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Economic Development Incentives, Reported Job Creation, and Local Employment*

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Abstract: State and local policy makers continue to utilize and emphasize economic development incentives to attract and retain employers, with tax increment financing (TIF) being one of the more popular incentives. Recently, several states increased reporting requirements for local economic development agencies in an attempt to ensure that targeted incentives are achieving their stated objectives. However, the economic validity of these reported jobs depends heavily on the extent to which the incentives draw new economic activity into an area. In this paper, I examine the credibility of the number of jobs reported by local economic development agencies in Missouri as having been created or retained by TIF. The analysis studies the impact of these reported jobs on county employment, as measured by the Bureau of Labor Statistics. Results suggest that the number of jobs reportedly created by TIF districts do not significantly impact county employment.

Keywords: Economic Development Incentives, Tax Increment Financing, Business Subsidies, Local Economic Development

JEL Codes: H71, R38

1. INTRODUCTION

State and local policy makers continue to utilize and emphasize targeted economic development incentives, such as Industrial Development Bonds, Tax Abatements, Job Creation Tax Credits, and Tax Increment Financing (TIF), as a means of fostering job creation within their local jurisdictions. Greenbaum and Landers (2014) report that 55 percent of all local governments that responded to the International City/County Management Association Economic Development Survey used TIF. The general public also appears to share the view that economic development programs are a necessary part of maintaining a vibrant local economy. Seventy percent of respondents to an American Planning Association (APA) poll identified job creation as a high priority for policy makers and 63 percent identified a preference for economic development funding receiving a high priority for scarce local government resources (APA, 2012). Although a large proportion of the population and policy makers generally support governments' role in implementing and operating economic development programs, there has been increased calls for economic development agencies to provide evidence of their effectiveness in creating jobs and on assessing incentive programs (Luger and Bae, 2005). In 2008, the Kansas Legislature asked the Legislative Division of Post Audit, the audit arm of Kansas government, to report on the effectiveness of the state's economic development programs (Legislative Division of Post Audit,

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2008). The State of Washington made a similar request to its State Auditor (Washington State Auditor's Office, 2014). Missouri, the state that is the focus of this paper, also attempted to document the economic impact of TIF by requiring all jurisdictions sponsoring TIF districts to file a TIF report with the State Auditor of Missouri reporting, among other things, the number of jobs created by the TIF project.

This paper examines if the job numbers reported by local economic development agencies in Missouri represent actual improvements in local employment. This paper does not attempt to directly measure the impact of TIF on jobs, but instead examines the extent to which the number of jobs reportedly created by TIF districts within a county positively influences employment in the county, as measured by the Bureau of Labor Statistics (BLS). Missouri is one of many states searching to quantify the benefits of economic development incentives. Even when not required by state laws, the number of jobs supported by economic development projects often take center stage when incentive packages are announced.

Although Missouri's increased reporting requirements represent progress in terms of greater disclosure and transparency, supporters of economic development incentives have a clear motivation to convince policy makers and the public that incentives have a large, positive impact on local employment. Therefore, they have little reason to examine critically the question of whether these reported job numbers represent an actual employment increase in the local economy. If the number of jobs created by TIF, as reported by TIF administrators, is a true economic impact, then the number of reported jobs should have a positive impact on county employment as measured by the BLS. On the other hand, the absence of a significant effect of reported jobs by TIF administrators on employment measured by the BLS would be consistent with TIF not having a true economic effect on county employment.

The next section provides a basic overview of the history of TIF, an overview of how TIF is structured, and a discussion of the difficulties in assessing its effectiveness as an economic development tool. Section 3 reviews the previous literature on TIF, which has primarily focused on TIF's efficacy as an economic development tool meant to increase property values. This section also addresses the drawbacks, due to data limitations, of the two previous studies that examined TIF's impact on employment and how the data in the current study allows us to avoid some of these issues. Section 4 describes the data sources and provides the descriptive analysis of the data. Section 5 presents the empirical model estimated using both panel data and instrumental variable approaches. This section also presents and discusses the primary results. Section 6 reiterates the main conclusions and discusses this study's contribution to policy makers' understanding of TIF's efficacy at furthering economic development objectives.

2. OVERVIEW OF TIF

First implemented in California in 1952, the use of TIF grew from eight states in 1970 to 49 states by 2010 (Greenbaum and Landers, 2014). As state statutes empower local jurisdictions to enact TIF, certain details vary by state. Nonetheless, the fundamental structure of TIF is common across states. A local jurisdiction, typically a municipality, creates a TIF district by designating a group of properties as part of the district. Although most TIF districts consist of contiguous properties, some states allow non-contiguous properties in close proximity to be part of a single TIF district. Figure 1 gives an example of a legally defined TIF district. It shows the College Hill TIF in Topeka, KS, consisting of approximately 35 parcels located in Topeka's

Figure 1: College Hill TIF District, Topeka, KS

central city that developers had acquired rights to purchase and planned on turning into a mixed-use retail and residential development.

