

AN EXAMINATION OF INCENTIVES TO ATTRACT AND RETAIN BUSINESSES: EVIDENCE FROM KENTUCKY

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INTRODUCTION

THE PRACTICE OF STATE AND, TO A LESSER EXTENT, local governments to offer tax and other location-based incentives to firms considering locating operations there, as well as firms with existing operations, has become a common practice with no abatement of this practice apparent in the near future. These incentive programs are used throughout the United States not only in the hopes of attracting very visible projects, such as automobile assembly plants and high-technology firms, but much smaller enterprises as well.

While frequently used, these programs are not without their critics. Undoubtedly some of the concerns about these programs arise from the lack of strong evidence, either supportive or critical, on the effects of these programs. Although a significant literature has developed studying programs that focus on economic development in specific areas, such as enterprise or empowerment zones or tax incremental financing (TIF), there is a very limited literature on incentive programs used throughout a state. The literature that has developed on business incentive programs has generally been theoretical and focused on when these incentives might be successful.

The relatively scant empirical literature on incentive programs has been plagued by limited access to data on these programs and the seemingly arbitrary nature of the awards. Difficulties also arise because of the distinction between incentives “awarded” and incentives received. Firms, both new and existing, may be offered (awarded) a tax credit, financing, or payments for training but often do not actually receive payment or tax credit or may receive them only after several years.

A unique data set obtained from the Kentucky Cabinet for Economic Development provides us access to information about the offered and received incentives by firms in Kentucky from 1992, the year of inception for several of Kentucky business incentive programs, to 2005. With these data we are able to track the annual value

of incentives received, by type of incentive, in each of Kentucky’s 120 counties for the period 1992 to 2005. Supplementing these data with information on economic activity in Kentucky’s counties enables us to examine the relationship between business incentives and economic growth in Kentucky’s counties, with particular emphasis on employment growth.

Many researchers have studied the effects of taxes on economic growth. In general, these studies look at the relationship between tax rates (such as the corporate tax rate) and economic growth. Economic growth typically means employment growth, but some studies use alternate measures such as rate of return on investment. Reviews of the literature often conclude that taxes have a negative relationship with economic growth (Bartik, 1991; Wasylenko, 1997)—higher taxes are associated with lower economic growth. However, it is unclear whether higher taxes cause lower economic growth, or whether there are other factors that are associated with both higher taxes and lower growth.

Few researchers have looked explicitly at the effects of economic development incentives on economic growth because data on taxes paid by firms, which is what is needed to evaluate these programs, is confidential and difficult to obtain.¹ As a result, states typically have not conducted regular evaluations of their development incentive programs (Buss, 2001), although regular assessments are starting to become more common. For example, North Carolina and Georgia now require periodic evaluations of their incentive programs. However, Ihlanfeldt and Sjoquist (2001) claimed that only one of Georgia’s incentive programs, the job tax credit program, had sufficient data to be evaluated. Faulk (2002) found that Georgia’s job tax credit created a modest number of new jobs, at a price below most other tax incentive programs: under \$2,500 per job created (in 1993 to 1995 dollars). Results from North Carolina also suggest positive effects of their incentive programs

(Luger, 2001; Luger, 2003); however, the estimates of impacts are based on simulations rather than actual data.

In addition to these state-funded evaluations, some researchers have written academic articles on development incentives. These articles vary greatly in their statistical sophistication, their measures of economic development, and the time periods studied. Fisher and Peters (1997) provided the most detailed summary of the economic development literature. They generally found a positive relationship between development incentives and economic growth, but they also pointed out that the pre-1997 literature did not adequately control for differences across counties and states in general business climates. For example, a county or state may use business incentives to level the playing field with other more attractive counties or states. More recent work is aware of these problems, but authors still often failed to control adequately for these differences.

Perhaps the most informative and technically rigorous work on economic development incentives is by Greenstone and Moretti (2003). In this work, the authors compared economic growth in counties that won “million-dollar plants” with counties that lost the competition for these plants. Greenstone and Moretti (2003) provided detailed evidence that the winning and losing counties were quite similar before the plant was built. However, the winning counties have had dramatically higher economic growth after the plants were built. This paper provides compelling evidence that the construction of these plants lead to higher economic growth. However, the authors did not have data on the size of the incentives, so they could not say whether or not the benefits of the plants outweighed their costs.

