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Why Don't Enterprise Zones Work?

Estimates of the Extent that EZ Benefits are Capitalized into Property Values

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Abstract. The study examines the impact of local Enterprise Zones (EZs) on commercial and industrial property values. Currently, 43 states have established EZ programs to target development incentives to economically distressed areas. While there is a substantial body of literature analyzing the effectiveness of EZ programs, the research has yielded varied findings. The varied results of EZ programs could potentially arise as EZ property values are bid up by businesses seeking to expand or locate operations in the EZs. This would reduce amounts that these businesses would otherwise spend on capital assets or labor. A hedonic price model is estimated to determine the effect of EZ status and nearby EZ activity on property values. The empirical results imply that EZ status may, in some instances, have a positive impact on EZ property values. However, the empirical results also suggest that these potential price effects may diminish as EZs are designated in other nearby locations.

1. Introduction

Enterprise Zone (EZ) programs have become one of the primary economic development policies employed by state and local governments to encourage business investment in economically distressed and blighted urban areas. According to the National Conference of State Legislatures (2005), 43 states currently have laws that authorize EZs and regulate their establishment and operation. In these states, approximately 3,600 EZs operate, with state totals ranging from a low of one EZ in New Mexico to a high of 1,740 in Louisiana. The foundation of all EZ programs is the set of economic incentives utilized to attract business investment and employment to the economically distressed areas comprising the EZs. The EZs provide a mechanism for targeting incentives to businesses that choose to operate in economically distressed urban areas. The incentive programs may utilize infrastructure improvements, new and improved public services, regulatory relief, tax abatements and incentives, training programs, and financial assistance to encourage business expansions or location of new businesses. Most often, however, EZ programs have gravitated to tax abatements and incentives to subsidize business purchases of capital assets, production materials, and labor. The abatements and incentives reduce production costs incurred by targeted businesses and enhance their profitability, thus, creating a business climate favoring sites in EZs and encouraging business establishments and expansions that would otherwise not occur in the EZs.

This study examines the impact of EZs, and the development incentives provided to businesses occupying EZ sites, on local property markets. A hedonic price model is estimated to measure the effect of EZ status on commercial and industrial property values. Assuming that development incentives make EZ sites more attractive than similarly situated non-EZ sites, the rental or sale value of EZ property is expected to be higher, on average, than similarly situated non-EZ property. Parcel-level property sales data from Cleveland, Ohio are employed to estimate this relationship. The data spans the period 1984 to 1993 when EZs were initiated in Cleveland, Ohio and neighboring suburban areas. The sample includes both non-EZ properties and properties located in eight Cleveland area EZs.

The study improves on prior research by reducing the unit of analysis from the state- or place-level to parcel-level EZ and non-EZ property data. By using micro-level property data, estimated economic effects

of EZs do not rely on aggregate shifts in impact measures. The estimating model used in this study also improves on prior research estimating the effects of EZs on property markets because it controls for various structural and spatial factors other than EZs that influence property values. If certain property attributes are systematically different in EZs the lack of control for these differences could potentially bias the estimated price effects attributed to EZ status. Ultimately, this study provides important information to planners, public managers, and policymakers regarding the potential impact that local property markets have on EZ program effectiveness. The EZ price effects have implications for the extent to which incentives are shifted from businesses to owners of EZ property either through rental or sales values. The price effects also have implications relating to whether the incentives ultimately improve the profitability of EZ businesses and encourage business establishments and expansions within the EZs.

2. Literature Review

2.1 Previous Enterprise Zone Studies

A substantial body of literature has grown over the years examining the extent to which Enterprise Zone (EZ) programs spur investment and employment in distressed urban areas. In particular this research focuses on estimating the impact of EZs on business location decisions, business capital investment levels, and employment. Generally, the evaluative literature indicates that EZ programs have a positive economic impact. HUD (1986) and Elling and Sheldon (1991) suggest that EZ programs have a positive impact on business location decisions. As well, Rubin and Wilder (1989), Erickson and Friedman (1990), Rubin (1991), Papke (1993, 1994), and Dowall (1996) suggest that EZ programs have a positive impact on investment and employment levels. Overall, Wilder and Rubin (1996) suggest that the evaluative literature consistently finds that EZs are linked to increases in economic activity that are not typical for similarly situated urban areas. However, the evaluative literature reveals that the economic impacts of EZs, albeit mostly positive, vary considerably in magnitude over time, between EZs, and between states and localities. Wilder and Rubin (1996, 480) echo this conclusion when they state that:

> *[I]n certain urban areas, enterprise zones have failed to generate significant economic growth. Every study that examined data from multiple cases revealed variable outcomes. Variability in job growth and investment was found between state programs, as well as between zones within the same state. In some zones, job losses easily outnumbered marginal increases.*

In contrast to the positive program effects outlined above, analyses by Logan and Barron (1991) and Grasso and Crosse (1991) regarding the employment effects of EZ programs were inconclusive. GAO (1988) and Dabney (1991) suggest that EZ programs have a negative impact on employment measures and business location decisions. Papke (1993, 1994) and Boarnet and Bogart (1996) utilize similar methodologies to estimate the impact of EZs on city employment levels in Indiana and New Jersey, respectively. While Papke finds that EZs have a positive impact on employment, Boarnet and Bogart fail to find a significant relationship between EZs and employment levels.

Several comparative studies cited above also provide compelling evidence that EZ program outcomes can vary substantially over time and between EZs (HUD 1986; Erickson and Friedman 1990, Elling and Sheldon 1991, Dowall 1996). Dowall (1996) found substantial variation in employment and investment change among California EZs. While all but one of California's EZs experienced job growth from 1986 to 1990, changes in EZ employment levels ranged from a 2.1 percent decline to an 81.6 percent increase. Meanwhile, all but three of the EZs experienced an increase in business establishments, with the change ranging from a 7.7 percent decline to a 57.7 percent increase. Similarly, Erickson and Friedman (1990) and Elling and Sheldon (1991) found substantial *interstate* variability in EZ investment and employment effects. Erickson and Friedman examined employment and investment changes in 357 EZs located in 186 communities across 17 states. Variation in jobs created and retained, business establishments and expansions, and investment was substantial. For each measure, the standard deviation exceeded the average, with differences ranging from 21 percent to over 300 percent greater than the mean value. Elling and Sheldon examined job creation and job retention in 47 EZs located in Illinois, Indiana, Kentucky, and Ohio. Annual performance ranged from 102 to 243 jobs created and 84 to 600 jobs retained. Moreover, business investment per EZ ranged from $700,000 to $218 million, with the number of firms making investments ranging from one to 69 per EZ.