TIF supporters argue that TIF encourages development by allowing a municipal controlled TIF commission to use tax revenues generated through the growth in the tax base within the TIF district to finance development costs necessary to encourage economic development. When a TIF district is created, the tax base accessible to overlapping jurisdictions, such as the school district, county, and municipal governments, is effectively frozen at its value in the year of creation. If the tax base grows, whether due to investment or some external factors, any tax revenue collected on the additional tax base (referred to as the tax increment) is diverted to the TIF administrators to pay for development costs, such as bonds used to finance infrastructure improvements, land acquisition costs, and demolition of existing structures. The initial infrastructure improvement and development costs can be financed by TIF bonds issued by the TIF commission or by the developer who is then reimbursed by the TIF administrator as the tax increment begins to generate revenue. If the TIF district's tax base fails to grow, the TIF district can either be dissolved or allowed to expire with the developer, bond holders, or municipality having to cover the incurred costs of improvements depending on the specifics of the TIF plan at its adoption.

One should note that the extent to which TIF financed improvements are necessary for the development to take place is not always clear cut and is addressed below. While municipalities allow some TIF districts to dissolve after the initial improvements are paid off, some states allow TIF to finance development in a pay as you go basis, with the TIF commission financing additional infrastructure or development costs as the tax increment grows. The number of years in which a TIF commission may divert the tax increment can vary by district, although state law sets a maximum period for which the TIF may exist, typically between 20 and 30 years.¹ Although TIF financing usually applies only to property taxes, Missouri and many other states have allowed taxes on a broader range of activities to be included in a district's tax increment, such as local sales and income taxes. The basic model of TIF is essentially unchanged when applied to other taxes.

¹ Missouri's limit is 23 years. Some state legislatures have extended the life of individual TIF districts that reached their normal statutory limit.

Although policy makers initially discovered TIF as a useful means to fund public infrastructure improvements in blighted areas with the hope that the overlapping jurisdictions would eventually benefit from a larger tax base, TIF has evolved into mostly an economic development tool. As such, its primary appeal to economic development practitioners is in its ability to attract jobs. Missouri's reporting requirements highlight the preeminence of TIF's role in job creation over blight reduction. TIF administrators are required to report the estimated new and retained jobs each year. On the other hand, there is no requirement for documenting TIF success at blight reduction. When St. Louis County's Lambert Airport Perimeter TIF was formed, the county's TIF commissions overwhelmingly supported the project, emphasizing the estimated 12,000 jobs the TIF would create over its lifetime (Harris, 2004). TIF's role as a job creator extends well beyond the Midwest. In North Carolina, where a 2004 constitutional amendment allowed the legislature to implement TIF, economic development officials touted TIF as a necessary tool for creating jobs and growth (Elkins, 2005). In Washington State, then Governor Locke undertook a long campaign to adopt a TIF statute that was permissible under its constitution in order to eliminate his state's perceived disadvantage at attracting firms resulting from its failure to adopt TIF (Erb, 2002).

The ultimate objective of economic development incentives such as TIF is to attract economic activity into an area that would otherwise occur elsewhere. The fact that many TIF districts experience incredible growth within their boundaries is undeniable. A more difficult and important task is determining whether such growth is attributable to the TIF and beneficial to the entire area. A number of often obscure issues have considerable impacts on assessing the success of TIF. First, although Missouri requires annual TIF reports, job numbers are self-reported by local TIF administrators without consistent rules on determining whether a job should be attributed to a TIF district. Second, proponents of TIF frequently overlook the extent to which TIF simply shifts economic activity from another area. Third, fairly attributing increased economic activity to TIF requires that the economic activity would not occur but for the presence of TIF. For all of these reasons, the State Auditor of Washington, when charged with assessing the efficacy of economic development agencies in Washington, stated that the Department of Commerce "could not carry out statutory intent to identify impacts, because doing so with certainty is virtually impossible." (Washington State Auditor's Office, 2014). The State of California eliminated its use of TIF in 2012 because of policy makers' concerns that its effectiveness as a generator of true economic development was overstated (Svorny, 2014).

The shifting of economic activity diminishes the benefits of TIF when growth in jobs or taxes within the TIF district comes at the expense of non-TIF areas of a jurisdiction. For example, Kansas City, MO's Pershing Road TIF is credited with creating 6,268 new jobs (State Auditor of Missouri, 2011). The development incentive involved the consolidation of the IRS's operations in the Kansas City area. While the IRS had no previous presence within the TIF district, most of the jobs existed at its Bannister Road office complex already located within Kansas City, MO with only approximately 1,800 jobs being relocated from the IRS center in Overland Park, KS (Collinson, 2003). Therefore, while the TIF district clearly experienced significant growth in economic activity, jobs, and related taxes, when considering the impact on the entire municipality the decrease in economic activity, jobs, and related taxes from the Bannister Road location offsets a large portion of these gains. Even when TIF does not finance relocation, it can facilitate a subtler shifting of economic activity. If TIF adoption increases economic activity within the district by attracting spending that had previously occurred with firms located outside the TIF district, the decrease in economic activity outside the district tempers the increase in economic activity within

the district. Since many Missouri TIF districts support retail establishments, failing to consider the shifting of economic activity from existing firms within a county can result in a significant overstatement of TIF's impact on job creation.

Even in cases where no economic shifting within a county occurs, the "but-for" condition is another caveat that must be considered when assessing TIF. The "but-for" provision refers to the statutory requirement that an incentive cannot be awarded unless the supported economic activity would not occur "but for" the incentive being offered. This legal provision has economic importance. If a relocating firm would locate in a particular jurisdiction with or without receiving the economic incentive, then the economic impact of offering the incentive is nonexistent even when the firm does not divert spending from other local firms. Although the "but-for" provision represents the legislature's attempt to prevent local jurisdictions from awarding more than the minimum incentive necessary to attract a firm, it also has an important impact on empirical estimates of TIF's efficacy at job creation.

