


Municipal Investment and Property Value Appreciation in Chicago's Tax Increment Financing Districts

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Abstract

To determine whether Tax Increment Financing (TIF) triggers or captures growth, we examine the relationship between expenditures and property value change in Chicago's TIF districts. A regression model relates spending type, which varies from infrastructure to developer subsidies, to a district's property value growth between 2002 and 2012. Results show variation in the impact of spending, with subsidies for commercial development having the clearest positive relationship while infrastructure spending has a negative effect. Although trends are less clear over the long run, these differences underscore how the effectiveness of TIF cannot be surmised without accounting for variations in spending.

Keywords

economic development, community development, public administration, infrastructure and capital facilities

Introduction

Tax increment financing (TIF) is one of the most popular instruments of local public finance in the United States. To use TIF, a city designates a particular geographic area for improvement and earmarks future growth in tax revenue in the area to pay for the cost of improvements there. Cities generally rely on debt instruments such as revenue bonds to finance expenditures in the designated area. These expenditures are expected to generate future increases in assessed property values, with the tax revenues derived from these increases then paying off the debt.

The design of TIF anticipates that TIF-funded expenditures will induce new private investment to take place where it might not have in the absence of financial incentives. Vacant land and abandoned structures may be converted to productive use, and nearby properties will be favorably influenced by the spillover effects of the new development. If TIF succeeds in making an area more attractive for investment, the price of land inside the district will be bid up. Expenditures, therefore, will pay for themselves through taxes on the appreciation, or “increment.”

Several previous studies have measured the impact of TIF designation on outcome measures such as property value change—with contradictory results. Some have found that TIF led to faster subsequent appreciation, compared with municipalities not using TIF or areas without this designation (Carroll 2008; Man and Rosentraub 1998; Smith 2006). In stark contrast, other studies have concluded that little or negative property value change is attributable to TIF (Dye

and Merriman 2000; Weber, Dev Bhatta, and Merriman 2003). What these studies have in common is their inability to account for the potential source of the positive or negative effects: municipal investment in specific capital projects. Lacking expenditure data, researchers are unable to determine whether or not property values react to TIF-funded physical and economic changes in the district, to the signaling effect provided by TIF (i.e., the “intent to treat”), or to factors other than TIF. The type of expenditure—which can range from infrastructure spending to developer subsidies to job training programs—is likely to have varying effects on the local property market. And even if no new development actually occurs, the market may value and capitalize the potential for future subsidies available from the tax increments into the sales price of the properties within TIF districts. Developers and owners may be willing to pay higher prices for TIF property if there is a high probability that they will be eligible for subsidies and/or experience rapid appreciation because the area has been targeted for additional development and infrastructure.

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In contrast, our study focuses on the nature of expenditures made under the umbrella of TIF, that is, the amount and type of government spending in each district, emphasizing the distinctive modes of public finance embodied in its different uses. We use regression analysis to compare dollar amounts of different expenditure categories with property values in the city of Chicago over the period 2002 to 2012. Chicago has been a heavy user of TIF since it designated its first district in 1984. However, it has only recently made information about expenditures available—twenty years after the start of the program (City of Chicago 2013).

Our results inform the question of whether municipal investment triggers appreciation in TIF districts or whether TIF is capturing secular growth that would have occurred in the absence of public interventions. If public investments through TIF positively impact property values, then this value-capture mechanism may be an effective way for local governments to encourage growth and revitalization. If municipal expenditures are irrelevant to the value of property within the district, then this mechanism may have more symbolic than substantive value. It may not create new value at all but may simply redistribute it among taxing jurisdictions. Findings from this study, therefore, can shed light on how equitably and efficiently this popular tool operates.

Background

In the wake of federal cuts and state tax caps, local governments have turned to value capture techniques like TIF, having been left to their own devices to raise revenue without also raising tax rates. Although its origins lie in the Urban Renewal era when it was used as a creative way to match federal grants, the proliferation of this instrument can be traced to the widespread devolution of fiscal responsibility for economic development from the federal government to local governments that occurred in the 1980s (Huddleston 1981; Weber and O'Neill-Kohl 2013).

State legislation enables TIF use by municipalities, and the program varies widely in scope and implementation across the United States. Forty-nine states (all except Arizona) have TIF-enabling legislation. In most states, a municipality first designates a particular geographic area as a TIF district. Parcels in the proposed district must be both “blighted” and unattractive to private investment “but for” the establishment of a TIF district. For example, the TIF-enabling legislation in Illinois requires that five factors be present in order to establish that a district is blighted, including obsolescence, excessive vacancy, presence of structures below minimum code standards, lack of ventilation, and deleterious land use layout, among others.¹ Demonstrating that a district would not experience value growth “but for” the use of TIF often only requires that a redevelopment plan identify some local impediments to redevelopment or value growth. Once these two provisions are met, the municipality can pass an ordinance designating the TIF district.

The assessed value of all the parcels in the district is determined, summed, and “frozen” at the moment of designation. Any revenue up to the frozen level is allocated to the municipality’s general fund and other taxing jurisdictions that rely on the levy (such as counties, schools, and special purpose districts) for the district’s life span (around twenty years in most states).² Meanwhile, the incremental revenue generated from any increase in property value is earmarked for the TIF fund and is used to pay for expenditures in the district.

The stated intent of most enabling legislation is to encourage renewal of deteriorated or “blighted” urban areas and create jobs. The kinds of expenditures funded are also set by the enabling legislation, although interpretations of that legislation offer municipalities much latitude. Municipalities are given discretion to make expenditures that would “encourage private investment and restore and enhance the property tax base of the taxing district” (Illinois Municipal Code, Chapter 24, 74.4-2(b)). Available or future increment can be allocated toward eligible project costs. Decisions about how to allocate increment in the individual TIF district accounts are typically made by administrators in consultation with elected representatives (in Chicago, planners within the City’s Department of Planning and Development make these decisions in concert with local aldermen). Community residents may offer comments but they typically have no formal decision-making or veto power (Schwartz 1999). Unlike Business Improvement Districts (BIDs), few cities require citizen advisory boards or management committees to oversee the allocation of TIF funds.

As the use of TIF has expanded, so too has its scope: it is now considered an “all-purpose local government tool for financing public investment in market-oriented development” (Briffault 2010, 72). This has prompted concerns as an increasing proportion of funds go to private developers for market-rate projects, and the hurdles for clearing the “blight” test have been gradually lowered. Critics point to incentives like TIF as proof of the undue influence of the private sector in making local policy. In Chicago, for example, individual businesses and developers initiate the TIF designation process and lay claim to tax dollars that would otherwise be allocated for more general purposes or, at least, through a more transparent budgeting process (Farmer and Poulos 2013). Because of TIF’s reliance on bonded debt to provide the initial funding for district improvements, cities have an incentive to use TIF for the redevelopment of those projects and in those areas likely to generate large spikes in increment and minimize risk of nonpayment (Weber 2010).