Our analysis of Kentucky’s incentive programs is an improvement on previous work for several reasons. First, we use more than 10 years of county-level data. This is a much longer panel than has been used in previous studies, many of which were simply cross-sectional studies. With a panel of this length, we can control for many of the unobserved differences among counties that are likely to influence economic activity in these counties. Second, we use data on actual incentives taken by firms. As we discuss later, the amount of incentives actually taken is much lower than amount of potential incentives offered to the firm.² Previous work has used much less precise measures

of business incentives such as expenditures of state economic development agencies. The true measure of incentives is the dollar amount of incentives taken by companies.

A number of findings emerge from our study. First, although we find evidence of positive and significant relationships between business incentives and employment, the significance and magnitude of these impacts depends on the type of incentive. Specifically, training incentives and, to a lesser extent, tax credits have positive and significant impacts on employment while financing programs appear to have no statistically significant impact. In addition to examining short-run effects of these incentives on employment, we also examine longer-run impacts (5-year) and find these long-run effects to be significantly larger for both training and tax credits. In both the short run and long run we find no statistically significant relationship between the level of financing incentives and employment. We find little evidence of spillover effects from these incentive programs – the level of incentives in neighboring counties appears to have little impact on employment in a county.

In addition to examining the relationship between these incentives and employment, we also consider their relationship with earnings and property value within the county. Here the impact of the incentives is more tenuous.

In the second section we discuss our data and methodology. The third section discusses our results and the fourth section concludes.

DATA AND METHODOLOGY

Data

Our data cover the period from 1992 to 2005, as 1992 is the first year that many of these business incentive programs were available in Kentucky. Data on business incentives are from the Kentucky Cabinet for Economic Development. The Commonwealth of Kentucky, like other states, has a myriad of incentive programs with some being very broadly defined while others are specific to region or industry. We aggregate these incentives into three broad classifications: tax incentives, training, and financing.³

We focus on the impact of tax incentives from the four largest tax incentive programs: the Kentucky Industrial Development Act (KIDA);

the Kentucky Rural Economic Development Act (KREDA); the Kentucky Jobs Development Act (KJDA); and the Kentucky Industrial Revitalization Act (KIRA). When examining the impact of tax incentives we combine these four programs together and treat them as a single program. We do not examine the impact of each program separately. We also have financing data from two programs, the Kentucky Economic Development Finance Authority (KEDFA) direct loan program and the Economic Development Bonds (EDB) program, and again we analyze the impact of these two programs together. Finally, we have data on training grants and tax incentives from the Bluegrass State Skills Corporation (BSSC) program, which we also combine into a single training program.⁴

For each of these incentive programs, we know the total amount received in a county between 1992 and 2005.⁵ Throughout this analysis we focus on the actual amount of tax incentives received in a year, as opposed to the actual incentives approved, since the former measure captures the true cost of the program.

Our primary interest is the impact of incentive programs on county employment; however, we also examine their impact on earnings and property values. Our data on employment and earnings come from the Regional Economic Information System (REIS) produced by the Bureau of Economic Analysis (U.S. Department of Commerce). Our measure of property value is total equalized real property value in the county. These data, obtained from Kentucky's Department of Revenue, are based on assessed property value data from the local (county) property value assessor. The assessed property values are converted into market values by using an assessment ratio based on properties sold in the county. All dollar figures have been converted to 2005 dollars using the Consumer Price Index for urban consumers (CPI-U).

Although answering the question of how business incentives might affect property values may be of interest in and of itself, we are also interested in how property values are affected by government policies for other reasons. Property value reflects both the value of a dwelling but also the value of residing in a community with given characteristics such as educational quality, taxes, parks, and other amenities.

County-level data are also available for demographics, school expenditures, and taxation. Yearly

population data by age, gender, and race are from the U.S. Census Bureau. The National Center for Education Statistics (NCES) provides yearly data on per-pupil expenditures for elementary and secondary education. The Census of Governments has detailed tax and government expenditure data for each county for the years 1992, 1997, and 2002. For non-survey years, values of these variables are interpolated. All tax and expenditure data are measured in 2005 dollars.

Methodology

To examine the impact of business incentive programs on economic growth, we employ panel data techniques. We have data for each of Kentucky's 120 counties from 1992 to 2005.

