THE IMPACT OF COMMUNITY DEVELOPMENT CORPORATIONS ON NEIGHBORHOOD HOUSING MARKETS
Modeling Appreciation

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Housing investment activities of community development corporations (CDCs) can be associated with a positive impact on the residential real estate market within their respective service area. Relying on a pseudo-experimental approach, the appreciation rate of single-family housing in CDC treatment and comparison areas is tested with a traditional hedonic model with pooled data. The results suggest that the area that is served by the 12 established CDCs operating in Center Township in the city of Indianapolis experienced a higher overall appreciation in the mean residential home value from 1987 to 2000 than did a comparison area in Center Township not served by CDCs.

Keywords: urban redevelopment; housing; community investment

INVESTING IN COMMUNITY WEALTH

What are the impacts of socially motivated housing development by nonprofit community development corporations (CDCs)? Since the beginning of the Great Society initiatives under then President Lyndon Johnson, myriad public and publicly sponsored nonprofit programs have addressed the needs of the urban disadvantaged. One of the more durable programs has been the CDCs. CDCs have been touted as the answer to rehabilitating blighted urban

and disconnected rural areas (Ford Foundation 1973). Although the activities of CDCs vary enormously, the vast majority focus on building wealth for the citizenry and community through the improvement of the residential housing stock and the provision of affordable housing for low-income populations within a specified geographic area (National Congress for Community Economic Development [NCCED] 1991). Operationally, they leverage investment grants and loans from public, private, and philanthropic interests for redeveloping the built environment in deteriorated and distressed neighborhoods and communities with the goal of empowering local citizens, both collectively and individually (Stoutland 1999; Zdenek 1987).

Numerous studies have focused on the efficiency of CDCs in completing projects, but there has been little emphasis placed on the benefits or outcomes accrued to those projects (Cowan, Rohe, and Baku 1999; Gittell and Wilder 1999). More specifically, there have been few systematic attempts to assess the neighborhood impact, in quantitative terms, of CDC presence relative to their ability to influence the real estate market (Berger and Kasper 1993). There are studies on the influence of residential construction on the sales price of existing homes within the broader context of the entire community (Ding, Simons, and Baku 2000; Simons, Quercia, and Maric 1998). Both of these studies examined the real estate market of Cleveland and the influence of government-subsidized housing projects across the entire city, but there has been no work directly linking similar investments of CDCs to the private real estate market. This study attempts to respond to this gap in the literature by presenting an analysis of the appreciation rate in residential property values in Center Township in the city of Indianapolis, Indiana. This is accomplished through observation of price index changes over the period from 1987 to 2000 in CDC-serviced areas (treatment) when compared to the area outside CDC boundaries within Center Township (comparison).

It is hypothesized that the reinvestment intervention of CDCs will stimulate a return of private investment in the area served. The resulting increased activity in the real estate market will drive increases in demand and provide upward pressure on the value of neighboring residences. The model results suggest that amid the numerous negative social factors contributing to the continued deterioration of CDC-designated neighborhoods, appreciation of the CDC zones is superior to those neighborhoods in the city not represented by CDCs. The study serves as a valuable first step in responding to policy makers' demands for quantitative evidence.

The remainder of this article is organized into the following sections. The next section outlines the background of CDCs, including the history, and the case of Indianapolis. The literature on the measurement of success or influence in urban development programs is then discussed. The empirical

analysis and the findings follow and include the development of a traditional ordinary least squares hedonic regression model. The conclusions and policy implications close the article and include suggestions for further research exploring the CDC investment influence on a more microscale to include an examination of clustering impacts and distance decay factors.

BACKGROUND LITERATURE

There is a wealth of literature touting the value of CDCs as the answer to stimulating economic activity in blighted communities. Many perceive CDCs as forming an essential core in an integrative program of community building through local-level empowerment complemented with outside funding. The literature suggests that community change is based on ordinary people who are moved to political action where they live and work, providing the one factor they lack—capital (NCCED 1994; Rubin 1994; Keating, Rasey, and Krumholz 1990; Shiffman 1989). As the theory holds, CDCs act as a conduit for cash from outside sources. This conduit carries with it the prospect of regenerating private investment and improving the economic health of the community (Ferguson and Stoutland 1999). Although CDCs have been the subject of extensive academic discussion, there remains limited support for their existence in the literature on economic theory or redevelopment policy. One question that has surrounded CDC activity is the level of effectiveness or impact of CDCs over their roughly 30-year life span (Rossi 1999; Twelvetrees 1997; Vidal 1992, 1995).

David Rusk (1999) argues against the merit of relying on local nonprofit organizations for urban redevelopment. The problems of urban America, according to Rusk, stem from federal, state, and local land-use policies that subsidize suburban development at the cost of providing services to the areas. He proposes a political strategy built around a coalition of interested parties, including city governments, civic and nonprofit groups, and developers, that links city centers and deteriorated urban areas with first-tier suburbs in a regional system of organizations. Although the discussion presented by Rusk is informative, it relies on a number of generalizations in rendering conclusions. Furthermore, Indianapolis CDCs, as with numerous CDCs, are linked to the broader economy through a hierarchy of organizations that include many of those suggested by Rusk (see Stoecker 1997 for further discussion on the CDC model within a regional development network).