It is difficult to generalize about the ultimate impact of TIF because funds from the increment are used to underwrite so many different kinds of projects, each with different beneficiaries. In the name of economic development, increment may be directed toward job training, physical redevelopment, or equity investments in start-up companies. Some expenditures are firm-specific and subsidize a portion of a developer’s project budget. These might

include the cost of assembling properties, building construction, rehabilitation, and financing. If a developer wishes to receive these kinds of subsidy from a TIF fund in Chicago, for example, they must negotiate a Redevelopment Agreement (RDA) with the relevant City agencies, City Council, and the Council's Finance Committee. In other cases, TIF expenditures are made for projects with a broader base of beneficiaries, such as infrastructure (street repaving, new streets and bridges, transit stations)—in which case an Intergovernmental Agreement (IGA) is signed with the internal agency with oversight over the project. Each of these uses will vary in cost and will likely induce separate direct and indirect effects—even controlling for other locational and demographic factors that influence the strength or weakness of the markets in which such investments are made.

Regardless of the type of expenditure, municipalities must find ways of paying for their costs up-front. TIF allows municipalities to borrow against future incremental tax revenues to pay for initial expenditures. Any short- or long-term debt that has been incurred to pay for improvements must be secured by the tax revenue generated by subsequent property value growth. Alternatively, some cities operate their districts in a “pay-as-you-go” manner whereby incremental revenue must be accrued prior to any spending in the area. While this method avoids incurring debt, capturing value appreciation prior to any public investment is at odds with the premise that property values would not have increased “but for” the investment.

A related quirk of the program that challenges the “but for” justification is the fact that TIF districts often accrue incremental revenue with tepid levels of prior municipal spending. Farris and Horbas (2009) note the incongruity between debt service obligations, TIF revenues, and unused TIF fund balances in Chicago districts. They found that that 75 percent of all Chicago TIF districts had no funds reserved for debt service in 2007. Additionally, 35 percent of all Chicago TIF districts had no funds reserved for debt service and reported no public investment between 1999 and 2007—despite the fact that these same districts were still accruing incremental revenue from increasing property values. Such findings call into question the very premise of TIF: municipalities may capture growth without having done anything to promote it.

However, in some cases the lack of correlation between public investment and subsequent property appreciation may be based not on TIF's ability to capture revenues but on its potential signaling effect. Even if no public expenditures are made and no new development actually occurs, the market may value and capitalize the potential for future expenditures available from the tax increments into the sale price of properties within TIF districts. In other words, developers and owners may be willing to pay higher prices for TIF property if the area has been targeted for future public and private investment—even if little has occurred.

Geographic Focus and Empirical Analysis

Previous studies of economic development programs have examined changes in employment, income, population, land use, number of establishments, and wealth as indication that TIF has or has not been successful (Bartik 1991; Bradbury, Kodrzycki, and Tannenwald 1997; Byrne 2009; Papke 1994). Output measures should be calibrated to the specific input to capture a policy's direct effects. For example, evaluating the impact of a job training program on land-use change may yield few relevant results.

We follow the lead of the majority of TIF studies and look at property values as such values form the crux of the program: debt is secured by the expectation of future property value increases. Property values are also a more universal measure of program outcome than most as they reflect changes in location-specific demand, which itself is a factor of modifications in employment, population, income, and the like. In competitive markets, such changes are capitalized into the value of land and structures in the area, with values acting as a kind of bellwether of overall neighborhood transformation. However, rapid property value increases can have a displacing effect on lower-income residents (Newman and Wyly 2006), which could be exacerbated by TIF. As such, property value change should be treated as an important but imperfect measure of policy impact that measures effectiveness but not necessarily equity.

As TIF is a location-specific policy involving a relationship between public finance and land use, analyzing the program's impact on redevelopment outcomes is highly sensitive to the choice of scale, with intra-municipal analysis and highly granular data preferred over large-scale indicators of change across municipalities (Chapman and Gorina 2012). Early empirical studies were primarily of the second variety: they determined, for example, the kinds of municipalities that adopted TIF relative to those that did not (Anderson 1990) and whether TIF adoption resulted in faster rates of property value across entire cities relative to those municipalities that did not adopt TIF. For example, Dye and Merriman (2000) found evidence that municipalities using TIF grew more slowly, while Man and Rosentraub (1998) reached the opposite conclusion—leading Byrne (2006, 319) to remark that “The effect of TIF on property value growth at the municipal level thus remains unresolved.” The parcel-level analyses of TIF's impact on the value of residential and commercial properties conducted by Carroll (2008), Smith (2006), and Weber, Dev Bhatta, and Merriman (2003) found no consistent evidence of value appreciation within and near TIF districts. However, these micro-level studies of a single city were able to control for the innumerable factors that vary by municipality. Others have used census geographies as the unit of analysis (Gibson 2003; Lester 2014), while Byrne (2006) is the only study that examines the characteristics of each district. He found evidence that the assessed values of

TIF districts in northern Illinois grew faster in those districts that were larger, lower-density, more industrial, and closer to downtown Chicago. We follow Byrne's lead and also focus on district-level variation as it is the smallest unit of analysis and most sensitive to land-use changes and investments made at the submunicipal level.

Even those studies examining spatial variation within single cities have not incorporated expenditure data in their models. Instead they have relied on either dummy variables to measure whether a property is inside a TIF district or on continuous variables to measure distance to the closest TIF district. In doing so, they are unable to tell the difference between the designation of a spatial policy overlay and that overlay's use in practice. Simply designating a TIF district—or an Enterprise Zone or a Business Improvement District for that matter—represents a vague sense of potential and does not mean that any public investment has or will take place there. In contrast, we have been able to obtain a novel data set of municipal investments in each TIF district in Chicago that allows us to tease out differing aspects of economic development strategies subsumed under the broad umbrella of TIF. We can go beyond the designation to examine the actual use of TIF funds in practice.

Chicago TIF Districts

This research examines the property market within one major city: Chicago. The first TIF district in Chicago, the Central Loop district, was designated in 1984. By 2012 the city hosted 160 such overlays, the bulk of them created after 2000 (Figure 1). Between 2009 and 2013, the TIF program generated about \$500 million in incremental tax revenue each year.