Wilder and Rubin (1996, 480-81) suggest that variability of EZ performance shows the limitations of these programs. They argue that EZs can not overcome "all [of] the physical, social, and economic barriers to revitalization" that persist in economically distressed areas. One potential barrier to EZ outcomes

may be capitalization of tax abatement and incentive policies into EZ property values. Tax abatements and incentives would lead to an increase in EZ property values which would diminish the production cost effects these abatements and incentives are supposed to achieve. With the exception of Papke (1993) and Boarnet and Bogart (1996), the evaluative literature outlined above does not investigate the potentially important impact that land capitalization could have on the efficacy of EZ programs.

2.2 Capitalization and Enterprise Zones

Several studies have either modeled the potential impact of capitalization on EZ programs (Norcliffe and Hoare 1982, Landers 2000) or have empirically tested for the presence of this phenomenon (Erickson and Syms 1985, Boarnet and Bogart 1996, Engberg and Greenbaum 1999). Landers (2000) models the potential EZ capitalization effect and the supply conditions that may cause the magnitude of the EZ capitalization effect to vary. This model suggests that tax abatements and incentives provided to businesses in EZs will improve the relative desirability of EZ properties. Since EZ property is immobile, increasing demand would tend to drive-up property values provided the supply of EZ sites is fixed. Under these conditions, the fiscal differentials between EZ properties and non-EZ properties would be capitalized into EZ property values. This suggests, however, that the magnitude of the capitalization effect could vary depending upon the elasticity of supply for EZ property at any given time in an urban area. As a result, the most pronounced capitalization effects are expected to arise in the least distressed EZs, where demand for resources is relatively high. Conversely, a capitalization effect may not arise at all in the most distressed EZs where there is little, if any, demand for zone resources.

Empirical estimates of capitalization related to EZ status suggest that resource shifting from EZ businesses to EZ property owners may occur under some circumstances. Erickson and Syms (1985) analyzed trends in rental rates for industrial property located in and around several EZs in Great Britain. The time frame of the analysis spanned the designation of these EZs. The trend estimates suggest that the EZs created a dual property market. While industrial properties just outside the periphery of the EZs exhibited a substantial real decline in rental rates, EZ properties exhibited a substantial real increase in rental rates. Erickson and Syms estimate that almost two-thirds of the value of the tax abatements provided to land and fixed capital in these EZs was capitalized into rental rates.

Boarnet and Bogart (1996) regress indicators of EZ designation on a time-series of municipal level property values to estimate the EZ capitalization effect. Data spanning nine years (1982 to 1990) from a panel of 28 New Jersey cities was utilized to estimate the regression model. The panel included 14 cities that applied to the state for EZs, seven of which were approved for a zone. The model failed to render statistically significant results on the EZ indicators.

Engberg and Greenbaum (1999) also estimate a capitalization model to examine the efficacy of EZs on local housing values. The model estimates the impact of EZ designation between 1980 and 1990 on the average annual growth in city housing values during the decade. The model is estimated with a much larger multi-state sample consisting of 4,107 cities with populations between 5,000 and 50,000. The sample contains 303 cities with EZs. Controls are specified for underlying growth and changes in housing vacancy rates (property supply). Nevertheless, the capitalization model does not include various structural and spatial factors that are determinants of housing values. Housing values (instead of commercial and industrial property values) were employed for availability reasons. This assumes that housing values are affected by EZs via demand pressures from in-migrating workers and entities transforming residential property into land for commercial use. The regression estimates suggest that EZ designation leads to a 1.2 percent average decline in housing values per year that the EZ operated. This impact was moderated by the supply of housing within each of the cities. Specifically, EZ designation coupled with a housing vacancy rate one standard deviation below average lead to a 0.948 percent increase in housing values. This suggests that the price effect of increased demand for property in EZs varies depending upon the elasticity of supply for property. When supply is inelastic (low vacancy rate) a positive price effect arises. When supply is elastic (high vacancy rate) the positive price effect does not arise, but vacancy rates decline due to increased demand.

2.3 Incentive Program Effectiveness in Ohio

Relevant literature by Gabe and Kraybill (1998), Sridhar (2000), and Gabe and Kraybill (2002) suggest that the efficacy of Ohio's EZs and several other incentives varied during the 1990s. Sridhar (2000) estimates the impact of EZs on census block group level unemployment rates in Ohio. She estimates that EZs initially reduce unemployment rates, with the average reduction ranging from 2.92 percentage points to 3.39 percentage points in the first year an EZ operates. The estimated impact in subsequent years is ambiguous,

with the preferred model implying that the unemployment rate actually increases in EZs relative to non-EZ areas. It is important to note that EZs were utilized pervasively throughout Ohio during the period of analysis, and were not necessarily limited to economically distressed areas. EZs encompassed 78 percent of the state's block groups and only 44 of 322 EZs during this period were designated according to distress criteria. All other EZs were designated based solely on population. Consequently, the extent to which the average unemployment reductions hold in economically distressed EZs is not fleshed out by Sridhar's analysis. In addition, areas designated under a separate place-based incentive program – Community Reinvestment Areas (CRAs) – overlapped many of the EZs. The CRA program also offers capital investment incentives for commercial and industrial projects as well as residential projects. Sridhar's estimation model, however, does not delineate the effects of the EZs from the CRAs.

