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DOES TAX-INCREMENT FINANCING PASS THE "BUT FOR" TEST IN MISSOURI?

THE IMPACT OF TAX INCREMENT FINANCING (TIF) ON LOCAL ECONOMIC DEVELOPMENT OUTCOMES IN SAINT LOUIS AND KANSAS CITY, MISSOURI.

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ABSTRACT

The use of tax-increment financing (TIF) remains a popular yet highly controversial tool among policymakers in their efforts to promote economic development. This paper is a comprehensive assessment of the effectiveness of Missouri's TIF program, specifically in Kansas City and Saint Louis, in creating economic opportunities. We build a time-series dataset covering the period from 1990 through 2012 of detailed employment levels, establishment counts, and sales at the census block group level to run a set of difference-in-differences estimates for the impact of TIF at the local level. Our analysis of the impact of TIF on a wide set of indicators and across various industry sectors yields no conclusive evidence that the TIF program in either city has a causal impact on key economic development indicators.

1. INTRODUCTION

In the second half of the 20th century, American cities faced deep economic challenges as the preponderance of population and employment growth shifted sharply toward suburban areas. Local mayors and civic leaders searched for tools to reverse this trend and shift the incentives that private businesses faced when considering investing in central cities and other distressed parts of U.S. metropolitan areas. Economic development planners have developed a broad set of tools, such as tax incentives, infrastructure subsidies, empowerment zones, and targeted grant and job training subsidies (see Fitzgerald & Green-Leigh, 2002). What unites these various policies is the fact that they shift public tax dollars to private entities (typically businesses or land developers). Along with tax abatement, tax-increment financing (TIF) is now one of most common forms of local public subsidy.

In addition to continued competitive disadvantages vis-à-vis suburban areas, cities also face deep fiscal challenges, making the use of TIF and similar policies that use scarce tax dollars for private economic development highly controversial. Thus, we need to carefully analyze whether such policies actually create the jobs and business growth their proponents promise. To do so, we must attempt to answer the classic "but-for" test, a statutorily required finding that the redevelopment area has not been subject to growth and development through private investment and that development cannot reasonably be anticipated *but for* the adoption of TIF. Satisfaction of the but-for test requirement is made via an affidavit by the proposed developer submitted along with the redevelopment plan. The central objective of our paper is, therefore, to assess the effectiveness of TIF and estimate its impact on employment and sales, and its ability to attract new businesses (measured in terms of the number of establishments). We also intend to assess the validity of the but-for test in Missouri, specifically examining the cases of Kansas City and Saint Louis for the study period of 1990 through 2012. We build a time-series dataset of detailed employment levels, establishment counts, and sales at the census block group[1] level to run a set of difference-in-differences (DiD) estimates for the impact of TIF at the local level.[2] Although we analyze the impact of TIF on a wide set of indicators and across various industry sectors, we find no conclusive evidence that the TIF program in either city has a causal impact on key economic development indicators.

The remainder of this paper is organized as follows: Section 2 provides an overview of how TIF works. Section 3 reviews some of the empirical literature on the impact of TIF and presents the specific research questions of this paper. Section 4 discusses the methodology, and section 5 discusses the data. Section 6 presents the main results and discusses the robustness of the findings. Section 7 concludes.

2. TIF BACKGROUND

The primary purposes of TIF are to attract business, create and retain jobs, increase the tax base, and stimulate investment in areas where investment is either considered too risky or not likely to occur without some form of public support. Specifically, the City of Saint Louis defines TIF as a "a development tool designed to help finance certain eligible improvements to property in designated redevelopment areas (TIF Districts) by utilizing the new, or incremental, tax revenues generated by the project after completion."[3]

Local governments agree to underwrite certain redevelopment project costs to attract new private development in a redevelopment area. The new tax revenue generated is then used to retire notes or bonds

that were issued to pay for the redevelopment project costs. In general, TIF works by freezing real estate taxes at their current levels in taxing districts that fall within the redevelopment area where a TIF plan is adopted. The increased assessed valuation resulting from redevelopment—the tax "increment"—is then used to pay directly for project costs or to retire any debt that was issued to pay for the project costs.

Though both Kansas City and Saint Louis are similar to many of their peers nationally in their use of TIF, the regulatory settings in which they operate are unique. Missouri State's TIF statute allows for up to 50 percent of economic activity taxes (EATs) to be diverted to TIF, whereas other states allow only the increase in property tax related to the TIF project or district to be diverted. Also of particular interest, TIF in Saint Louis is implemented at a project level, whereas elsewhere, including in Kansas City, TIF is implemented at a district level. In particular, implementing TIF at a project level could have the effect of diverting more funds to a particular location than if TIF were implemented at a district level.

Interest in the effectiveness of TIF, especially in the Saint Louis region, is not new. Many have criticized the widespread use of TIF in Saint Louis as "giving incentives to wealthy developers by taking away much-needed tax dollars for education and public safety,"[4] thereby creating "the potential for overuse and abuse of TIF".[5] These claims have non-trivial welfare implications, as freezing the property tax for the length of a TIF arrangement prevents the city from benefitting from increased revenue that would have been available if a project had been undertaken in the same period without TIF. Another related claim is that TIF is used to finance projects in high-tax-base suburban areas with little need for assistance in the competition for tax base. For example, only nine of thirty-three of the Saint Louis region's TIF projects lie in the region's core.[6] Others, pointing to TIF approved in 2010 for the relocation of a Walmart store on the same street two miles away, claim that the tool encourages a retail shell-game, simply shifting sales receipts around the region.[7]

3. LITERATURE REVIEW

Since the use of TIF by local governments has been both popular and controversial, it has received significant attention in the academic literature of economics, public policy, planning, and geography. This section briefly summarizes the most salient studies to contextualize the empirical work conducted in this study. This paper focuses only on quantitative research that analyzes the impact of TIF on economic development outcomes. While most research has investigated the effect of the TIF designation itself (i.e., whether a parcel falls inside or outside a TIF district), a few studies also include data on actual spending within the TIF area. This aspect is retained in the empirical work proposed in the methodology section.

An important part of answering the but-for question for TIF lies in determining which municipalities are choosing to offer TIF and which districts are being designated for TIF. Greenbaum and Landers (2014), in a nationwide study of 424 municipal and county governments, found that local governments that adopted TIF tended to be municipalities rather than county governments, and also tended to be larger, have lower average personal income, and not be within a central city.

3.1 Empirical Literature on TIF and Economic Development Outcomes

Most papers that analyze TIF's impact do not explicitly address the problem of endogeneity with regard to TIF designation. Specifically, since most TIF legislation requires that districts be created in portions of the city that have experienced "blight," it is possible that TIFs are *only* created in less-desirable areas that one would not expect to grow at the same rate as non-blighted sections. Alternatively, areas might be selected that are expected to grow faster, so more increment can be captured (Greenbaum & Landers, 2014). Smith (2009) provides one of the few papers to directly address the issue of selection bias with respect to TIF-designation. He examines the impact of TIF on the change in individual commercial property values and predicts TIF assignment with a propensity-score approach that controls for neighborhood characteristics such as poverty, unemployment, and housing values. This issue is potentially critical in attempting to answer the but-for question, because comparisons between TIF districts and comparable non-TIF parts of the city are necessary. Smith's results show that the implicit price of commercial properties in TIF districts increases faster than properties

that are not in TIF districts. Further, the rate of change in real estate prices accelerates after TIF designation, even after controlling for the similarities between non-TIF and TIF areas.

Finally, one of the few papers to directly examine the impact of TIF on job creation is Byrne (2010), which focuses on the effect of TIF adoption on municipal employment growth in Illinois. Specifically, Byrne uses a panel dataset consisting of employment and TIF adoption dates at the municipal level and uses a fixed-effect estimate approach[8] to assess the impact of TIF adoption. Overall, the findings suggest that TIF adoption, in general, does not lead to higher employment. However, Byrne does not adequately control for the issue of selection bias in that cities that use TIF are potentially those that have experienced slower growth rates relative to rapidly-growing suburban areas. While Byrne uses a first-differenced fixed effects model that he claims eliminates the issue of selection bias, it is still possible that slower-growth municipalities adopt TIF after a recent period of slow growth (e.g., a recession). Lastly, as Byrne points out in discussing the detailed findings by industry, it is unclear whether we should even expect to find a municipal-level impact of TIF, because its stated purpose is to increase economic development within a narrowly conscribed geographic area.

Using time-series data for Chicago at the block group level, Lester (2014) showed that the use of TIF failed the but-for test with no evidence of increasing tangible economic development benefits in terms of job growth or investment. The use of block group level data was significant because it allowed for testing of the impact of TIF designation on job creation at the same level at which investments are funneled. The paper addressed the issue of selection bias through a weighting mechanism to account for the likelihood of each block group to receive TIF. Lester also took advantage of the time-series nature of the dataset to evaluate which aspect of TIF was most influential in driving economic development in the designated district—the timing of TIF designation or investments made from TIF revenues.

In Indiana, the Indiana Legislative Services Agency published the Indiana Tax Incentive Review (2014),[9] which used parcel-level data to examine the effect of TIF on employment growth. This econometric evaluation controlled for endogenous factors using a propensity score matching technique and found that TIF does not have a statistically significant impact on employment growth over time. It also analyzed the change in gross assessed value in property over time and found that TIF parcels did exhibit slightly higher growth than non-TIF parcels over time, but the difference was economically small and did not necessarily pass the but-for test.

Hicks, Faulk, and Devaraj (2016) took an alternative approach and evaluated the effectiveness of TIF by examining fiscal impacts. Their study, conducted in the context of Indiana, found no net benefits for overall economic development in terms of assessed value, payrolls, employment, taxable income, or taxable sales of goods. It also reported heavy losses to the state's non-TIF tax base—as large as $12.3 billion a year.

