Measuring the Effect of Job Creation Tax Credits

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1. Introduction

The desire to create new jobs has lead states to adopt incentives in the form of tax credits. Gabe and Kraybill (2002), citing a Council of State Governments document by Chi (1994), report that in 1984, 27 states offered tax incentives for job creation. In a more recent Council of State Government document Burnett (2011) reports that in 2010, 45 states offered such incentives. On the other hand, Chirinko and Wilson (2010) report that the first job creation tax credit (JCTC) was adopted in 1993 and that by 2009, 24 states had a JCTC. Regardless of which site is correct, the evidence is that states have become increasing aggressive in using the tax system to provide incentives for job creation.

Whether JCTCs are successful in creating jobs is an open question despite the numerous studies that have been conducted. The existing studies have used a variety of approaches (Fisher and Peters 1998), including case studies, surveys, general equilibrium analysis, simulations, and statistical/econometric models. However, most of the research is unable to measure the causal effect of tax credits on job creation. Most of the existing research reports on the number of jobs for which a job tax credit was awarded, provided inconsistent results regarding the number of jobs that would have been created in the absence of the JCTC program. We use econometric models applied to Georgia data to measure the causal effect of Georgia's job tax credit on job creation. We make use of the variation across counties and time in the value of the job tax credit and address the endogeneity issue in multiple ways. We use both aggregate county level employment data and establishment level employment data to explore the effect of Georgia's job tax credit program.

We have identified three papers that use econometric techniques that measure the causal effect of state job tax credit programs. Faulk (2002) uses firm level Georgia corporate income tax

return data in a switching regression model to jointly estimate the decision to participate in the job tax credit program and the effect of the tax credit on employment. She finds that between 1993 and 1995, firms taking the Georgia job tax credit created 23 to 28 percent more jobs than firms not taking the credit but which were eligible for the credit. Hicks and LaFaive (2011) also consider the effect of job tax credits, focusing on the effect of the MEGA credits in Michigan. The authors use an instrumental variable approach to account for issues of endogeneity. Contrary to the Faulk study, Hicks and LaFaive find no impact of the MEGA credits on county measures of per capita income, employment or the unemployment rate for the industrial sectors of manufacturing or wholesale. Their results indicate a short term gain in employment in the construction industry but not a lasting effect.

More recently Chirinko and Wilson (2010) report on preliminary analysis of the effect of JCTCs by comparing state employment growth pre- and post-adoption of JCTC across the 24 states that they identified as having adopted a JCTC. They find small positive effects on employment.

Related to this line of research are the econometric studies of the effect of enterprise zones on job creation. To the extent that the magnitude of the job tax credit varies across a state, JCTC programs are similar to place-based enterprise zone programs that provide incentive within a geographically defined area; see Hanson (2009) for a review of studies of geographically-targeted tax incentives. There are two major issues associated with the analysis of the effect of enterprise zones programs. First, the choice of the boundaries of the zone is not random, so that endogeneity is an issue. Second, the financial benefits available in an enterprise zone oftimes include a host of incentives, making it difficult to separate the effect of a job tax credit from the effect of other incentives. Papke (1994) estimates the effects of enterprise zone incentives on

capital investment and employment in Indiana. Using three alternative specifications, she finds a permanent decrease in the number of unemployment claims in enterprise zones but only a temporary change in capital investment in the form of increased inventories in the zones. The author also finds that the increased inventories are accompanied by a decline in the value of machinery and equipment in the enterprise zones, indicating a shifting between the types of capital investments due to the presence of the enterprise zone incentives.

Bondonio and Greenbaum (2007) use establishment level data from 10 states to evaluate the effect of enterprise zones on employment, shipments, capital expenditures, and payroll. By using firm level data the authors are able to disaggregate firms into three different types, existing, new, and vanishing. Using a propensity score method to account for the endogeneity problem associated with the selection of the enterprise zones, the findings confirm the results of earlier works when viewed through the measure of total employment or capital investment, that is, average employment, shipments, payroll, and capital expenditures show little relationship to enterprise zone status. On the other hand, when considered on a firm by firm basis, the research shows significant gains in employment and capital expenditure for new establishments located in the enterprise zones and to a smaller extent for existing firms. Zone designation was found to be negatively related to payroll for new establishments, indicating that new jobs are lower wage jobs. But these gains were found to be offset by losses in employment and investment for vanishing firms. Greenbaum and Engberg (2007) find similar results using a difference in difference approach between areas with an enterprise zone designation and those without. In this study, the authors also consider the effect of zone designation on different types of firms. In general, their research confirms the findings that on average enterprise zone designation has little effect but also confirms the findings that there is great variation across

firms on the effects of these incentives. Both Papke (1994) and Greenbaum and Engberg (2007) provide support for the use of firm level data when evaluating these types of incentives.