Gabe and Kraybill (1998) investigate the probability of industrial development projects receiving Ohio's Job Creation Tax Credit (JCTC). Gabe and Kraybill (2002) also investigate the impact on job creation of the JCTC and four other Ohio programs providing direct assistance. In the first study, Gabe and Kraybill use a sample of 494 major development projects announced between 1993 and 1995 (156 of which received the JCTC). They estimate that the average project had only a 29 percent chance of receiving the tax credit, suggesting that development officials have a fairly low propensity for granting the tax credit. In addition, the estimates suggest that the probability that projects received tax incentives was inversely related to the average wage in counties containing projects that received the tax credit. This result suggests that the tax credit is being focused on projects occurring in more distressed areas of the state. Gabe and Kraybill (2002) investigate whether the JCTC and four other direct assistance programs stimulate job creation in Ohio; and whether recipients of these incentives systematically overestimate the number of jobs that they will create. They analyze 366 expansions of manufacturing and nonmanufacturing businesses occurring from 1993 to 1995. A total of 129 of the businesses received at least one of the incentives, with 101 receiving the JCTC. The data analysis suggests that the incentives have little or no effect on overall job creation, with the studied incentive programs estimated to have generated less than one additional job on average. More striking was the estimated impact of incentives on announced job creation where the incentives led to an average overestimate of job creation by firms of almost 22 jobs.

Arguably, these studies illuminate how facets of the local economy, the implementation of the incentive program, and the economic stimulus provided by the incentive program might cause incentives to generate varied impacts, including varied impacts on land values. If Ohio's EZs are not focused on economically distressed communities (as revealed in descriptive data analysis by Sridhar (2000)) a capitalization effect may be discernable, but only because EZs are allowed in growing areas where the supply of land is inelastic. In addition, if development officials do not have a penchant for awarding incentives (as revealed by Gabe and Kraybill's (1998) study of the Ohio Job Creation Tax Credit) under the EZ program, potential renters or purchasers of EZ property may be reticent to bid up property values. This could prevent capitalization effects from arising. Finally, if the EZs simply fail to consistently stimulate lasting development (as revealed by Sridhar (2000) relative to long run employment effects of Ohio EZs and Gabe and Kraybill (2002) relative to several Ohio incentive programs), capitalization effects will not be generated in the long run.

3. Methods and Data

3.1 Empirical Model Specification

A hedonic price model is estimated to examine the relationship between the sale value of commercial and industrial properties and various structural, neighborhood, and public sector attributes possessed by these properties. The estimating model relates the natural log of the nominal unit sales price (V) of a commercial or industrial property to a set of structural, neighborhood, and public sector attributes (X).[1] As shown in equation 1, the model is expressed as:

$$\ln V_i = \alpha + \sum_{j=1}^{n} \beta_j X_{ij} + \sum_{t=1985}^{1993} \chi_t Y_{it} + \varepsilon_i \qquad (1)$$

where the unit sales price is the price per square foot of land area comprising the property, property i, j represents the n structural, neighborhood, and public sector attributes possessed by the property, and ε is a random error term. The variables Y_{it} are binary and represent the year in which the property sold. Thus, β_j

[1] The log-linear form allows the value of a property attribute to vary with the other attributes in the regression model (Sonstelie and Portney (1980), Thibodeau (1989)). As well, the log-linear form simplifies the interpretation of the marginal values - indicating the percentage change in the unit property value due to a unit change in a particular attribute (Sonstelie and Portney (1980), Thibodeau (1989)).

represents the marginal impact on the average parcel sales price due to a change in attribute j and χ_t represents the year-specific shifts in the average parcel sales price. In particular, the regression model is expected to reveal whether a constant-quality property obtains a premium value because it is located in an EZ.

Sample Data

The sample data are collected from EZs established under the Ohio Urban Jobs and Enterprise Zone Program. This program was established in 1982 to allow cities and counties to provide local property tax relief and other incentives to businesses investing in economically distressed areas. The period under examination runs from 1984 to 1993. During this period, property tax abatements were used almost exclusively in the EZs to attract business investment. The property tax abatements were discretionary EZ policies. Businesses operating in an EZ were not entitled to tax relief or incentives merely by having a presence in the EZ. Rather, the EZ Program allowed cities and counties to selectively grant property tax abatements to EZ businesses that would enter into tax abatement agreement with the EZ operator specifying investment and employment levels to be attained by the business. From 1982 to 1994, the property tax abatements could be granted for up to 10 years. Cities could abate up to 100 percent of the value of improvements to real property. Counties could do the same beginning in 1987, but were limited to abatements of up to 75 percent before that time.[2]

The sample data are cross-sectional parcel sales data, comprising individual properties sold in Cuyahoga County, Ohio, from 1984 to 1993. However, the data are not comprised of repeat-sales.[3] The sample data describes the nominal sales price and structural, neighborhood, and public sector attributes of properties zoned for commercial or industrial use. The sales data (sales price and transfer date) and structural data (property size, number of buildings, building space, building age) were obtained from the Metroscan Real Estate Database System and real estate data maintained by the Housing Policy Research Program at Cleveland State University.[4] Determination of whether a property was located in an EZ when it was sold was based on the census tract location of properties and EZs.[5] Other EZ information was obtained from records of the Ohio Department of Development.

Data also were drawn from tax data reports of the Ohio Department of Taxation, school finance data maintained by the Ohio Department of Education, and demographic data from the 1990 U. S. Census of Population. Detailed definitions of all variables are listed in Appendix 1. Variable means and standard deviations are reported in Table 1

The sample contains 1,732 commercial and industrial properties.[6] Properties located in one of eight focal EZs comprise 30.4 percent of the sample, with properties zoned for industrial use comprising 40.9 percent of the sample. A combined 68.6 percent of the sample EZ properties are located in the Cleveland East Side, Lakeside, and West Side EZs. A combined 20.7 percent of these properties are located in the three remaining Cleveland EZs (Collinwood, Flats, and Southeast). Properties located in the suburban Garfield Heights and Solon EZs comprise 10.6 percent of the total EZ properties in the sample. The sample is distributed evenly between the city of Cleveland and outlying areas of Cuyahoga County, with 50.3 percent of the sample properties located in the Cleveland city limits. Sample properties are situated in almost every general government jurisdiction (municipality) within Cuyahoga County, including every municipality having a population in excess of 20,000.[7] The distribution of properties among jurisdictions, excluding Cleveland, is also fairly uniform, with the relative share ranging from 0.1 percent to 3.3 percent of the sample.

[2] State tax relief was provided to some EZ businesses to augment local property tax abatements and other incentives. The state tax incentives offset the state corporation franchise tax and income tax for investment in real and tangible personal property, for wages paid to new employees meeting unemployment and other economic distress criteria, and for child-care expenses reimbursed for certain employees. The state tax incentives, however, were utilized much less often than local property tax abatements during the period examined. According to state records, less than five percent of the businesses granted local property tax abatements during the period under study obtained any state tax incentives.