Another strand of the empirical literature focuses on TIF's impact on real estate values and reveals mixed but largely negative results. For example, Dye and Merriman (2000) used data from municipalities within the Chicago metropolitan area to examine whether TIF adoption impacts overall growth in equalized assessed value (EAV). They found that TIF adoption had a negative impact on municipality growth, even after controlling for a variety of municipal characteristics—community type, community location, and fiscal structure. They attribute this finding to higher growth within TIF districts at the expense of non-TIF portions of the city. This finding was echoed by Merriman, Skidmore, and Kashian (2011) using city-level data from Wisconsin.

Weber, Bhatta, and Merriman (2007) analyzed appreciation rates of single-family homes that sold more than one time from 1993 to 1999 in the City of Chicago. After controlling for the characteristics of homes and neighborhood conditions, the researchers found mixed results: Proximity to an industrial TIF district negatively affected prices, but proximity to TIF districts with both commercial and residential parcels increased appreciation rates. A critical aspect of their study is the use of additional control of information for both TIF-funded activity as well as the inclusion of a measure of overall TIF spending.

Kane and Weber (2016) included data on TIF spending to examine the effects of TIF on property value change in Chicago based on the type of publicly funded expenditures made under the designation of TIF. These expenditures

ranged from developer subsidies to infrastructure to job training programs. This study revealed TIF expenditures to be generally poor predictors of property value change, suggesting a more symbolic than substantive value of TIF. However, the degree to which TIF affects property value varies by the type and timing of the expenditures, with subsidies for commercial and residential projects and community development being most quickly capitalized into property values. Hicks, Faulk, and Quirin (2015) compared TIF and non-TIF districts within Indiana counties from 2003 to 2012. They found that TIF districts were associated with a small but positive increase in assessed valuation, but negatively associated with employment, number of business establishments, and sales tax revenue.

3.2 Previous Work on TIF in Missouri

Though short-term effects of TIF may be positive, there is little evidence to support the claim that it has contributed to overall regional economic growth. Most work to date has focused on Saint Louis. In 2011, the East-West Gateway Council of Governments issued a report on the impact of development incentives in the Saint Louis region, with particular attention given to the use of TIF.[10] Examining TIF activity through 2009 with a mix of quantitative and qualitative methods, the report found that the over $2 billion diverted as subsidies for TIF, largely for retail developments,[11] were ineffective in increasing regional sales tax revenue or in producing a significant increase in quality jobs.

In 2015, Saint Louis University's Center for Sustainability[12] published a descriptive study examining spatial patterns of economic and racial isolation to evaluate the impact TIF was having on patterns of neighborhood distress using data from 2000 to 2012. The study examined the spatial distribution of a distress index by municipality in order to determine whether or not the use of TIF was driving investment to the more-distressed communities in the region.

3.3 TIF in Saint Louis and Kansas City

In Missouri, the responsibilities of approving ordinances and designating redevelopment areas that define redevelopment plans lie with the municipality. The Missouri TIF Act permits different redevelopment projects within the redevelopment area (pursuant to the same redevelopment plan) to be undertaken, provided that the redevelopment area contains a blighted area, a conservation area, an economic development area, or any combination thereof. In Kansas City, a total of 80 TIF districts were designated, with the first project implemented in 1998. In Saint Louis, the first TIF district was designated in 1991 and there have been over 160 TIF project implementations since. In Saint Louis, the redevelopment areas are bounded properties. Specifically, the area "includes only those parcels of real property directly benefitting from the project." (Saint Louis Ordinance #67847) How this difference affects the estimation is discussed subsequently in the methodology section. See Figures 1 and 2 for maps of TIF districts/parcels for Saint Louis and Kansas City.

The municipality also establishes a TIF commission, which reviews the redevelopment plans, keeps the public informed through hearings, and makes a recommendation.[13] The municipality can still approve and move forward with TIF if the commission votes down the plan. Missouri statutes relevant to TIF are listed and defined in Appendix A.

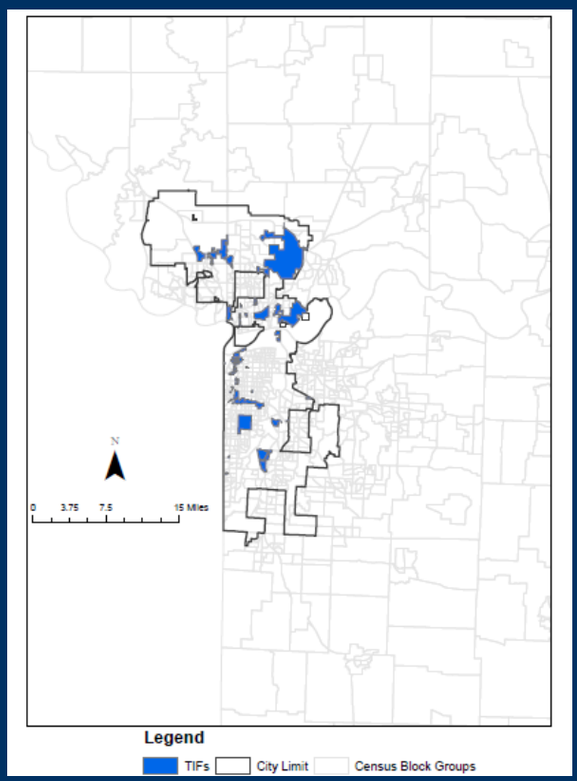
4. METHODOLOGY

A key goal of our analysis is to assess the impact of TIF designation on job growth and business development in local areas that receive TIF. To do so, we want to measure outcomes of interest, (e.g., employment, sales, creation of establishments) in block groups for several years before a TIF was designated and examine what has happened several years after the TIF. While this simple subtraction method is clear, it is not sufficient to conclude that the TIF "caused" any observed growth. Thus, we make this same before-and-after comparison both for block groups that receive TIF and for other areas that never received TIF. Then we compare the observed growth over the same time period in both areas with TIF designation (i.e., treated areas) and those without it (i.e., control areas). This methodology is referred to as *difference-in-differences* (DiD) and is the methodology used in Lester (2014); we follow it with some key improvements.

Figure 1

Map of TIF Districts in Kansas City

Blue areas indicate TIF districts designated since 1991.

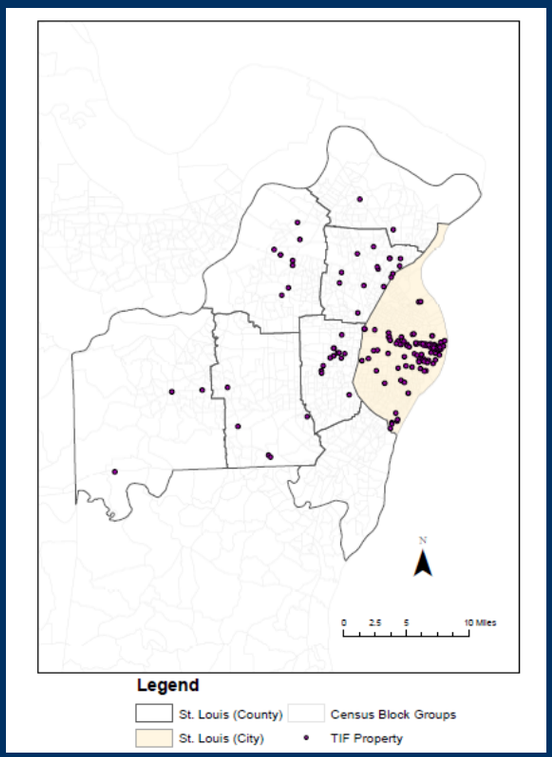


Source: Department of Economic Development Annual Reports (2007–2015).

Figure 2

Map of TIF Districts in Saint Louis (City and County)

In Saint Louis, properties (rather than districts) are designated for TIF. Purple dots indicate properties designated since 1998.



Source: Department of Economic Development Annual Reports (2007–2015).

Following the methodology used in Lester (2014), this paper uses an interrupted time-series research design to generate DiD estimates that compare changes in the outcome variables in a set of treated areas relative to a control group at the block-group level. A naïve comparison of treatment and control outcomes would simply attribute the difference in outcomes between the two groups to the treatment. This approach would ignore any initial difference in the starting points of each group, and therefore could overstate the impact of the intervention. Assuming that both groups change the same way over time, DiD estimation improves on the naïve, single-difference approach by including a before-and-after comparison, thereby taking into account the initial difference between the two groups. The DiD estimate is therefore composed of two differences, a before-and-after comparison as well as a treatment-control comparison. In this framework, we first examine the impact of TIF designation. Equation (1) summarizes the basic modelling approach to measuring the impact of TIF designation.

$$ln\,(y_{it}) = \beta TIF_{it} + \delta_t + \gamma_i + \mu_{it} \quad (1)$$

The natural log of the outcome, y_{it}, is regressed on an indicator variable indicating treatment status, TIF_{it}. The

log-linear functional form is standard in the policy impact and empirical labor economics literature (see, e.g., Dube, Lester, and Reich, 2010; and Lester, 2011). The key independent variable (TIF_{it}) is coded as (0) for each year *(t)* that a given block group *(i)* is not part of a TIF district, in case of Kansas City, or does not include a TIF project, in the case of Saint Louis. It is coded as (1) for each full calendar year after designation. The model also includes fixed effects for each year, δ_t, and each block group, γ_i. The inclusion of year fixed effects controls for any changes in employment that are due to cyclical trends correlated with time (e.g., statewide growth). The establishment of fixed effects controls for any time-invariant idiosyncratic differences across block groups. The coefficient, β, is a DiD estimator and is therefore identified solely by changes in the treatment indicator within a given block group over time.