3. PREVIOUS LITERATURE

Since the primary way that TIF finances economic development is through the property value increment, it is not surprising that empirical studies have focused on TIF's impact on property values. Smith (2006, 2009), Byrne (2006), Weber, Bhatta, and Merriman (2003, 2007), and Carroll (2008) examined the impact of TIF on property values at the parcel or TIF district level, finding mixed results in terms of TIF success. Anderson (1990), Dye and Merriman (2000, 2003), and Merriman, Skidmore, and Kashian (2011) looked at the effect of TIF on property values at the municipal level. Anderson (1990) examined municipal property values in Michigan and found that municipalities that adopted TIF experience higher property value growth. Dye and Merriman (2000) studied municipalities in the Chicago metropolitan area and found that TIF adoption has a negative impact on a municipality's aggregate property value growth. Although Dye and Merriman found significant property value growth within TIF districts, the growth was more than offset by decreased growth in the non-TIF areas. This finding highlights the importance of considering the shifting of economic activity when examining the TIF impact at a jurisdictional level. These findings were confirmed by Dye and Merriman (2003), who found that commercial activity within TIF districts substituted for similar activity outside the districts. Weber (2003) also highlighted the importance of the potential broader impact of TIF on overlapping jurisdictions, as she found that more intensive use of TIF, measured as the amount of the property tax base included in TIF, negatively affects the property tax revenue of school districts.

Byrne (2010) and Lester (2014) are the only studies to my knowledge that examined the impact of TIF on employment. Byrne (2010) found that Illinois TIF districts supporting industrial development have a positive impact on employment growth, whereas those supporting retail development have a negative impact on municipal employment. This positive impact for industrial TIF on employment is consistent with these firms being less reliant on local spending and thereby less likely to shift economic activity within the jurisdiction. Byrne (2010) further hypothesizes that the negative employment effect from TIFs supporting retail development is consistent with these developments shifting local spending to more labor efficient national chains. Lester (2014) examined employment at the block group level in Chicago between 1990 and 2008 and did not find a significant impact of TIF designation on employment. Although Byrne (2010) and Lester (2014) are the only previous studies that examined the employment impact of TIF, many studies

have examined the employment impact of other economic development incentives, finding mixed results (Faulk, 2002; Billings, 2009; Hanson, 2009; Bartik, 2012).

A shortcoming of Byrne (2010) and Lester (2014) is that Illinois lacked any type of detailed reporting requirements. Due to this, both studies examined whether localities experienced an increase in overall employment in the years following the adoption of a TIF district. One drawback of this approach is that there is often a lag between the creation of the TIF district and the beginning of development. The data limitation also meant that the previous papers could not consider the variation in the size of the development occurring within the TIF district or whether the primary benefit was employment or expansion of the property or sales tax base. The current study improves upon the previous research by utilizing the number of jobs that the TIF administrator reports that the TIF incentive supports. As such, this analysis does not suffer from the problem of potentially misidentifying the treatment period and can control for the magnitude of each TIF districts' purported employment impact from year to year.