[3] The sample is superior to samples employed generally in the literature estimating the determinants of non-residential property values. This is the case with respect to: Sample size; the period of years encompassed by the sample, and the variety of structural and spatial attributes employed in the regression model. The study by Wheaton and Torto (1994) appears to be the one study with more extensive sample data.

[4] These databases contain various items of tax assessment- and ownership-related information for every property in the county. The information contained in the databases was acquired from the tax assessment/property ownership records maintained by the Cuyahoga County Auditor.

[5] EZ properties were determined by matching properties to 1990 census tracts comprising the EZs. The census tract information for Cuyahoga County EZs was obtained from Dr. William Bogart, Department of Economics, Case-Western Reserve University.

[6] Outliers in sales price, lot size, building size, number of buildings, and average building age were eliminated from the initial sample of 1820 real estate parcels.

[7] Annual population estimates by the U.S. Census Bureau provided a list of municipalities and villages located in Cuyahoga County along with corresponding populations.

Table 1. Descriptive Statistics (n = 1,732)

Variable	Mean	Std. Deviation
Property Size	51,405.3230	84,679.7047
Buildings	0.8239	0.8495
Building Space	7,881.5993	13,388.1720
Building Age	23.8359	27.4649
Industrial Parcel[a]	0.4094	0.4919
Medium Access[a]	0.3025	0.4595
Low Access[a]	0.3251	0.4685
Income	32,761.2220	12,603.1178
Tax Rate	0.0361	0.0070
Per Pupil School Expenditure	5,450.7748	1,237.0839
EZ Property[a]	0.3037	0.4600
EZ Property-Cleveland Collinwood[a]	0.0231	0.1502
EZ Property-Cleveland Eastside[a]	0.0814	0.2735
EZ Property-Cleveland Flats[a]	0.0150	0.1216
EZ Property-Cleveland Lakeside[a]	0.0577	0.2333
EZ Property-Cleveland Southeast[a]	0.0248	0.1556
EZ Property-Cleveland Westside[a]	0.0693	0.2540
EZ Property-Garfield Heights[a]	0.0156	0.1239
EZ Property-Solon[a]	0.0167	0.1283
Number of EZ's	8.1074	5.8602
EZ Property*Number of EZ's	3.4827	5.6968
EZ Lag-2nd Year[a]	0.0422	0.2010
EZ Lag-3rd Year[a]	0.0491	0.2161
EZ Lag-4th Year[a]	0.0473	0.2124
EZ Lag-5th Year[a]	0.0439	0.2049
EZ Lag-6th Year[a]	0.0381	0.1915
EZ Lag-7th Year[a]	0.0225	0.1484
EZ Lag-8th Year[a]	0.0133	0.1145
EZ Lag-9th Year[a]	0.0029	0.0537
Sale Year 1985[a]	0.1022	0.3030
Sale Year 1986[a]	0.1028	0.3037
Sale Year 1987[a]	0.0935	0.2913
Sale Year 1988[a]	0.1241	0.3298
Sale Year 1989[a]	0.1039	0.3053
Sale Year 1990[a]	0.1010	0.3015
Sale Year 1991[a]	0.0941	0.2921
Sale Year 1992[a]	0.0883	0.2839
Sale Year 1993[a]	0.0907	0.2872
Unit Price	8.2156	17.3724
Log of Unit Price	1.2665	1.4213

[a]Binary variable. The mean indicates the proportion of the sample that possesses the attribute.

Finally, the sample is uniformly distributed on year-of-sale, as the relative share of properties ranges from a low of 8.8 percent sold in 1992 to a high of 12.4 percent sold in 1988.

3.2 Focal Variables

A binary variable indicates whether a property was located in one of the focal EZs when it was sold. The regression coefficient represents the shift in value of a constant-quality property due to being located in an EZ. The coefficient is expected to be positive reflecting a premium for properties located in active EZs. Prior studies of the determinants of commercial and industrial property values have employed binary variables to estimate the impact of site location within an industrial park (Kowalski and Colwell, 1986); location of a site within the local land market (Glascock, 1990, McDonald, 1993a, Wheaton and Torto, 1994); site location with respect to rapid transit (Hough and Kratz, 1983); and the site being zoned for industrial use (Asabere and Huffman, 1991). In particular, Kowalski and Colwell (1986) found that a premium is placed upon sites within an industrial park. They suggest that the industrial park location premium arose due to the amenities available to park businesses and being separated from other land uses.

A discrete numerical variable is used to represent the number of EZs in the county when a property was sold. This variable is expected to measure the impact that the availability of EZ properties has on overall property values. This variable is interacted with the EZ location dummy to measure the impact of other nearby EZs on the value of a property in the focal EZs. The regression coefficient on the interaction variable is expected to be negative, suggesting that any premium arising in relation to a particular EZ is diminished as other competing EZs are established.

Finally, a set of binary variables is employed to represent the lag between the time at which an EZ was established and the time at which an EZ property was sold. The regression coefficients on these binary variables represent the shifts in property value due to this lag. Analysis by Anderson and Wassmer (2000) suggests that the effectiveness of EZ programs diminishes over time as more communities, in particular more prosperous communities, employ EZs. The lag variables are expected to account for the effects of additional EZs over time.

3.3 Control Variables

Several explanatory variables control for differences in structural, neighborhood, and public sector attributes among the sample properties. Measures of structural attributes include property size in square feet, number of buildings on the property, total building space in square feet, and age of buildings. The amenity literature suggests that socioeconomic circumstances will vary inversely with property values. Wheaton (1984) and Asabere and Huffman (1991) found that non-residential property values tended to decline in economically distressed areas. In addition, typical land rental models suggest that land values vary, in part, as a function of distance or access to the central business district. Consequently, neighborhood attributes include median family income by census tract and two binary variables indicating the estimated distance of each property from the Cleveland central business district.

The public sector variables are comprised of a binary variable indicating whether the parcel is zoned for industrial use and proxies for local taxes and local public sector. The land use variable indicates the pricing differences between the local industrial and commercial land markets. The land use designation imposed by local government establishes impediments or limits to the types of business operations that may locate on a property. Though zoning classifications or restrictions may be revised, such alterations require local government action and are neither a certainty nor free of cost. Thus, land use designation establishes two land markets that must be accounted for in the property value model.