The rest of the paper proceeds as follows. In the next section we explain how Georgia's job tax credit program works and how it has changed over time. That is followed by a discussion of the various empirical approaches we take, and by a discussion of our data. Section 5 contains the results, while we make summary comments in section 6.

2. Georgia's Job Tax Credit Program

Georgia's job tax credit (JTC) was instituted in 1990, at which time the primary purpose of the program was to increase employment in Georgia's 40 most distressed counties. In 1990, firms were granted a credit of $1,000 per job for up to five years provided that the firm created and maintained at least 10 jobs. Initially, the credit was limited to jobs created in manufacturing, warehousing and distribution, goods processing, and research and development industries. Since 1990, many changes have been made to the program, including the expansion of the program to all counties, increases in the credit amount, and reductions in the minimum number of jobs that must be created to be eligible for the credit. The following is a summary of the current (2011) structure of the JTC program.

Georgia's 159 counties are grouped into four tiers by the Georgia Department of Community Affairs (DCA) based on the economic conditions in the county. Each year, DCA ranks counties according to the highest unemployment rate for the most recent 36 month period; the lowest per capita income for the most recent 36 month period; and the highest percentage of residents below living poverty according to the most recent data available. Each county is ranked according to each of these three factors, with the most distressed county being ranked

number one. The three rankings are then combined using equal weights for each factor. DCA divides the counties into four tiers, with Tier 1 encompassing the most economically disadvantaged counties. By Georgia law, the 71 counties with the lowest ranking are to be designated as Tier 1 counties. The next 35, 35, and 18 counties are designated as Tier 2, Tier 3, and Tier 4 counties, respectively.

Only jobs created in certain industries are eligible for a job tax credit. The eligible industries include: manufacturing, warehousing and distribution, processing, telecommunications, broadcasting, tourism, research and development industries, and services for the elderly and persons with disabilities. Retail businesses are explicitly excluded except for counties ranked as the first through fortieth least developed counties.

The credit can be taken for each year for five years beginning in the year the job was created, if the jobs are maintained. Unused credits may be carried forward for ten years from the close of the taxable year in which the qualified jobs were established. In tiers 3 and 4 the credit taken in any one taxable year cannot exceed 50 percent of the taxpayer's state income tax liability. A firm in a tier 1 county can take the credit against the enterprise's quarterly or monthly income tax withholding payment. The credits are not refundable or transferrable to an unrelated firm.

The number of new full-time jobs is determined by comparing the monthly average number of full-time employees subject to Georgia income tax withholding for the taxable year with the corresponding period of the prior taxable year. For a job to qualify for a credit, the average wage of the new jobs created must be above the average wage of the county that has the lowest average wage of any county in the state. In addition, the employer must make health

insurance coverage available to the new employees if the firm provides health insurance coverage for other employees.

The JTC program also applies to certain specially designated less developed areas that are smaller than a county. In general, an area consisting of 10 or more contiguous census tracts within a county is designated as a less developed area if it meets the same economic conditions as the least distressed tier 1 county. In addition, the commissioner of community affairs can designate four other types of less developed areas.

Table 1 shows by year how the number and composition of tiers, the minimum number of jobs that must be created to be eligible, and the credit amount have changed since the program was first adopted. In 1994, the JTC was incorporated into the Georgia Business Expansion Support Act (BEST), which has been amended several times since, including expanding the industries that are eligible. The BEST program encompasses several other tax credits. The current list of income tax credits provided to businesses can be found in Wheeler (2011).

3. Methodology

Our objective is to measure the causal effect of Georgia's job tax credit program on employment. We approach this question using two data sets, and employing several alternative econometric models. We first use aggregate county level changes in employment. The second approach uses establishment level data. Both data sets are described in more detail in the next section. For now, we note that for the firm level data we know the number of jobs each establishment created, and whether the establishment took a job tax credit or not.