4.1 Addressing Selection Bias

A necessary justification for the use of TIF is that development would not occur "but for" the use of TIF. In order to evaluate this claim, it is necessary to ensure that comparisons are made against a reasonable control group. If the assignment of TIF to fund projects or districts were decided through random assignment, simply comparing treatment and control groups using the DiD methodology described above would be sufficient. However, municipalities do not designate TIF districts randomly but instead designate districts on the basis of certain characteristics that are generally "positively related with neighborhood distress"(Gibson, 2003). Simply comparing block groups that received treatment to those that did not is not adequate, as the block groups that received treatment status were chosen because they were systematically different that those that did not.

To address the endogeneity of TIF designation, we employ a propensity score weighting procedure that identifies economically similar treated and untreated block groups based on pretreatment characteristics (Rosenbaum & Rubin, 1983). The procedure predicts likelihood of TIF treatment at the block-group level based on observable pretreatment characteristics obtained from 1990 U.S. Census data. In other words, the procedure identifies block groups in both groups that can function as statistical twins on the basis on their socioeconomic conditions in 1990. The statistical twin in the control group can then be considered an area that was a plausible candidate for TIF even though it did not receive it, and is therefore comparable to an area that actually received treatment. The goal of propensity score weighting is to achieve balance in the distribution of the pretreatment characteristics so that the distribution is the same in the treated and control groups. The purpose of the weighting technique is not to predict timing of designation but rather to control for factors that may be correlated to economic development or growth that may also be correlated with TIF assignment.

4.2 Addressing Common Trend Assumption

One of the main assumptions underpinning the main DiD specification above is that all block groups, in Kansas City and Saint Louis respectively, share a common time trend. In other words, all block groups are assumed to follow the same time trend in the absence of being designated a TIF area. It is important to note that this does not mean they are assumed to have the same mean outcome. To account for any differences in time trends and any characteristics that vary linearly with time for each, we also estimate a set of models that include linear time trends:

$$\ln(y_{it}) = \beta TIF_{it} + \delta_t + \gamma_i + \gamma_i t + \mu_{it} \quad (2)$$

4.3 Addressing Pre-treatment Bias

Another related potential concern is that the jurisdiction awarding TIF may have some unobservable knowledge about the area that prompted the use of TIF in the first place. This would introduce endogeneity between the treatment and the outcome. For example, if a TIF designation is created in an area that is already showing a positive trend, then any potential measured impact could simply be picking up this trend. Alternatively, TIF may be used in an area that recently experienced a negative shock which would normally be proceeded by a return to a normal (pre-existing) trend. In this case the basic equation (1) would erroneously detect a positive impact from a simple pattern of regression to the mean, or return-to-trend effect. The problem of pretreatment bias was first illustrated by Ashenfelter and Card (1985) in a study on job training. Specifically, they found that the recipients of

job training exhibited a downward trend in earnings prior to training which led to biased estimates of the benefits of the training program. To account for the possibility of an "Ashenfelter dip," we estimate an additional specification.

Because we are more concerned with controlling for potential pretreatment bias than with the timing of the TIF designation itself, we estimate the following model with controls for each year starting from 3 years prior ($t-3$) to the implementation of TIF through a 1-year lead ($t+1$). Since the main independent variable is coded as 1 for all years after implementation, the coefficient on the lead term, β_{k+1}, can be interpreted as the long-term impact on the dependent variable of interest.

$$\ln(y_{it}) = \sum_{k=t-3}^{t+1} \beta_k TIF_{it} + \delta_t + \gamma_i + \gamma_i t + \mu_{it} \quad (3)$$

Graphically, the coefficients of the lead and lags produced from this estimation can be traced to create a time path. This is discussed further in section 6.3.

4.4 TIF Investment

Since Saint Louis implements TIF at the project level, the same block group could contain multiple TIF projects. To control for the amount of funds being spent in a block group, we additionally estimate the same set of models for Saint Louis using a measure of the cumulative total anticipated reimbursable TIF project costs as the main independent variable of interest. This measure is to weight the various TIF-designated block groups by the amount of TIF investment.

5. DATA

Data from three main sources were used to construct a time-series database by block groups that was then used to conduct the necessary analysis. All outcomes and measures were assigned at the 2010 U.S. Census block group level. Block groups were used as the unit of study because they are the smallest geographical unit for which sociodemographic variables of interest are available.[14] Measurement at the block-group level also allows for capturing any spillover effects TIF designations may have had in their immediate vicinity.

5.1 TIF Information

This study focuses on TIF activity in Missouri, specifically in the cities of Kansas City and Saint Louis.[15] To construct our primary independent variable of interest and to ascertain which block groups were treated with TIF and which ones would serve as controls, we needed information on both the spatial location of each TIF district as well as the year it was designated (along with TIF investment levels in some cases). Prior to 2013, the Department of Economic Development was responsible for collecting and reporting TIF activity and publishing information in annual reports. This responsibility was transferred to the Department of Revenue after the signing of executive order 13-02. Information on TIF activity for both cities was obtained through the Department of Economic Development and Department of Revenue TIF annual reports.[16]

For Kansas City, we obtained the spatial boundaries of each TIF district from the city's Office of Economic Development web portal.[17] Using GIS, TIF districts were then matched and aggregated to the block-group level, recording the date of designation in the GIS shapefiles. In some cases, very small portions of block intersected a TIF district. In other instances, block groups were intersected by multiple TIF districts. To address the possibility of overstating degree of treatment, we established the criteria that at least 50 percent of a block group's area must be within a given TIF district. We then overlaid the TIF district boundaries with the census block centroids. In cases where multiple TIF districts overlapped the same block group, information for the TIF district with the highest area coverage of the block group is used. Of the 528 block groups in Kansas City 141 were considered to have been "TIFed." In Saint Louis, the procedure was slightly different as TIF designation is assigned at a property level instead of by district. TIF properties were geocoded in GIS, and information was aggregated to the block-group level. Addresses for TIF properties were obtained from *Better Together*.[18] Block groups containing one or more properties that used TIF were considered to have received a TIF. Out of 1,054 block groups, 92 contained TIF projects.

5.2 National Establishment Time Series (NETS)

As TIF is a tool generally meant to promote economic development, we examined the impact on employment (count), sales ($), and the number of establishments by industry using information from the National Establishment Time-series (NETS) database. The NETS is a longitudinal dataset produced by Walls and Associates and based on annual snapshots of the Dun and Bradstreet Inc. (D&B) business listing and credit rating service. The survey is essentially a census of business establishments in the United States as it contains detailed information on employment, sales, primary industry, and birth and death year of businesses at the establishment level. The data is self-reported by the firms surveyed. It is important to note that this database cannot be used as an official measure of city employment nor to measure official growth in employment.

Each record also contains detailed geographic information for each establishment's current or final location and a detailed inventory of all establishment moves. To generate accurate block-group-level counts of employment and the number of existing establishments in each year, each record in Kansas City as well as Saint Louis (city and county) was geocoded based on its listed latitude and longitude. These records were then associated with a unique block group for each year that the establishment operated in that location. Using the records of establishments that moved, the subset of establishments that moved one or more times during the 1990–2012 period was also geocoded based on the establishments' origin latitude and longitude information on the move table of the NETS. These records were tracked and geocoded to uniquely identify the place-year combination of each record.

5.3 Census

We used 1990 U.S. Census data at the block-group level in order to establish a baseline comparison for the propensity score weighting technique. We chose 1990 because it was prior to the vast majority of TIF designations in our case cities, and we therefore could rely on these figures for an assessment of pretreatment existing conditions. We collected information on demographics including race, percent employment in jobs with wages that exceed the community average, as well as measures of neighborhood distress from the U.S. Census. These include measures such as poverty rates, property use indicators, and other indicators associated with neighborhood decline based on evidence in the literature (a full list of indicator variables is available in Tables 1 and 2).

We also included a measure for the distance in meters from each block group's centroid to the respective central business district. U.S. Census 2010 block groups were then matched to those in 1990. The IPUMS database has 1990 census information reconfigured to 2000 boundaries. Census 2010 block centroids were matched to 2000 block groups and were given their attributes. If block groups split since 2000, both 2010 block groups were given the same attributes because they originated in the same 2000 block group. If block groups consolidated since 2000, they were given the attributes of the 2000 block group where the centroid of the 2010 block group fell.

5.4 Descriptive Statistics

First we compared the characteristics of census block groups that received a TIF "treatment" (at any time during the study period) to block groups that never received TIF (i.e., controls). We used 1990 Census data measured at the block-group level because we wanted to compare demographic and economic differences prior to TIF treatment. In both cities, block groups that received TIF designation had higher rates of poverty, higher housing vacancy rates, a higher percentage of people working outside the central city, and higher proportions of African-Americans in 1990.Pre-weighted summary statistics for employment change over the study period and various neighborhood and land-use characteristics for the treatment and control block groups are provided in Appendix C in Tables 3 and 4.

