

Does the Earned Income Tax Credit Birth New Establishments?

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Abstract

Entrepreneurship is a key driver of regional economies, associated with increased knowledge spillovers and innovation. One of the most important aspects of entrepreneurship is its role in job creation and employment growth. The transition from a non-employer to an employer is a significant decision for the entrepreneur, as hiring the first employee is often harder than hiring subsequent employees given the fixed costs of becoming an employer. The Earned Income Tax Credit (EITC), a benefit for working low-income individuals, may be one policy that may impact the job creation aspects of entrepreneurship. While the main beneficiary is the recipient of the credit, employers are able to capture some of the surplus by paying lower wages. The wage savings from the EITC may influence the decision to open, expand, contract, and shutdown. Using a contiguous cross-border county analysis, I find that the difference in the number of establishment births (hiring of the first employee), and expansions significantly decreases between counties with a state EITC policy and their cross-border counterpart without such a policy, upon implementation of the tax credit. These results hold both for differences in the existence of the policy and differences in the generosity of the policy. These effects are particularly strong in rural counties where labor markets are relatively thinner in comparison to more populous counties. These results suggest a trade-off between the increased labor supply effects of the EITC and decreased labor demand, a feature which should be considered when deciding to implement or expand the Earned Income Tax Credit.

1 Introduction

Regional economics has long recognized geographical differences in economic outcomes. This has not been of much concern due to the mobility of people and capital. Historically, individuals would migrate from low wage areas to high wage areas in search of better jobs and pay. This would increase the competition for jobs, applying downward pressure on wages. At the same time capital would flow to low wage areas, increasing the opportunities for job seekers. These dynamics caused regional economies to converge. However, regional convergence has slowed highlighting the need for policies to help the economically lagging regions (Austin, Glaeser, and Summers 2018). The Earned Income Tax Credit is one such policy that has been suggested as a solution.

The Earned Income Tax Credit (EITC) is one of the largest cash transfer programs in the United States. Primarily targeted at low income working people, the EITC is designed to supplement their incomes while encouraging work. Beginning in the 1980s states implemented their own versions of the EITC to supplement the federal credit. Due to its work requirement, the Earned Income Tax Credit has been suggested as a policy to help economically lagging regions. In order for this to be an effective solution, the increase in labor supply from the introduction of the tax credits needs to also be met with an increase in labor demand.

In this paper, I answer whether state level Earned Income Tax Credits causes new firms to be born. I also examine if the Earned Income Tax Credits also influences other firm decisions including the decision to expand, contract, or close. The Earned Income Tax Credit may impact these decisions since firms are able to capture some of the surplus of the credit by paying their employees lower wages (Rothstein 2010; Leigh 2010). Firms may decide to locate in states with a state EITC policy in order to lower their wage bill by capturing more of the surplus from the Earned Income Tax Credit. Lower employment costs may have other advantages as well. Firms may be more likely to hire more workers since the marginal cost of an additional worker is lower in the presence of the state credit. This may also cause firms to be less likely to layoff workers or close down.

This work extends the literature in three important ways. First, I examine how the Earned Income Tax Credit impacts the establishment's decisions to open. The majority of the work studying the impacts of the policy focuses on its impacts on individuals; either the recipient or their offspring. I first use a panel of all counties in the United States to test whether counties in states with an EITC policy experience more establishment births than counties in states without such a policy. I do not find any significant effects for both the existence of the policy and the generosity of the policies for establishment births. I then use a sample of contiguous cross-border counties because if the marginal establishment birth is influenced the state EITC policies then any difference in outcomes will most likely occur in counties that are more similar, where the only meaningful difference is the EITC policy. Using this sample of counties, I find that the existence of the Earned Income Tax Credit significantly reduces the difference in the number of establishment births between counties with the policy and those without.

Second, this paper investigates how state Earned Income Tax Credit policies impact other business decisions. Specifically it extends the analysis to examine how the EITC impacts establishment deaths, employment expansions, and employment contractions. Given that employers are able to capture some of the surplus from the tax credit, this is likely to affect existing establishments as well. These effects will show up in the decision to expand or contract employment or ultimately shutdown. Using the same methodology as before, I find that the EITC reduces the difference in the number of establishments that expand employment between counties with the policy and their cross-border counterpart that does not. I do not find evidence that the EITC significantly impacts the difference in the number of establishment deaths or establishment contractions.