A number of studies have suggested that CDCs are successful in the execution of development projects if the staff possesses the capacity to analyze the financial feasibility of a particular project (Wiewel and Weintraub 1990;

Keating 1990). In a study by Gittell and Vidal (1998), organizational competency as indicated by the perceived strength of the staff, director, and board was a success factor in CDC project completion. Success in planned projects, however, does not translate into measurable community impact. Dennis Keating (1990) reported that although CDCs have had a positive impact on their communities, the impact was minimal. Studies by Rubin (1994) and Pierce and Steinbach (1987) suggest that the impact of CDCs is not sufficient to alter the deterioration caused by market forces. Such a limited view of CDC impact is further touted by Marquez (1993) and Stoecker (1997), who suggest that positive results are not attributable to CDC efforts as there is little support for the theory that redevelopment would not have occurred despite their involvement.

Cowan, Rohe, and Baku (1999) identified the tenure of the executive director and a clear, concise mission statement as factors that increase efficiency of CDCs. They argued that organizations with a clear focus and a sense of purpose consistently outperformed organizations lacking a clear mission. Twelvetrees (1997) and Berger and Kasper (1993) identified connections to political officials and corporations as attributes that directly influence CDC outcomes and impacts. Finally, Gittell and Wilder (1999) identified four factors to CDC success: a clear mission, sophisticated staff, and political and financial capital.

None of the previously mentioned studies consider the impact on the residential real estate market. The influence of group home and public housing placement on neighborhood property values has been studied extensively with mixed results (Colwell, Dehring, and Lash 2000; Lyons and Loveridge 1993). The Colwell, Dehring, and Lash (2000) study found that residential properties proximate to publicly constructed group homes resulted in a decline in value following the announcement of a plan to construct a group home. Two studies of the impact of government-subsidized housing projects were performed on the Cleveland real estate market. Both Ding, Simons, and Baku (2000) and Simons, Quercia, and Maric (1998), using a cross section of residential sales, present findings that indicate that government-subsidized housing has a positive, though geographically limited, impact on residential values. Two earlier studies illustrate similar results indicating that local clusters of new construction positively affected existing residential property values (Segal 1977; Varaday 1989).

Quercia et al. (2000) performed a study on house price appreciation rates and market volatility in what they define as underserved areas within Dade County, Florida. Those areas identified as underserved are similar to the communities served by CDCs. The results from the study indicated that appreciation rates in underserved areas, defined on the basis of median

income, are at least as high or higher than those in other areas with volatility. A study by Schwartz (1999) of the subsidized housing program in New York City indicated that a well-funded program could have significant social impacts on the immediate community. The results of the study suggest that subsidized housing investments correlate most strongly with reductions in vacant units and vacant lots. Schwartz also provides significant correlations with reductions in welfare rolls and violent crime but uneven economic impacts. There remains, however, the question of the impact that *nonprofit* housing developers have on the local real estate market and if there is variability in appreciation rates over time between areas served by nonprofit CDCs and areas that are not.

CDCs IN A NUTSHELL

The participation of nonprofit organizations in the provision of housing for low-wealth households is not a new phenomenon. Since the settlement houses of the late nineteenth century, nonprofit organizations in the United States have built and operated a wide variety of housing developments. Roots of the modern CDC movement are traced back to the 1960s "gray areas" programs of the Ford Foundation and to the federal government's community action agency programs (Smith 1998; Robinson 1996). In theory, these programs were designed to demonstrate that grassroots nonprofit organizations could empower lower-income people both economically and socially by stabilizing the community and preserving the primary source of wealth for a family in the home (Berger and Kasper 1993). This focus was largely dictated by the source of program funding support that was directed toward housing provision. Although the concept is not new, the past two decades represent unprecedented growth in the prominence of nonprofit housing providers—specifically, CDCs—as front-line implementing agents of national housing policy (Schill 1994).

Avis Vidal (1995) defines community development as "a state of change in the institutional infrastructure locally available to develop and sustain productive members of the community." The change agent in this case is investment occurring in a community in the form of capital, labor, or activism. This is the realm of the CDCs, and the primary instrument is housing development and management with a sprinkling of business and economic development, commercial real estate rehabilitation, labor training, social/community services, and community financial services. CDCs produce multi- and single-family housing, rental housing, and for-purchase housing in fragile neighborhoods largely abandoned by private developers. They operate within a

realm of limited government regulation except when private-sector financial institutions are involved with lending.

The high locational risk associated with CDC neighborhoods limits the interest of traditional financial institutions. The data in Table 1 are based on the 1990 census user-defined boundaries for the Indianapolis neighborhoods and presents selected statistics for the CDC services areas and the comparison area in the Center Township.[1] The analysis is restricted to the Center Township in an attempt to limit the exogenous, uncontrollable differences between CDC neighborhoods and the comparison area. Township-level differences in the perceived quality of schools, variations in the willingness of township officials to provide low-income housing tax credits or affordable housing vouchers for the poor, the impact caused by the rebirth of the central city, relatively homogeneous construction quality, and accessibility to retail product and service providers all represent added concerns if the study is expanded outside the Center Township area.

The neighborhoods that the Indianapolis CDCs operate in are diverse, typically encompassing numerous census tracts, and they are in extreme disrepair in many cases. The deteriorated conditions of the community arguably regulate their potential influence. For example, the Riley area has an 11% owner occupancy rate. This suggests the likelihood of extensive absentee ownership, whereby the owners have a reduced motivation for investing in the community. The $6,954 median household income in the Near North Development Corporation service area is almost $15,000 below the average for the city of Indianapolis in 1990. An income deficiency of this magnitude prohibits the creation of homeowners from the existing population and suggests that CDCs will need to recruit buyers from outside the neighborhood. The area served by the Southeast Neighborhood Development Corporation has 9,100 housing units within its boundaries. It is likely that the size of the area and the number of homes unaffected by their presence could dampen any positive results.