Consistent with the capitalization literature, tax rate and public spending variables are included in the property value model. These variables reflect per pupil operating expenditure and effective property tax rate of the school district in which the property is located. These measures are for the year immediately prior to the sale of the property. The effective tax rate is equal to the ratio of aggregate real and personal property tax revenues collected by a school district to the total taxable value of real and personal property within that district. Since micro-level sales data is being employed, the model should not suffer from bias due to the simultaneity of price and tax variables. The tax rate is a jurisdiction-level tax rate and would not be significantly influenced by the change in valuation of any particular property.[8]

[8] Typically, simultaneity of property valuation and tax variables is problematic in two types of studies: Aggregate studies where jurisdiction-level property valuation and the jurisdiction-level tax rate are simultaneously determined and repeat sales studies where individual parcel valuation and tax payment are simultaneously determined.

4. Data Analysis

Elasticities derived from three model specifications are reported in Table 2. The regression coefficients and standard errors for these specifications are reported in Appendix 2. The three model specifications are statistically significant at the one percent level. The models explain about 22 percent to 23 percent of the variation in the log-transformed unit property values. In general, the coefficients are intuitive and stable over the three model specifications. The coefficients on the structural control variables generally have the expected signs and are statistically significant. One exception is the coefficient on Building Age, which is significant but has the incorrect sign. In contrast, the coefficients on Property Size, Buildings, and Building Space are intuitive and statistically significant. Property Size suggests that the marginal value of property square footage is diminishing, while building assets such as Buildings and Building Space serve to improve unit property values.

The coefficients on the six neighborhood and public sector control variables have the expected signs, but only three are statistically significant. Consistent with property tax capitalization and local amenity arguments, the estimates suggest that unit property values are increasing in community socioeconomic standing (Income) and public sector spending (Per Pupil School Expenditure), and decreasing in the local property tax rate (Tax Rate). However, the coefficient on Tax Rate is insignificant. The estimates also suggest that outlying properties have higher market values than comparable inner city properties. However, only the coefficient relating to "inner-ring" properties (Medium Access) is statistically significant.

The regression results for the focal variables are mixed. Nonetheless, some of the coefficient estimates suggest that property values may indeed be influenced by EZ status. In addition, the coefficient estimates suggest that EZ property values may be influenced by the supply of EZs and EZ properties. As expected, the coefficients on EZ Property in Model 1 and Model 3 are positive. The coefficients imply that the average percentage effect of EZ status could range about 19 percent to 22 percent over the value of non-EZ properties. However, in both instances the coefficient is not significant at even the 10 percent level. The significance level for both coefficients is approximately 29 percent. Thus, the results fail to confirm that EZ property *generally* obtains a premium value.

The coefficients on the eight separate EZ Property variables specified in Model 2 are varied as to sign and significance level. Five of the eight coefficients are positive with two being statistically significant - Lakeside at the one percent level and Solon at the 10 percent level. In addition, the positive coefficients on the EZ Property variables for Westside and Collinwood are significant at the 15 percent level. The three negative coefficients are insignificant. Thus, the Model 2 results suggest that property in *some* EZs does obtain a premium value. The estimated premium in the Lakeside and Solon EZs ranges from 63 percent to 73 percent of the average unit property value for similar property not located in these EZs. Compared to a similar property selling at the average of $8.22 per square foot, these premiums could translate into an additional $5.20 to $5.98 per square foot. For an average size property (51,405 square feet) the estimated impact ranges from $267,306 to $307,402.

The EZ supply variables contained in Model 1 and Model 2 provide mixed results as well. The coefficient on Number of EZs is insignificant. Thus, increasing the supply of EZ sites apparently has no impact on property values in general. However, the negative coefficient on the interaction term - EZ Property* Number of EZs - is statistically significant.[9] This suggests that increasing the supply of EZ sites affects only property values in existing EZs, not property values in general. On average, each additional EZ is estimated to decrease property values in existing EZs by 1.1 percent to 1.4 percent. Based on the mean property value of $8.22 per square foot, the decline would range from $0.09 to $0.12 per square foot for each additional EZ. The impact would translate into a $4,648 to $5,912 decrease in value for an average size property (51,405 square feet).

Closely related, the EZ Lag variables suggest that the impact of EZs on property values declines over time. The coefficients on the 5-year to 8-year lags are statistically significant, while the 9-year lag is significant at the 15 percent level. While varying somewhat from year to year, the lag coefficients suggest that EZ properties sell for considerably less after the fourth year of existence than in its first year of operation. The percentage impact after year five is estimated to range from 62 percent for EZ properties sold in the 7th year of operation to 90 percent for EZ properties sold in the 8th year of operation. While the potential cause for these results is somewhat unclear, they may reflect the price effects of an increasing supply of EZs and EZ property within the urban area. The lagged price effects may suggest that EZ property selling in later years is simply not as desirable as the property that sold during the initial years of an EZ. However, from

[9] The variables are excluded from Model 3 because the effects of both are accounted for by the EZ Lag variables and their inclusion produces a substantial amount of collinearity.