Our first approach considers variation in job growth across counties and relies on the fact that the size of the job tax credit varies across counties and over time. As our first step we

estimate a set of linear regression models. However, the value of the credit is related to the economic strength of the county, and thus there is an endogeneity issue. We address this endogeneity issue in two ways. First, we use regression discontinuity analysis. As noted above in the description of the Georgia job tax credit program, counties are divided into tiers, with the value of the credit dependent on the tier the county is assigned to. We use the tier designation as a point of sharp discontinuity. Over the time period of our data the county's tier can change and the value of the credit can change. Thus, we estimate the following equation

$$\Delta E_{jt} = \beta_0 + \beta_1 T_{jt} + \beta_2 r_{jt} + \epsilon_{jt} \qquad (1)$$

where ΔE_{jt} is the change in jobs in county *j* in year *t* in industries that are eligible for a job tax credit, T_{jt} is the treatment variable, r_{jt} is the rank of the county, and ϵ_{jt} is the error term.

There are multiple cut points since there are multiple tiers and the value of the credit varies by tier. We estimate separate regressions for each cut point. For each of these cut points the treatment variable equals 1 if the county is in the tier with the greater job tax credit and zero if the county is in the higher tier. We estimate equation 1 using alternative band widths based on closely ranked counties placed in different tiers and with alternative control variables.

The coefficient on T_{jt} tells us whether the additional credit in the tier with the lower ranking caused additional jobs to be created. One of the limitations of this approach is that we can only determine the effect of the difference in the value of the job tax credit associated with the different tier ranking, and not the base effect of the credit on employment.

The second approach to address the endogeneity issue compares employment growth between border counties that are in different tiers. The assumption we rely on is that neighboring counties should have similar economic conditions even if they are in different tiers. For this model we estimate equation 2, in which we regress the difference in employment growth

between the two border counties j and h, $\Delta E_{jt} - \Delta E_{ht}$, against the difference in the tax credit between the two border counties j and h, $C_{jt} - C_{ht}$.

$$\Delta E_{jt} - \Delta E_{ht} = \beta_0 + \beta_1(C_{jt} - C_{ht}) + \epsilon_{kt} \quad (2)$$

As with the regression discontinuity model we estimate separate regressions for each of the three pairs of tiers.

We also employ establishment level data in several alternative methodologies to control for endogeneity. The first approach uses the fact that there are firms that we determined were eligible for the job tax credit but did not take the credit. (As noted in section 2, to be eligible the firm had to create a certain number of jobs that depends on the county's tier and must be in an eligible industry.) The difference in job creation between these two sets of firms can be attributed to the job tax credit. The problem is that firms that were eligible for the credit but didn't take it are likely to be different from firms that did take the credit. Thus, we estimate a participation equation to explain why eligible firms did or did not take the credit, and use that equation to account for the endogeneity. This is the basic approach taken by Faulk (2002).

The second approach uses firm level data to estimate equation 1. For the regression discontinuity analysis we compare establishments that are in counties just above and just below the cut point for the tiers.

Our third approach considers establishments that are in neighboring counties that are in different tiers and thus have different credit amounts. For this analysis we consider only establishments that are within a given distance of the county's border, and report results using alternative distances. Since some census tracts are designated as economically distressed, we also compare employment growth in those census tracts as compared to areas within the county that are close to the boundary of those census tracts, making use of the fact that the value of the

credit in the designated census tracts is greater than the value of the credit in the remainder of the county.

Finally, in addition to estimating the magnitude of the effect of Georgia's job tax credit on employment growth, we use a duration model to determine whether the duration of jobs created by firms that take the job tax credit is different from the duration of jobs created by other firms. For the non-credit taking firms we consider two alternative set of jobs: all jobs created by establishments in industries that are eligible for a job tax credit regardless of the number of jobs the establishment created, and jobs created by establishments that would have been eligible for a job tax credit because they created sufficient number of jobs or jobs created by establishments in eligible industries but did not create sufficient jobs to be earn a job tax credit.

4. Data

We use two data sets to measure job growth, county-level data and establishment-level data.

County Level Data

The county-level employment data are from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages annual flat files, and cover the period 1990 through 2011 for all 159 Georgia counties. Table 2 provides the descriptive statistics, while Table 3 the means by tier. The data from this file are used to construct the dependent variable used in the regression analysis, growth in total qualified employment. This variable is the sum of county level employment in all qualifying NAICs industries, such as manufacturing, wholesale, tourism, research and development, broadcasting, telecommunications, and processing, and retailing in counties with a rank of 40 or less. Total non-qualifying employment is defined as total county

employment less qualifying employment and employment in government and nonprofits. Thus in most cases, non-qualifying employment consists of retail activities and services.