Our basic model for estimating the short-term effects of business incentives can be expressed as

$$(1) \quad E_{it} = I_{i,t-2}\alpha + I_{i,t-2}^N\beta + D_{it}\chi + G_{it}\delta + \gamma_i + v_i + \varepsilon_{it},$$

where E_{it} denotes the level of employment, in county i in year t . Business incentive payments in the county are similarly denoted by I_{it} with the business incentive payments of the county's neighbors denoted by $I_{i,t-2}^N$. The terms D_{it} and G_{it} denote vectors of demographic variables and government taxes and expenditures, respectively. As we assume that incentives are unlikely to immediately affect economic activity, rather than using contemporaneous incentives we use incentives from two years earlier. In assuming that economic growth depends on the policies of preceding year(s) (lags), we are also following the long-standing approach in the literature on economic development to reduce concerns about the endogeneity of the incentives.

Of course, economic growth in a state, region, or county is not solely determined by the incentives received by business operations in that area nor is economic growth constant over time. Therefore, any attempt to examine the influence of incentives on economic growth must attempt to control for other possible influences on growth in a region. With our data we observe employment growth in 120 counties in each of the 14 years between 1992 and 2005. Because we have observations on the same counties over time, we are able to include county fixed effects to control for the underlying long-term employment growth in each county that is unrelated to the tax incentives.

In addition to tax incentives, we include other characteristics of the counties that vary over time and are likely to influence economic growth in our estimation. These include variables that characterize total population, the racial and age composition of the population, local taxes, and public services, specifically primary and secondary educational spending. Although these variables are included in all of the specifications we estimate, they are not the focus of this study and we do not report their coefficients in our results.

It is possible that business incentives received by a firm in one county influence economic activity in neighboring counties. The impact might be through suppliers to a firm locating in neighboring counties or, perhaps, existing firms in one county experience an increase in sales volume arising from the demand for firms receiving incentives in another county. Alternatively, expansion of business activity in one county as a result of obtaining business incentives might lead to reductions in business activity in neighboring counties. Thus, it is an open question whether business incentives in one county increase or decrease economic activity in neighboring counties.

To try to capture possible cross-county impacts of incentives, we include the level of incentives for surrounding counties in some specifications we estimate. In addition, we estimate equation (1) using the difference between the (log) of employment in a county and its contiguous neighbors as the dependent variable. We do this with the intent of defining more precisely the set of counties that are more likely to be potential competitors although, as we acknowledged earlier, neighboring counties might benefit from increased employment in a county. We believe that the relationship between this measure of relative economic activity and incentives should offer some indication of how Kentucky's incentives influence economic activity in these counties relative to the incentives offered in its neighboring states.

Because the choice of a 2-year lag is somewhat arbitrary, we also estimate specifications where the lag time varies from one to five years. Such flexibility allows us to estimate the effects of business incentives in both the short and long run. Although it is possible that effects occur beyond five years, each year that we add to the incentive effect reduces our sample size by one year.

BUSINESS INCENTIVES AND ECONOMIC ACTIVITY

The Use of Incentives over Time and Across the Commonwealth

As can be seen in Table 1, there has been a distinct difference in the use of tax credits and financing incentives from the use of BSSC training incentives. As a percentage of earnings, all three programs are relatively modest, with the largest, the tax credit programs, averaging less than 0.09 percent of earnings for the period of 1992 to 2005.

Figure 1 shows trends in the use of the three types of business incentives during this period. From Figure 1 it is apparent that the use of financing incentives has diminished over time whereas tax credits have significantly increased in use. There has been little change in the use of BSSC training incentives as the amount for these are capped by legislation. Figure 2 shows the geographic distribution, by quartile, based on dollars of incentives per earnings, for each of the programs. These maps suggest that the use of these incentives is fairly dispersed throughout the state with rural counties in western and southern Kentucky appearing to make greater use of them than eastern Kentucky.