TIF expenditures vary widely based on the physical character of the district, developer interest, and development needs there. In particular, there appears to be a difference between downtown and neighborhood districts. In the downtown, the City has used TIF funds to renovate theatres, build market-rate townhomes, jumpstart beautification projects, and make major infrastructure improvements. The now-expired Central Loop TIF, Chicago's largest, generated \$862 million in increment between its designation and its expiration in 2008. This increment was pumped back into the downtown to spur private investment in office buildings, hotels, and cultural institutions in the city's vibrant downtown core. Other downtown TIF districts have a more focused intent. For example, the single-block Ohio/Wabash TIF district was established in 2000 with the expressed intent of saving two historic buildings in Chicago's River North neighborhood. The blight requirement was satisfied by identifying poor lighting, ventilation, and building age, while slower-than-normal EAV growth was cited to show that private investment was unlikely to occur without intervention (Trkla, Pettigrew, Allen & Payne, Inc. 2000). Over our study period, 99 percent of the direct expenditures (\$10.6 million)

made in this district were to a single private developer for the redevelopment of the Medinah Temple and the Tree Studios Building to house upscale retail.

In the neighborhood TIF districts, funds have been used to construct shopping malls, big-box chain stores, and build new streets in industrial corridors. For example, Chicago's three Stockyards TIF districts were designated following the closure of its historic South Side meat-packing facilities in 1980. The City used general obligation bonds to improve public infrastructure, provide environmental remediation, and assemble smaller sites so that they would be available for larger-scale private investments (Healey and McCormick 1999). These kinds of districts—often located in lower income or industrial neighborhoods on the city's south and west sides—are more closely aligned with the original legislative intent of creating jobs and redeveloping areas that had a difficult time attracting market interest. Neighborhood TIF districts also have been the recipient of smaller community development programs financed through TIF. For example, the Neighborhood Improvement Program (NIP) and Small Business Improvement Fund (SBIF) provide small grants for funding home repairs and matching grants to remodel commercial or industrial properties. For example, the 119th/Halsted TIF provides this type of community-based funding in the far-south side West Pullman neighborhood. NIP, SBIF, and job training programs in this neighborhood are intended to foster business district creation and build affordable housing (Cameros 2003). However, compared with the TIF districts located in or near the downtown, most of these neighborhood TIF districts have experienced less redevelopment activity—with the exception of senior and affordable housing, infrastructure improvements, and the occasional commercial development.

Hypothesis Variable: Expenditure Data

For most of the program's existence (through 2013), the City of Chicago made little data on TIF expenditures available. Annual reports by district were made public in 2010, but line items included lump sum totals like "relocation costs" and "building repair" which could not be directly attributed to specific projects; such payments could have been made for basic street repairs, a public school, or for a private industrial facility.³ In 2010 the Chicago News Cooperative submitted a Freedom of Information Act (FOIA) request to the City and compiled a database of all TIF payments to individual vendors (such as individual service providers, construction companies, and developers) with detailed descriptions.⁴

Our data consist of total values for the period between 2002 and 2008 and are not assigned to an individual year. Expenditures varied significantly by district (see Figure 2), with most of the high-expenditure districts located near the CBD. There is a relationship between the incremental revenue that districts generate based on appreciation and their spending practices. However, individual TIF districts are neither limited to spending what they generated to that point

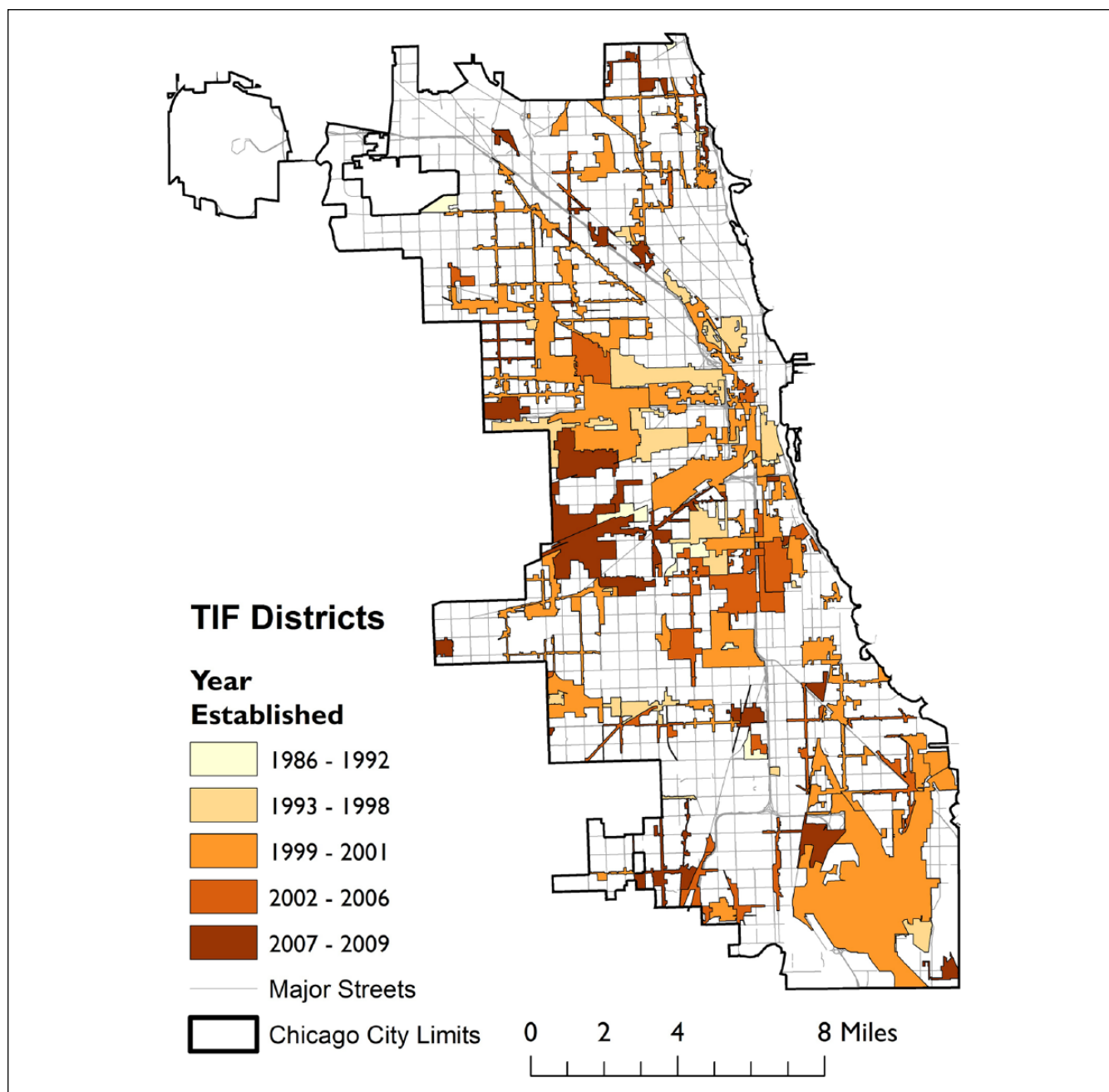


Figure 1. Chicago's TIF districts by establishment year.

nor or are they forced to spend down the funds in their accounts every year. Instead districts carry a “fund balance”—unspent or uncommitted monies that are available for future spending or debt service.