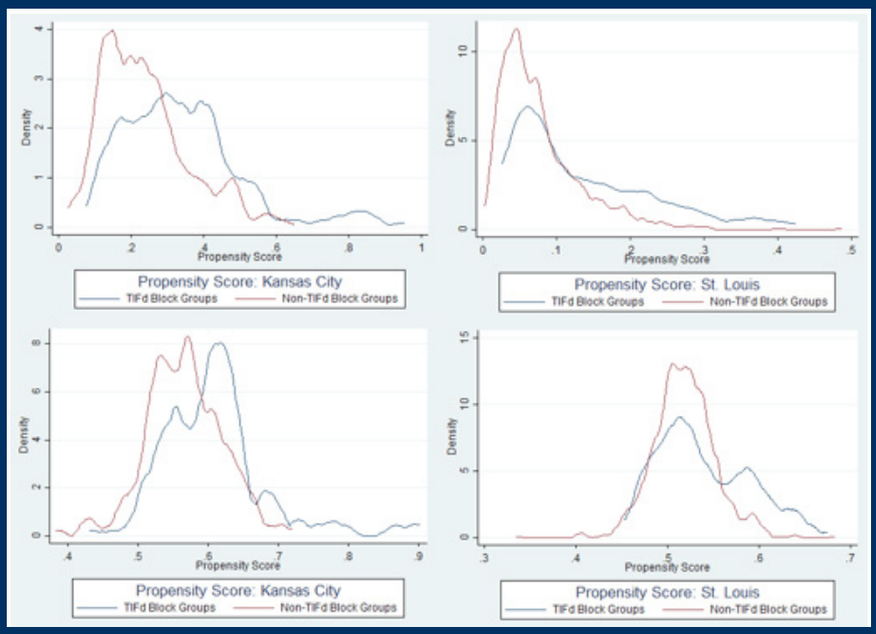
5.5 Propensity Score Weighting

Figure 3 graphically displays the application of the propensity score methodology used to address selection bias. The propensity score itself represents the likelihood that a block group would receive a TIF designation given the similarities in pretreatment characteristics. The top two panels in the figure show the propensity score before the matching process and show strong regions of support in both locations. The bottom two panels show the

Figure 3

Application of Propensity Score Weighting.

Top two panels show the propensity scores before matching. The bottom two panels show the propensity scores after matching.



Source: Authors' analysis of TIF information and National Establishment Time Series (NETS) database.

propensity score after the weighting process, displaying the balance in the distributions achieved through the methodology.

Tables 1 and 2 below show the post-weighted summary statistics. After applying the propensity weighting procedure, the differences between the treatment and control groups on all observable characteristics were insignificant, indicating that the weighting procedure is reasonably effective in addressing the issue of selection bias.

5.6 Changes in Employment

The average year-on-year change employment[19] in Kansas City is around 6.9 percent, with a rate of 7.8 percent in block groups that ever received a TIF designation and 6.4 percent in those that did not. As shown in Appendix B (Figure B1), the average year-on-year changes, with the exception of 1993, follow similar patterns across block groups that ever received a TIF and those that did not.

In Saint Louis, the average year-on-year change employment is around 5.6 percent, with a rate of 5.8 percent in block groups that ever received a TIF and 3.8 percent in those that did not. The general pattern of the changes is consistent across block groups that ever received a TIF and those that did not. The graphs for both cities indicate that employment changes may be heavily influenced by macroeconomic shocks.

6. RESULTS

Overall, the analysis conducted in this study finds no support for the claim that TIF generated tangible economic development benefits in either Kansas City or Saint Louis. In other words, we do not find evidence that the use of TIF generated economic development opportunities that would not have arisen in the absence of TIF. Accounting for the different types of potential biases with various specifications and robustness checks discussed below, the results show little or no systematic positive effect of TIF. To clarify, the analysis performed does not indicate that no economic development occurred in block groups where TIF projects were designated, but that the level of economic activity was not discernably greater than the levels of similar areas where TIF projects were not designated. In other words, the development seen in TIF areas is what would have been expected in the absence of the TIF program. We therefore conclude that, in general, the TIF program does not pass the required but-for test.

Table 1: **Census Block Group Summary Statistics: Kansas City Weight-Adjusted**

	TIFed		Non-TIFed		Difference	
	Mean	SD	Mean	SD	b	se
% Caucasian	0.66	0.37	0.70	0.35	0.0278048	0.0389392
% African–american	0.30	0.38	0.27	0.35	–0.0251902	0.0397664
% Race other	0.66	0.37	0.70	0.35	0.0278048	0.0389392
% Vacant housing	0.11	0.09	0.10	0.08	–0.0093077	0.0087991
Median rent	339.09	133.86	353.34	127.60	2.766515	13.03248
75th percentile rent	407.15	158.42	424.35	149.52	2.910482	15.27604
25th percentile rent	268.60	113.84	281.13	114.39	3.623851	11.32274
Median housing value	59,749.26	34,713.16	61,394.43	38,355.87	–1,015.874	3,655.213
75th percentile housing value	80,718.02	64,758.63	78,071.65	51,797.79	–6,241.294	6,318.162
25th percentile housing value	47,773.19	28,224.42	49,055.86	28,947.80	–845.0057	2,911.076
% With bachelor's degree or higher	0.16	0.13	0.16	0.14	–0.0083775	0.0142763
% Unemployed	0.04	0.04	0.04	0.03	–0.0001477	0.003885
% Poverty	0.51	2.06	0.48	1.74	0.000687	0.1969116
% Professional sector	0.23	0.12	0.23	0.09	0.0002479	0.0111656
% Manufacturing	0.13	0.07	0.14	0.06	0.0066892	0.0067274
% Work outside central city	0.26	0.15	0.27	0.14	0.0092821	0.0151003
Distance CBD	8,832.36	6,227.35	9,589.39	6,445.92	504.5119	651.0316

Source: U.S. Census information from NHGIS (Manson, Schroeder, Van Riper, and Ruggles 2017).

Table 2: **Census Block Group Summary Statistics: Saint Louis (City and County) Weight-Adjusted**

	TIFed		Non-TIFed		Difference	
	Mean	SD	Mean	SD	b	se
% Caucasian	0.66	0.31	0.67	0.37	0.0095164	0.0372431
% African-american	0.32	0.31	0.31	0.38	–0.0085823	0.0373641
% Race other	0.66	0.31	0.67	0.37	0.0095164	0.0372431
% Vacant housing	0.13	0.11	0.11	0.10	–0.0055401	0.0109334
Median rent	294.11	140.23	326.20	125.42	4.077082	13.0466
75th percentile rent	357.67	159.61	393.73	145.46	1.991485	14.17888
25th percentile rent	231.58	120.79	259.00	109.20	5.373058	11.82552
Median housing value	66,251.09	62,065.33	73,206.77	59,059.70	1,032.958	7,168.738
75th percentile housing value	86,013.04	78,145.76	94,737.16	80,806.38	934.7748	9,065.203
25th percentile housing value	50,680.39	48,653.50	56,198.74	40,910.70	1,064.259	5,525.385
% With bachelor's degree or higher	0.16	0.14	0.16	0.14	–0.0067914	0.0159393
% Unemployed	0.04	0.04	0.04	0.04	–0.0002286	0.0050571
% Poverty	0.28	0.84	0.31	1.40	0.027365	0.1289022
% Professional sector	0.27	0.13	0.27	0.11	–0.0008097	0.014615
% Manufacturing	0.15	0.08	0.16	0.08	0.0074004	0.0097118
% Work outside central city	0.49	0.24	0.51	0.21	0.0188271	0.0280156
Distance CBD	8,678.62	7,875.71	10,034.21	6,750.97	699.1122	898.2845

Source: U.S. Census information from NHGIS (Manson, Schroeder, Van Riper, and Ruggles 2017).

Table 3: **The Impact of TIF Designation on the Natural Log of Employment, Sales, and Establishments, 1990–2012.**
Main Difference in Differences Specification.

	Kansas City		Saint Louis	
	Unweighted	Weighted	Unweighted	Weighted
Ln Employment: Total	–0.083 (0.088)	–0.065 (0.076)	–0.155** (0.021)	–0.093** (0.010)
Ln Employment: Manufacturing	–0.120 (0.164)	–0.081 (0.157)	–0.320** (0.048)	–0.202** (0.027)
Ln Employment: Retail	–0.022 (0.122)	0.026 (0.116)	–0.117** (0.034)	–0.069** (0.018)
Ln Employment: Services	–0.047 (0.085)	–0.091 (0.089)	–0.073** (0.028)	–0.072** (0.013)
Ln Sales: Total	–0.107 (0.094)	–0.073 (0.082)	–0.220** (0.024)	–0.178** (0.013)
Ln Sales: Manufacturing	–0.060 (0.253)	–0.059 (0.249)	–0.317** (0.058)	–0.214** (0.033)
Ln Sales: Retail	0.015 (0.143)	0.069 (0.135)	–0.164** (0.040)	–0.108** (0.021)
Ln Sales: Services	–0.078 (0.096)	–0.121 (0.099)	–0.117** (0.031)	–0.149** (0.016)
Ln Num. Establishments: Total	–0.079 (0.064)	–0.060 (0.057)	–0.146** (0.014)	–0.072** (0.007)
Ln Num. Establishments: Manufacturing	0.080 (0.077)	0.068 (0.072)	–0.082** (0.024)	–0.034** (0.013)
Ln Num. Establishments: Retail	–0.021 (0.062)	–0.014 (0.052)	–0.004 (0.021)	0.019 (0.011)
Ln Num. Establishments: Services	–0.077 (0.056)	–0.080 (0.058)	–0.095** (0.017)	–0.052** (0.008)

Note: Main independent variable is a binary indicator of TIF designation. Standard errors clustered at TIF district level for Kansas City. All specifications account for raw population changes at the tract level and include block–group and year fixed effects.

Source: Authors' analysis of TIF information and National Establishment Time Series (NETS) database.

**Statistically significant at the 5% level.

6.1 Main Difference-in-Differences Specification

Table 3 contains the results of the difference-in-differences analysis summarized in Equation 1. Estimates of the impact of TIF in both Kansas City and Saint Louis are presented for both the un-weighted (columns 1 and 3) and propensity-score weighted (columns 2 and 4) specifications. The results are also sorted into three panels according to the major set of dependent variables considered. The upper panel contains the estimates on employment across the four categories considered; the middle panel summarizes the impacts on establishments' sales activity in the same categories; and the lower panel summarizes the impacts on the number of business establishments in the same categories. The weighted results for all models presented are the preferred specification as they address the issue of selection bias.