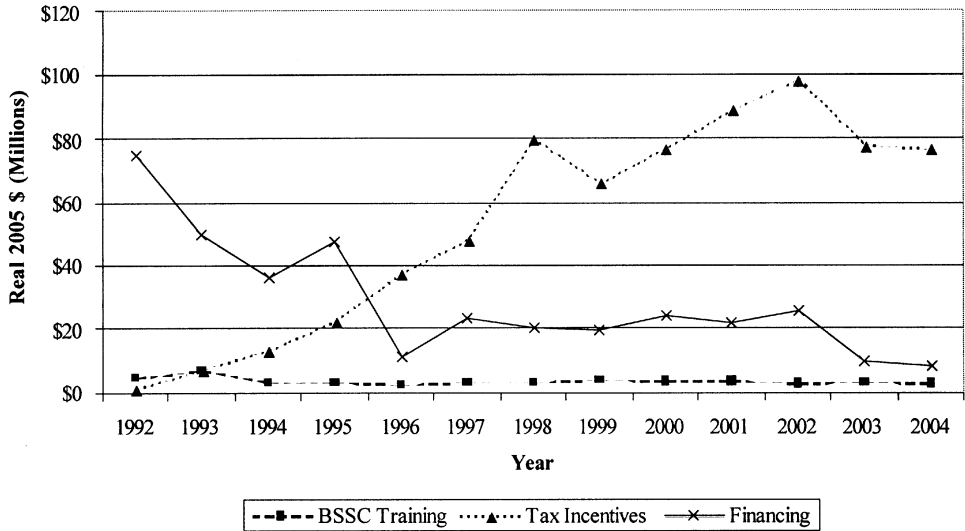
The Short-Term Relationship Between Business Incentives and Employment

As discussed, in our basic specification we undertake a logarithmic transformation of both the dependent variable and our measures of business incentives. In addition to including variables characterizing the demographic characteristics of the county (age, race, gender), public services (primary and secondary spending per student),

Table 1
Summary Statistics

Number of Counties	120
Employment	18,757
Earnings (\$1000, 2005)	587,000
Property Value (\$1000, 2005)	1,070,000
Earnings per Worker (\$2005)	27,966
BSSC Training (\$2005)	66,812
Tax Credits (\$2005)	428,097
Financing Incentives (\$2005)	252,274
BSSC (% Earnings)	0.0135
Credits (% Earnings)	0.0876
Financing (% Earnings)	0.0521

Figure 1: Amount of Business Incentives Taken in Kentucky, 1992 to 2004



and local taxes (per capita), we also control for the impact of other characteristics of a county that affect the level of economic activity and for business cycle influences on the entire county by including county fixed effects as well as year fixed effects. Because we compare economic activity in a county with the values of tax incentives from two years earlier, our analysis is restricted to the period from 1994 to 2005.

Table 2 contains the results of our estimation. In all three specifications reported, the coefficients on $LN(Training)_{t-2}$ and $LN(Credits)_{t-2}$ are both positive and statistically significant. In none of the regressions do we find a statistically significant relationship between financing incentives and employment.

We estimate two specifications that contain measures of incentives in adjacent counties. Column (2) of the table reports the results when we include the level of incentives of adjacent counties. None of the coefficients on neighboring counties' incentives are statistically significant, showing little evidence of positive or negative spillovers from business incentives in adjacent counties. In addition, inspection of the coefficients on the county's own level of incentives shows both the value and significance to be virtually the same as those reported in column (1). Column (3) reports the results from the estimation of equations with

the dependent variable now being the difference between (log) employment in the county and the (log) employment in the adjacent counties. In this case, we find that increases in the level of training credits in the adjacent counties decreases the difference in employment between the county and its neighbors. The signs and magnitudes of the coefficients on the variables measuring a county's own incentives are remarkably similar to the coefficients reported in columns (1) and (2).

As we are estimating a log-linear model, the coefficients on the incentives are elasticities and readily interpretable. Based on the results in column (1) of Table 2, a 10 percent increase in the level of tax credits will increase employment 0.013 to 0.015 percent whereas an increase in training incentives of 10 percent will increase employment by 0.010 to 0.015 percent. Although these elasticities suggest the impact of these incentive programs on employment is small, it is important to bear in mind that these programs are quite small, at least measured as a share of total earnings. From 1992 to 2005, BSSC training incentives averaged about 0.006 percent of earnings; tax credits averaged 0.088 percent; and financing incentives average 0.052 percent. Thus, for example, the mean annual BSSC training award was \$66,812 (\$2005), making 10 percent equal to \$6,681. With mean employment in these counties during this period at 18,757, the