The majority (98 percent) of district expenditures can be classified into eight categories:

1. Accounting/finance
2. Operations
3. Community expenditures
4. Infrastructure

5. Public facilities
6. Property
7. Commercial development
8. Residential development

Table 1 provides a detailed description of each category, and Table 2 provides summary statistics. The data record expenditures from all Chicago TIF districts with any financial activity from 2002-2008 ($n = 160$).

The accounting/finance category represents a majority of the charges, demonstrating the reliance of the City on bonded

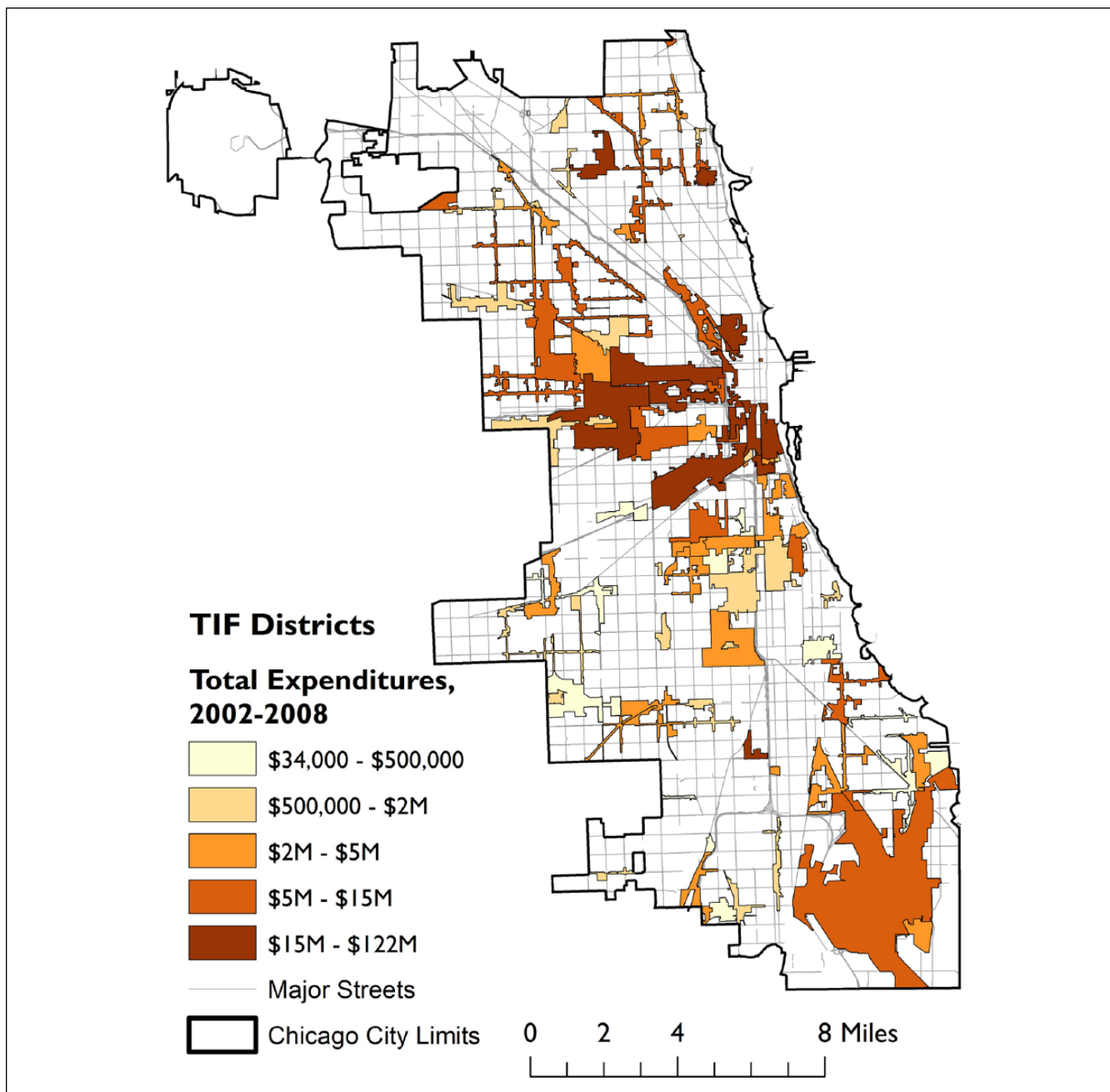


Figure 2. Chicago's TIF districts by total expenditure, 2002–2008.

debt to underwrite TIF projects. A shortcoming of this data source is that the City does not categorize debt service payments and associated underwriting costs with the final recipient or project type. Thus, it is not possible to determine the type of project with which these expenditures are associated or the point in time at which the project received the principal. We address this data flaw with our research design. Our regression analysis first compares the total financing expenses per district (category 1) side-by-side with the sum of categories 2 through 8, which represent actual payments to vendors during the study period (2002–2008) for specific

projects. While we are limited to analyzing variation in spending type outside of category 1, the variation across categories 2 through 8 still provides insights into the impact of different kinds of direct (i.e., unleveraged) spending. If we disaggregate the remaining nonfinance expenditures, we see that they were split fairly evenly between categories 4 through 7, with \$167 million going to infrastructure, \$127 million to public facilities, \$184 million going to property-related expenses, and \$271 million to commercial development across the TIF districts. Residential development represented a slightly smaller proportion of total spending at

Table 1. Description of TIF Expenditures by Category, Organized from Public to Private Beneficiaries.

Accounting/finance	Principal, interest, and various other expenses associated with bonds and debt service.
Operations	Soft costs associated with management of the TIF program. The majority is employee costs, but also includes annual reports, office expenses, and other overhead.
Community programs	Neighborhood Improvement Program (NIP) funds, Small Business Improvement (SBIF) funds, façade rebate/beautification programs, and job training funding to companies or non-profit organizations in TIF districts.
Infrastructure	Payments to contractors for public improvements. This includes alleys, bike lanes, bridges, elevated façade, lighting, parking, railroad, ramps, riverbanks, sewers, sidewalks, street improvements, streetscaping, traffic signals, management, and studies, utilities, viaducts, and water mains.
Public facilities	Payments to contractors or public organizations for larger public projects, including transit stations, libraries, parks, police/fire, schools, and waste management.
Property acquisition	Funds expended to assemble parcels of land that also includes property-related expenses such as appraisal, demolition, property management, environmental remediation, insurance, surveying, relocation assistance, some construction costs, and soft costs/professional expenses related to the above.
Commercial development	Funding to developers for commercial projects through Redevelopment Agreements (RDAs).
Residential development	Funding to developers for residential projects through RDAs. Some explicitly mention an affordable or senior housing component.