In Kansas City, the estimated impact of TIF designation across all categories is very close to zero with relatively small standard errors, which suggests that the TIF program in Kansas City has been ineffective in promoting business development. In Saint Louis, the results are slightly negative and, for the most part, statistically significant. Despite the significance, we cannot yet conclude that TIF has a negative causal effect because there may be differences among block groups that the specification is not able to capture. The main concerns are potentially differing time trends among treatment and control block groups as well as the potential for pre-treatment bias. The results from this specification for Saint Louis, therefore, suggest that the sectors that are most closely associated with stated goals of TIF projects do not have a positive impact on job creation.

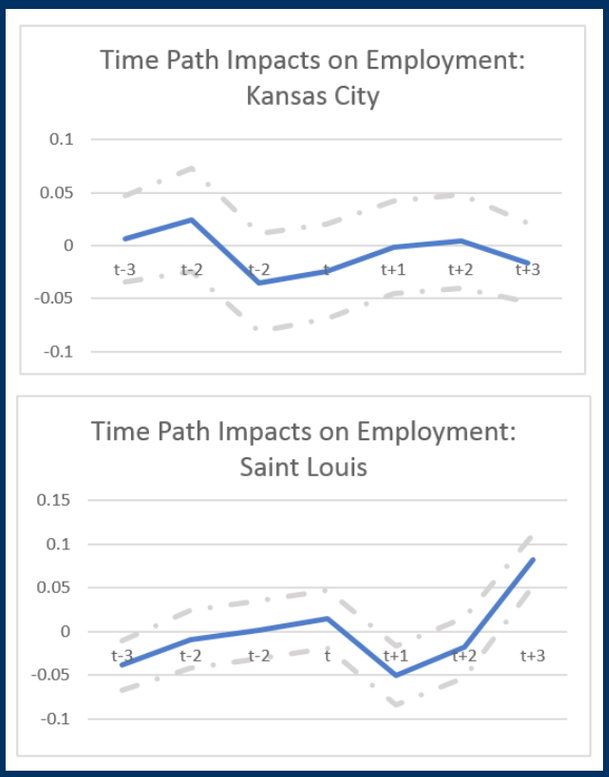
6.2 Time Trend Specification

To ensure that the analysis conducted here is valid, several additional specifications are estimated. Table 4 below contains the results of an alternative specification of the previous difference-in-differences analysis to include time trends, summarized in equation 2. In Kansas City, results indicate positive and significant effects on employment and sales in the retail sector, but negative effects on for the services sector. The fact that results are not robust to block group specific time trends raises the question of whether or not the effects that are being captured are necessarily due to TIF or the general environment that leads to the adoption of TIF. The results for Saint Louis are relatively robust to the inclusion of block-group-specific time trends.

Figure 4

Time-path of TIF Impacts on Employment. Impact on Natural Log of Total Employment, 3 Years Pre/Post TIF Designation

There is no clear evidence of a lagged positive effect on employment after TIF designation.



Source: Authors' analysis of TIF information and National Establishment Time Series (NETS) database.

6.3 Time Paths

This "time-path" analysis presented in Figure 4 also checks for the possibility of anticipatory effects of employment

Table 4: **The Impact of TIF Designation on the Natural Log of Employment, Sales, and Establishments, 1990–2012.** *Alternative Specification with Time Trends.*

	Kansas City		Saint Louis	
	Unweighted	Weighted	Unweighted	Weighted
Ln Employment: Total	0.006 (0.020)	0.008 (0.013)	0.007 (0.025)	–0.005 (0.011)
Ln Employment: Manufacturing	–0.002 (0.057)	0.004 (0.040)	–0.189** (0.059)	–0.187** (0.026)
Ln Employment: Retail	0.078 (0.040)	0.082** (0.028)	–0.175** (0.044)	–0.181** (0.019)
Ln Employment: Services	–0.085** (0.029)	–0.089** (0.019)	–0.055 (0.036)	–0.075** (0.015)
Ln Sales: Total	0.018 (0.025)	0.019 (0.016)	–0.034 (0.030)	–0.060** (0.013)
Ln Sales: Manufacturing	0.035 (0.072)	0.037 (0.050)	–0.306** (0.071)	–0.300** (0.032)
Ln Sales: Retail	0.088 (0.048)	0.091** (0.033)	–0.163** (0.052)	–0.171** (0.023)
Ln Sales: Services	–0.101** (0.032)	–0.103** (0.021)	–0.146** (0.041)	–0.163** (0.018)
Ln Num. Establishments: Total	–0.017 (0.013)	–0.017* (0.009)	–0.025 (0.015)	–0.030** (0.006)
Ln Num. Establishments: Manufacturing	0.020 (0.031)	0.019 (0.021)	–0.055 (0.029)	–0.071** (0.013)
Ln Num. Establishments: Retail	0.016 (0.026)	0.014 (0.018)	–0.049 (0.028)	–0.062** (0.012)
Ln Num. Establishments: Services	–0.060** (0.018)	–0.061** (0.012)	–0.051* (0.021)	–0.055** (0.009)

Note: Main independent variable is a binary indicator of TIF designation. All specifications account for raw population changes at the tract level and include block group and year fixed effects as well as block-group-specific time trends.

Source: Authors' analysis of TIF information and National Establishment Time Series (NETS) database.

*Statistically significant at the 10% level.

**Statistically significant at the 5% level.

Table 5: **The Impact of TIF Designation on the Natural Log of Employment, Sales, and Establishments, 1990–2012.**
Alternative Specification Accounting for "Ashenfelter Dip."

	Kansas City		Saint Louis	
	Unweighted	Weighted	Unweighted	Weighted
Ln Employment: Total	0.038 (0.055)	0.047 (0.051)	–0.017 (0.049)	–0.006 (0.020)
Ln Employment: Manufacturing	–0.315 (0.157)	0.300 (0.159)	–0.018 (0.109)	–0.000 (0.048)
Ln Employment: Retail	0.114 (0119)	0.142 (0.113)	–0.026 (0.078)	–0.014 (0.033)
Ln Employment: Services	0.120 (0.079)	0.097 (0.072)	0.004 (0.067)	–0.003 (0.026)
Ln Sales: Total	0.027 (0.063)	0.050 (0.058)	0.013 (0.055)	0.017 (0.024)
Ln Sales: Manufacturing	–0.304 (0.169)	–0.313 (0.176)	–0.006 (0.129)	0.014 (0.057)
Ln Sales: Retail	0.131 (0.131)	0.169 (0.124)	–0.018 (0.091)	–0.008 (0.040)
Ln Sales: Services	0.142 (0.085)	0.118 (0.076)	0.051 (0.073)	0.032 (0.031)
Ln Num. Establishments: Total	0.024 (0.061)	0.033 (0.055)	–0.051 (0.033)	–0.022 (0.013)
Ln Num. Establishments: Manufacturing	–0.068 (0.064)	–0.072 (0.064)	–0.080 (0.054)	–0.069** (0.023)
Ln Num. Establishments: Retail	0.040 (0.049)	0.039 (0.039)	–0.002 (0.048)	–0.008 (0.021)
Ln Num. Establishments: Services	0.031 (0.063)	0.029 (0.058)	–0.021 (0.039)	–0.009 (0.015)

Note: Main independent variable is a binary indicator of TIF designation. This specification accounts for Ashfelter dip by including 3 leads and 1 lag. Reported coefficient is that of the lag coefficient. Independent variable is a binary indicator of treatment status. Standard errors clustered at TIF district level for Kansas City. All specifications account for raw population changes at the tract level and include block-group and year fixed effects.

Source: Authors' analysis of TIF information and National Establishment Time Series (NETS) database.

**Statistically significant at the 5% level.

Table 6: **The Impact of TIF Investment on the Natural Log of Employment, Sales, and Establishments, 1990–2012.**
Difference-in-Difference Specification.

	Saint Louis	
	Unweighted	**Weighted**
Ln Employment: Total	–0.011** (0.001)	–0.008** (0.001)
Ln Employment: Manufacturing	–0.019 (0.003)	–0.012 (0.002)
Ln Employment: Retail	–0.008 (0.002)	–0.006 (0.001)
Ln Employment: Services	–0.006 (0.002)	–0.007 (0.001)
Ln Sales: Total	–0.014 (0.001)	–0.012 (0.001)
Ln Sales: Manufacturing	–0.019 (0.003)	–0.012 (0.002)
Ln Sales: Retail	–0.011 (0.002)	–0.008 (0.001)
Ln Sales: Services	–0.009 (0.002)	–0.011 (0.001)
Ln Num. Establishments: Total	–0.010 (0.001)	–0.005 (0.000)
Ln Num. Establishments: Manufacturing	–0.006 (0.001)	–0.003 (0.001)
Ln Num. Establishments: Retail	–0.000 (0.001)	0.001 (0.001)
Ln Num. Establishments: Services	–0.006 (0.001)	–0.004 (0.000)

Note: Independent variable is the log of the cumulative total anticipated reimbursable TIF project costs. All specifications account for raw population changes at the tract level and include block-group and year fixed effects.

Source: Authors' analysis of TIF information and National Establishment Time Series (NETS) database.

**Statistically significant at the 5% level.

relative to TIF designation. If there were a causal impact of TIF designation, one would expect the time-paths to exhibit a sharp rise during the year of treatment (time *t*) and remain significantly above zero for all subsequent years. If there were a lagged impact of TIF on employment then this increase would appear after time *t*. In Kansas City, the time path indicates the pattern of TIF impact is relatively flat and insignificant (i.e., dashed 95 percent confidence interval includes the zero line). The time path for Saint Louis, however, is almost completely flat with a marked increase at time $t + 3$ relative to the time of treatment designation. Given the fact that the overall DiD impacts are negative and significant, and that the overall trend is not indicative of a clear causal effect, we cannot interpret this finding as clear evidence of a lagged positive effect.