Table 2. Estimation Results: Elasticities

Variable	Model 1	Model 2	Model 3
Property Size[a]	-0.287 *	-0.289 *	-0.290 *
Buildings[a]	0.171 *	0.173 *	0.164 *
Building Space[a]	0.101 *	0.097 *	0.102 *
Building Age[a]	0.184 *	0.177 *	0.188 *
Industrial Parcel[b]	-3.242	-6.053	-3.865
Medium Access[b]	45.300 *	42.300 *	42.400 *
Low Access[b]	5.984	2.874	3.510
Income[a]	0.349 *	0.350 *	0.353 *
Tax Rate[a]	-0.042	-0.061	-0.076
Per Pupil School Expenditure[a]	0.378 **	0.384 **	0.360 **
EZ Property[b]	21.600		18.600
EZ Property-Cleveland Collinwood[b]		43.500	
EZ Property-Cleveland Eastside[b]		-1.593	
EZ Property-Cleveland Flats[b]		-7.952	
EZ Property-Cleveland Lakeside[b]		72.700 *	
EZ Property-Cleveland Southeast[b]		-2.402	
EZ Property-Cleveland Westside[b]		37.200	
EZ Property-Garfield Heights[b]		30.800	
EZ Property-Solon[b]		63.300 ***	
Number of EZ's[a]	-0.317	-0.264	
EZ Property*Number of EZ's[a]	-0.111 ***	-0.139 **	
EZ Lag-2nd Year[b]			-16.400
EZ Lag-3rd Year[b]			-17.900
EZ Lag-4th Year[b]			-24.400
EZ Lag-5th Year[b]			-57.800 *
EZ Lag-6th Year[b]			-72.300 *
EZ Lag-7th Year[b]			-62.400 **
EZ Lag-8th Year[b]			-90.400 *
EZ Lag-9th Year[b]			-86.000
Sale Year 1985[b]	-2.289	-2.021	-3.188
Sale Year 1986[b]	20.300	21.500	14.800
Sale Year 1987[b]	7.513	2.413	-14.500
Sale Year 1988[b]	48.400	41.900	12.900
Sale Year 1989[b]	52.600	45.800	7.322
Sale Year 1990[b]	74.500	66.400	25.500 ***
Sale Year 1991[b]	68.100	60.800	21.300
Sale Year 1992[b]	81.500	72.700	34.600 **
Sale Year 1993[b]	96.800	88.100	40.900 **

[a]Elasticity evaluated at the mean (= mean*β).

[b]Percentage difference in dollars associated with being in designated group coded 1 rather than in the reference group coded 0 (= 100*β).

*Significant at the 1% level.
**Significant at the 5% level.
***Significant at the 10% level

1984 to 1993 the number of EZs in the Cuyahoga County rose from zero to 20. By 1990 there were 12 EZs in the county. Thus, property in existing EZs may be less desirable overtime as new EZs come online within the urban area.

It is worth noting that the lag effects also may be related to the tax abatement and incentive process employed in the Ohio EZs. During the period examined, businesses occupying property in an EZ were not entitled to property tax abatements. Property tax abatements were granted selectively at the discretion of the city or county operating an EZ. State tax incentives were granted infrequently, and then only to businesses receiving local property tax abatements. From 1984 to 1993, the tax abatement agreements in effect in Cuyahoga County EZs rose from three in 1985 to 156 in 1993. Eighty tax abatement agreements were in effect in 1990. That is an average of about eight agreements per EZ in 1990 and 1993. Therefore, the lagged price effects may suggest that prospective buyers or occupants of EZ properties adjusted their bidding overtime based on the propensity of EZ operators to grant tax abatements. This institutionalized uncertainty of receiving tax relief may, as a result, help to diminish the EZ capitalization effect.

5. Conclusions and Recommendations

This study examines the impact of Enterprise Zone (EZ) designation on commercial and industrial property values and the potential diminution of this impact as the supply of EZs and EZ property grows. Shifting of tax abatement and incentive dollars has important implications for the efficacy of EZ programs. The rise in EZ property values could signal a reinvigoration of local property markets and economic improvement for property owners. Conversely, the relative improvement in profitability of firms locating or expanding in EZs due to the tax abatements and incentives is diminished as the capitalization effects shift resources from these businesses to landowners. As the impact of EZ tax abatements and incentives on firm profitability declines, it follows that the incentive effects of the EZ program likewise are diminished.

The presence of capitalization effects could potentially have implications for placing stricter limits on the creation of EZs in more prosperous areas. In most economically depressed communities the supply of commercial and industrial property is probably rather elastic and the demand for business sites is probably rather inelastic. This would likely be the case even in the short run because of an over-abundance of idle resources in very depressed areas. As a result, an EZ premium likely would not arise in the most depressed communities. This outcome may be good as it suggests that resource shifts from EZ businesses to property owners are minimized and the impact of EZ tax abatements and incentives on business profit is maintained. Unfortunately, this also may suggest that the EZ inducements only minimally increase development of available commercial and industrial property in the most depressed communities.

In contrast, the supply of commercial and industrial property may well be inelastic in the short run and demand may be elastic in more prosperous communities that nevertheless have EZs. These conditions may give rise to the EZ premium where tax abatement and incentive dollars secured by EZ businesses are shifted to property owners. Consequently, the more prosperous the community in which an EZ is situated, the lesser is the incentive effect generated by the EZ program. Under these circumstances, EZs appear to be of little use in providing a competitive advantage in terms of cost or profit to the business receiving EZ tax abatements. Alternatively, substantial capitalization should be absent in EZs located in economically distressed communities. Therefore, the incentive effect of the EZ would be preserved as the tax abatement resources are retained by targeted businesses.

The statistical analysis fails to confirm that EZ property *generally* obtains a premium value compared to similar non-EZ property. Still, the statistical analysis indicates that a substantial premium has arisen in two of the eight focal EZs. It also indicates that considerable variation exists from one EZ to another as to the presence and magnitude of the EZ premium. These results imply that resource shifts are occurring in some EZs due to capitalization. Thus, policy makers and development officials who seek to improve local property values by establishing an EZ have no guarantee that this will occur. They may be better served relying on more traditional, albeit more immediately costly, efforts such as public service and infrastructure improvements to enhance the attractiveness and value of property in declining areas. For those public officials seeking to increase capital investment and employment within communities encompassed by an EZ, the findings indicate that the EZ premium may well divert abatement and incentive dollars from expenditures on facilities improvements, machinery and equipment, and wages. The resource shifts may involve EZ businesses receiving tax abatements and incentives as well as businesses that have not received these benefits. Unfortunately, the empirical estimates do not differentiate between property buyers receiving and not receiving EZ tax abatements and incentives.

Since the increase in property values could impact EZ businesses that have not received tax abatements and incentives, public officials must be very selective in creating EZs so as not to stunt employment, wage, and investment growth that would otherwise occur by driving up property values generally. This suggests that policy makers and development officials should not establish EZs in areas that are not distressed, where a significant amount of business development may arise in the absence of the EZ and its tax abatements and incentives. Local development officials also should evaluate EZs in more prosperous areas to determine whether the potential economic gain from the EZ program exceeds the potential loss from the capitalization effects imposed on businesses not receiving EZ tax abatements and incentives.