Source: City of Chicago Expenditure Data from Freedom of Information Act Request by the Chicago News Cooperative.

Table 2. TIF District Expenditures, Total for Years 2002-2008.

	Category Total (\$) ^a	Percentage of Total	No. of Districts ^b	Average (\$) ^c	Maximum (\$)
Accounting/finance	1,836,204,774	66.37%	91	20,178,074	267,960,063
Operations	42,936,619	1.55%	152	282,478	4,256,722
Community programs	53,644,130	1.94%	81	662,273	7,929,480
Infrastructure	166,831,434	6.03%	95	1,756,120	37,085,567
Public facilities	127,124,624	4.60%	39	3,259,606	25,400,000
Property acquisition	183,650,532	6.64%	107	1,716,360	43,348,720
Commercial development	271,085,054	9.80%	53	5,114,812	38,327,485
Residential development	85,067,670	3.07%	35	2,430,505	18,025,525

a. Total for all districts in existence as of May 2012 ($n = 160$).

b. Number of districts that did not receive this type of expenditure.

c. Excludes districts that did not receive this type of expenditure.

\$85 million, while community programs and operations expenditures were the lowest at \$54 million and \$43 million, respectively. This distribution of TIF spending across these categories matches a City of Chicago report, which found roughly equal proportions of spending between public outlays such as infrastructure and facility improvements and private outlays such as property acquisition and development (TIF Reform Panel 2011).

Dependent Variable: Property Value Change

The goal of our model is to isolate the independent impact of total and disaggregated TIF expenditures on property value change. The Cook County Clerk's Office maintains annual records on property values (Equalized Assessed Value or EAV) in each TIF district from which we were able to

construct our dependent variable, the magnitude of EAV change. This is measured as the difference between initial and final EAV. We control for the size of a district in the regression equation using initial EAV as a baseline variable.

Determining the causal effects of TIF is complicated because of the other factors in and near the districts affecting property values. In order to control for the expectation of future property value growth in a TIF district, we construct a variable based on prior growth rates of nearby properties (1997–2003). Because of their odd shapes, TIF districts do not nest well with other boundaries like census tracts or city wards, making it difficult to determine characteristics unique to a district. Therefore, we geocoded EAV data for small residential properties (6 units or less) and identified those properties that were within one-half mile of each TIF district, but not in any other TIF district.⁵ We refer to this area as each

district's "buffer." We then calculated the average change in residential property value from 1997 to 2003 for the parcels in each buffer, which we consider that district's "expected growth." The purpose of this exercise is to address the value capture hypothesis put forth by Anderson (1990) and Dye and Merriman (2000), who proposed that TIF districts may be intentionally established in previously fast-growing areas to siphon off revenue from future property value growth. This simultaneity problem makes accurate empirical estimation of the impact of TIF challenging but not impossible.⁶ While a sample of residential property values is an imperfect measure of prior growth in an area that may include commercial and industrial properties, it provides a general indicator of the health of the real estate market in the vicinity of the TIF district before the expenditures in question were made there.

We also consider the age of the TIF district in 2002 in order to control for variation in the spending and growth patterns over its life cycle. Appreciation is expected to be higher in a district's early years as new infrastructure and properties are built: the latter are directly added to the tax rolls and the former are eventually capitalized into nearby values. Furthermore, the signal sent by designating a TIF district indicates that the city is serious about redeveloping the area; this "intent-to-treat" effect may cause an early spike in values irrespective of any actual redevelopment activity.

Use types for each TIF are included in the model, as numerous prior studies have found that property value growth differs based on a district's primary land use (Merriman, Skidmore, and Kashian 2011; Weber, Bhatta, and Merriman 2007). District redevelopment plans specify the current and intended land use or uses. Many districts have more than one use type, so we create three binary indicator variables for whether a district contained a majority of residential, industrial, or commercial land uses, with the latter category combining retail, institutional, and office uses.

Controls: Other Determinants of Value Change

Additionally, we include a number of locational variables to account for property value trends independent of TIF use. Land area is included because of the likelihood that larger districts may capture scale economies, particularly in terms of administrative expenses. Distance to downtown measures the distance from each TIF district's centroid to the intersection of State and Madison streets—generally considered to be the center of the downtown. A common criticism of TIF in Chicago is that wealthier downtown districts are often established to the detriment of neighborhood districts.

Ease of access to transportation is a significant factor in determining property values. The variation in both the size and shape of TIF districts prevents a simple distance measure from being useful to gauge a district's connection to road and transit networks. Instead, using point data provided by the City of Chicago for commuter rail stations, elevated train ("el") stations, and highway exits, we create two variables: accessibility

to passenger rail and highways. Using GIS, we identify the proportion of each district that is served by train or limited-access highway, defining the service area as being within a half-mile.

The demographic characteristics of a district may also impact property value change independent of TIF. Previous studies that use parcel-based data usually attribute the characteristics of the containing census tract to each parcel. Because TIF districts vary greatly in size and are often oddly shaped, some TIF districts span several census tracts while others cover only a single city block. The US Census Bureau's block level is the smallest available spatial unit and can be accurately nested within TIF districts using GIS. Preserving geographic integrity comes at the cost of the availability of unemployment and poverty data, which have been included as controls in previous studies (see Byrne 2006). However population density and residential vacancy from the 2000 Census are available at this level. These variables measure the desirability of an area and capture the likelihood of secular value change.

Regression Model

We use a multiple regression model to examine the relationship between expenditure categories and the difference in property value from period i to period j , controlling for other characteristics of a TIF district that may affect appreciation. Ordinary least squares (OLS) estimators are found for the following linear relationship:

$$EAV_j - EAV_i = \beta_0 + \beta_1 X_{EAV_i} + \beta_2 X_C + \beta_3 X_E + \beta_4 X_U + \beta_5 X_D + \varepsilon$$

where the dependent variable is the magnitude of EAV change between periods i and j , where X_{EAV_i} is the district's base year property value used to control for the size of the district in terms of assessed value, X_C is an $(n \times 2)$ matrix of variables controlling for the expected future property value growth in the surrounding region and the age of the TIF district in the base year, X_E is an $(n \times k)$ matrix of 2002–2008 expenditures split into k categories, X_U is an $(n \times 3)$ matrix of dummy variables by city-designated use type, X_D is an $(n \times k)$ matrix of other district-wide characteristics such as population, size, vacancy, and access, and ε is a random error term with an expected value of zero. We adopt several different specifications to estimate this relationship, considering different hypothesized drivers of a district's value change separately. Conducting regressions separately also provides a test of the robustness of the expenditure coefficient estimates. A log transformation is applied to some independent variables to better approximate linearity.