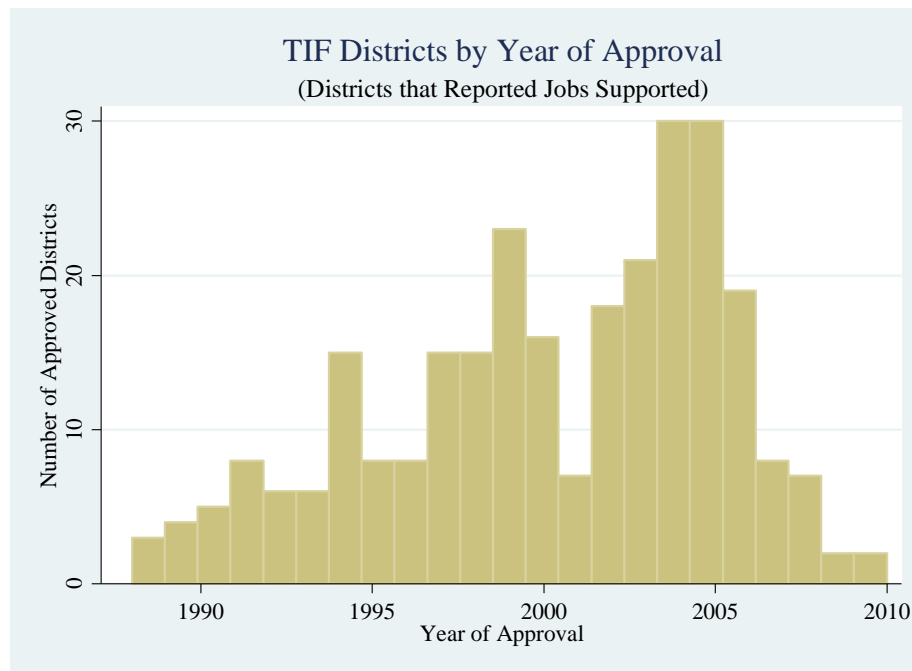
4. DATA

This paper utilizes three measures of TIF supported employment reported by TIF administrators in the Annual TIF reports filed with the State of Missouri Auditor between 2007 and 2010: *Total Jobs*, *New Jobs*, and *Retained Jobs*. Each report is required to state the number of jobs attributed to TIF, categorizing such jobs as either retained jobs or new jobs. *Retained Jobs* are the number of jobs "saved" by TIF support. These jobs are attributed to TIF under the assumption that the firm or firms within the district would have shut down or relocated without TIF support. *New Jobs* are jobs that did not exist prior to TIF designation. These jobs are attributed to TIF under the assumption that the firm or firms within the district either expanded operations or relocated into the district because of TIF. *Total Jobs* is simply the sum of *Retained Jobs* and *New Jobs*. It should be noted that the baseline from which a job is designated as new or retained is the year in which the TIF is created and a new job remains categorized as such throughout the life of the TIF district.

Table 1 shows an example of how TIF supported jobs are reported. It shows the number of new and retained jobs for Kansas City's 13th and Washington TIF District. The TIF plan was approved in 1996 to convince the company Unitog to keep its headquarters in Kansas City, MO instead of moving across the state line into Kansas. The company moved into the TIF district, which had previously been a vacant surface parking lot. At the time of the 2007 to 2010 TIF reports, the building was home to Argus Health Systems (Kansas City Economic Development Corporation, 2007). Since there was no existing business located within the TIF district at the time of adoption in 1996, all of the employment reported between 2007 and 2010 are categorized as new jobs. These jobs, reported by the TIF administrator, vary from year to year with the change in employment at the company located within the district.

Table 1: Reported TIF Jobs for Kansas City's 13th and Washington TIF District

Year	Reported New Jobs Supported	Reported Retained Jobs Supported
2007	410	0
2008	355	0
2009	423	0
2010	374	0

Figure 2: TIF Districts by Year of Approval (Districts that Reported Supported Jobs)

Since we are assessing the impact of TIF on county-wide employment, TIF supported employment data is aggregated for all TIF districts located within each county. The reporting requirements for TIF supported employment at the discretion of the sponsoring jurisdiction and TIF reports are based on the sponsoring jurisdiction's fiscal year. The year in which this paper categorized TIF supported employment was based on the end of the reporting period.² In total, there were 513 TIF districts in the years examined, with 276 of these districts reporting a positive number of jobs supported. It is not uncommon for a TIF district to be approved, only to have a long period of inactivity at the site. Figure 2 is a histogram of the TIF districts that reported jobs supported by the year in which they were created. Two hundred fifty-seven of the 276 TIF districts were approved prior to 2007. Three TIF districts expired during the years this paper examines.

Data on county-wide employment, which includes employment inside and outside of TIF districts, comes from the BLS's Quarterly Census of Employment and Wages (QCEW). The QCEW was chosen as the source for the dependent variable for a variety of reasons. First the QCEW measures employment at the county level, whereas the BLS's Local Area Unemployment Statistics (LAUS) measures employment at the municipal level. The geographical area is important since TIF has the potential to shift economic activity within a locality. A TIF district that shifts economic activity from one municipality in a county to another could have a positive impact on municipal employment but no impact on county employment.³ A second key characteristic is that the QCEW is a census of establishments, as opposed to a household survey. In large metropolitan areas with multiple municipalities, such as Saint Louis and Kansas City, there is a higher

² For example, TIF reports with reporting years of 7/1/2007 to 6/30/2008, 10/1/2007 to 9/30/2008, and 5/1/2007 to 4/30/2008 were all assigned as 2008 TIF supported employment.

³ For instance, in 2007 a sales tax TIF was approved in support of a redevelopment project in Mission, KS, which included the relocation and expansion of a Wal-Mart Supercenter located just 0.75 miles up the road in neighboring Roeland Park. While the relocation would likely have increased employment in Mission, KS, both Roeland Park and Mission are located in Johnson County. Therefore, the relocation is unlikely to increase county employment.

probability that workers may not live in the same municipality or county of their employer. Since TIF reports document the employment impact at the establishment level, the QCEW is more comparable to TIF reports. The final benefit of QCEW is that it includes employment estimates for all 115 Missouri counties, whereas LAUS does not report data for municipalities with populations below 25,000, resulting in data for only 26 Missouri municipalities. The QCEW used is the average county employment over the calendar year.

Information on sales and property tax rates come from the Missouri Department of Revenue. Wasylenko (1997) and Bartik (2012) summarize the literature on taxes and economic development and report tax elasticity estimates in the range of -0.1 to -0.6, implying that a 10 percent increase in taxes would result in a 1 to 6 percent decrease in economic activity. The share of establishments in the manufacturing (*%Manufacturing*), retail (*%Retail*), and finance and real estate (*%FIRE*) industries come from the Census Bureau's County Business Patterns. Funderburg, et al. (2013) and Garrett, Wagner, and Wheeler (2007) found that industry mix has a significant impact on economic growth.

A number of demographic variables come from the American Community Survey (ACS).⁴ The percent of the population with a bachelor's degree or higher (*%Bach*) is included to control for local human capital levels. Population density (*PopDens*) is included to control for positive effects of agglomeration economies on local employment. Additional demographic variables from the ACS include controls for the percentage of the population between the age of 18 and 65 (*%18to65*), sex (*%Male*), race (*%White*, *%Black*, *%Asian*, *%Other*), and ethnicity (*%Hispanic*) are included to control for differences in labor force participation between groups (Edmiston, 2006; Partridge and Rickman, 1997). Finally, the variable *Interstate* takes a value of 1 if an interstate runs through the county. This is used as a proxy for both infrastructure and lower transportation costs and is expected to have a positive impact on employment.