Marion County, encompassing the city of Indianapolis, is divided into nine townships, and this analysis is focused on the most central of those nine—known as Center Township. Counties within Indiana are divided into townships for the purpose of developing school boundaries and for organizing service delivery. There are a total of 12 CDCs operating in Center Township in Indianapolis; Figure 1 divides the CDC service areas and comparison area within Center Township. In addition to the individual CDC neighborhood data, Table 1 also provides aggregated data for the neighborhoods both inside and outside the CDC service areas that are within the Center Township analysis area.
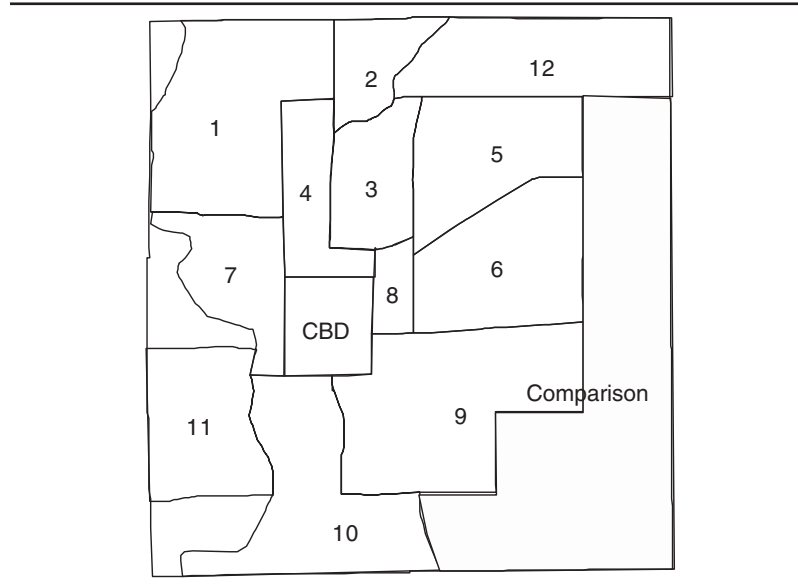
Figure 1:   Map of Center Township in Indianapolis

There is evidence that the comparison neighborhoods are more economically stable than the CDC neighborhoods. This claim is supported by the comparably high owner occupancy rate (61%) and the low vacancy rate (8%). Both owner occupancy and vacancy rates have been viewed as key indicators of the structural stability of a neighborhood (Twelvetrees 1997; Vidal 1995). Indianapolis's CDCs are outgrowths of local neighborhood organizations run by citizens with self-interest in improving the communities where they live. This is indicative of many CDCs across the country (Vidal 1995). The CDC boundaries were drawn to ensure coverage of the most deteriorated neighborhoods identified in a technical report released by the Indianapolis Department of Metropolitan Development in 1980.

The Indianapolis CDCs' central focus is on producing and rehabilitating residential properties and offering those properties as affordable housing in the form of rental and/or market-grade owner occupancy properties. In most neighborhoods where the Indianapolis CDCs operate, they represent the only investor/developer serving the community. Over the course of the 1990s, the Indianapolis CDCs were a dominant force in the market for housing development in the center-city neighborhoods. As an example, from 1991 to 1994,

TABLE 1:   Neighborhood, Treatment, and Comparison Characteristics

	Number of Households	Median Household Income	% of Households with Earnings	Number of Housing Units	% Owner-Occupied Housing	% Owned by African-Americans	% Vacant
BOS CDC (7)	621	22,250	92	685	0	0	7
Concord CDC (10)	6,729	21,853	76	7,375	51	1	8
Eastside Community Investments (6)	7,219	18,845	79	11,326	37	2	16
King Park Area Development (3)	4,034	13,145	71	5,283	19	13	25
Martindale Brightwood CDC (5)	2,904	14,213	69	1,193	40	39	23
Mapleton–Fall Creek Housing Development (2)	3,462	18,605	82	4,435	28	23	19
Near North Development Corporation (4)	2,339	6,954	52	2,637	11	11	18
Riley Area Revitalization Program (8)	2,797	14,679	66	3,632	11	1	21
Southeast Neighborhood Development Corporation (9)	7,606	17,877	77	9,098	46	2	15
United Northwest Area Development Corporation (1)	6,244	14,733	71	7,577	40	39	16
Westside Community Development Corporation (11)	5,265	16,303	75	6,142	43	18	15
United Northeast CDC (12)	3,334	19,345	76	3,831	55	2	11
Treatment/CDC areas aggregated	52,554	16,959	74	63,214	37	11	16
Comparison area or (neighborhoods outside CDC zones)	11,566	16,700	76	12,572	61	4	8

SOURCE: 1990 census user-defined area program in which the Census of Housing survey data are allocated by locally defined neighborhoods.
NOTE: CDC = community development corporation. The numerals (1-12) in parentheses following each neighborhood/CDC identify its location on the map shown in Figure 1.

the vast majority (96.4%) of all new residential construction in Indianapolis occurred in the suburban townships. During that period, only 468 of the 13,133 new units built in the city were located in Center Township, the area of study that has a concentration of the CDCs. According to construction inspectors for the city of Indianapolis, the CDC construction activity represents the lion's share of development in Center Township outside of the immediate central business district. For example, in 2000, approximately 75% of all CDC residential projects could be categorized as new construction and complete rehabilitation. Indianapolis CDCs have sold approximately 50% of all residential units as affordable housing, with the remainder retained as affordable rental properties.

