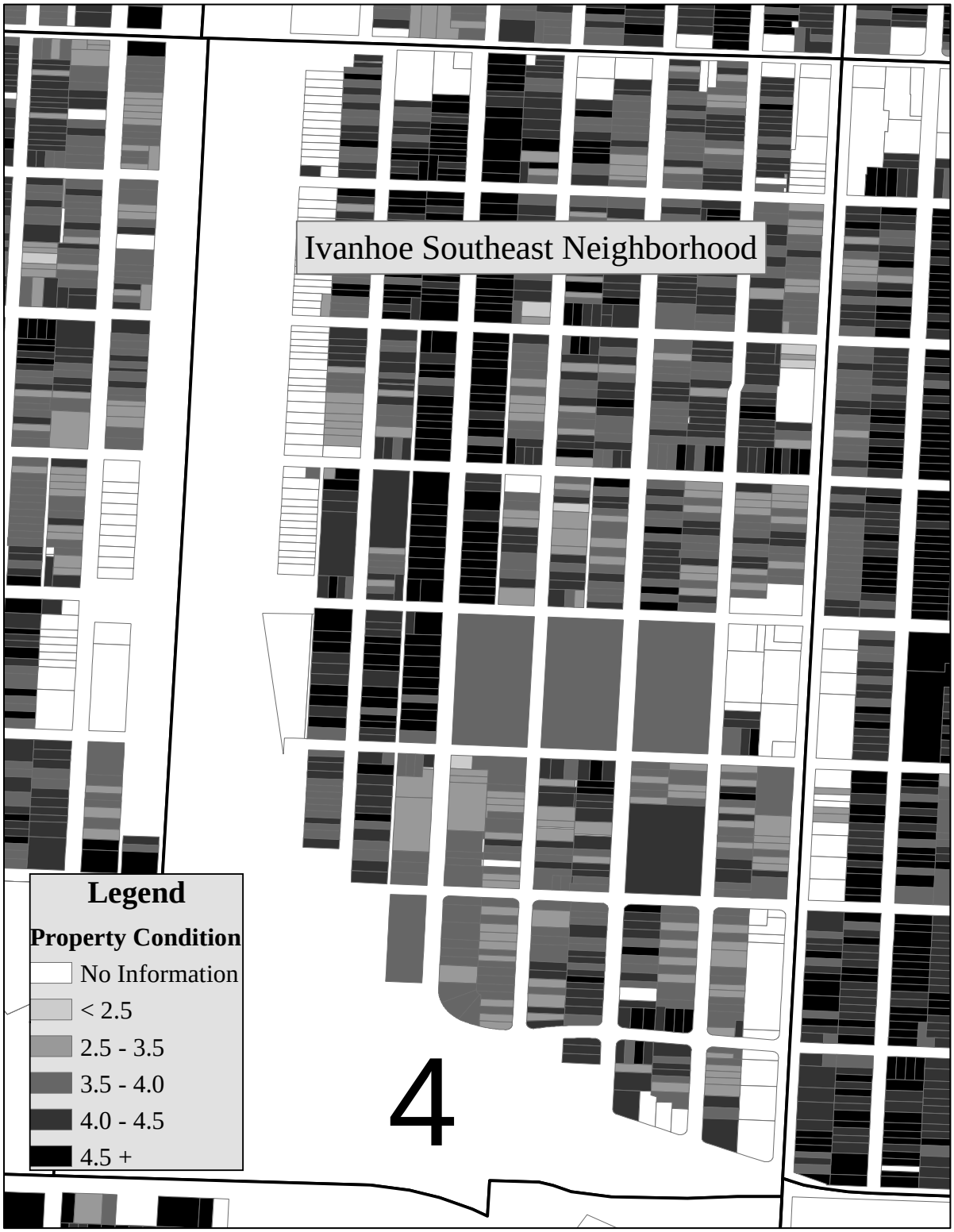

Figure 3: Parcels Proximal to LIHTC Developments, Key Coalition Neighborhood, Kansas City, MO