Property values and expenditures may be endogenously determined. In order to establish whether expenditures drive property value growth and not the other way around, the model takes two forms. First, we examine simultaneous property value growth in each district using EAV change

from 2002 to 2008, and second, we examine subsequent property value growth using EAV change from 2008 to 2012. Each period covers two reassessment years (2003 and 2006; 2009 and 2012), which is important because the largest jumps in EAV tend to take place between these years. From the 160 TIF districts that were extant between 2002 and 2008, the sample is restricted to those that were active over the entire period of study: 114 districts for same-period growth regressions and 107 for the subsequent-period growth regressions. Four districts are excluded from the same-period regressions because their initial EAVs in 2002 were nearly zero, likely reflecting publicly owned or specially assessed property that would make interpretation of change in the dependent variable difficult.

Results

Results for the same-period EAV growth model can be found in regressions 1–4 of Table 3. Regression 1 examines the relationship between EAV growth and total financial and nonfinancial expenditures using three control variables. Base year EAV is included to ensure that results are scale free; i.e. large and small districts can be compared. Thus the only substantive interpretation of its positive, significant coefficient is that large districts (measured in terms of initial EAV) have larger absolute increases in EAV when measured in dollars. In regression 1, aggregated financial expenditures show a negative relationship with 2002–2008 EAV growth and aggregated nonfinancial expenditures show a positive relationship. However neither relationship is statistically significant: there appears to be no systematic relationship between overall spending and same-period property appreciation across districts. The expected growth buffer's coefficient estimate is positive and highly significant, indicating that nearby residential value change from 1997 to 2003 is very closely related to 2002–2008 EAV change within the district. Expected growth is related to subsequent growth; that is, trajectories for appreciation are set early on. The negative and significant coefficient on TIF district age confirms the supposition that newer districts appreciate more in value than older ones.

While aggregated expenditures appear unrelated to same-period property value growth, splitting the nonfinancial expenditures into seven further spending categories in regression 2 reveals important relationships between particular types of expenditure and property value growth. Operations expenditures are withheld from the regressions because they were found to be significantly multicollinear with other expenditure types. We suspect that this is because administrative expenses track other direct expenses, with more staff needed to oversee larger public expenditures. No other examples of significant multicollinearity were found in any regressions (i.e., there are no VIF scores above 4), suggesting that all other expenditure categories (including accounting/finance) are sufficiently distinct.

Releasing the variation within expenditures greatly improves model fit, with *R*-squared values increasing from 0.28 to 0.60 and above. Community and public facilities expenditures have a statistically indeterminate relationship with EAV increase; there is too much variation between districts to say anything about their impact. The strongest relationship between any expenditure category and same-period EAV growth is for infrastructure expenses—it is highly significant and unexpectedly negative (–12.65). In contrast, expenditures on commercial and residential development have a strong ($p < 0.01$) relationship with same-period appreciation, with the impact of residential spending slightly more than double (8.54 vs. 3.72) that of commercial spending, all else equal. The relationship between expenditures on property acquisition and EAV increase is weaker ($p < 0.10$) but still positive (2.36).

Adding a use-type indicator variable in regression 3 reveals that industrial land uses in TIF district are positively related ($p < 0.05$) to EAV growth. However, neither residential nor commercial land uses have a significant relationship with EAV growth. While taking use type into account does not change most of the expenditure variables' coefficients substantially, the estimate for community spending increases slightly to 11.31, and it is now strong enough to be considered a weakly significant positive predictor of EAV growth ($p < 0.10$).

Regression 4 controls for the influence of other location-specific characteristics that might independently affect property value change. An increase in district size is significantly associated with EAV increase (21.26), while the proportion of a district's land area that is rail-accessible is also significantly associated with same-period growth (33.82). The log distance to downtown is significant at the $p < 0.01$ level as well, with a coefficient of –46.3; that is, districts closer to downtown grow more than those further away. Again, the inclusion of nonexpenditure variables does not change the sign or relative magnitude of any of the disaggregated expenditure variables, though the (highly significant) coefficient estimates for infrastructure, community spending, commercial development, and residential development decrease somewhat. Property acquisition expenditures, which had been associated with growth, no longer appear in Regression 4, suggesting a differential impact of property expenditures on EAV growth when district location and accessibility are taken into account. On the other hand, the category measuring aggregated financial expenditures has a slightly larger coefficient estimate and lower standard error. When taking into account external growth drivers, it is a significant ($p < 0.05$) but negative predictor of EAV appreciation. However, the magnitude of its impact is much smaller than other expenditure variables (a coefficient of –0.304).

Regressions 5–8 (Table 4) examine the relationship between 2002–2008 spending totals by district and subsequent property value growth for the period 2008 to 2012. In regression 5, which tests total financial and nonfinancial

Table 3. Regression Results for Simultaneous Growth, $Y = \text{EAV } 2008 - \text{EAV } 2002$ ($n = 114$).

Variable	1	2	3	4
Base year EAV (2002)	0.4437** (0.17229)	0.79634*** (0.16696)	0.66776*** -0.17958	0.44115*** (0.15923)
Buffer growth rate (1997–2003)	55.26417*** (16.24531)	38.00923*** (12.8332)	38.71938*** (13.06598)	15.7264 (11.55423)
TIF district age in 2002	-4.17262** (1.72809)	-2.93541** (1.32625)	-2.60679* (1.38929)	-1.22603 (1.24714)
Residential			12.60932 (12.02191)	
Commercial			0.38813 (12.11337)	
Industrial			26.7365** (12.14635)	
Ln(acreage)				21.25926*** (4.83569)
Ln(Distance to CBD)				-46.29879*** (8.27149)
Percentage served by rail				33.82578*** (12.72058)
Percentage served by highway				-14.3570 (12.56728)
Population per acre				0.0085 (0.01398)
Household vacancy rate				-31.8873 (40.83065)
Accounting/finance expenditures	-0.34755 (0.21252)	-0.26549 (0.17243)	-0.22532 (0.17742)	-0.304** (0.1474)
Total nonaccounting/finance expenditures	0.85253 (0.62524)			
Community		9.17008 (5.8351)	11.3145* (6.01228)	9.99155** (4.98397)
Infrastructure		-12.64892*** (2.15862)	-12.48675*** (2.20909)	-11.95197*** (1.83421)
Public facilities		1.5790 (1.50306)	2.23428 (1.52475)	0.09213 (1.28768)
Property		2.36499* (1.21411)	2.58892** (1.20818)	1.6544 (1.03267)
Commercial development		3.71565*** (0.86928)	3.94682*** (0.87057)	2.66273*** (0.79421)
Residential development		8.54222*** (2.28205)	8.46644*** (2.30209)	6.14665*** (1.95194)
R-squared	0.2789	0.6029	0.6233	0.7364
Adjusted R-squared	0.2455	0.5644	0.5743	0.6929

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

expenditures using the control variables, aggregated nonfinancial expenditures are a significant ($p < 0.05$) positive predictor of subsequent-period EAV growth, while financial expenditures are not significantly related. The base year EAV, used to control for magnitude, is negative and highly significant ($p < 0.01$), indicating divergence: higher EAV districts tended to grow less or decrease in EAV over this time, which is likely reflective of the recession's impact on previously fast-growing areas and EAV more generally. This

coefficient estimate is responsible for most of the high R-squared values found in regressions 5–8.