6.4 Accounting for Pretreatment Bias

To further control for presence of pretreatment bias, we estimated an additional alternative specification, using Equation 3, to account for the fact that block groups that receive TIF designation may be subject to systematically different (negative) trends than those that do not. The coefficient on the lag term, corresponding to time $t + 1$, is interpreted as the impact on employment for 1 year after the incentive took effect as well as for all subsequent years. The results are presented in Table 5. The overall patterns of the findings remain the same, though the magnitudes decrease, eliminating significant effects. To clarify, these results indicate that there is no discernible positive impact on job creation or any of the stated goals of TIF as the results are statistically insignificant from zero.

6.5 TIF Investment Levels

Focusing on the case of Saint Louis, an alternative independent variable, the cumulative total anticipated reimbursable TIF project costs, was used as a proxy to weight the various block groups by the amount of TIF dollars spent. Rather than a simple yes/no variable indicating the timing to TIF designation for treated block groups, this alternative independent variable measures the relative TIF subsidy given to developers or private businesses over the course of the TIF. Since one might expect that the benefits of TIF in terms of job growth and business development would be higher for projects that receive greater amounts of public investment, this alternative specification attempts to capture this possibility. Comparable investment data by year was not available for Kansas City. The results are shown in Table 6 and are consistent with the previous findings in that the results are small, negative, and statistically indistinguishable from zero.

6.6 Robustness Checks

In addition to the various specifications, several robustness checks were performed. Specifically, the analysis is repeated after removing outliers. The analysis is also repeated after removing observations prior to 1994 to account for potential noise in the NETS data. The results from the robustness checks, shown in Appendix C, reinforce the main finding that TIF has no discernible positive impact on job creation or any of the stated goals.

7. CONCLUSIONS AND POLICY RECOMMENDATIONS

TIF remains a popular tool among policymakers in their efforts to promote economic development. Theoretically, their use also has the potential to reduce blight and encourage economic activity, thereby increasing the tax base. Additionally, the immediate visible impacts from designating a TIF district or project (e.g., press releases, ribbon cuttings, etc.) reflect positively on local government officials, projecting an image of strength and proactivity. However, the incentive created from the positive image could lead to attempts to, for example, convert already thriving neighborhoods into bustling commercial districts, or to the overuse of TIF in general.

In practice, the impact of TIF remains unclear and its use remains controversial, especially in light of the large amount of tax dollars involved. Evaluations of the effectiveness of such programs are critical in our understanding not only of how best to promote and fund economic development projects, but also of how to support local economies without needless spending of scarce resources. Given the fiscal stress in many communities in Missouri, such as Saint Louis and smaller suburbs within Saint Louis County, such as Ferguson, the

potential waste of tax dollars may be more important than the condition of blight itself. Our findings suggest that policymakers should therefore be more cautious in their use of TIF.

This study underscores the importance of such evaluations by examining the implementation of TIF in Kansas City and Saint Louis. We use a careful and detailed methodology to test whether the use of TIF passes the "but for" test, a necessary requirement that holds that the use of TIF should be reserved exclusively to promoting economic development that would not occur in the absence of the incentive. Though we conclude that there are no systematically positive impacts of TIF, it is important to acknowledge that this refers to the use of TIF in these cities on average. We find that the use of TIF has not diverted investment or increased economic activity beyond what we would have expected if TIF was not used. Our analysis does not enable us to make any claims regarding individual TIF projects, and we acknowledge that TIF could be justifiable and effective in certain cases or for different reasons beyond a pro-growth economic development argument (e.g., for the sake of equity).

Based on this and other research, we argue that the TIF approval process should be modified to promote transparency and accountability. One way to achieve this would be to couple the TIF proposal with a careful cost-benefit analysis that projects and clearly articulates the job creation outcomes of the redevelopment proposal. Another option would be to strengthen legislative requirements. Until recently, Missouri's state statute required only that the TIF commission make a recommendation on the approval of a TIF project. Though not studied in this article, the recent TIF legislation passed in 2016[20] restricting the ability of local governments in the Saint Louis region (Saint Louis County, Saint Charles County, and Jefferson County) to override the decision of TIF commissions in cases where a project is not approved may be a step in the right direction. In addition, local or state government bodies should be empowered to disband TIF designated regions that are underperforming and immediately return any accrued increment to the public tax rolls.

T. William Lester is an associate professor, and A. Rachid El-Khattabi is a doctoral candidate, in the Department of City and Regional Planning at the University of North Carolina–Chapel Hill.

APPENDIX A: RELEVANT MISSOURI STATUTES[21]

- "Blighted area", an area which, by reason of the predominance of defective or inadequate street layout, unsanitary or unsafe conditions, deterioration of site improvements, improper subdivision or obsolete platting, or the existence of conditions which endanger life or property by fire and other causes, or any combination of such factors, retards the provision of housing accommodations or constitutes an economic or social liability or a menace to the public health, safety, morals, or welfare in its present condition and use.

- "Conservation area", any improved area within the boundaries of a redevelopment area located within the territorial limits of a municipality in which fifty percent or more of the structures in the area have an age of thirty-five years or more. Such an area is not yet a blighted area but is detrimental to the public health, safety, morals, or welfare and may become a blighted area because of any one or more of the following factors: dilapidation; obsolescence; deterioration; illegal use of individual structures; presence of structures below minimum code standards; abandonment; excessive vacancies; overcrowding of structures and community facilities; lack of ventilation, light or sanitary facilities; inadequate utilities; excessive land coverage; deleterious land use or layout; depreciation of physical maintenance; and lack of community planning. A conservation area shall meet at least three of the factors provided in this subdivision for projects approved on or after December 23, 1997.

- "Economic development area", any area or portion of an area located within the territorial limits of a municipality, which does not meet the requirements of subdivisions (1) and (3) of this section, and in which the governing body of the municipality finds that redevelopment will not be solely used for development of commercial businesses which unfairly compete in the local economy and is in the public interest because it will:

  Discourage commerce, industry or manufacturing from moving their operations to another state; or

  Result in increased employment in the municipality; or

  Result in preservation or enhancement of the tax base of the municipality.

- "Payment in lieu of taxes", those estimated revenues from real property in the area selected for a redevelopment project, which revenues according to the redevelopment project or plan are to be used for a private use, which taxing districts would have received had a municipality not adopted tax increment allocation financing, and which would result from levies made after the time of the adoption of tax increment allocation financing during the time the current equalized value of real property in the area selected for the redevelopment project exceeds the total initial equalized value of real property in such area until the designation is terminated pursuant to subsection 2 of section 99.850.

- "Economic activity taxes", the total additional revenue from taxes which are imposed by a municipality and other taxing districts, and which are generated by economic activities within a redevelopment area over the amount of such taxes generated by economic activities within such redevelopment area in the calendar year prior to the adoption of the ordinance designating such a redevelopment area, while tax increment financing remains in effect, but excluding personal property taxes, taxes imposed on sales or charges for sleeping rooms paid by transient guests of hotels and motels, licenses, fees or special assessments. For redevelopment projects or redevelopment plans approved after December 23, 1997, if a retail establishment relocates within one year from one facility to another facility within the same county and the governing body of the municipality finds that the relocation is a direct beneficiary of tax increment financing, then for purposes of this definition, the economic activity taxes generated by the retail establishment shall equal the total additional revenues from economic activity taxes which are imposed by a municipality or other taxing district over the amount of economic activity taxes generated by the retail establishment in the calendar year prior to its relocation to the redevelopment area.

- "Redevelopment area", an area designated by a municipality, in respect to which the municipality has made a finding that there exist conditions which cause the area to be classified as a blighted area, a conservation area, an economic development area, an enterprise zone pursuant to sections 135.200 to 135.256, or a combination thereof, which area includes only those parcels of real property directly and substantially benefitted by the proposed redevelopment project.

APPENDIX B: DESCRIPTIVE STATISTICS

Table B1: Census Block Group Summary Statistics: Kansas City

	TIFed		Non-TIFed		Difference	
	Mean	SD	Mean	SD	b	t
% Caucasian	0.67	0.37	0.78	0.30	0.11***	(16.10)
% African-american	0.30	0.38	0.19	0.31	–0.11***	(–14.95)
% Race other	0.67	0.37	0.78	0.30	0.11***	(16.10)
% Vacant housing	0.11	0.09	0.09	0.09	–0.02***	(–11.45)
Median rent	350.57	122.22	355.74	126.53	16.65***	(6.41)
75th percentile rent	421.44	143.78	425.11	150.30	17.96***	(5.83)
25th percentile rent	277.50	105.29	289.95	113.60	21.35***	(9.52)
Median housing value	62,410.30	33,053.91	63,009.49	37,861.79	3,260.23***	(4.65)
75th percentile housing value	84,312.95	63,853.89	79,654.71	51,092.96	–1,063.31	(–0.88)
25th percentile housing value	49,900.86	26,942.59	50,004.34	27,816.45	2,231.15**	(4.03)
% With bachelor's degree or higher	0.17	0.13	0.15	0.13	–0.01***	(–4.03)
% Unemployed	0.04	0.04	0.04	0.04	–0.00***	(–3.71)
% Poverty	0.48	2.02	0.59	1.96	0.08	(1.96)
% Professional sector	0.23	0.11	0.23	0.09	0.00	(0.72)
% Manufacturing	0.13	0.07	0.15	0.06	0.01***	(10.40)
% Work outside central city	0.26	0.15	0.30	0.15	0.05***	(14.83)
Distance CBD	9,084.88	6,238.96	11,123.59	6,559.81	2,291.23	(18.41)

Source: U.S. Census information from NHGIS (Manson, Schroeder, Van Riper, and Ruggles 2017).