In addition to estimating the model using panel data, the model is also estimated using a cross-sectional instrumental variable approach to account for the potential endogeneity of TIF supported jobs. Three instruments are used. The variable *HHI* is a Herfindahl-Hirschman type index calculated as the sum of the squares of each municipality's share of the county population. For example, St. Charles County has a population of 360,485 spread out among 14 municipalities, the largest being O'Fallon, which makes up 22 percent of the county's population, followed by St. Charles city (18 percent) and St. Peters (15 percent). The least populated municipality is Foristell with a population of 245 (0.07 percent of the county population). Summing the squared shares of all 14 municipalities in St. Charles county results in an *HHI* of 1,125. The concentration of population share could influence TIF adoption, because although the decision to create a new TIF district is made by municipalities, TIF's unique structure could negatively affect overlapping jurisdictions (e.g. county governments and school districts). Since TIF diverts tax revenue from all overlapping jurisdictions, municipalities are sometimes accused of using TIF to capture tax revenue from county governments and school districts. In counties with a high *HHI*, municipal leaders have less of an incentive to use TIF as a means to capture revenue, as a greater portion of the overlapping jurisdictions' residents are municipal residents as well. On the other hand, when a municipality with a small share of the county population uses TIF to capture revenue from the county, most of the harm is falling on residents outside of the municipality adopting the TIF.

⁴ Since the 1-year ACS only provides estimates for areas with populations over 65,000, estimates would only be available for 17 of the state's 115 counties. For this reason, demographic data is taken from the 2006-2010 5-year ACS which provides estimates for all 115 counties (US Census Bureau, 2017).

Table 2: Summary Statistics

Variable	Mean	Std. Dev.
Ln (County Employment) (<i>Employ</i>)	8.77	1.32
Ln (Total Jobs Attributed to TIF + 1) (<i>Total Jobs</i>)	1.72	2.93
Ln (New Jobs Attributed to TIF + 1) (<i>New Jobs</i>)	1.60	2.81
Ln (Retained Jobs Attributed to TIF + 1) (<i>Retained Jobs</i>)	0.93	2.11
Sales Tax Rate (<i>Sales Tax</i>)	0.059	0.006
Property Tax Rate (<i>Property Tax</i>)	0.049	0.012
Population per Sq. Mile (<i>PopDens</i>)	130.67	520.15
% of Firms in Manufacturing Sector (% <i>Manufacturing</i>)	5.35	2.52
% of Firms in Retail Sector (% <i>Retail</i>)	17.37	3.20
% of Firms in Finance and Real Estate Sector (% <i>FIRE</i>)	6.77	1.66
County with an Interstate Highway (<i>Interstate</i>)	0.33	0.47
% of Population with Bachelor's Degree or Higher (% <i>Bach</i>)	15.85	6.65
% of Population between Ages of 18 and 65 (% <i>18to65</i>)	59.62	3.48
% of Population between Ages of 18 and 65 that is Male (% <i>Male</i>)	50.26	3.05
% of Population White, Non-Hispanic (% <i>White</i>)	91.85	8.03
% of Population Black, Non-Hispanic (% <i>Black</i>)	3.30	6.60
% of Population Hispanic (% <i>Hispanic</i>)	1.43	1.47
% of Population Asian, Non-Hispanic (% <i>Asian</i>)	0.54	0.72
% of Population, Other (% <i>Other</i>)	2.88	2.03
HHI for Municipal Shares of County Population (<i>HHI</i>)	1,286.63	1,429.55
Percent of Democrat Vote in 2008 Governor's Race (<i>Dem2008</i>)	50.55	8.00
Border County (<i>Border</i>)	0.41	0.49

Table 3: TIF Attributed Employment in Missouri

Year	New and Retained Jobs Attributed to TIF	Percent of State Employment
2007	80,043	2.9%
2008	86,460	3.2%
2009	109,786	4.2%
2010	91,096	3.5%

A second instrument is the percent of the vote share for the democratic candidate in the 2008 Missouri gubernatorial election (*DEM2008*). Betz et al. (2012) found that political ideology influences a county's propensity to offer economic development incentives. A dummy variable for border counties (*Border*) is used as the final instrument. Since TIF is often just one part of an economic development package that may also include incentives from the state government, jurisdictions near the state border face more competition. Whereas the state of Missouri should be reluctant to provide incentives to induce a firm to locate in one Missouri county versus another, border counties face a competitive environment in which both Missouri and neighboring states are focused on capturing each other's firms. As such, we would expect TIF districts to be more likely to be created in these counties.