The majority of the rental properties are partially financed through tax credits offered by the state of Indiana to encourage private investment in designated neighborhoods. Interviews with CDC executive directors revealed that many properties remain on the books as unsold because of difficulties in marketing. The respondents identified a set of reasons for this relationship. First, there is a relatively small pool of potential buyers with significant, stable earnings to support a mortgage, even at affordable prices, who could also qualify as a low-income family. According to data from a 1997 CDC performance report prepared by the OMG Center for Collaborative Learning (1997), the percentage of households that can afford a market-rate home in the Center Township CDC neighborhoods ranges from 28% to 60% by CDC area, and the percentage of households that can afford a CDC-offered home ranges from 28% to 72%, again by CDC area.

Second, low-income families, saddled with more constraints than their more financially stable counterparts, will still make housing purchase decisions with concern for threats such as crime and wealth preservation. Third, like many other CDCs across the country, Indianapolis's CDCs must operate within a specific geographic area and are restricted to purchasing properties from a relatively small pool that are typically not marketable. Under these constraints, CDCs select sites that are often the most physically distressed, representing the largest and/or most obsolete architectural mechanical construction in areas that private investors do not venture, which further limits the marketability of their houses. On another front, the costs to CDCs for constructing new and rehabilitated housing in a scattered-site approach on existing urban lots drives up the development costs to the point where CDC housing no longer competes with the market as an affordable alternative. Indianapolis CDCs have only recently begun to develop productive communications with the real estate brokerage community. In fact, real estate brokerage fees are typically not included in CDC development budgets. CDCs that are successful in marketing their homes are largely those that locate

buyers through word of mouth or through the positioning of the CDC within the community as the place to find a home.

Despite the obstacles to success, CDCs in Indianapolis continue to be productive and provide affordable alternatives to rental housing provided by absentee owners. The number of housing units produced by the local CDCs has increased markedly over the observation period. In 1989, the Indianapolis CDCs reported having constructed or completely rehabilitated a total of approximately 471 homes and repaired 1,692 others. By 2000, the CDCs had completed approximately 2,375 housing units and repaired 5,350 others, suggesting an active network of local nonprofit housing developers (Weinheimer & Associates 1997). The focus of Indianapolis's CDCs has shifted; in 1989, a substantial portion of the CDC projects was repairing existing houses, but the concentration has now moved to new construction and rehabilitation.

The following analysis uses a model developed to assess the influence of CDC presence on the rate of appreciation of residential real estate in Center Township in Indianapolis, Indiana (see Figure 1). The data set includes 1,375 residential sales from 1987 and from the second quarter of 1999 through the second quarter of 2000.[2] The study period is relevant as it encompasses the decade of the 1990s, a period of rapid expansion of CDC activities in Indianapolis. In 1990, under the direction of then Indianapolis Mayor William Hudnut, city leaders, with funding primarily provided by the Lilly Endowment (Lilly) of the Lilly Pharmaceutical firm, established the Indianapolis Neighborhood Housing Partnership (INHP). Through INHP, Lilly distributes annual core operating grants to the 14 CDCs in the city, including the 12 under study here.[3] The city's Department of Metropolitan Development relies on INHP to funnel a portion of the federal community development block grant and housing and urban development program funds to the CDCs. In addition, the INHP has been established as the CDC oversight intermediary linking financial institutions seeking Community Reinvestment Act credits with CDCs and low-income housing purchasers.

ANALYTICAL DESIGN

The returns to private investment in real property over time and across geographic boundaries provide insight into the influence of CDC presence in quantitative terms. The analysis is performed with a traditional ordinary least squares hedonic regression. Private investment can be divided into three factions: (1) gentrification by "urban/rural pioneers" or owner occupants, (2) purchases by absentee owners seeking normal or extraordinary profits, and

(3) public and nonprofit development mechanisms designed to influence the housing market. Hedonic price indices of single-family residential sales are created for Center Township in Indianapolis, allowing for comparison of appreciation rates between housing markets within and outside the 12 CDC service areas.

HEDONIC MODEL SPECIFICATION

Hedonic price modeling is widely used in the analysis of real estate markets and has recently been traced back to a 1922 thesis prepared by G. C. Hass (Colwell and Dilmore 1999). The current theory behind hedonic modeling is based on the consumer behavior studies of Kevin Lancaster (1966). Preferences for consumption goods are determined by the utility that people derive from a set of characteristics inherent in those goods that are traded in private markets. Hedonic modeling has been accepted as a viable method for developing the value of a durable good, such as real estate, on the basis of shadow prices of components of that good by differentiating the good into a bundle of attributes with varying qualities and quantities. More specifically, the hedonic regression model relates the price of an asset to all of the attributes (or characteristics) that theoretically affect its value, thereby allowing for recovery of implicit prices of nonmarket qualities based on observations of transactions in private markets, where a good with weak complementarities to the attribute in question is traded (Smith 2000). In the hedonic model for residential real estate, the unitdividual residence, and the dependent variable is the natural log of t of observation is the inhe selling price used as a proxy for market value.