**Statistically significant at the 5% level.
***Statistically significant at the 1% level.

Table B2: **Census Block Group Summary Statistics: Saint Louis (City and County)**

	TIFed		Non-TIFed		Difference	
	Mean	SD	Mean	SD	b	t
% Caucasian	0.66	0.31	0.75	0.34	0.09***	(13.27)
% African-american	0.32	0.31	0.23	0.34	–0.09***	(–12.97)
% Race other	0.66	0.31	0.75	0.34	0.09***	(13.27)
% Vacant housing	0.12	0.09	0.08	0.08	–0.05***	(–20.20)
Median rent	322.12	111.85	388.45	159.27	94.34***	(30.44)
75th percentile rent	391.74	120.63	464.30	180.49	106.63***	(30.24)
25th percentile rent	253.63	101.91	313.88	140.65	82.30***	(30.74)
Median housing value	72,173.81	61,680.98	87,047.96	64,250.55	20,796.87**	(15.30)
75th percentile housing value	93,802.38	77,321.71	110,190.01	86,289.22	24,176.96***	(14.04)
25th percentile housing value	55,134.48	48,520.60	68,853.80	47,590.84	18,173.41**	(17.15)
% With bachelor's degree or higher	0.16	0.14	0.18	0.14	0.02***	(4.89)
% Unemployed	0.04	0.04	0.04	0.03	–0.01***	(–6.65)
% Poverty	0.28	0.85	0.14	0.78	–0.14***	(–7.23)
% Professional sector	0.27	0.13	0.26	0.10	–0.01	(–1.90)
% Manufacturing	0.15	0.08	0.18	0.07	0.02***	(11.57)
% Work outside central city	0.49	0.24	0.59	0.20	0.10***	(17.64)
Distance CBD	9,335.10	7,928.52	13,634.86	7,809.11	4,956.25***	(28.85)

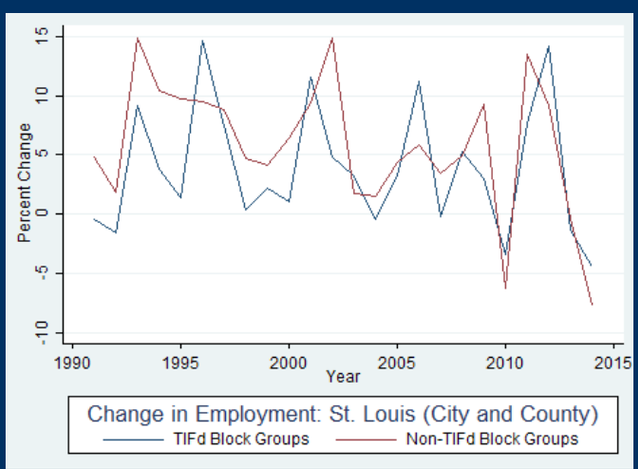
Source: U.S. Census information from NHGIS (Manson, Schroeder, Van Riper, and Ruggles 2017).

**Statistically significant at the 5% level.
***Statistically significant at the 1% level.

Figure B1

Year-on-year percent changes employment for Kansas City and Saint Louis, respectively.

Year-on-year employment changes follow similar patterns for block groups that recieved TIF and those that did not.



Source: Authors' analysis of TIF information and National Establishment Time Series (NETS) database.

APPENDIX C: ROBUSTNESS CHECKS

Table C1: **Robustness Checks**

The Impact of TIF Designation on the Natural Log of Employment, Sales, and Establishments, 1990–2012. Main Difference-in-Difference Specification: Removing bottom and top 1% of observations.

	Kansas City		Saint Louis	
	Unweighted	Weighted	Unweighted	Weighted
Ln Employment: Total	0.014 (0.016)	0.013 (0.011)	–0.070** (0.020)	–0.074** (0.009)
Ln Employment: Manufacturing	0.069 (0.065)	0.059 (0.044)	–0.062** (0.065)	–0.049** (0.028)
Ln Employment: Retail	0.113 (0.044)	0.120 (0.029)	–0.226 (0.049)	–0.207 (0.021)
Ln Employment: Services	–0.064 (0.031)	–0.070 (0.020)	–0.022 (0.038)	–0.055 (0.015)
Ln Sales: Total	0.039 (0.019)	0.040 (0.012)	–0.071** (0.022)	–0.087** (0.010)
Ln Sales: Manufacturing	0.176 (0.080)	0.169 (0.053)	–0.160** (0.075)	–0.142** (0.035)
Ln Sales: Retail	0.005 (0.052)	0.016 (0.034)	–0.203** (0.057)	–0.202** (0.026)
Ln Sales: Services	–0.060 (0.037)	–0.068 (0.023)	–0.085** (0.040)	–0.117** (0.016)
Ln Num. Establishments: Total	–0.028 (0.011)	–0.029 (0.008)	–0.043** (0.016)	–0.047** (0.007)
Ln Num. Establishments: Manufacturing	0.043 (0.030)	0.046 (0.021)	–0.037 (0.035)	–0.050 (0.015)
Ln Num. Establishments: Retail	0.017 (0.026)	0.014 (0.019)	–0.087 (0.033)	–0.095 (0.013)
Ln Num. Establishments: Services	–0.033 (0.017)	–0.034 (0.012)	–0.077** (0.024)	–0.083** (0.009)

Note: Main independent variable is a binary indicator of TIF designation. Standard errors clustered at TIF district level for Kansas City. All specifications account for raw population changes at the tract level and include block-group and year fixed effects. Top and bottom 1% of observations removed.

Source: Authors' analysis of TIF information and National Establishment Time Series (NETS) database.

**Statistically significant at the 5% level.

Table C2: **The Impact of TIF Designation on the Natural Log of Employment, Sales, and Establishments, 1990–2012.**

The Impact of TIF Designation on the Natural Log of Employment, Sales, and Establishments, 1990–2012. Main Difference-in-Difference Specification: Removing bottom and top 1% of observations.

	Kansas City		Saint Louis	
	Unweighted	Weighted	Unweighted	Weighted
Ln Employment: Total	0.014 (0.016)	0.013 (0.011)	–0.070** (0.020)	–0.074** (0.009)
Ln Employment: Manufacturing	0.069 (0.065)	0.059 (0.044)	–0.062 (0.065)	–0.049 (0.028)
Ln Employment: Retail	0.113* (0.044)	0.120** (0.029)	–0.226** (0.049)	–0.207** (0.021)
Ln Employment: Services	–0.064* (0.031)	–0.070** (0.020)	–0.022 (0.038)	–0.055** (0.015)
Ln Sales: Total	0.039* (0.019)	0.040** (0.012)	–0.071** (0.022)	–0.087** (0.010)
Ln Sales: Manufacturing	0.176* (0.080)	0.169** (0.053)	–0.160* (0.075)	–0.142** (0.035)
Ln Sales: Retail	0.005 (0.052)	0.016 (0.034)	–0.203** (0.057)	–0.202** (0.026)
Ln Sales: Services	–0.060 (0.037)	–0.068** (0.023)	–0.085* (0.040)	–0.117** (0.016)
Ln Num. Establishments: Total	–0.028* (0.011)	–0.029** (0.008)	–0.043** (0.016)	–0.047** (0.007)
Ln Num. Establishments: Manufacturing	0.043 (0.030)	0.046* (0.021)	–0.037 (0.035)	–0.050** (0.015)
Ln Num. Establishments: Retail	0.017 (0.026)	0.014 (0.019)	–0.087** (0.033)	–0.095** (0.013)
Ln Num. Establishments: Services	–0.033 (0.017)	–0.034** (0.012)	–0.077** (0.024)	–0.083** (0.009)

Note: Main independent variable is a binary indicator of TIF designation. All specifications account for raw population changes at the tract level and include block group and year fixed effects as well as block-group-specific time trends. Top and bottom 1% of observations removed.

Source: Authors' analysis of TIF information and National Establishment Time Series (NETS) database.

*Statistically significant at the 10% level.

**Statistically significant at the 5% level.

Table C3: **The Impact of TIF Designation on the Natural Log of Employment, Sales, and Establishments, 1990–2012.**

The Main Difference-in-Difference Specification: Removing bottom and top 2% of observations.

	Kansas City		Saint Louis	
	Unweighted	Weighted	Unweighted	Weighted
Ln Employment: Total	–0.032 (0.050)	–0.028 (0.049)	–0.072** (0.020)	–0.025** (0.009)
Ln Employment: Manufacturing	0.016 (0.237)	0.039 (0.207)	–0.285** (0.063)	–0.169** (0.033)
Ln Employment: Retail	–0.046 (0.164)	–0.038 (0.152)	–0.049 (0.047)	–0.095** (0.023)
Ln Employment: Services	–0.045 (0.074)	–0.079 (0.083)	0.062 (0.036)	0.041** (0.016)
Ln Sales: Total	–0.054 (0.043)	–0.073 (0.043)	–0.167** (0.022)	–0.114** (0.011)
Ln Sales: Manufacturing	–0.126 (0.481)	–0.038 (0.478)	–0.084 (0.081)	0.023 (0.042)
Ln Sales: Retail	–0.037 (0.112)	–0.009 (0.116)	–0.056 (0.051)	–0.056* (0.025)
Ln Sales: Services	–0.101 (0.103)	–0.155 (0.107)	–0.046 (0.036)	–0.076** (0.017)
Ln Num. Establishments: Total	0.011 (0.053)	0.009 (0.051)	–0.171** (0.018)	–0.090** (0.008)
Ln Num. Establishments: Manufacturing	0.185 (0.101)	0.161 (0.095)	–0.029 (0.034)	–0.002 (0.017)
Ln Num. Establishments: Retail	0.006 (0.057)	0.032 (0.042)	0.014 (0.031)	–0.008 (0.015)
Ln Num. Establishments: Services	0.009 (0.063)	–0.005 (0.072)	–0.075** (0.023)	–0.048** (0.010)

Note: Main independent variable is a binary indicator of TIF designation. Standard errors clustered at TIF district level for Kansas City. All specifications account for raw population changes at the tract level and include block-group and year fixed effects. Top and bottom 2% of observations removed.

Source: Authors' analysis of TIF information and National Establishment Time Series (NETS) database.