Finally, I analyze whether the effects of state EITC policies are the same for metropolitan, micropolitan, and rural counties. This is important because rural areas on average display higher and more persistent rates of poverty, so the Earned Income Tax Credit policies may be more salient in these areas for individuals and establishments. Also, The effect of these policies may be different across the different types of counties because of their densities and agglomeration economies. When testing heterogeneous effects of the EITC policies for these classifications of counties, I find that the cross-border county results are driven mainly by the micropolitan and rural counties. There is not a significant difference between cross-border metropolitan counties with the tax credit and without.

The rest of the paper proceeds as follows. Section 2 reviews the relevant literature. Section 3 presents a simple theoretical model to motivate the empirics. Section 4 describes data sources and the construction of the samples. Section 5 outlines the empirical methodology. Section 6 presents the main results of the paper, including potential mechanisms and Section 7 concludes.

2 Previous Literature

This work builds on and contributes to several strands of literature. First, my results contribute to the literature on the effects of the Earned Income Tax Credit. Many studies have focused on the labor supply effects of the EITC. Eissa and Liebman (1996) find that the expansion of the federal credit in 1987 increased the labor force participation of single mothers relative to single women without children. Given the structure of the EITC single women already in the labor force should, according to theory, decrease their work hours to increase their total earnings from wages and the credit, but no such effect is found (Eissa and Liebman 1996). Others have found that over 60% of the increase in the weekly and annual employment of single mothers from 1984-1996 can be attributed to the EITC and other tax changes from this time period (Meyer and Rosenbaum 2001). Using all federal and state expansions, Schanzenbach et al. (2020) find that the EITC does increase the extensive margin of labor supply. Most of these effects are for contemporaneous changes in the EITC, but the EITC has long term effects on the labor market outcomes of women as well. A more generous EITC leads to higher cumulative earnings and greater labor market experience for unmarried mothers with children in the long term (Neumark and Shirley 2020). However, when children are too old to count as a qualifying child for the credit, women, who would likely qualify for the credit, decrease their labor force participation by 3.3-8% compared to women who still have qualifying children (Moulton, Graddy-Reed, and Lanahan 2016). Combined, these studies suggest that the EITC is an important factor in determining who is in the labor force and how large it is, which could be an important determining factor for where an establishment decides to open.

While most of the the research on the Earned Income Tax Credit has focused on the labor supply decisions of individuals, there has been some research on its effect on business. Individuals can satisfy the work requirement through becoming self-employed and forming their

own business. Earned Income Tax Credit expansions increase the likelihood that individuals report self-employment income (LaLumia 2009). Saez (2010) also finds that individuals increase their reported self-employment income in order to maximize amount of the EITC they receive, and this behavior increases in areas with higher concentrations of EITC filers (Chetty, Friedman, and Saez 2013). The self-employment effects for the EITC are important for this study because areas with higher entrepreneurship are associated with more dynamic economies (Bunten et al. 2015) and more establishment births.

Rothstein (2010) and Leigh (2010) both focus on employer firms and find that the EITC affects those firms as well. Employers are able to capture 55% of the marginal dollar given to single mothers in the form of reduced wages (Rothstein 2010). The EITC not only lowers the wages of workers most likely to qualify for the EITC but also those who are ineligible for the credit as well (Rothstein 2010). Using state EITC policies, Leigh (2010) finds that a 10 percentage point increase in the generosity of the policies is associated with a 5 percent fall in hourly wages of high school dropouts and a 2 percent decrease for those with a high school diploma, and these results hold for both workers who qualify and for the credit and those who do not. These results are important because if firms are able to lower their wage bill by capturing a portion of the surplus from the EITC then firms may be more likely to locate in areas with such a policy.