Disaggregating the positive impact of nonfinancial spending on future growth in regression 6 shows that only one category is significant, commercial development spending, which has a positive and highly significant ($p < 0.01$) relationship with future-period EAV growth, though its positive impact (0.79) is far lower than any relationships between spending and same period growth in regressions 1–4 (which

Table 4. Regression Results for Subsequent Growth, $Y = \text{EAV } 2012 - \text{EAV } 2008$ ($n = 107$).

Variable	5	6	7	8
Base year EAV (2008)	-0.21403*** (0.01682)	-0.22478*** (0.01986)	-0.24115*** (0.02228)	-0.22689*** (0.02749)
Buffer growth rate (1997–2003)	-0.95032 (3.82126)	-1.57455 (3.81554)	-0.16921 (4.04142)	-3.15156 (4.51199)
TIF district age in 2008	0.20441 (0.49418)	0.22347 (0.48785)	0.15464 (0.50676)	0.07366 (0.52221)
Residential			0.23625 (3.61836)	
Commercial			-2.12068 (3.52154)	
Industrial			5.22887 (3.75307)	
Ln(acreage)				-1.87532 (1.98258)
Ln(Distance to CBD)				-4.3928 (3.76068)
Percentage served by rail				3.32113 (4.53651)
Percentage served by highway				-7.56706* (4.37893)
Population per acre				-0.00469 (0.00525)
Household vacancy rate				2.59772 (32.92885)
Accounting/finance expenditures	-0.06813 (0.04595)	-0.03867 (0.05019)	-0.01942 (0.05193)	-0.0423 (0.05136)
Total nonaccounting/finance expenditures	0.35156** (0.13475)			
Community		1.99998 (1.67063)	2.34383 (1.7303)	2.6515 (1.7484)
Infrastructure		0.14599 (0.53095)	-0.11181 (0.55243)	0.2730 (0.54587)
Public facilities		0.7775 (0.5039)	0.91935* (0.51464)	0.58382 (0.52573)
Property		-0.3822 (0.36699)	-0.27438 (0.37125)	-0.30346 (0.37039)
Commercial development		0.79281*** (0.26381)	0.92332*** (0.27258)	0.56387* (0.29444)
Residential development		0.4784 (0.72072)	0.6461 (0.74181)	0.17185 (0.73866)
R-squared	0.6950	0.7180	0.7281	0.7352
Adjusted R-squared	0.6799	0.6886	0.6901	0.6882

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

ranged from 2.6 to 11.3). Adding use types in regression 7 does not substantively alter any coefficient estimates (nor are any of the use type coefficients significant) with the exception of public facilities expenditure, which now show a weakly significant ($p < 0.10$) and positive impact on subsequent period property value growth. Far fewer of the secular drivers of growth, examined in regression 8, are significant. Highway proximity is negative and weakly significant ($p < 0.10$), indicating that on average having better highway

access corresponds with weaker EAV growth. When taking these secular drivers into account, again, only commercial development is significant—positively, but more weakly than before ($p < 0.10$).

Discussion

Our regression results reveal variation in the relationships between expenditures and EAV appreciation based on time

period and spending type. While the City frequently makes investments in TIF districts through pay-as-you-schemes that do not require financing, it is unfortunate that we cannot link the large accounting/finance expenditure category with specific kinds of projects in the TIF districts. On its own, however, this large category representing the debt the City takes on to front-fund TIF projects does not appear to have a consistent positive or negative relationship with appreciation. This finding—combined with the fact that growth is strongly related to district age and prior appreciation in the surrounding area—indicates a stronger symbolic effect of district establishment. In other words, appreciation may occur irrespective of TIF activity, consistent with either the “value capture” or “intent-to-treat” hypotheses.

However, results from our expenditure variables clearly indicate that public sector spending is not immaterial, particularly when it is disaggregated. The relationship between different spending categories and same-period appreciation (2002–2008) underscores the substantial variation in the mechanisms through which TIF spending relates to EAV appreciation. Analyzing same-period appreciation has the advantage of circumventing any recessionary impacts on EAV, but it also reflects how closely related a particular expenditure type is to property value, which then approximates a rate of capitalization. Our results indicate that on average, subsidies for residential development are more quickly capitalized into nearby property values. This is true even though our buffer control variable already takes into account prior residential property value trends. The weakly positive relationship between other property-related expenditures (acquisition, site improvements, etc.) may be interpreted similarly. Such findings support the notion that postindustrial cities like Chicago are becoming more consumption focused and in some cases, reversing long-standing trends of residential suburbanization (Ehrenhalt 2012).

The positive relationship between community development expenditures and same-period EAV growth challenges the notion that municipal expenditures need to entail massive physical transformation for them to push the market upwards. While this relationship is not strong, it does indicate that modest investments in activities like job training and façade improvement may be effective at promoting value growth.

What is more surprising is the negative relationship between infrastructure investment in the TIF district and EAV growth. While infrastructure, community development, and public facilities expenditures may not be as quickly capitalized into values because they increase private property values in an indirect manner, the strength and magnitude of the negative results stand out. It may be that those areas in need of basic infrastructure investment are also those that are challenged in ways (too much vacant or underutilized space) that would impede their ability to capitalize such investments. It is also possible that the impact of TIF on infrastructure is harder to isolate because other sources of financing are readily available (Chicago Department of Transportation

and aldermanic discretionary funds can be used for street repaving, in addition to TIF). TIF may “crowd out” these other sources, lowering values compared to districts that used TIF for developer-specific subsidies. Our subsequent regression results do not suggest they increase values in the longer-term, but this likely is recession-impacted.