Establishment Level Data

Firm level employment is based on the ES202 data files and covers years 1998 through 2007. The primary data source used for this study is the Employer File (formerly, the ES202 employment data) collected by the Georgia Department of Labor (GDOL) for the purposes of administering the state's Unemployment Insurance program. Winders (2000) provides a discussion of the ES202 data. This dataset has several characteristics that make it appropriate for the analysis of Georgia's job tax credit program. First, it has almost comprehensive coverage. The dataset is compiled from quarterly tax and wage information submitted to the GDOL by every employer covered by Georgia unemployment insurance. Only firms with paid employees are legally required to report to the GDOL, which means that this data source does not consider very small firms, that is, those with only self-employed or family workers.

Second, the data are at the establishment level, with unique identifiers at both the establishment and firm levels. Establishment refers to an economic unit in a single physical location. A business enterprise may be composed of multiple establishments under the same firm. The identifying scheme makes it possible to track a business enterprise over the duration of its life.

From the Georgia Department of Revenue (GDOR) we obtain confidential information about which establishments earned job tax credits in each year, as well as the number of jobs created and the credit earned and taken. This information contains a firm identifier, the county location of the firm, its industry NAIC code, the change in employment from the previous year,

and the value of the credit taken. This information is then matched by means of the firm identifier to establishment level data from the Georgia Department of Labor (DOL) ES202 files.

Data from the ES202 file provides information on the street address of each establishment and the level of establishment employment. Using the establishment street address from the ES202 file, the file was geocoded and census blocks were determined for each establishment over the 1998-2007 period. We also used the coordinates to measure the distance from the establishment's location to the county boundaries.

The ES202 files serve as the only source of information for firms that did not take the credit in a given year but still qualified based on their change in employment. While the DOR files have a variable for the change in employment for firms taking the credit, the only source for this information for the noncredit firms is from the ES202 files. For purposes of consistency we used the employment information from the ES202 files to compute the change in employment for all firms, those taking the credit and those not.

Another issue that required attention was due to a mismatch in units between the DOR firm level data and the DOL establishment level data. The DOR data is reported on an aggregate basis for each taxpayer and county combination, so that multiple establishments with a common owner in a county are counted as one entity for the purpose of qualifying for the jobs tax credit. The ES202 data is reported on an establishment level basis. To address this issue, when multiple establishments in the ES202 file were found to exist for a common owner in a given county, these establishments were aggregated and matched to the taxpayer on the DOR file. To the DOR/DOL data we added information on the tier status and annual rank of each county, as well as other significant county and firm characteristics. For instance, firms located in a county with

a joint development authority received a tax credit bonus of $500 and existing firms also received an added bonus compared to the credit received for new firms.

Tables 4, 5, and 6 provide descriptive information on the data from the establishment file.

Control Variables

Four county-level control variables are included in the dataset. The first variable is a dummy variable indicating the presence of an interstate highway passing through the county. Second is the geographic area of the county. Third we include the percent of the population that has a high school degree or higher. This variable was only available at the county level for 1990 and 2000. Therefore, we use the 1990 values for each county for years 1990-1999 and the 2000 values for each county for years 2000-2011. Our last county level control variable is county population from the U.S. Census Bureau. Table 2 provides descriptive statistics for the control variables and employment growth variables, while Table 3 provides descriptive statistics by county tier. Information on annual county tier and rank status was obtained from the Georgia Department of Community Affairs, while the values of the credits by year and tier were obtained from the state laws.

5. Empirical Results

In this section we present the results of our empirical analysis. We first discuss the results using county-level data and then the results using firm level data.

B. County Level Analysis

In this section we report on the empirical results using the growth over the period 2001 to 2011 in county employment in those industries that are eligible for the job tax credit. We also

estimated the regressions using the entire period and using the percentage change in employment; the results are not reported but are equivalent to those reported with one exception as noted below. This analysis makes use of the variation across counties and time in the inflation adjusted value of the job tax credit.

Table 7 reports the finding from linear regression equations. Regression [1] is a simple bivariate regression using the real value of the credit, *Credit*, as the only explanatory variable. The coefficient is positive and statistically significant, suggesting that the job tax credit increased employment. However, the results are very sensitive. The coefficient on *Credit* becomes insignificant if the data for the entire period is used, if years 2010 and 2011 are dropped, and if the percent change in employment is used as the dependent variable. In addition, when control variables are included, the coefficient is no longer statistically significant.