Second, I contribute to the literature on the effect of local characteristics on firm location. The prevalence of unionization and high local taxes reduces the amount of business that locate in a state (Bartik 1985; Holmes 1998; Guimaraes, Figueiredo, and Woodward 2004; Duranton, Gobillon, and Overman 2011). Different organizational structures of firms react differently to corporate tax rates. A 1 percentage point increase in the corporate tax rate reduces the number of openings by 0.5 percent and a decrease of 0.4 percent for S-corporations (Giroud and Rauh 2019). The effects of local corporate taxes can be mitigated though; agglomeration economies lessen the impact of taxes on firm location decision (Brühlhart, Jametti, and Schmidheiny 2012). Research and development spending at universities also create externalities that increase the number of manufacturing births (Woodward, Figueiredo, and Guimarães 2006). The Earned Income Tax Credit could be another determining local factor for where businesses establish themselves.

Third, this paper also contributes to the literature on place-based policies. The conventional spatial equilibrium model finds that place-based policies are distortionary since factors of production are perfectly mobile and land and labor markets are perfectly competitive. Thus, place-based policies tend to favor landowners and new migrants (Bartik 1991). For these reasons economists have argued against using geographically targeted policies (Glaeser and Gottlieb 2008). People are not as mobile as originally thought, however, suggesting that place-based policies may be an effective tool for helping struggling regions (Partridge et al. 2015). Austin, Glaeser, and Summers (2018) provide evidence that the economic convergence between regions is slowing, and that the rate of non-working has nearly tripled for prime-aged men in the last 50 years. As a remedy, they point to place-based policies and a focused EITC as one of the potential solutions. Place-based policies have also been shown

to be effective in increasing employment (Bartik 2020; Ku, Schönberg, and Schreiner 2020). This work will test whether state Earned Income Tax Credit policies are an effective policy to increase local labor demand.

3 Theoretical Model

This section presents a simple theoretical model to motivate the empirical analysis and clarify how the Earned Income Tax Credit can influence the business decisions of entrepreneurs. I build upon and adapt the theoretical model in Holmes 1998 to the current research question. This model helps reinforce the decision to focus on the difference in state EITC policies at the borders. This model is also flexible enough to include other policy considerations which may help explain the empirical results.

As in Holmes 1998, the economy is modeled as a line segment with different locations indexed by $y \in [-1, 1]$. For simplicity there are only two states in the economy and $y = 0$ is the border between them. Locations $y \leq 0$ are in *state A* and locations $y > 0$ are in *state B*. *State A* is a state that has a state-level Earned Income Tax Credit and the policy is absent in *state B*. Further, assume that initially potential entrepreneurs are uniformly distributed along the line segment before starting their business and should an entrepreneur undertake their project they will hire a low-wage employee.

The potential entrepreneur is faced with three options: they can set up their business at their initial location y , they can choose to not set up their business, or they can move and set up their business in a new location. Let q be the productivity of the entrepreneur which will equal the amount of the final goods and services produced should the entrepreneur start their business and hire a low-wage employee. q is uniformly distributed on the unit interval and is independent of location. Let the workers be perfectly homogeneous and mobile, and are paid the competitive wage, w , which is constant across locations.

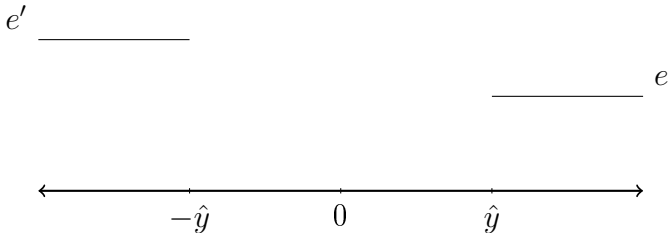
If the entrepreneur decides to under take their project in *state B*, their profit equals their productivity less the competitive wage w : $\pi_B = q - w$. If an entrepreneur decides to begin a business in *state A*, the entrepreneur receives a wage subsidy, s . The wage subsidy come from the surplus that employers are able to capture from the state EITC policy that exists in *A*, but is absent in *B*. Profit becomes $\pi_A = q - (w - s)$ less any moving costs.