Table 2 presents the summary statistics. County employment (*Employ*) and each measure of TIF supported employment (*Total Jobs*, *New Jobs*, and *Retained Jobs*) are measured as natural logs to improve the normality of the error terms.⁵ The sample includes 115 counties measured across four years, 2007 to 2010. The average county had an employment of 22,508, with the mean value of $\ln(\text{Employ})$ being 8.771. As mentioned above, TIF reports require TIF administrators to report new and retained jobs separately. The mean number of reported *Total Jobs* (*New Jobs* + *Retained Jobs*) supported by TIF in a county is 802.5 jobs (the mean value of $\ln(\text{Total Jobs})$ is 1.725) with 548.1 of those being categorized as new jobs (the mean value of $\ln(\text{New Jobs})$ is 1.60). Employment within TIF districts represent a large portion of Missouri's labor markets. Therefore, if the reported TIF supported jobs are credible, we expect to find a significant impact on county employment.

Table 3 shows the number of new and retained jobs attributed to Missouri TIF districts between 2007 and 2010. Between 80 and 110 thousand jobs in Missouri were attributable to TIF districts, representing 2.9 to 4.2 percent of the total employment in the state. TIF can have an even more pronounced impact on the labor markets at the local level. Table 4 shows the ten counties with the largest number of reported jobs attributed to TIF districts within the county, along with the percentage these jobs represent of the county's employment level as measured by the BLS. For example, in Jackson County, the largest county in the Kansas City metropolitan area, TIF reports attributed 43,528 jobs created or retained by TIF districts, 13 percent of the county's total employment. In Buchanan County, located just north of Kansas City, the 6,998 jobs reportedly created or retained by its TIF districts represents 15 percent of its employment.

⁵ Since Total Jobs, New Jobs, and Retained Jobs take the value of zero for some counties, the log-transformations for these three variables are $\ln(\text{Jobs} + 1)$.

Table 4: Ten Counties with the Most Reported TIF Jobs in 2010

County	Reported TIF Jobs (2010)	Reported TIF Jobs as a Percentage of BLS Measured Jobs (2010)
Jackson County	43,528	13%
St. Louis County	15,652	3%
St. Louis City	7,328	3%
Buchanan County	6,998	15%
Clay County	6,171	1%
Taney County	3,411	12%
St. Charles County	2,063	2%
Jefferson County	1,145	2%
St. Francois County	1,045	5%
Jasper County	972	2%

5. EMPIRICAL MODEL AND RESULTS

5.1 Empirical model

This paper estimates the impact of TIF reported jobs on county employment using two approaches: panel data models and an instrumental variables method. Since TIF administrators report the number of TIF supported jobs annually, this allows for estimation using panel data approaches which incorporate within counties variation. The panel data model estimated is:

$$(1) \quad \text{Employ}_{it} = \alpha + \beta \text{TIFJOBS}_{it} + X_{it}\lambda + J_i\theta + \text{YEAR}_t\eta + u_{it}$$

Employ_{it} is the natural log of employment in county i in period t , TIFJOBS_{it} is the natural log of the number of reported jobs supported by TIF, which enters the model either as a single variable (*Total Jobs*) or as two separate variables for *New Jobs* and *Retained Jobs*, depending on the specification. X_{it} are time-varying covariates: *Sales Tax*, *Property Tax*, *%Manufacturing*, *%Retail*, and *%FIRE*. J_i are observed time-invariant county effects. Since population and demographic variables are taken from the 5-year ACS, *%Bach*, *%18to65*, *%Male*, *PopDens*, and race and ethnicity variables are treated as time-invariant variables in the regressions. Z_i are unobserved time-invariant county fixed effects, YEAR_t are indicatory variables for each year, and u_{it} is an idiosyncratic error. If TIF is indeed successful at drawing new jobs or retaining existing jobs for the county, we would expect a positive relationship between TIF supported jobs and BLS county employment estimates. Since the variable of interest, the reported number of jobs supported by TIF is reported annually, the model can be estimated with either a random-effects (RE) or fixed-effects (FE) model.

The appropriateness of the models depends on the underlying assumptions, as the FE estimation yields unbiased estimates even in the presence of unobserved county effects (Z_i) that are correlated with other explanatory variables. Endogeneity, discussed more below, could still

potentially bias the estimates. However, panel data has the benefit of incorporating within-panel variation into its estimates.

A weakness of the panel data approach comes from the fact that the creation of TIF districts is not random. Although FE estimates can be consistent when the omitted variable causing the endogeneity is constant across the panels, if the omitted variable is thought to deviate in years in which TIFs are created, endogeneity may still be a problem. As shown in Figure 2, 19 of the 276 TIF districts that reported jobs at some point in our sample were created between 2007 and 2010. These 19 TIF districts were distributed in 11 of the 115 Missouri counties. To test the robustness of the estimates, an instrumental variable (IV) approach is also used on the 2010 cross-section. The IV model estimated is

$$(2) \quad \text{Employ}_i = \alpha + \beta \text{TIFJOBS}_i + X_i\lambda + J_i\theta + u_i$$

The IV model treats the *TIFJOBS* variables (*Total Jobs*, *New Jobs*, and *Retained Jobs*) as endogenous, using *HHI*, *DEM2008*, and *Border* as instruments.⁶ As mentioned previously, each of the instruments are expected to impact the propensity for TIF districts to be adopted within a county and therefore on the number of TIF supported jobs reported within the county. In low *HHI* counties, municipalities have a greater incentive to use TIF to capture tax revenue from overlapping jurisdictions. Political leanings are also expected to influence the use of TIF. Finally, *Border* counties face greater competition from neighboring states.