The dependent variable is transformed to the natural log for the purpose of interpreting the appreciation rates between the CDC neighborhoods (treatment area) and the neighborhoods not serviced by a CDC (comparison area).[4] The general form of the hedonic model is as follows:

$$\ln P_{it} = \beta_j S_{jit} + \beta_m L_{mit} + \beta_t R_{ti} + \beta_d K_{dit} + \beta_{dt} F_{dit} + e_{it}, \tag{1}$$

where the notation is as follows:

$\ln P_{it}$ = natural log of the sales price of residential unit i in an arm's-length transaction at time $t = 2000$ or $t – 1 = 1987$, $i = 1, \ldots n$;

S_{jit} = a vector of coefficients on structural and lot characteristics S_{jit}, including building square footage, construction materials, condition, year of construction, rooms, fireplaces, garages, and lot size;

$L_{mit} =$ a vector of coefficients representing endogenous locational attributes L_{mit}, including measures of crime, welfare dependency, and a set of distance bands representing distance from the central business district;[5]

$R_{ti} =$ a time-dichotomous variable with a value of 1 if the ith house was sold in 2000 (period t) and 0 if the house was sold in 1987 (period $t - 1$);

$K_{dit} =$ a dichotomous variable representing comparison and treatment, coded 1 if the observation is located in a neighborhood serviced by a community development corporation and 0 otherwise;

$F_{dit} =$ a vector of interaction variables identifying the location of observations as either within or outside of a CDC service area d and if those observations sold in 1987 or 2000;

$e_{it} =$ the random error. For purposes of this model, it has an assumed mean = 0, and variance is σ^2.

The variables represented by the coefficient β_{dt} are the variables of focus as they provide the time and location differential. The three dimensions—structure, neighborhood quality, and access—are in keeping with the literature on house price estimation (Quercia et al. 2000). The comparison/treatment and time variables are incorporated specifically to address the question of appreciation variances across the sample and are similar to those applied by Chung, Waddell, and Berry (1997) to study the spatial/temporal influences of the Dallas housing market. According to Quercia et al. (2000), the effect of neighborhood and structural components can vary across neighborhoods and locations. For example, the increased investment can trigger increases in localized pricing caused by local desirability factors and the higher potential profits associated with a positive sloping price curve. Likewise, decreased investment can also be attributed to the characteristics of the immediate neighborhood such as the level of crime, local income levels, the presence of pollution, and/or other uncontrolled externalities.

The expectation is that the positive externality associated with the nonprofit development in a CDC neighborhood will increase the value of the mean residential sales value at a faster rate than the mean value of houses in neighborhoods outside of CDC service areas and within the Center Township. Table 2 presents descriptions and selected summary statistics for the variables used in the study. Data for the analysis were compiled from a number of sources. The closed sale records for Center Township in Indianapolis for 1987 and from the fourth quarter of 1999 through the third quarter of 2000 were provided by the Indianapolis Metropolitan Board of Realtors and include structural and site characteristics along with location. Observations with incomplete data were cleaned with information from the Center

**TABLE 2:   Summary Statistics of Aggregate Data for 1987 and 2000
(N = 1,375)**

Variable	Mean	SD	Minimum	Maximum	Variable Description
LnSalesPrice	10.366	0.636	7.31	13.07	Natural log of sales price
Crawl_space	0.215	0.411	0.00	1.00	Coded 1 if structure on crawl, else 0
Frontage	45.468	15.554	20.00	200.00	Linear feet of road frontage
Lot_size	8.682	0.412	7.09	12.92	Natural log of total lot size
Garage	0.704	0.457	0.00	1.00	Coded 1 if garage present, else 0
Central_air	0.412	0.492	0.00	1.00	Coded 1 if central air-conditioning
Fireplace	0.316	0.465	0.00	1.00	Coded 1 if fireplace present, else 0
Condition	2.556	0.856	0.00	4.00	Subjectively coded 0 through 4, with 4 = *best*
Vynl_Side	0.537	0.500	0.00	1.00	Coded 1 if aluminum or vinyl siding
Stone_ext	0.031	0.174	0.00	1.00	Coded 1 if stone exterior, else 0
Brick_ext	0.136	0.342	0.00	1.00	Coded 1 if brick exterior, else 0
Total_Rooms	6.045	1.400	0.00	12.00	Total number of rooms
Square_footage	1,280.186	530.536	440.00	4,068.00	Square feet of living space
Age	4.052	0.544	0.41	5.11	Natural log of age
Ratio_bath_beds	0.514	0.200	0.20	1.50	Number of bathrooms/number of bedrooms
Total_baths	1.342	0.578	1.00	5.00	Total count of full and half bathrooms
Square_to_baths	1,021.367	405.058	287	3,686	Square footage/total bathrooms
Beds_squared	7.918	4.914	1.00	36.00	Number of bedrooms squared
Gas_heat	0.920	0.273	0.00	1.00	Coded 1 if heated by gas, else 0
Comparison	0.399	0.490	0.00	1.00	Coded 1 if house is outside of CDC service area, else 0
Yr00	0.370	0.483	0.00	1.00	Coded 1 if house sold in 2000, else 0
In87	0.362	0.481	0.00	1.00	Interaction variable coded 1 if house is located in CDC service area and sold in 1987, else 0
Out87	0.268	0.447	0.00	1.00	Interaction variable coded 1 if house is located outside CDC service area and sold in 1987, else 0
In00	0.239	0.427	0.00	1.00	Interaction variable coded 1 if house is located in CDC service area and sold in 2000, else 0
Out00	0.131	0.338	0.00	1.00	Interaction variable coded 1 if house is located outside CDC service area and sold in 2000, else 0

TABLE 2 (continued)

Variable	Mean	SD	Minimum	Maximum	Variable Description
Gun_arrests98	0.684	1.330	0.00	8.00	Number of violent crime by tract 98
TANF98	4.877	0.791	1.61	5.97	Natural log of TANF recipients, tract 98
Foodstamps	11.106	5.225	1.24	27.69	% of population by tract obtaining Food Stamps
Med_income	4.125	0.252	3.37	4.70	Natural log of % of MSA median income by tract
Mile 1	0.021	0.144	0.00	1.00	Coded 1 if the observation is within 1 mile of the central business district, else 0
Mile 2	0.223	0.417	0	1	Coded 1 if the observation is between 1 and 2 miles of the central business district, else 0
Mile 3	0.346	0.476	0	1	Coded 1 if the observation is between 2 and 3 miles of the central business district, else 0
Mile 4	0.410	0.492	0	1	Coded 1 if the observation is between 3 and 4 miles of the central business district, else 0