As previously mentioned, one of the choices the entrepreneur can make is to move and set up their business in a new location. With probability p an entrepreneur is initially located at some location $y > 0$ in *state B* has an alternate location $y' < 0$ in *state A*. Given that there is an alternative for the entrepreneur to move, assume this location is drawn from a uniform distribution over the set of locations in *state A*, $y \in [-1, 0]$. Let the cost of moving be a function of the distance traveled from y to y' such that the cost is equal to $t \times (|y - y'|)$. This implies that the farther one moves from their initial location the higher the cost. This formulation also prohibits the entrepreneurs from moving to $y' = 0$ to minimize their moving

costs. The initial location may have specific features that do not exist at the border of A but do exist at a more interior location.

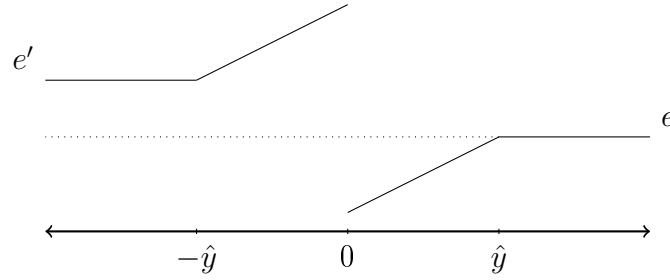
The number of entrepreneurs at any location y is the number of entrepreneurs who choose to set up their business at their initial location plus any entrepreneurs who move to y to open their business. There exists a critical distance, \hat{y} such that it does not make economic sense for the entrepreneur to move. This distance is defined as $t\hat{y} \equiv s$. At this point the cost of moving locations is greater than the subsidy captured from the state EITC policy. This means that locations $y > \hat{y}$ in *state B* are too far from the border and it never would be worth moving locations. The entrepreneurs at these locations have a productivity level $q > w$. Let the number of entrepreneurs at these locations be denoted e . Similarly, in *state A* there are locations that are too far from the border to which it does not make economic sense for entrepreneurs to move: $y < -\hat{y}$. Let the number of entrepreneurs located at these locations be equal to e' and $e' > e$ since the wage subsidy from *state A's* EITC policy lowers the level productivity required to undertake an entrepreneurial endeavor. This is illustrated in Figure 1.

Figure 1: Level of Entrepreneurship away from the Border



Now consider locations $y \in (0, \hat{y})$. Entrepreneurs in this region may be lucky enough to obtain locations where $t \times (|y - y'|) < s$ thus moving does make economic sense. The lower y is the higher the likelihood that there is a location in A to which it is worth moving. Based on this increased probability the number of entrepreneurs near the border in *state B* is lower than the number of entrepreneurs in *state A* near the border. Right at the border where there is a change in state EITC policies, there is a discontinuous jump in the number of entrepreneurs. As y continues to decrease and moves further towards the interior of A , the number of entrepreneurs decreases because as you move farther from the border the number of entrepreneurs willing to pay the moving costs decreases. This dynamic is demonstrated in Figure 2.

Figure 2: Entrepreneurship Dynamics at State Border



Let the status quo be the case where neither state has an EITC policy. In this case, the number of entrepreneurs will be equal to e at all locations in both states. This is illustrated by the dotted line in Figure 2. After the initial period, *state A* decides to implement an EITC policy. This increases the number of entrepreneurs at all locations in *A* because the entrepreneurs are able to subsidize their wage bill by capturing some of the EITC surplus. Away from the border the increase in the number of entrepreneurs is not as large as near the border because those locations are too far for entrepreneurs to move. At the border, the subsidy attracts entrepreneurs with locations in *state B* that are closer to the border than the critical distance \hat{y} . This result provides the motivation for the empirical analysis to focus on the effects of the EITC near the state border.

It is also possible for the EITC to have different effects on entrepreneurship. Given that the EITC is designed to be a benefit for the individual, the savings on wages may not be the most salient feature of the policy for entrepreneurs. The state credits may be funded at least in part by increases to the corporate tax rate. This tax rate increase may be more salient for entrepreneurs or the tax may dominate the wage subsidy. This model can be adapted to account for these possibilities.

Suppose that in the absence of the EITC in *state A*, both states have the same corporate tax rate. In this initial state the number of entrepreneurs is the same as before, e . Now, when *A* enacts the EITC policy it also increases the corporate tax, τ , to help fund the benefit. The profit function for entrepreneurs in *state A* becomes: $\pi_A = q - (w - s) - \tau$ less any potential moving costs. From this there are two possible outcomes depending on the magnitude of the tax.