5.2 Results

Based on the means reported previously, TIF supported jobs are only 3.6 percent of county employment. However, when a simple pooled OLS model is used to estimate the full set of covariates and year dummy variables, we see that TIF supported jobs have a statistically significant impact on county employment. Table A1 of the appendix shows the pooled OLS regressions. Whether TIF supported employment enters as a single variable (*Total Jobs*), or split between *New Jobs* and *Retained Jobs*, the coefficients are positive and statistically significant at the 1 percent level. Therefore, it is plausible that the impact of TIF supported jobs, if economically valid, would be measurable at the county level. Of course, the pooled OLS assumes that each county has a common intercept. This assumption is violated when unobserved county effects are present, necessitating the use of a panel data model.

Table 5 shows the regression results from the RE and IV models. The first two columns present the panel data results and the last two columns show the IV results. For each set of regressions, the number of TIF supported jobs is first entered as the single variable, *Total Jobs*, and then with *New Jobs* and *Retained Jobs* included as two separate variables. In the first two columns, there is no evidence that the reported number of TIF supported jobs has an impact on county employment. The lack of significance for the *Total Jobs*, *New Jobs*, and *Retained Jobs* variables is consistent with TIF supporting jobs that were simply shifted from other areas of the county or supporting jobs that would have located within the county with or without TIF's financial incentive. The coefficients of TIF supported jobs are also insignificant in the FE estimates, which are not reported in this table, with p-values of 0.458, 0.442 and 0.882.⁷

⁶ The model was estimated using Stata's `ivregress 2sls` command.

⁷ As mentioned previously, three TIF districts dissolved between 2007 and 2010. For two of the districts, 2008 was the final year with reported job numbers and for one, 2009 was the final year with reported job numbers. The model was estimated with these three districts excluded and the results are consistent.

Table 5: Regression Results

Variable	Panel Data: Random Effects	Panel Data: Random Effects	IV Model: 2SLS	IV Model: 2SLS
Ln (<i>Total Jobs</i>)	0.003 (0.003)		0.113 (0.083)	
Ln (<i>New Jobs</i>)		0.005 (0.005)		0.042 (0.118)
Ln (<i>Retained Jobs</i>)		0.001 (0.003)		0.131 (0.141)
<i>Sales Tax</i>	-4.416* (2.656)	-4.317 (2.655)	-17.705 (13.739)	-19.774 (14.802)
<i>Property Tax</i>	1.559 (1.677)	1.271 (1.703)	-7.872 (6.425)	-9.581 (6.848)
% <i>Manufacturing</i>	-0.007 (0.006)	-0.008 (0.006)	-0.018 (0.029)	-0.022 (0.034)
% <i>Retail</i>	-0.003 (0.004)	-0.003 (0.004)	-0.050** (0.022)	-0.043 (0.024)
% <i>FIRE</i>	-0.002 (0.009)	-0.002 (0.009)	0.077* (0.042)	0.069 (0.045)
% <i>Bach</i>	0.051*** (0.017)	0.051*** (0.017)	0.047*** (0.018)	0.050*** (0.019)
<i>PopDens</i>	0.0004** (0.0002)	0.0004** (0.0002)	0.0003 (0.0003)	0.0002 (0.0003)
<i>Interstate</i>	0.407*** (0.153)	0.405*** (0.154)	0.197 (0.222)	0.145 (0.229)
% <i>18to65</i>	0.136*** (0.031)	0.136*** (0.031)	0.117*** (0.032)	0.122*** (0.013)
% <i>Male</i>	-0.105*** (0.028)	-0.106*** (0.028)	-0.098*** (0.027)	-0.106*** (0.029)
% <i>Black</i>	0.013 (0.016)	0.013 (0.016)	0.018 (0.017)	0.012 (0.018)
% <i>Hispanic</i>	0.121** (0.051)	0.121** (0.052)	0.110* (0.056)	0.108* (0.057)
% <i>Asian</i>	0.013 (0.155)	0.011 (0.156)	-0.087 (0.148)	-0.115 (0.155)
% <i>Other</i>	0.063* (0.037)	0.063* (0.037)	0.048 (0.035)	0.047 (0.035)
<i>Year = 2008</i>	-0.013 (0.009)	-0.013 (0.009)		
<i>Year = 2009</i>	-0.043*** (0.010)	-0.043*** (0.010)		
<i>Year = 2010</i>	-0.055*** (0.011)	-0.055*** (0.011)		
Observations	460	460	115	115
R ²	0.712	0.713	0.785	0.775
Shapiro-Wilk Normality of Errors	0.729	0.701	0.507	0.556

Note: standard errors in parentheses; *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level

The IV models treat *Total Jobs*, *New Jobs*, and *Retained Jobs* as endogenous, using *HHI*, *DEM2008*, and *Border* as instruments. In the first IV regression, the instruments *HHI* and *Border* have p-values of 0.053 and 0.028, respectively, and the signs are as expected, with low *HHI* counties and border counties reporting more TIF supported jobs. The joint F-statistic for the three

instruments are 0.029. In the first-stage of the IV model with *New Jobs* and *Retained Jobs* entered separately, the first-stage results for *New Jobs* is similar to that of *Total Jobs*, with *HHI* and *Border* having p-values of 0.044 and 0.032. In the first-stage result for *Retained Jobs*, *Border* remains significant with a p-value of 0.016. While the instrument *HHI* does not significantly impact *Retained Jobs*, *DEM2008* does, as counties with a larger share of democratic voters report more *Retained Jobs* with a p-value of 0.007. The joint F-test of the instruments in these two first-stage regressions are 0.029 and 0.010. The Sargan χ^2 tests for the two IV models have p-values of 0.465 and 0.416, suggesting that the instruments satisfy the assumption that they are uncorrelated with the structural error term.