Equation [2] in Table 7 adds a set of 4 county control variables: *Interstate*, which equals one if an interstate highway runs through the county; *BA*, the percent with a BA degree or higher in 2000; *Pop*, the population of the county in 1000s in 2000; and *area*, the area of the county in square miles. The value of the control variables do not vary over time. In this regression the coefficient on *Credit* is negative but it has a very large standard error. Only *Population* has a statistically significant coefficient. No adjustment has been made for the fact that the control variables do not vary over time.

Equation [3] adds the growth in employment in industries that are not eligible for a job tax credit. This variable, *JobGrowth*, was included as a measure of the growth in employment not associated with the job tax credit, and reflects the economic conditions in the county. The coefficient on Credit is positive but again has a very large standard error. The coefficient on *JobGrowth* is positive and statistically significant. The results are equivalent if the 4 county

control variables are included, that is when *Credit* and *JobGrowth* are the only independent variables included. Equation [4] adds year dummies. The only sizable effect of adding year dummies is to reduce the magnitude of the coefficient on *Credit*.

Equation [5] is a county fixed effect regression that includes year dummies and *JobGrowth*. The coefficient on *Credit* is positive but again with a very large robust standard error. The results are equivalent if *JobGrowth* is excluded from the regression. Of the regressions reported in Table 7, equation [5] is the most appropriate, but all suffer from endogeneity.

A second approach to estimating the effect of the job tax credit on employment growth is to estimate a regression discontinuity analysis. Table 8 contains the results. As noted above, the Georgia Job Tax Credit program involves a sharp discontinuity based on the ranking of counties. There are three breaks, between counties in Tier 1 and Tier 2, between counties in Tier 2 and Tier 3 and between counties in Tier 3 and Tier 4. We consider 10 counties that are ranked just above and just below the tier break points. The variable *Treatment* equals one if the county is in the tier with the larger job tax credit. *Rank* is the rank of the county, with the worst off county being ranked 1. Equation [1] in Table 8 is the regression that compares counties in Tier 1 and Tier 2, while equations [2] and [3] compare counties in tiers 2 and 3, and tiers 3 and 4, respectively.

The coefficients on *Treatmen*t are never statistically significant, and are actually negative in equations [2] and [3]. The same is true for the coefficients on *Rank*. We experimented with alternative band widths, but the results were equivalent to those reported in Table 8. We also estimated the regressions in which the control variable are included and regressions in which

year dummies and county fixed effects are included. The results are equivalent to those reported in Table 8.

Table 9 compares counties that are close in terms of rank but are in different tiers and thus are subject to alternative values of the job tax credit. An alternative comparison is to use counties that border one another but that are in different tiers. We created a file of matched counties and calculated the difference in job growth between counties. For the independent variable we calculated the difference in the value of *Credits,* denoted *DiffCredit*. We estimated three regressions using border counties that are in tiers 1 or 2, in tiers 2 and 3, and in tiers 3 and 4, respectively. The results, which are presented in Table 9, are mixed. In equations [1] and [2] the coefficients on *DiffCredit* are negative and statistically insignificant, while a positive coefficient would have been expected if the job tax credit affect job growth. In equation [3], the coefficient on *DiffCredit* is negative and is actually statistically significant.

The results presented in tables 7, 8, and 9 do not provide support for the hypothesis that Georgia's job tax credit program has a positive effect on job growth. A more refined analysis is presented next in which we use firm level data.

Establishment Level Results

THE RESULTS FOR THE ESTABLISHMENT LEVEL ANALYSIS ARE FORTHCOMING.