*Statistically significant at the 10% level.

**Statistically significant at the 5% level.

Table C4: **The Impact of TIF Designation on the Natural Log of Employment, Sales, and Establishments, 1990–2012.**

Alternative Specification with Time Trends: Removing bottom and top 2% of observations.

	Kansas City		Saint Louis	
	Unweighted	Weighted	Unweighted	Weighted
Ln Employment: Total	0.015 (0.016)	0.015 (0.011)	–0.071** (0.020)	–0.081** (0.008)
Ln Employment: Manufacturing	0.116 (0.075)	0.098 (0.052)	–0.065 (0.075)	–0.076* (0.030)
Ln Employment: Retail	–0.034 (0.051)	–0.023 (0.033)	–0.246** (0.060)	–0.232** (0.023)
Ln Employment: Services	–0.064 (0.034)	–0.083** (0.022)	–0.044 (0.045)	0.080** (0.017)
Ln Sales: Total	–0.037* (0.019)	–0.039** (0.012)	–0.111** (0.022)	–0.103** (0.009)
Ln Sales: Manufacturing	0.183* (0.089)	0.175** (0.063)	–0.119 (0.094)	–0.123** (0.040)
Ln Sales: Retail	–0.051 (0.060)	–0.063 (0.039)	–0.180** (0.066)	–0.157** (0.025)
Ln Sales: Services	–0.103* (0.041)	–0.105** (0.026)	–0.051 (0.044)	–0.071** (0.019)
Ln Num. Establishments: Total	–0.030** (0.011)	–0.032** (0.008)	–0.045* (0.019)	–0.050** (0.007)
Ln Num. Establishments: Manufacturing	0.062 (0.030)	0.065** (0.021)	–0.028 (0.041)	–0.049** (0.016)
Ln Num. Establishments: Retail	0.092** (0.037)	0.092** (0.025)	–0.095* (0.039)	–0.109* (0.015)
Ln Num. Establishments: Services	–0.054** (0.020)	–0.061** (0.014)	–0.082** (0.028)	–0.091** (0.010)

Note: Main independent variable is a binary indicator of TIF designation. All specifications account for raw population changes at the tract level and include block group and year fixed effects as well as block-group-specific time trends. Top and bottom 2% of observations removed.

Source: Authors' analysis of TIF information and National Establishment Time Series (NETS) database.

*Statistically significant at the 10% level.

**Statistically significant at the 5% level.

Table C5: **The Impact of TIF Designation on the Natural Log of Employment, Sales, and Establishments, 1990–2012.**

Main Difference-in-Difference Specification: Removing bottom and top 5% of observations.

	Kansas City		Saint Louis	
	Unweighted	Weighted	Unweighted	Weighted
Ln Employment: Total	–0.012 (0.031)	–0.041 (0.042)	–0.095** (0.021)	–0.035** (0.010)
Ln Employment: Manufacturing	0.089 (0.474)	0.151 (0.467)	–0.493** (0.090)	–0.316** (0.041)
Ln Employment: Retail	–0.163 (0.142)	–0.122 (0.167)	0.013 (0.062)	–0.011 (0.027)
Ln Employment: Services	–0.185 (0.098)	–0.310* (0.109)	0.023 (0.051)	0.009 (0.022)
Ln Sales: Total	–0.116 (0.063)	–0.088 (0.061)	–0.127** (0.030)	–0.070** (0.012)
Ln Sales: Manufacturing	1.072 (0.558)	1.106 (0.506)	–0.326* (0.136)	–0.124** (0.061)
Ln Sales: Retail	–0.050 (0.236)	–0.094 (0.249)	–0.104 (0.075)	–0.091** (0.031)
Ln Sales: Services	–0.172 (0.059)	–0.097 (0.036)	–0.077 (0.078)	–0.124** (0.029)
Ln Num. Establishments: Total	–0.029 (0.040)	–0.035 (0.033)	–0.191** (0.023)	–0.096** (0.010)
Ln Num. Establishments: Manufacturing	0.316 (0.149)	0.295 (0.151)	–0.002 (0.046)	0.087** (0.020)
Ln Num. Establishments: Retail	0.006 (0.129)	0.071 (0.109)	–0.058 (0.042)	–0.046* (0.020)
Ln Num. Establishments: Services	–0.058* (0.024)	–0.025 (0.034)	–0.131** (0.032)	–0.098** (0.013)

Note: Main independent variable is a binary indicator of TIF designation. Standard errors clustered at TIF district level for Kansas City. All specifications account for raw population changes at the tract level and include block-group and year fixed effects. Top and bottom 5% of observations removed.

Source: Authors' analysis of TIF information and National Establishment Time Series (NETS) database.

*Statistically significant at the 10% level.

**Statistically significant at the 5% level.

Table C6: **The Impact of TIF Designation on the Natural Log of Employment, Sales, and Establishments, 1990–2012.**

Alternative Specification with Time Trends: Removing bottom and top 5% of observations.

	Kansas City		Saint Louis	
	Unweighted	Weighted	Unweighted	Weighted
Ln Employment: Total	–0.036* (0.017)	–0.041** (0.011)	–0.039 (0.021)	–0.016 (0.009)
Ln Employment: Manufacturing	0.157 (0.106)	0.186** (0.071)	–0.045 (0.104)	–0.028 (0.036)
Ln Employment: Retail	–0.122 (0.068)	–0.121** (0.043)	–0.081 (0.080)	–0.083** (0.029)
Ln Employment: Services	–0.120** (0.037)	–0.133** (0.026)	–0.108 (0.062)	–0.096** (0.026)
Ln Sales: Total	–0.063** (0.023)	–0.079** (0.014)	–0.041 (0.029)	–0.037** (0.010)
Ln Sales: Manufacturing	0.766** (0.130)	0.788** (0.093)	–0.234 (0.152)	–0.256** (0.057)
Ln Sales: Retail	–0.171 (0.099)	–0.233** (0.062)	0.010 (0.093)	0.003 (0.032)
Ln Sales: Services	0.010 (0.090)	0.011 (0.113)	–0.167* (0.062)	–0.177** (0.026)
Ln Num. Establishments: Total	–0.052** (0.016)	–0.055** (0.010)	–0.006 (0.022)	–0.001 (0.009)
Ln Num. Establishments: Manufacturing	0.087 (0.066)	0.110* (0.044)	0.031 (0.056)	0.025 (0.020)
Ln Num. Establishments: Retail	0.081 (0.046)	0.083** (0.030)	–0.102 (0.055)	–0.108** (0.022)
Ln Num. Establishments: Services	–0.062* (0.030)	–0.071** (0.019)	–0.064 (0.039)	–0.066** (0.015)

Note: Main independent variable is a binary indicator of TIF designation. All specifications account for raw population changes at the tract level and include block-group and year fixed effects as well as block-group-specific time trends. Top and bottom 5% of observations removed.

Source: Authors' analysis of TIF information and National Establishment Time Series (NETS) database.

*Statistically significant at the 10% level.

**Statistically significant at the 5% level.

ENDNOTES

1. A census block group is a geographic unit that is smaller than a tract but larger than a block. It is the smallest unit for which the Census Bureau publishes data.

2. The Difference-in-Difference methodology is explained on page 8.

3. St. Louis Development Corporation https://www.stlouis-mo.gov/government/departments/sldc/economic-development/tax-increment-financing.cfm

4. Moffit, Kelly, "Are TIF, tax abatement being used in St. Louis in the best way?" Saint Louis Public Radio. Feb. 21, 2017 http://news.stlpublicradio.org/post/are-tif-tax-abatement-being-used-st-louis-best-way-tale-2-differing-philosophies#stream/0

5. Luce, Tom "Tax Increment Financing in the Kansas City and St. Louis Metropolitan areas." Brookings Institution, Apr 1, 2003 https://www.brookings.edu/research/tax-increment-financing-in-the-kansas-city-and-st-louis-metropolitan-areas/

6. Ibid.

7. Gillerman, Margaret "Walmart Store Gets Bridgeton's Approval." *St. Louis Post Dispatch* 8 July 2010, available at: http://www.stltoday.com/news/local/metro/walmart-store-gets-bridgeton-s-approval/article_8d158273-5237-5e5d-b0d8-fc23c94dc3ff.html

8. A group fixed effect is meant to capture any time-invariant characteristics associated with the group of interest. This is meant to remove potential omitted variables unique to the group. Year fixed effects are often used to capture the influence of time trends that affect all groups (e.g., macroeconomic shocks or the business cycle).

9. 2014 Indiana Tax Incentive Review. https://iga.in.gov/static-documents/7/1/0/1/710134cd/indiana_tax_incentive_review_2014_annual_report.pdf

10. East-West Gateway Council of Gov't, *An Assessment of the Effectiveness and Fiscal Impacts of the Use of Local Development Incentives in the St. Louis Region: Final Report* 35 (2011)

11. Retail development can be found in about 80% of Missouri's TIFs

12. Coffin, 2015. *Tax Increment Financing in St Louis County, 2000–2012,* Applied Research Collaborative

13. Statute requires that the TIF commission make a recommendation and vote, not approve TIF

14. Block groups are a standard areal unit reported in the decennial census typically representing populations between 500 and 1500 persons.

15. Both the city of Saint Louis as well the county of Saint Louis

16. Yearly DED reports were provided by EWGateway

17. Kansas City Economic Development Corporation http://maps.kcmo.org/apps/parcelviewer/

18. Addresses also were checked against the DED Annual Reports. http://www.bettertogetherstl.com/studies/economic-development/tif-database

19. The average year-on-year percent change for block groups. where i represents city and t represents year. This is calculated for block groups that received TIF designation and block groups that did not by city for each year.

20. House Bill 1434

21. State of Missouri, Reservoir of Statutes http://www.moga.mo.gov/mostatutes/stathtml/09900008051.html

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