Figure 2a: **Distribution of Training Incentives Among Kentucky Counties, by Quartile**

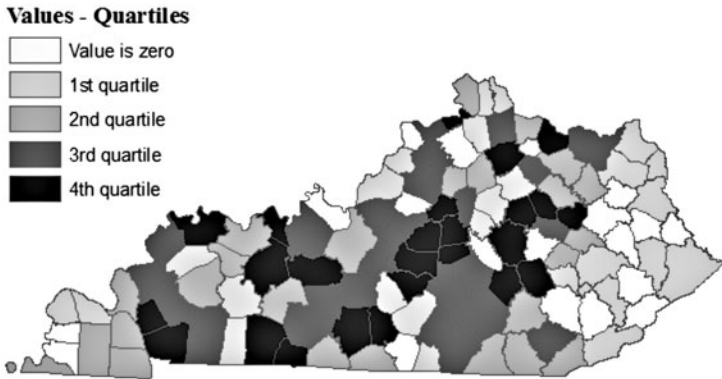


Figure 2b: **Distribution of Tax Credits Among Kentucky Counties, by Quartile**

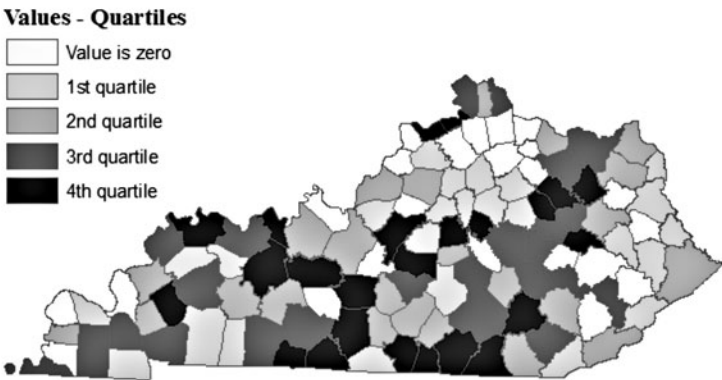


Figure 2c: **Distribution of Financing Incentives Among Kentucky Counties, by Quartile**

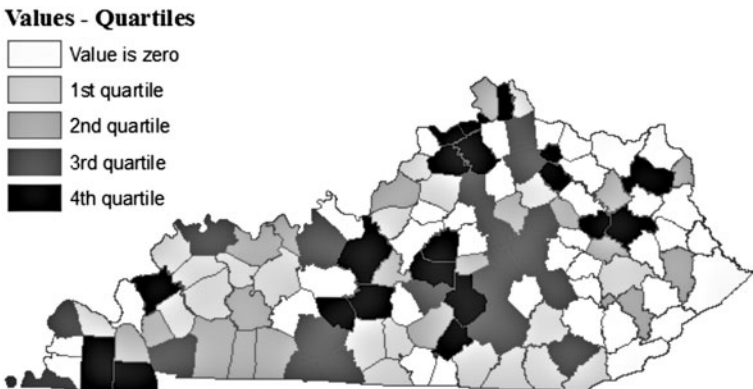


Table 2
Short-Term Effects of Business Incentives on Employment

<i>Dependent Variable</i>	(1) <i>LN(Employment)</i>	(2) <i>LN(Employment)</i>	(3) <i>LN(Employment)– LN(Neighbor Employment)</i>
<i>LN(Training)_{t-2}</i>	0.001068* (2.25)	0.001107** (2.35)	0.001549** (2.56)
<i>LN(Credits)_{t-2}</i>	0.001292** (2.05)	0.001285** (2.02)	0.001450* (1.91)
<i>LN(Financing)_{t-2}</i>	-0.000119 (-0.37)	-0.000105 (-0.33)	0.000301 (0.85)
<i>Neighboring LN(Training)_{t-2}</i>		-0.000373 (0.50)	-0.000061 (-0.087)
<i>Neighboring LN(Credits)_{t-2}</i>		0.001221 (1.22)	0.001050 (0.86)
<i>Neighboring LN(Financing)_{t-2}</i>		0.000033 (0.11)	0.000458 (1.40)
Observations	1440	1440	1440
Counties	120	120	120
R-squared	0.45	0.45	0.24

Robust t statistics in parentheses.