If the tax is less than the wage subsidy entrepreneurs are able to capture from the EITC surplus, then the outcome is similar to scenario without the tax. There is some critical distance, \tilde{y} , such that it does not make economic sense for the entrepreneur to move. This distance is defined as $t\tilde{y} \equiv s - \tau$. At this point locations in *B* where $y > \tilde{y}$ are too far from the border to move. The entrepreneurs at this location still have a productivity level $q > w$ and the number of entrepreneurs is e . This is the same level as the no-tax situation because the conditions on this side of the border have not changed. However, notice that the new critical distance is closer to the border because the amount of the surplus entrepreneurs are able to capture is small when $s > \tau$. On the opposite side of the border, there are locations

that are too far from the border for it to make moving worthwhile: $y < \tilde{y}$. The number of entrepreneurs here is equal to e'' . This is greater than e because the subsidy is greater than the tax still making the required productivity level for success lower. The existence of the tax, however, makes it less than e' in the no-tax situation. Locations $y \in (0, \tilde{y})$ may have entrepreneurs where $t \times (|y - y'|) < s - \tau$ and moving makes economic sense.

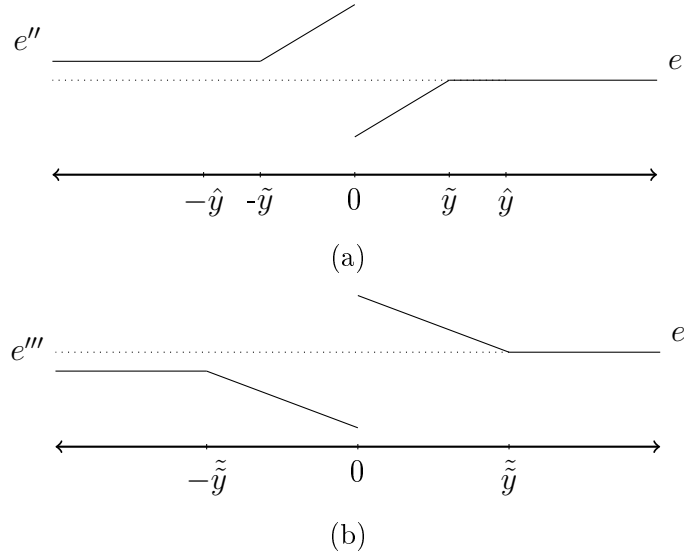
The status quo case where neither state has an EITC policy is the same as the no-tax status quo. The number of entrepreneurs is e on both sides of the border and is denoted by the dotted line in Figure 3. Now, *state A* enacts the EITC and the corporate tax to pay for the credit. This will increase the number of entrepreneurs in *A* at all locations because they are still able to capture some of the surplus in the form of lower wages. Near the border there is a decrease in the number of entrepreneurs in *state B* because some decide to move to capture some of the EITC surplus, which causes the number of entrepreneurs near the border in *A* to increase. This is illustrated in panel (a) of Figure 3.

The second case is when $\tau > s$. Here the subsidy is dominated by the increase in the corporate tax rate. In this scenario the entrepreneur's profits after policy implementation in *state A* is $\pi_A = q - (w - s) - \tau$ but this is lower than the profits for entrepreneurs in *B* without the policies: $\pi_B = q - w$ less any potential moving costs. Now there is some critical distance, \tilde{y} , for which it does not make sense for entrepreneurs in *A* to move to *B*. Let this be defined as $\tilde{y} \equiv \tau$. Entrepreneurs at locations $y < -\tilde{y}$ are too far from the border to move to avoid the corporate tax. The number of entrepreneurs at this location is equal to the number of entrepreneurs that have a productivity level $q > (w - s) + \tau$, denoted e''' . Similarly, in *B* there are locations that are too far from the border to which entrepreneurs can move, $y > \tilde{y}$. The number of entrepreneurs at this location is still equal to e . Since the productivity threshold in *B* (w) is lower than the productivity threshold in *A* ($(w - s) + \tau$) this implies that $e > e'''$. Entrepreneurs in the region $y \in (-\tilde{y}, 0)$ may be lucky enough to have locations worth moving to. Again the closer y is to 0 the greater the likelihood the entrepreneur has a location worth moving to. This accounts for the decrease in entrepreneurs the closer y is to 0. As one crosses the border into *B*, there is a jump in the number of entrepreneurs near the border that decrease as y increases.