NOTE: The data represent sales involving a licensed real estate broker during 1987 and from the last quarter of 1999 through the third quarter of 2000. The information was obtained from the published records of the Indianapolis Board of Realtors and provided by the Center for Real Estate Studies, Indiana University Kelley School of Business. The statistics are associated with 1,375 observations remaining after the data were cleaned for missing observations. A number of sociodemographic variables have been incorporated into the models. These data were provided by the Polis Center and are compiled in their SAVI data sets for the state of Indiana and for metropolitan Indianapolis. CDC = community development corporation; MSA = metropolitan statistical area; TANF = Temporary Assistance for Needy Families.

Township Assessor's records. A total of 1,375 residential sales transactions are used after cleaning for missing observations.

Tract-level information such as the number of arrests for gun-related crimes committed in a given year, median incomes, the percentage of the population receiving Food Stamps, and so forth was obtained from the Polis Center.[6] Mortgage activity in the form of conventional loan activity by tract level is included as a proxy for real estate turnover rates. It was shown by Hu and Thibodeau (2001) that the level of real estate transaction activity was positively correlated with housing price appreciation. Distance from the central business district was obtained by geocoding the observations and allocating those observations in a range from 1 to 4 miles, with no observation exceeding 5 miles.

TABLE 3:   Summary Statistics of the Data by Year and by Treatment Versus Comparison

Variable	Year 1987 (n = 866)		Year 2000 (n = 509)		In CDC Areas (n = 548)		In Comparison Areas (n = 827)	
	M	SD	M	SD	M	SD	M	SD
LnSalesPrice	10.225	0.527	10.606	0.727	10.546	0.413	10.247	0.724
Crawl_space	0.196	0.397	0.248	0.432	0.241	0.428	0.198	0.399
Frontage	46.134	15.600	44.336	15.427	48.558	16.649	43.421	14.433
Lot_size	8.700	0.391	8.653	0.443	8.749	0.385	8.638	0.423
Garage	0.738	0.440	0.646	0.479	0.830	0.376	0.620	0.486
Central_air	0.359	0.480	0.503	0.501	0.516	0.500	0.343	0.475
Fireplace	0.348	0.477	0.261	0.440	0.283	0.451	0.337	0.473
Condition	2.678	0.752	2.348	0.976	2.807	0.681	2.389	0.918
Vynl_Side	0.494	0.500	0.609	0.489	0.631	0.423	0.474	0.500
Stone_ext	0.036	0.186	0.024	0.152	0.401	0.197	0.025	0.157
Brick_ext	0.156	0.363	0.102	0.303	0.139	0.346	0.134	0.341
Total_Rooms	5.913	1.306	6.269	1.510	5.757	1.125	6.236	1.521
Square_ footage	1,268.130	523.847	1,300.697	541.628	1,088.900	340.051	1,406.940	592.678
Age	3.967	0.535	4.200	0.527	3.926	0.414	4.135	0.601
Ratio_bath_ beds	0.507	0.195	0.525	0.201	0.498	0.179	0.524	0.208
Total_baths	1.309	0.549	1.400	0.621	1.243	0.478	1.408	0.628
Square_to_ baths	1,036.417	425.142	995.760	367.370	934.484	305.811	1,078.938	450.183
Beds_squared	7.829	4.987	8.069	4.789	7.093	3.897	8.464	5.418
Gas_heat	0.917	0.276	0.923	0.266	0.938	0.242	0.907	0.291
Comparison	0.425	0.495	0.353	0.479				
Gun_arrests98	0.607	1.216	0.813	1.500	0.699	1.222	0.674	1.398
TANF98	4.840	0.792	4.939	0.785	4.588	0.780	5.068	0.738
Foodstamps	10.555	4.999	12.044	5.467	7.569	3.552	13.450	4.822
Med_income	4.145	0.245	4.090	0.262	4.279	0.148	4.022	0.255
Mile 1	0.017	0.131	0.028	0.164			0.035	0.184
Mile 2	0.212	0.409	0.242	0.429			0.371	0.483
Mile 3	0.350	0.477	0.338	0.474	0.277	0.448	0.391	0.488
Mile 4	0.420	0.494	0.393	0.489	0.723	0.448	0.203	0.403

NOTE: For definitions of variables, see Table 2.

Table 3 illustrates summary statistics for the data divided by the two observation years. All characteristics remain relatively stable across the time periods, save for the price and the age. In areas where there is demolition and new construction, the variable measuring the age of the house often lags behind, depending on the level of new residential construction activity. This is not observable in Table 3 because the vast majority of new residential

construction in Center Township, during the observation period, was initiated by CDCs. CDC residences are not included in this study because the study objective is to assess the influence on private investment of CDC construction activity. CDC observations are not consistent with the observed sales as CDC properties in Indianapolis are not sold in arm's-length transactions with the aid of a realtor, and their buyers are selected and must qualify as low-income households. Furthermore, the motivations of CDCs to provide affordable housing often result in a sales price that is deeply discounted through government incentives.

RESULTS FROM THE MODEL

The results from the ordinary least squares model are given in Table 4. The data have been run as a single aggregate model and as two separate models for the two years of observation. A concern with the prospect of endogeneity in the independent variables warranted a test derived from a Durbin-Wu-Hausman test. Davidson and MacKinnon (1993) suggest structuring an augmented regression test that includes the residuals of each endogenous right-hand side variable, as a function of all exogenous variables, in a regression of the original model. The conclusions from this test suggested that endogeneity was not a serious concern.