Industrial land uses appear to be a positive driver for same-period growth. This may be due to the fact that industrial properties are initially assessed at lower rates and so subsequent redevelopment (and conversion into alternative uses) stimulates a more radical spike in values (see Weber, Dev Bhatta, and Merriman 2003). Larger TIF districts experience higher same-period growth, reflecting scale economies. Rail service and proximity to downtown support the notion that a downtown location is positively related to EAV growth. Household vacancy and population density, which had been included in previous studies as predictors of TIF’s effectiveness in blighted areas, do not appear to have any impact in our model.

Results for future-period growth are not as robust, which is expected as they analyze growth using a smaller sample of by-then older districts. The strong negative relationship between 2008 EAV and 2008–2012 appreciation reverses the sign from the simultaneous-period regressions and indicates the recession’s impact on our dependent variable: larger, higher-valued districts suffered the greatest EAV decreases over this period. The fact that once-important factors like intraurban location and the buffer variable are no longer significant indicates the heightened impact of external factors and idiosyncratic district characteristics during the recession as well.

Even given these substantial changes, total spending is positively and significantly related to subsequent EAV growth. Disaggregating by expenditure type indicates that the source of this growth is almost entirely in the form of subsidies to commercial developers, with a small component related to public facilities. In contrast, residential development does not appear to have an effect, perhaps indicating that commercial real estate investment represented a less volatile proposition during the housing bust. Publicly subsidized commercial assets may hold their value better through downturns than residential ones.

Conclusions

We set out to analyze the relationship between the timing and nature of municipal expenditures made in TIF districts and property value changes. While this study’s results are unique to the experience of Chicago, a particularly heavy user of TIF, the finding that different expenditure types have different impacts on property value change is relevant to the “scope creep” of TIF that has occurred more broadly in municipalities across the United States. Many states have TIF enabling legislation that grants even more autonomy and flexibility to cities than Illinois. As the tool moves from its

original legislative intent as an economic development and blight-elimination tool to its current use as a general-purpose property redevelopment mechanism, policy makers need to know which kinds of public investments are most likely to result in value growth. Our findings suggest that developer-specific subsidies for commercial and residential projects and community development expenditures are most quickly capitalized into property values. Commercial development expenditures show a smaller, but still significant, relationship with longer-term appreciation. Infrastructure investments, counterintuitively, depress values.

Property appreciation is critical to repaying the bonds and notes secured by future increments. If the initial expenditures do not result in sufficient appreciation, municipalities could face additional financing costs or even default. Property appreciation is also the measure used most frequently to determine whether TIF “pays for itself” or whether the tool allows municipalities to redistribute revenue growth that would have occurred in its absence. Since county governments, school, library, and other districts also have jurisdiction over property in TIF districts, TIF programs have the potential for redistributing tax revenue away from these entities by freezing property values. The results of our regression analyses are mixed. On the one hand, they suggest that, on average, total TIF expenditures are not strong predictors of property value change, supporting either the redistribution hypothesis or the notion that the signaling effect of TIF is more important than the value of the public improvements TIF underwrites. On the other hand, specific kinds of expenditures—commercial and residential real estate projects—have a greater likelihood of paying for themselves with subsequent appreciation. Based on our analysis of Chicago during the 2000s, the answer to whether TIF compels or captures property value growth is that it varies based on expenditure type and timing.

While the legislative intent of TIF and its public packaging emphasize blight elimination, this municipal policy is used in both prosperous and poor neighborhoods. The fact that our regression results change during the recession years is an important part of the story of TIF as well, indicating that market conditions impact the linkages between different types of expenditure and property value appreciation. As would be expected, linkages between expenditures and appreciation during the recession period are weaker—underscoring TIF’s dependence on robust private development markets and its use as a pro-cyclical tool. However, the tenuous connections between secular growth determinants like intraurban location and prior growth rates during the recession suggest that the effects of numerous factors—TIF expenditures included—are less clearly related to appreciation when private development markets are anemic.

Finally, when evaluating this popular program in the near and long term, measures other than appreciation should be considered: property value growth does not reflect improved well-being for all residents, and it can even make some worse

off if it causes tenant displacement (Hackworth 2002; Newman and Wyly 2006). While this empirical study focuses on empirical regularities in TIF across an entire city, case studies of specific Chicago districts highlight the difference between the experiences of TIF districts in prosperous versus poorer neighborhoods. In the working-class, port-of-entry immigrant neighborhood of Pilsen, the local TIF district has been widely criticized for subsidizing upmarket housing development that is not affordable to current residents (Black 2011) while the Ohio/Wabash district described earlier promoted retail investment in one of Chicago’s most upscale neighborhoods. Analyzing the effect of TIF on alternative outcome measures such as changes in employment, business starts, and household income (e.g., Byrne 2009; Lester 2014) would address these concerns over equity more directly, as would the study of specific development deals and consequences of municipal entrepreneurialism more generally.

Considering the variation in TIF spending, as we have done here, in concert with such alternative measures of well-being would further inform policy makers about the equity implications of TIF. In Chicago, concerns about the equitable distribution of benefits of the TIF program have resulted in mayor-appointed task forces to recommend reforms to the program, increased data transparency, raising the bar for TIF allocations, improving administrative efficiency, the termination of several TIF districts that were either dormant or that had achieved their stated redevelopment goals, and distributions of surplus TIF revenues to the public schools (Greve 2013). Given that our results cast some doubt on whether TIF causes or captures subsequent property value growth, continued scrutiny of the program and further consideration of mechanisms to alleviate such concerns is merited.

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Notes

1. Only three factors are needed to designate a so-called conservation area, which is also eligible for TIF designation (“Tax Increment Allocation Redevelopment Act,” 1977). Other states have more or less stringent criteria for meeting the blight threshold.
2. Some states, such as Missouri, allow municipalities to increment a portion of the sales taxes collected in TIF districts. Illinois allowed this practice for a short window of time (1985–1989) to jumpstart adoption of the TIF program across municipalities.
3. Thanks to Robert Ross for sharing the TIF Annual Report data. District expenditure totals from the Annual Reports are

similar to those compiled with the FOIA data for the years that overlap. However, our FOIA data in general include more and smaller expenditures.

4. Thanks to Juan-Pablo Velez for making these data available.
5. Nine of our TIF districts were located in heavily industrial areas and had few nearby residences, so in these cases the buffer was expanded to one mile so that the sample of nearby residential parcels was sufficiently large. Thanks to Dan McMillen for providing access to and assistance with residential property values.
6. A concern raised in the TIF literature is that of self-selection bias: a district may have been established because the expectation of growth in an area would make it an attractive mechanism with which to secure debt financing. This causes an endogeneity problem when trying to identify the determinants of value growth (Anderson 1990; Carroll 2008). Because our project does not focus on variation between TIF and non-TIF areas, we circumvent the self-selection problem.

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