**p < 0.05, *p < 0.1.

10 percent or \$6,681 increase in training incentives is associated with increased employment of 2.00 to 2.91 jobs based on our results in Table 2. A 10 percent increase in tax credits is associated with increased employment between 2.41 to 2.72 jobs. However, it should be noted that with tax credits averaging \$428,097 (\$2005) during this period, a 10 percent increase in tax credits is significantly larger than a 10 percent increase in training incentives.

Long Term Effects of Business Incentives

The findings reported in Table 2, particularly for the BSSC training program, indicate a positive relationship between the amount of spending on incentive programs two years earlier and current economic growth. However, the models we have estimated may not fully capture the relationship between the level of business incentives in a county and the level of economic activity in the county. Specifically, our approach ignores the possibility that it may take more than two years for the full impact of the incentives to occur. Alternatively, it

may be that the impacts of these programs are short-lived, and after they have been received economic growth diminishes or even abates. To examine the long-term impact of incentives on economic activity, we estimate a model including the level of business incentives from each of the preceding five years. Although revising our model in this way allows us to get a better indication of the long-term impacts of these programs, it comes at a cost – the loss of three additional years of data to use in estimating our model. These regressions cover the time period from 1997 to 2005. Table 3 contains the results from this long-term analysis with the log of employment again as the dependent variable. By looking at the individual coefficients, it is difficult to determine whether incentives are associated with higher economic activity. However, the results suggest that financing incentives have no impact on employment regardless of the lag structure.

A more intuitive measure of the long-term effect of business incentives is the cumulative effect of incentives on economic activity. Table 3 contains the sum of the coefficients for each of the types of

Table 3
**Long Term Impacts of Business Incentives
on Employment**

<i>Dependent Variable</i>	<i>LN(Employment)</i>
<i>LN(Training)_{t-1}</i>	0.000690* (1.81)
<i>LN(Training)_{t-2}</i>	0.000612 (1.62)
<i>LN(Training)_{t-3}</i>	0.000932** (2.32)
<i>LN(Training)_{t-4}</i>	0.0008818** (2.23)
<i>LN(Training)_{t-5}</i>	0.000761* (1.66)
<i>LN(Credits)_{t-1}</i>	0.000488 (0.96)
<i>LN(Credits)_{t-2}</i>	0.000330 (0.89)
<i>LN(Credits)_{t-3}</i>	0.000668 (1.72)
<i>LN(Credits)_{t-4}</i>	0.000825** (2.22)
<i>LN(Credits)_{t-5}</i>	0.000746 (1.41)
<i>LN(Financing)_{t-1}</i>	-0.000163 (-0.50)
<i>LN(Financing)_{t-2}</i>	-0.000251 (-0.67)
<i>LN(Financing)_{t-3}</i>	0.000064 (0.19)
<i>LN(Financing)_{t-4}</i>	0.000022 (0.067)
<i>LN(Financing)_{t-5}</i>	0.000110 (0.34)
<i>LN(Training), 5 periods</i>	0.003812** (6.68)
<i>LN(Credits), 5 periods</i>	0.003058** (6.37)
<i>LN(Financing), 5 periods</i>	-0.000346 (-0.06)
Observations	1080
R-squared	0.30

Robust t statistics in parentheses.

**p < 0.05, *p < 0.1.

business incentives. The results show that training has a positive, significant effect on employment with a long-term elasticity of 0.003812, over three times larger than the short-term elasticity reported in Table 2. The sum of coefficients on tax credits is 0.003058, twice the short-term elasticity.

It should not be too surprising that there appears to be evidence of a long-term association between the level of training incentives and employment in a county. Presumably training incentives are being used to train workers and increase their productivity. In this sense they are similar to expenditures on education. If the training is effective, then the enhanced productivity of workers will continue beyond the period when their training is received and the funds from the incentive have been spent. This enhanced productivity should increase the demand for these workers, increasing both the level of employment and earnings in the county. This delayed response may indicate increases in employment from subsequent growth in complementary businesses and expanded retail and services.

The Impact of Incentives on Earnings and Property Value

As mentioned earlier, there are a number of reasons why we might be interested in how business incentives not only affect employment but also earnings and property values. A frequent criticism of business incentives is that they attract low-paying employment. A positive relationship between business incentives and property values is consistent with these incentives increasing the desirability of residing in a county that receives incentives.