The parameters of primary interest are those for the dichotomous interaction variables In87, In00, and Out00, which measure the differences in value over time t for the comparison and treatment areas d for 1987 and 2000 (the variable Out87 is the base variable and repr0esents sales observations outside of CDC services areas that sold in 1987) (Butler 1982). The principle hypothesis asserts that, despite the negative factors associated with CDC zone neighborhoods, the presence and activities of CDCs enhance the return opportunities that stimulate private investment.[7] This influence is expected to manifest itself in the time/location variables as a superior appreciation index for the mean residence in the treatment (CDC) area when compared to the comparison area. The appreciation estimates obtained from the dichotomous interaction variables representing the mean values inside and outside the CDC service areas are computed using the formula developed by Halvorsen and Palmquist (1980) for interpreting dummy variables in semilogrithimic equations as follows:

$$I^* = 100[\exp(\beta_{dt}) - 1]. \tag{2}$$

The values of the parameter estimate for In00 and Out00 result in a nearly identical 62.42% and 64.87% respective appreciation over the study period from the mean price of those observations in the comparison area that sold in

TABLE 4:   Ordinary Least Squares Model Results

Variable	Model 1: Aggregated	t-Value	Significance	Model 2: Year 1987	t-Value	Significance	Model 3: Year 2000	t-Value	Significance
Constant	10.482	24.28	0.000	10.342	18.43	0.000	10.735	15.46	0.000
Crawl_space	−0.064	−2.82	0.039	−0.071	−2.45	0.014	−0.076	−2.02	0.044
Frontage	0.002	2.06	0.036	0.002	1.45	0.149	0.002	1.11	0.269
Lot_size	0.047	1.52	0.129	0.053	1.30	0.193	0.056	1.14	0.253
Garage	0.152	7.15	0.000	0.153	5.89	0.000	0.144	3.85	0.000
Central_air	0.148	7.30	0.000	0.126	5.35	0.000	0.161	4.07	0.000
Fireplace	0.083	3.88	0.000	0.072	2.90	0.004	0.101	2.44	0.015
Condition	0.330	26.40	0.000	0.302	19.07	0.000	0.351	15.86	0.000
Vynl_Side	0.051	2.40	0.016	0.075	2.98	0.003	0.002	0.04	0.964
Stone_ext	0.124	2.34	0.020	0.166	2.77	0.006	0.042	0.38	0.705
Brick_ext	0.128	4.26	0.000	0.167	4.89	0.000	0.060	0.98	0.328
Total_Rooms	0.015	1.49	0.137	0.029	2.12	0.034	−0.001	−0.09	0.932
Square_footage	0.311e-03	5.33	0.000	0.257e-03	3.50	0.000	0.330e-03	3.34	0.001
Age	−0.124	−6.60	0.000	−0.124	−5.30	0.000	−0.124	−3.83	0.000
Ratio_bath_beds	−0.480	−3.91	0.000	−0.487	−3.38	0.001	−0.393	−1.70	0.089
Total_baths	0.166	2.67	0.008	0.188	2.47	0.014	0.130	1.19	0.236
Square_to_baths	−0.191e-3	−2.84	0.005	−0.182e-03	−2.22	0.027	−0.131e-03	−1.08	0.281
Beds_squared	−0.013	−3.10	0.002	−0.015	−2.94	0.003	−0.008	−0.97	0.333
Gas_heat	0.065	2.00	0.045	0.004	0.10	0.92	0.191	3.09	0.002
In00	0.485	14.79	0.000				−0.036	−0.73	0.467
Out00	0.499	16.04	0.000						
In87	−0.087	−3.03	0.003	−0.082	−2.69	0.007			

TABLE 4 (continued)

Variable	Model 1: Aggregated	t-Value	Significance	Model 2: Year 1987	t-Value	Significance	Model 3: Year 2000	t-Value	Significance
Gun_arrests98	−0.019	−2.66	0.008	−0.017	−1.86	0.063	−0.026	−2.36	0.019
TANF98	−0.012	−0.66	0.513	−0.028	−1.24	0.216	−0.007	−0.19	0.847
Foodstamps	−0.030	−7.65	0.000	−0.027	−5.37	0.000	−0.032	−4.98	0.000
Med_income	−0.144	−2.11	0.035	−0.128	−1.48	0.140	−0.122	−1.08	0.282
Mile 2	−0.540	−7.40	0.000	−0.402	−4.14	0.000	−0.632	−5.50	0.000
Mile 3	−0.553	−7.59	0.000	−0.396	−4.14	0.000	−0.657	−5.55	0.000
Mile 4	−0.571	−8.03	0.000	−0.407	−4.38	0.000	−0.710	−6.09	0.000
Number	1,375			866			509		
Adjusted R^2	0.747			0.660			0.785		

NOTE: For definitions of variables, see Table 2.

1987. The appreciation estimate for those observations in the CDC service area must, however, be adjusted by the variable In87, which indicates that the value of the mean house in 1987 was lower in the CDC treatment area than in the comparison area by approximately 7.79%. This would indicate that the appreciation rate of the treatment area between 1987 and 2000 was higher than in the comparison area.