Similar to the panel data results, the coefficients of *Total Jobs*, *New Jobs*, and *Retained Jobs* are all positive but statistically insignificant in the IV models. These results again suggest that the number of TIF supported jobs in a county, as reported by TIF administrators, does not have a significant impact on county employment, as measured by the BLS. While the increased reporting requirements for economic development incentives are important tools for furthering transparency, these results suggest that such reported job numbers may need to be looked at with some skepticism. Both the panel data model, which incorporates the within-panel variation in reported jobs and county employment data, and the IV model, which accounts for the potential endogeneity of TIF reported jobs, come to this same conclusion.

Of the other explanatory variables in the model, *%Bach*, *%18to65*, and *%Male* have statistically significant impacts across all models. The coefficient for *%Bach* varies from 0.047 to 0.051 and is significant at the 1 percent level across all specifications. The coefficients indicate that at the mean, a one standard deviation change in *%Bach* from 15.9 to 22.5 percent increases county employment by 0.31 to 0.34 percent or 71 to 76 workers. The coefficients of *%18to65* and *%Male* are also significant at the 1 percent level, with a 1-percentage point change in the population between 18 and 65 increasing county employment from 0.117 to 0.136 percent and a 1-percentage point change in males decreasing employment by 0.098 to 0.106 percent.

PopDens and *Interstate* are both significant in the panel data model, with both density and the presence of an interstate having a positive effect on county employment, but are insignificant in the IV model. *%Hispanic* has a positive impact on employment and is significant at the 5 percent level in the panel data models, but is only significant at the 10 percent level in the IV models. Although the impact of industry makeup does not have a statistically significant effect across all specifications, *%Retail* has a coefficient of -0.05 that is significant at the 5 percent level in the first IV specification, indicating that a 1-percentage point change in the number of establishments in the retail sector decreases county employment by 0.05 percent, or 11 workers. In all models, the Shapiro-Wilk test for the normality of errors does not reject the null hypothesis that the errors are normally distributed.

6. CONCLUSION

Economic development practitioners view TIF as an indispensable tool for promoting local job growth and retention. Not surprisingly, local policy makers in Missouri, like those in other states, have aggressively utilized TIF in an attempt to attract jobs into their jurisdictions. As a result, TIF has come to cast a large shadow over local finances, as TIF can divert a large portion of overlapping jurisdiction's tax revenue. In 2012, California eliminated the use TIF in the state because of the concerns over these diverted revenues. Proponents of TIF counter that the large number of jobs in businesses supported by TIF is justification for the diversion of these revenues.

The results in this paper, however, give credence to State Auditor of Washington's concerns that simply requiring economic development administrators to report the number of jobs supported by economic development incentives provided little credible evidence of job creation. Results indicate that the number of jobs supported by TIF, as reported by local economic development agencies in Missouri, does not have a statistically significant positive effect on county employment as measured by the BLS. The lack of a significant impact of reported jobs on employment suggests that TIF supported jobs either come at the expense of other areas in the county or would have located in the county regardless of the existence of Missouri's TIF districts.

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APPENDIX

Table A1: Pooled OLS Regression Results

Variable	Pooled OLS	Pooled OLS
Ln (<i>Total Jobs</i>)	0.111*** (0.013)	
Ln (<i>New Jobs</i>)		0.061*** (0.018)
Ln (<i>Retained Jobs</i>)		0.092*** (0.023)
<i>Sales Tax</i>	-26.955*** (6.077)	-27.741*** (6.071)
<i>Property Tax</i>	-9.546*** (3.067)	-10.681*** (3.087)
% <i>Manufacturing</i>	-0.027* (0.015)	-0.033** (0.0147)
% <i>Retail</i>	-0.051*** (0.011)	-0.049*** (0.011)
% <i>FIRE</i>	0.059*** (0.022)	0.058*** (0.022)
% <i>Bach</i>	0.042*** (0.009)	0.045*** (0.009)
<i>PopDens</i>	0.0004*** (0.0001)	0.0003*** (0.0001)
<i>Interstate</i>	0.243*** (0.077)	0.238*** (0.076)
% <i>18to65</i>	0.115*** (0.016)	0.120*** (0.031)
% <i>Male</i>	-0.098*** (0.014)	-0.103*** (0.014)
% <i>Black</i>	0.009 (0.008)	0.005 (0.008)
% <i>Hispanic</i>	0.119*** (0.025)	0.118*** (0.025)
% <i>Asian</i>	-0.067 (0.076)	-0.085 (0.076)
% <i>Other</i>	0.060*** (0.018)	0.056*** (0.037)
<i>Year = 2008</i>	-0.013 (0.084)	-0.011 (0.084)
<i>Year = 2009</i>	-0.115 (0.085)	-0.119 (0.085)
<i>Year = 2010</i>	-0.104 (0.086)	-0.107 (0.085)
Observations	460	460
R ²	0.775	0.777
Shapiro-Wilk Normality of Errors (p-values)	0.056	0.147