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Table 1. JTC Amounts and Minimum Job Creation for Eligibility				
Tax Years	**Tier 1 Counties**	**Tier 2 Counties**	**Tier 3 Counties**	**Tier 4 Counties**
1991	Counties: 40 Jobs: 10 Credit: $1000	Not Eligible	Not Eligible	Not Eligible
1992	Counties: 40 Jobs: 10 Credit: $1000	Not Eligible	Not Eligible	Not Eligible
1993	Counties: 40 Jobs: 10 Credit: $2000	Counties: 40 Jobs: 10 Credit: $1000	Not Eligible	Not Eligible
1994	Counties: 53 Jobs: 10 Credit: $2500	Counties: 53 Jobs: 25 Credit: $1500	Counties: 53 Jobs: 50 Credit: $500	Not Eligible
1995	Counties: 53 Jobs: 10 Credit: $2500	Counties: 53 Jobs: 25 Credit: $1500	Counties: 53 Jobs: 50 Credit: $500	Not Eligible
1996	Counties: 53 Jobs: 5 Credit: $2500	Counties: 53 Jobs: 15 Credit: $1500	Counties: 53 Jobs: 25 Credit: $500	Not Eligible
1997	Counties: 53 Jobs: 5 Credit: $2500	Counties: 53 Jobs: 15 Credit: $1500	Counties: 53 Jobs: 25 Credit: $500	Not Eligible
1998	Counties: 53 Jobs: 5 Credit: $2500	Counties: 53 Jobs: 15 Credit: $1500	Counties: 53 Jobs: 25 Credit: $500	Not Eligible
1999	Counties: 53 Jobs: 5 Credit: $2500	Counties: 53 Jobs: 15 Credit: $1500	Counties: 53 Jobs: 25 Credit: $500	Not Eligible
2000	Counties: 53 Jobs: 5 Credit: $2500	Counties: 53 Jobs: 15 Credit: $1500	Counties: 53 Jobs: 25 Credit: $500	Not Eligible
2001	Counties:71 Jobs: 5 Credit: $3500	Counties:35 Jobs: 10 Credit: $2500	Counties:35 Jobs: 15 Credit: $1250	Counties:18 Jobs: 25 Credit: $750
2002	Counties:71 Jobs: 5 Credit: $3500	Counties:35 Jobs: 10 Credit: $2500	Counties:35 Jobs: 15 Credit: $1250	Counties:18 Jobs: 25 Credit: $750

2003	Counties:71 Jobs: 5 Credit: $3500	Counties:35 Jobs: 10 Credit: $2500	Counties:35 Jobs: 15 Credit: $1250	Counties:18 Jobs: 25 Credit: $750
2004	Counties:71 Jobs: 5 Credit: $3500	Counties:35 Jobs: 10 Credit: $2500	Counties:35 Jobs: 15 Credit: $1250	Counties:18 Jobs: 25 Credit: $750
2005	Counties:71 Jobs: 5 Credit: $3500	Counties:35 Jobs: 10 Credit: $2500	Counties:35 Jobs: 15 Credit: $1250	Counties:18 Jobs: 25 Credit: $750
2006	Counties:71 Jobs: 5 Credit: $3500	Counties:35 Jobs: 10 Credit: $2500	Counties:35 Jobs: 15 Credit: $1250	Counties:18 Jobs: 25 Credit: $750
2007	Counties:71 Jobs: 5 Credit: $3500	Counties:35 Jobs: 10 Credit: $2500	Counties:35 Jobs: 15 Credit: $1250	Counties:18 Jobs: 25 Credit: $750
2008	Counties:71 Jobs: 5 Credit: $3500	Counties:35 Jobs: 10 Credit: $2500	Counties:35 Jobs: 15 Credit: $1250	Counties:18 Jobs: 25 Credit: $750
2009	Counties:71 Jobs: 5 Credit: $3500	Counties:35 Jobs: 10 Credit: $2500	Counties:35 Jobs: 15 Credit: $1250	Counties:18 Jobs: 25 Credit: $750
2010	Counties:71 Jobs: 5 Credit: $3500	Counties:35 Jobs: 10 Credit: $2500	Counties:35 Jobs: 15 Credit: $1250	Counties:18 Jobs: 25 Credit: $750
2011	Counties:71 Jobs: 5 Credit: $3500	Counties:35 Jobs: 10 Credit: $2500	Counties:35 Jobs: 15 Credit: $1250	Counties:18 Jobs: 25 Credit: $750

Table 2. County Level Descriptive Statistics

Variable	# of obs.	Minimum	Maximum	Mean	Standard Deviation
Year	3,498	1990	2011	2001	6
Total Employment	3,498	0	673,221	18,396	58,636
County Population	3,498	1,699	1,033,756	51,789	110,404
County Area	3,498	121	906	374	158
Interstate dummy	3,498	0.00	1.00	0.40	0.49
Value of Tier Credit	2,703	500	3,500	2,132	1,091
Percent of Population with BA Degree,2000	3,498	5.40	41.40	13.98	7.23
Percent of Population with BA degree,1990	3,498	4.20	37.50	10.95	5.68
Total qualified employment	3,088	0	389,514	11,028	35,670
Total nonqualified employment	2,492	113	243,604	10,411	25,263