The status quo case without the EITC or the tax remains the same as in the other scenarios and is represented by the dotted line in panel (b) of Figure 3. After enacting the EITC and tax policy, the number of entrepreneurs decreases in *state A* as they react to the tax being greater than the subsidy. This effect is small far from the border, but there is a large effect near the border driven by the entrepreneurs who are able to make a small move just over the border into *B* to avoid the tax increase. The effect of *state A* increasing corporate taxes fizzles out away from the border.

There is another possible outcome for the effect of the EITC policy being different than in Figure 2. Since the EITC is designed as a benefit for low-income individuals, the policy may not be salient to the entrepreneur. If the EITC is not salient and the credit is not funded by a corporate tax increase, then the result of the model is the status quo case with the

Figure 3: Entrepreneurship Dynamics at State Border with Tax



number of entrepreneurs equal to e in both states. If the credit is funded by a corporate tax increase, but the credit is not salient, then the outcome is panel (b) of Figure 3 regardless of the tax's magnitude.

In the empirical model, I test whether the state Earned Income Tax Credit policies impacts the business decisions of entrepreneurs located near the state border. I pay special attention to employer entrepreneurs and their decision to open a new establishment (an establishment birth) or to expand their employment at an existing establishment. Establishment births are of particular interest because a new establishment is considered as being born when the entrepreneur hires their first employee. The transition from a non-employer to an employer is a significant decision for the entrepreneur, as hiring the first employee is often harder than hiring subsequent employees given the fixed costs of becoming an employer. The subsidizing effect of the EITC may lower the barrier to becoming an employer. Establishment expansions may be similarly affected by the policy since the wages of new employees may also be subsidized after the implementation of the policy.

Based on this model, the main determining factor in whether the EITC increases the number of hires (either first or subsequent) is the magnitude of the subsidy relative to the tax. If the wage subsidy is larger than the tax then there should be more establishment births and expansions in the the state with the EITC policy relative to its cross-border counterpart without the policy. If the tax is greater than the subsidy, or if the tax is more salient, then there will be fewer establishment births and expansions in the state with the EITC relative to the neighboring state without.

4 Data and Sample Construction

This study is built on making comparisons between local economic areas that are contiguous and similar but differ in the existence of a state Earned Income Tax Credit policy. Since I am interested in these policies' effects on the decision of where a business opens, I utilize data from the U.S. Census Bureau's Statistics of U.S. Businesses Employment Change Tables for my main outcome of interest: establishment births. These data contain information on the number of existing establishments, establishment births, establishment deaths, establishment expansions, and establishment contractions. Establishment births are a useful metric for measuring the impact of the EITC on labor demand and new business formation. An establishment is counted as being born when it hires its first employee. If state EITC policies are an effective way to increase local labor demand, then this will appear in the number of establishment births in a county.

The other primary source of data needed for this work is on state EITC policies. This comes from the Tax Policy Center. These data contains information on which states have enacted state Earned Income Tax Credit policies, when the policies were enacted, and how generous each state's policy is represented as a percentage of the federal credit. These data combined with the data on establishment births, allow me to identify the effect of the Earned Income Tax Credit on establishment births.

I use three different panels of counties: one that includes all counties, one that includes all contiguous border county-pairs, and a sample of contiguous border county-pairs where one county enacts the EITC and the other never enacts an EITC policy during the sample period. The construction of the second and third panels will be discussed in more detail. The first panel uses all counties in the contiguous United States over the years 2001 to 2015 for a total of 46,134 observations. This provides a baseline set of estimates for the effect of the Earned Income Tax Credit on establishment births. It is possible that there are unobserved factors associated with a county that partially determine an establishment's decision to open in a particular location. While some of these factors can be controlled for through the inclusion of county and year fixed effects, some unobserved factors still remain. Also, this sample implicitly assumes that one county in the United States is just as good as any other. Instead of weighing all options equally for where to open a new establishment, decision makers generally target areas that are attractive for their business instead of deciding between all possible options. The use of the cross-border county sample solves some of these issues.