Columns (1) and (2) of Table 4 report the results from estimating the relationship between business incentives and the log of earnings in a county. Here we see marginally significant positive relationships (t-statistics between 1.73 and 1.77) between earnings and tax credits. Although the point estimates (elasticities) for the coefficients training credits are quite similar to those we found in our regressions on employment reported in Table 2, the coefficients on tax credits are significantly larger—an estimated elasticity of about 0.0022 versus one of approximately 0.0013. Of course, given the marginal significance of these estimates, these differences in coefficients are unlikely to be statistically significant.

Table 4
The Impact of Business Incentives of Earnings and Property Value

<i>Dependent Variable</i>	<i>LN(Earnings)</i>		<i>LN(Property Value)</i>	
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
<i>LN(Training)_{t-2}</i>	0.000884 (1.20)	0.000989 (1.369)	0.000788 (1.33)	0.000723 (1.24)
<i>LN(Credits)_{t-2}</i>	0.002221* (1.77)	0.002189* (1.73)	0.000619 (0.59)	0.000617 (0.59)
<i>LN(Financing)_{t-2}</i>	-0.000872* (-1.74)	-0.000869* (-1.72)	-0.000006 (-0.017)	-0.000032 (-0.093)
<i>Neighboring LN(Training)_{t-2}</i>		0.001388 (1.10)		0.000928 (-0.77)
<i>Neighboring LN(Credits)_{t-2}</i>		0.002590 (1.52)		-0.000708 (-0.49)
<i>Neighboring LN(Financing)_{t-2}</i>		0.000393 (0.78)		0.000144 (0.36)
Observations	1440	1440	1440	1440
Counties	120	120	120	120
R-squared	0.39	0.39	0.80	0.81

Robust t statistics in parentheses.

*p > 0.1.

For property value, none of the coefficients on the incentives are statistically significant although for the tax and training credits they are positive in both regressions.

SUMMARY AND CONCLUSIONS

Business incentives are used by every state to attract new businesses and entice existing businesses to expand. In this paper, we investigate whether these incentives achieve their goal of improving economic activity in the county where the incentives are located. An important contribution of the analysis is that it focuses on incentives received rather than incentives offered. The actual incentives received are the most relevant measure of incentives, since they represent the true costs of the program for states. Our analysis uses a panel of more than 10 years of data on incentives, economic activity, and demographics for each Kentucky county.

Training and tax incentives have a positive effect on county employment. A 10 percent increase in training incentives corresponds with a short-run increase of employment of roughly 0.011 percent or about two jobs. The short-term effect for tax

incentives in these counties is somewhat larger, on the order of an increase in employment of 0.013 percent (2.5 jobs) for a 10 percent increase in employment. Because much less is spent on training credits than tax credits, the cost per job for training credits (\$3,335) is lower than the cost per job for tax credits (\$17,665). Over a longer period, we find the cumulative effect of training and tax incentives over a 5-year period is even larger. None of the programs has any significant impact on employment in neighboring counties.

Our work provides useful evidence on the relationship between business incentives and economic activity. Although we find compelling evidence that training and tax incentives lead to higher economic activity, we do not examine whether the “price” of increases in employment and earnings associated with these programs is too high. Attempts to quantify the benefits of increased employment or earnings would be a valuable extension and complement to the analysis we have undertaken here. Future work should also address the question of whether incentives actually influence business location decisions or if they are given to companies that would have located in the same place even if they did not receive incentives.

Notes

- ¹ As an agent to the Cabinet for Economic Development, the University of Kentucky was given access to confidential county-level information with strict limitations to its use.
- ² Faulk (2002) finds a significant difference between incentives offered and taken in Georgia as well.
- ³ See Hoyt et al. (2007) for more information about Kentucky's business incentive programs.
- ⁴ Most training incentives are in the form of grants. Job training credits were first offered in 1998, but credits comprise a small share of the money allocated to training incentives.
- ⁵ We know the credits received under the KIDA, KREDA, KJDA, and KIRA programs. We do not always know the credits received under the BSSC program, but we feel that, for the BSSC program, the amount approved closely matches the amount taken.

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