Table 3. Means by County Tier Status

	Tier 1	Tier 2	Tier 3	Tier 4
Number of Observations	1,103	700	702	198
Total Employment	4,247	14,532	39,604	48,948
County Population	17,056	41,345	98,660	153,124
County Area	403	361	354	327
Interstate dummy	0.22	0.42	0.60	0.62
Value of Tier Credit	3,212	2,046	910	750
Percent of Population with BA degree, 2000	10.20	12.97	17.95	24.60
Percent of Population with BA Degree,1990	8.48	10.52	13.54	16.99
Total qualified employment	2,251	7,375	20,939	26,020
Total nonqualified employment	2,577	9,200	18,601	20,906

Table 4. Descriptive Statistics for Firms taking the Jobs Tax Credit, 1998-2007

Variable	# of Obs	Minimum	Maximum	Mean	Sum
Old/New Firm Dummy	1478	0	1	0.77	1,139
Total Firm Level Wage	1477	17,431	602,805,732	13,087,491	19,330,224,293
Total Firm Level Employment	1478	0	6,105	307	453,038
Total Firm Employment change from prior year (DOL Data)	1478	-336	1,232	33	49,328
Tier Status of Counties	1474	1	4	2	3,299
Tier Credit Value	1474	500	3,500	1,961	2,891,250
Jobs Created (DOR Data)	1477	-338	1,858	31	45,375
Credit Taken	1478	0	4,074,812	127,807	188,899,067

Table 5. Distribution of Credits across County Tiers

Tier of County	# of Observations	Percent of Total
Tier 1	460	31.2%
Tier 2	355	24.1%
Tier 3	507	34.4%
Tier 4	152	10.3%

Table 6. Distribution of Credit Firms by Existing and New Firms

New or Existing Firms	# of Observations	Percent of Total
New	339	23.9%
Existing	1139	77.1%

Table 7. The Effect of Job Tax Credit on County Employment in Qualified Industries (standard errors in parentheses)

Variables	[1]	[2]	[3]	[4]	[5][#]
Credit	16.70**	-1.06	3.64	1.57	36.55
	(7.47)	(9.06)	(8.77)	(8.67)	(41.05)
Interstate		98.89	99.93	91.65	
		(89.30)	(86.68)	(84.66)	
BA		13.32	8.74	8.01	
		(8.69)	(8.38)	(8.21)	
Population		-3.74***	-3.34	-3.33	
		(0.45)	(0.43)	(0.42)	
Area		0.15	0.06	0.07	
		(0.26)	(0.26)	(0.25)	
JobGrowth			0.41***	0.38***	0.38
			(0.03)	(0.03)	(0.31)
Year dummies	No	No	No	Yes	Yes
County fixed effects	No	No	No	No	Yes
Constant	-340.41	-175.32	-174.14	-400.15	-890.78
	(103.13)	(221.79)	(215.78)	(248.47)	(581.02)
R^2	0.003	0.060	0.153	0.198	0.146
N	1542	1542	1510	1510	1510

[#]Robust standard errors. * $p \leq 0.01$; ** $p \leq 0.05$; ***$p \leq 0.10$

Table 8. Regression Discontinuity Analysis (standard errors in parentheses)

Variable	[1]	[2]	[3]
Treatment	102.30	-205.10	-427.02
	(122.37)	(516.93)	(622.96)
Rank	6.67	-47.12	-53.94
	(9.71)	(40.91)	(48.57)
Constant	-645.88	4837.99	7770.00
	(748.24)	(4623.86)	(7193.16)
R^2	0.002	0.008	0.004
N	333	362	359

Table 9. Employment Growth Across Border Counties (standard errors in parentheses)

	Border Counties		
	[1]	[2]	[3]
Variables	Tiers 1 & 2	Tiers 2 & 3	Tiers 3 & 4
DiffCredit	-154.82	-46.40	-5136.42***
	(109.92)	(452.08)	(1887.00)
Constant	807.67	666.81	12543.43***
	(568.76)	(2901.02)	(4878.57)
R^2	0.003	0.000	0.020
N	649	452	359

* $p \leq 0.01$; ** $p \leq 0.05$; ***$p \leq 0.10$