By using the cross-border county sample I can better solve the outlined problems of the all county sample. The use of this sample is allows to control for more unobservable characteristics of the counties than by just using county and year fixed effects with the all county sample. There are economic and cultural ties between counties which may impact the decision to open. By focusing on the subset of counties that share a state border, I am able to control for these unobserved factors. This sample also improves on the all county sample by the fact that a county is more similar to its cross-border counterpart than a randomly chosen county both in observable and unobservable features. Assuming that the decision maker is

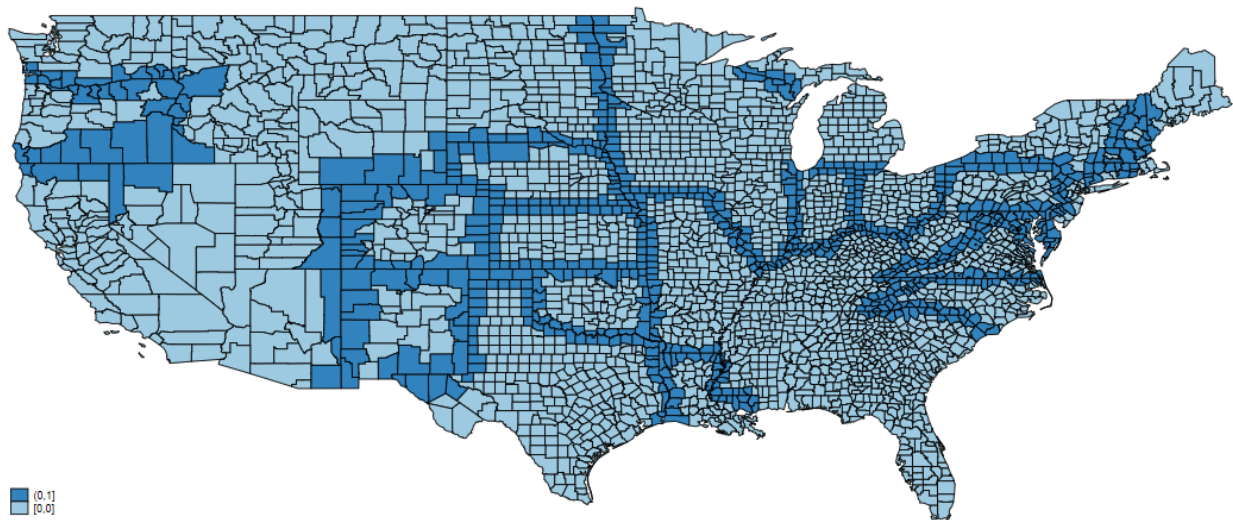


Figure 4: Contiguous Cross-Border Counties with a difference in state EITC policy existence

targeting an area, the cross-border county sample contains pairs of counties that are similar with a sharp policy change at the border. This allows for a more precise estimation of the effect of the Earned Income Tax Credit on establishment births.

The all cross-border county sample consists of all counties that neighbor each other across a state border. The other cross-border county sample starts the same as the all border county sample but only keeps the county-pairs where one of the states has a state Earned Income Tax Credit policy and the other state does not. There are 1,139 counties in the United States that lie along a state border, and of these counties there are 750 counties that have are along state borders with a difference in the existence of state EITC policies at some point in the observational period. Since counties are not uniform in size, it is possible for counties to share a state border with multiple counties. I consider all cross-border county pairs, so an individual county will show up in the sample as many times as it has cross-border neighbors.

Table 1 provides the descriptive statistics for the two samples. Comparing the samples, I find that the two sets of counties are similar to each other across most of the outcomes and controls. The similarity between the two samples suggests that I am able to control for the aforementioned unobserved factors, such as economic relationships between counties, without losing generality.