Considering the condition of the focal EZs, the absence of an EZ premium generally is an intuitive result and is consistent with prior research findings. Six of the focal EZs encompass economically distressed areas where the supply of property is expected to be elastic. An EZ premium was found in only one of these distressed EZs. An EZ premium was found in one of two non-distressed EZs analyzed. While the results appear to be ambiguous with respect to the occurrence of EZ premiums in non-distressed areas, the results do provide some evidence to suggest that EZ premiums are not prevalent in economically distressed EZs. This means capitalization effects in EZs may be minimized, if not prevented, so long as EZs are limited geographically to truly economically distressed areas. The six economically distressed EZs are located in Cleveland – the Collinwood EZ, East Side EZ, Flats EZ, Lakeside EZ, Southeast EZ, and Westside EZ. In each of these EZs, educational attainment and income levels are substantially lower than the countywide and non-EZ area averages. More important, the housing vacancy rate in these EZs ranges from 2.5 to 4.5 times that in non-EZ areas and 1.5 to three times the countywide vacancy rate. The separate premium estimates for the EZs, however, indicate that a substantial premium is present in the distressed Lakeside EZ and the non-distressed and suburban Solon EZ. Capitalization in the Lakeside EZ is inconsistent with the prior research and analysis linking capitalization with an inelastic supply of property. The housing vacancy rate in the Lakeside EZ during the period analyzed was about 13 percent, which was about 7.5 percentage points above the countywide average and 9.5 percentage points higher than for non-EZ areas. In contrast, the vacancy rate in the Solon EZ was 4.9 percent, which was only about one-half of a percentage point less than the countywide vacancy rate and about 1.4 percentage points above the non-EZ area vacancy rate.

Six of the focal EZs exhibited no premium while the Solon EZ and the Lakeside EZ exhibited premiums of about 63 percent and 73 percent, respectively, above other property. Disregarding the significance tests, the estimated effects in the other six focal EZs vary from about eight percent below other property (the Flats EZ) to 43.5 percent above other property (the Collinwood EZ). The Lakeside EZ and Solon EZ results imply that resource shifts are occurring at least in some EZs due to capitalization. The varied capitalization rates may be due to varying restrictions on the number of EZs and the supply of EZ properties. The statistical analysis suggests that the establishment of new EZs drives down the value of property in existing EZs. Moreover, it appears that EZ property values are subject to decline over time, whether as result of the increasing supply of EZ property or other more desirable non-EZ property. The property value effects of establishing new EZs may have important implications for the broader aspects of implementing EZ policies. This is not to say that more and more EZs should be established in order to minimize, if not eliminate, any EZ capitalization effects. The dummy variable analysis discussed above fails to confirm that this would be effective. On the contrary, the negative property value effects linked here to the more pervasive use of EZs suggests that policy makers and development officials should focus there efforts on distressed areas. Creation of more EZs, in particular if EZs are established in areas that are only marginally distressed or not distressed at all, will simply dilute the effectiveness of incentive packages offered in distressed EZs. In addition, the tailing off of EZ property values over the life of the EZ may imply that once tax abatements and incentives have generated an initial surge of investment, possibly due to the novelty or uniqueness of a new approach, additional incentives or programmatic efforts may be necessary to attract additional investors to the EZ. Thus, local development officials must be diligent in maintaining business interest in an EZ in latter years when there may be increased competition for development opportunities by other areas and what could be a natural decline in the attractiveness of the EZ.

The varied capitalization effects also could be linked to local differences in implementing abatement and incentive programs in EZs. Abatement totals for the focal EZs, however, does not reveal a clear link between the propensity of officials to provide the tax abatements and the capitalization effects arising in those EZs. Among the focal EZs, the Solon EZ by far led the way by granting almost four times the average number of tax abatements during the period under study – granting a total of 34 property tax abatements.

Since the Solon EZ encompasses areas that are not economically distressed (see discussion above), it is unclear whether the EZ premium in the Solon EZ is due to an inelastic supply of property or the relatively high propensity of local officials in awarding tax abatements. Of the remaining EZs, only one (the Garfield Heights EZ) exhibited an above average propensity for granting tax abatements. The Garfield Heights EZ did not exhibit a statistically significant EZ premium. In contrast, the Lakeside EZ, comprised of economically distressed areas, exhibited a statistically significant EZ premium and provided only three tax abatements during the period analyzed. This suggests that local differences in implementation of EZ program components beyond just granting of tax abatements and incentives could potentially be an important factor leading to variation in capitalization impacts. Therefore, local development officials must be attentive to various components of local implementation, including programs to: (1) market EZs and available EZ properties; (2) improve and expand public services in EZs; (3) improve infrastructure in EZs; and (4) clear, prepare, and consolidate sites for future development. This also suggests that policy makers must provide a sufficient array of programmatic opportunities (in addition to tax abatements and incentives) that local officials can access and use in operating EZ programs.

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Appendix 1. Description of Variables

Variable	Description
Building Age	Average age of buildings on the property.[a]
Building Space	Size of buildings on the property measured in thousands of square feet.[a]
Buildings	Number of buildings on the property.[a]
EZ Lag-2nd Year	Enterprise zone property sold in 2nd year of zone existence (1=Yes, 0=No).[c]
EZ Lag-3rd Year	Enterprise zone property sold in 3rd year of zone existence (1=Yes, 0=No).[c]
EZ Lag-4th Year	Enterprise zone property sold in 4th year of zone existence (1=Yes, 0=No).[c]
EZ Lag-5th Year	Enterprise zone property sold in 5th year of zone existence (1=Yes, 0=No).[c]
EZ Lag-6th Year	Enterprise zone property sold in 6th year of zone existence (1=Yes, 0=No).[c]
EZ Lag-7th Year	Enterprise zone property sold in 7th year of zone existence (1=Yes, 0=No).[c]
EZ Lag-8th Year	Enterprise zone property sold in 8th year of zone existence (1=Yes, 0=No).[c]
EZ Lag-9th Year	Enterprise zone property sold in 9th year of zone existence (1=Yes, 0=No).[c]
EZ Property	Property located in an enterprise zone when sold (1=Yes, 0=No).[b]
EZ Property-Cleveland Collinwood	Property located in the Cleveland-Collinwood enterprise zone when sold (1=Yes, 0=No).[b]
EZ Property-Cleveland Eastside	Property located in the Cleveland-Eastside enterprise zone when sold (1=Yes, 0=No).[b]
EZ Property-Cleveland Flats	Property located in the Cleveland-Flats enterprise zone when sold (1=Yes, 0=No).[b]
EZ Property-Cleveland Lakeside	Property located in the Cleveland-Lakeside enterprise zone when sold (1=Yes, 0=No).[b]
EZ Property-Cleveland Southeast	Property located in the Cleveland-Southeast enterprise zone when sold (1=Yes, 0=No).[b]
EZ Property-Cleveland Westside	Property located in the Cleveland-Westside enterprise zone when sold (1=Yes, 0=No).[b]
EZ Property-Garfield Heights	Property located in the Garfield Heights enterprise zone when sold (1=Yes, 0=No).[b]
EZ Property-Solon	Property located in the Solon enterprise zone when sold (1=Yes, 0=No).[b]
Income	1989 median family income in census tract containing property.[d]
Industrial Parcel	Property zoned for industrial use (1=Yes, 0=No).[a]
Log of Unit Price	Natural log of the unit sale price of property.[a]