The results from the two single-year models suggest a similar outcome. The value of the mean sales observation in 1987 in the treatment area was approximately 7.14% lower than in the comparison area. In the model for the year 2000 observations, the lack of significance in the parameter estimate for the variable In00 suggests that there is no significant difference between the mean value of the house in the treatment and comparison areas. Again, the conclusion is that the appreciation rate in the CDC treatment area is superior.[8]

CONCLUSION

Although the findings from this analysis are enlightening, cautious enthusiasm is warranted in implying causality directly to CDCs on the basis of this model. CDCs are but a single unit in a garrison of public and nongovernmental entities working to combat urban decay in Indianapolis's more degraded areas. Controlling for the involvement of other organizations in a parsimonious model would be a daunting proposal and would likely dilute the value of the findings. Many alternative support units (neighborhood community organizations, church groups, small-business enhancement programs, and urban enterprise zones) conduct activities outside as well as inside CDC boundaries. Implicitly, one would expect the activities of such groups to influence community well-being and property values in a similar manner whether in or outside of CDC boundaries. As was previously discussed, this concern is mitigated by the fact that CDCs are the primary developers in their respective areas. Local officials report that CDCs are the sole development entity in many of the CDC neighborhoods. Interviews with representatives from Habitat for Humanity and the Local Support Initiatives Corporation revealed that the redevelopment projects of both entities are located equally across the CDC neighborhoods and the comparison area.

An additional concern is the possibility of spatial interaction. The CDC boundaries are often drawn on historical neighborhood characteristics that no longer apply. In addition, CDCs frequently focus their efforts on pockets within their area that serve as anchors in a strategy aimed at diffusion of influence. To avoid a hollowing-out effect of the core as their efforts expand geographically, CDCs will locate anchor project(s) adjacent to stable areas.

Typically, those stable or gentrifying areas are along the boundaries of CDC neighborhoods. The intended effect of this placement is a two-way spillover. The CDC planners anticipate that the influences of the stable community will spill over their boundaries: The stable community benefits from a publicly funded buffer to deterioration in the form of new and rehabilitated housing. This interaction of influences limits the explanatory power of the location variables (in this case, the CDC zones). This concern is enhanced by the arbitrary nature of the community boundaries assigned to the Indianapolis CDCs. Rossi (1999) suggests, however, that such target boundaries may not be exactly "right," but they may be acceptably approximate because CDC boundaries frequently coincide with those of contiguous small geographic areas that have already been defined and for which useful data have already been collected.

A more micro-level modeling approach that explores appreciation rates within neighborhoods and as a function of the distance from CDC investment will bolster the findings presented here. Such an approach would include an analysis of the effects of clustering housing investment and the influence of distance. In addition, a comparison between CDCs based on organizational characteristics would contribute to our understanding of the relationship between nonprofit capacity and performance measurement.

CDC evaluation is often predicated on the number of units produced. Variances in this activity level are based on a host of internal and external factors, including management capacity, length of existence, partnership relations with public and private entities, zoning, and the level of deterioration facing particular CDCs. As one tool of urban economic development, the Indianapolis CDCs are seen as essential to providing the local citizenry with the capacity to improve their community.

There are, however, alternative uses for the funds available to CDCs, and calls for accountability are growing louder with each reduction in federal funding. This study provides an alternative view of performance that addresses one of the ultimate outcome goals of most housing-focused CDCs: the economic stabilization of a neighborhood. The study further serves as a valuable starting point for policy makers seeking quantitative evidence that moves beyond simple output figures. Increasing the wealth within a community is one way of arresting the chronic deterioration that is plaguing urban neighborhoods across the country. Such information would also be of value to practitioners as they seek to respond to questions of performance and find measures that articulate their objective.

The findings for the CDCs in Indianapolis suggest that redevelopment activities within the CDC zones may be altering the detrimental effects on the real estate market caused by deterioration and neglect. Although CDCs are

not a panacea for all the social ills attributed to urban decay, they have become ingrained in the political apparatus as grassroots policy-implementing agents designed to connect the local citizens to outside capital sources. Initiated with little fanfare, limited capital and political resources, and still less labor experience, the CDC industry has grown from a scattering of efforts to a nationwide movement. If government policy and foundation support is to continue, it will be increasingly important to identify those change elements that can be measured and isolated. The residential appreciation rate, with the potential to directly increase the wealth of the local citizens, represents one viable performance measure that can be adopted across the CDC industry as a whole.

NOTES

1. User-defined boundary (UDB) data are data from the 1990 U.S. Bureau of the Census housing survey data, which are configured to fit boundaries recognizable by typical and potential users. In the mid-1990s, the Census Bureau developed UDB data for the 20 largest cities. In Indianapolis, the UDB data are synonymous with the community development corporation (CDC) service area boundaries.

2. Restricting the analysis to single-family residential structures represents a limitation of the study based on the findings of Tong and Glascock (2000), who observed variability in appreciation rates between residential structure types.

3. As of the end of fiscal year 2000, the total funding contribution made by the Lilly Endowment over the proceeding 10 years to support the housing development work of the CDCs was in excess of $70 million.

4. A Box-Cox transformation was attempted on the dependent variable, with no improvement in the model's explanatory power.

5. Although Indianapolis is a typical polycentric midwestern city, the area of study does not exceed beyond 4 miles outside the central business district, suggesting that the greatest employment and service center gravitational pull occurs from the city center.

6. The Polis Center is a social research center based on the campus of Purdue University at Indianapolis. The center provides geocoded social, demographic, economic, and real estate–based data for central Indiana, including Indianapolis.

7. It is acknowledged that numerous goals for community development corporations are largely contingent on the needs of the local community being served. In Indianapolis and elsewhere, however, CDCs are being called on to justify their existence with quantifiable results, and increasing local wealth represents one way of responding to the demand for information.

8. Additional models with a spatial autoregressive lag variable included for spatial autocorrelation and spatial heterogeneity were run with results similar to those reported in this article.

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