Appendix 1. Description of Variables (continued)

Variable	Description
Low Access	Property located (approx.) more than 10 miles from downtown Cleveland (1=Yes, 0=No).[e]
Medium Access	Property located (approx.) between 5 and 10 from downtown Cleveland (1=Yes, 0=No).[e]
Property Size	Size of property size measured in thousands of square feet.[a]
Per Pupil School Expenditure	School district operating expenditure per pupil in year immediately prior to sale of property.[f]
Sale Year 1985	Property sold in 1985 (1=Yes, 0=No).[a]
Sale Year 1986	Property sold in 1986 (1=Yes, 0=No).[a]
Sale Year 1987	Property sold in 1987 (1=Yes, 0=No).[a]
Sale Year 1988	Property sold in 1988 (1=Yes, 0=No).[a]
Sale Year 1989	Property sold in 1989 (1=Yes, 0=No).[a]
Sale Year 1990	Property sold in 1990 (1=Yes, 0=No).[a]
Sale Year 1991	Property sold in 1991 (1=Yes, 0=No).[a]
Sale Year 1992	Property sold in 1992 (1=Yes, 0=No).[a]
Sale Year 1993	Property sold in 1993 (1=Yes, 0=No).[a]
Tax Rate	Effective school district property tax rate in year immediately prior to sale of proerty.[g]
Unit Price	Nominal sales price per square foot of space on property.

[a]Obtained from Metroscan and Housing Policy Research Program databases.

[b]Census tract descriptions of selected enterprise zones provided by Dr. William Bogart.

[c]State of Ohio, Department of Development.

[d]U.S. Census of Population, 1990.

[e]Access distances estimated from county maps.

[f]State of Ohio, Department of Education.

[g]State of Ohio, Department of Taxation.

Appendix 2. Estimation Results: Coefficients & Standard Errors

	Model 1		Model 2		Model 3	
Variable	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**
Constant	.194	.292	.246	.291	.257	.292
Property Size	-5.59E-06*	4.16E-07	-5.63E-06*	4.16E-10	-5.63E-06*	
Buildings	.208*	.053	.210*	.053	.199*	.053
Building Space	1.28E-05*	2.84E-06	1.23E-05*	2.83E-06	1.29E-05*	
Building Age	7.71E-03*	.001	7.43E-03*	.001	7.9E-03*	.001
Industrial Parcel	-3.24E-02	.065	-6.05E-02	.065	-3.87E-02	.065
Medium Access	.453*	.090	.423*	.098	.424*	.090
Low Access	5.98E-02	.093	2.87E-02	.104	3.51E-02	.093
Income	1.06E-05*	3.43E-06	1.07E-05*	3.51E-06	1.08E-05*	
Tax Rate	-1.174	4.856	-1.681	4.831	-2.101	4.848
Per Pupil School Expenditure	6.93E-05**	3.17E-05	7.04E-05**	3.19E-05	6.61E-05**	
EZ Property	.216	.208			.186	.162
EZ Property-Cleveland Collinwood			.435	.294		
EZ Property-Cleveland Eastside			-1.59E-02	.216		
EZ Property-Cleveland Flats			-7.95E-02	.336		
EZ Property-Cleveland Lakeside			.727*	.240		
EZ Property-Cleveland Southeast			-2.4E-02	.286		
EZ Property-Cleveland Westside			.372	.242		
EZ Property-Garfield Heights			.308	.325		
EZ Property-Solon			.633***	.325		
Number of EZ's	-3.91E-02	.037	-3.25E-02	.036		
EZ Property*Number of EZ's	-3.19E-02***	.017	-4.0E-02**	.018		
EZ Lag-2nd Year					-.164	.212
EZ Lag-3rd Year					-.179	.208
EZ Lag-4th Year					-.244	.213
EZ Lag-5th Year					-.578*	.220
EZ Lag-6th Year					-.723*	2.31
EZ Lag-7th Year					-.624**	.267
EZ Lag-8th Year					-.904*	.319
EZ Lag-9th Year					-0.86	.595
Sale Year 1985	-2.29E-02	.138	-2.02E-02	.137	-3.19E-02	.137
Sale Year 1986	.203	.152	.215	.151	.148	.139
Sale Year 1987	7.51E-02	.237	2.41E-02	.236	-.145	.150
Sale Year 1988	.484	.330	.419	.328	.129	.142
Sale Year 1989	.526	.410	.458	.409	.073	.150
Sale Year 1990	.745	.466	.664	.464	.255***	.152
Sale Year 1991	.681	.499	.608	.497	.213	.161
Sale Year 1992	.815	.553	.727	.551	.346**	.166
Sale Year 1993	.968	.636	.881	.634	.409**	.173
Adjusted R^2	**Coefficient**	**F-value**	**Coefficient**	**F-value**	**Coefficient**	**F-value**
	0.222	23.415	0.231	18.952	0.225	18.921

a Dependent variable = natural log of price per square foot of property size. Sample size = 1,732 properties.
*Significant at the 1% level.
**Significant at the 5% level.
***Significant at the 10% level