5 Empirical Methodology

To establish a baseline, I use first estimate the effect of state Earned Income Tax Credit policies on establishment births using the sample of all counties in the contiguous United States. I estimate:

Table 1: Summary Statistics for All Counties and Border Counties

VARIABLES	(1)	(2)	(3)	(4)
	All County mean	sd	Border Counties mean	sd
State EITC Indicator	0.371	0.483	0.486	0.500
State EITC	5.571	10.02	6.102	8.735
Est. Births per 1k	2.048	1.087	2.005	0.942
Est. Expansions per 1k	5.411	2.042	5.494	1.893
Est. Deaths per 1k	2.036	0.974	2.035	0.867
Est. Contractions per 1k	5.374	1.986	5.490	1.825
Non-Employers 1k	67.09	19.81	65.09	17.87
Unemployment Rate	6.503	2.746	6.330	2.642
Existing Establishments	2,055	6,806	1,934	4,844
Med. January Temp.	43.14	13.16	41.27	10.24
Minimum Wage	6.210	1.265	6.266	1.326
Per Capita Income	26,584	7,217	27,098	7,017
Population Density	242.6	1,732	211.7	793.7
State CIT	6.037	2.974	6.389	2.773

Sample means reported for counties over the period 2001-2015

$$Y_{it} = \beta_0 + \beta_1 EITC_{it} + X_{it}\Gamma + \eta_i + \tau_t + \epsilon_{it} \quad (1)$$

where i indexes the counties and t indexes the years. Y_{it} is the outcome of interest. These outcomes include establishment births per person, establishment deaths per person, establishment expansions per person, and establishment contractions per person. Since existing establishments are also able to capture a portion of the EITC surplus, I also test whether the EITC affects these outcomes which are more relevant for existing establishments.

I examine both the extensive and the intensive margin of the state Earned Income Tax Credit policies. Depending on the regression $EITC_{it}$ is either an indicator for whether a county is in a state with an EITC policy, or it is the the generosity of the state policy represented as a percentage of the federal credit. This allows for the observation of whether the outcomes are affected by just the existence of the state policy or by how generous the policy is.

X_{it} is a matrix of controls. This includes the number of existing establishments, unemployment rate, the minimum wage, per capita income, concentration of professional, scientific and technical services employment, population density, state corporate income tax, and median January temperatures. These variables are used as controls to be consistent with the literature on firm location (Bartik 1985; Guimaraes, Figueiredo, and Woodward 2004; Buntten et al. 2015). I also include county and year fixed effects. The county fixed effects, η_i , control for time-invariant differences across counties such as political ideology and industrial make-up that may affect the outcomes of interest. Year fixed effects, τ_t , are also included to capture national economic conditions that may also affect the outcomes.

Since my model has some limitations. It implicitly assumes that one county in the United States is as good as any other county, and there are still some unobservable factors that remain even after including county and year fixed effects, I estimate an alternative model the just uses the contiguous cross-border counties that lie along a state border where at some point in the sample period, one state had an EITC policy and the other did not. The use of this sample of counties allows for better comparisons since border counties are more similar to each other than to a random county in the United States. Since businesses do not decide over the full set of counties when determining where to open an establishment, this approach better replicates their decision making process.

In the contiguous cross-border county sample, each county is paired with its neighboring county across the state border. Given that these counties are both geographically and economically related, there are going to be unobserved factors that will affect both counties. These unobserved factors are a potential source of bias. These unobserved factors can be eliminated by differences the differencing the data across the border. Let i denote a county in a state with an EITC policy and j denote county i 's cross-border county neighbor and let p denote the pair. Then each county's relationship of EITC to establishment outcomes can be modeled as:

$$Y_{it} = \alpha + \theta_i + \beta EITC_{it} + \lambda_p t + \delta X_{it} + \epsilon_{it} \quad (2)$$

$$Y_{jt} = \alpha + \theta_j + \beta EITC_{jt} + \lambda_p t + \delta X_{jt} + \epsilon_{jt} \quad (3)$$

θ are the unobserved time-invariant county characteristics, X are the same controls as in the all county sample, and $EITC$ is again either an indicator representing if the county is in a state with an EITC policy or not or the generosity of the policy. $\lambda_p t$ is the pair specific time-varying unobserved factors. By subtracting (3) from (2) these unobserved factors can be eliminated.

$$\Delta_t^p Y_{ipt} = \Delta^p \theta_{ip} + \beta \Delta_t^p EITC_{ipt} + \delta \Delta_t^p X_{ipt} + \Delta_t^p \epsilon_{ipt} \quad (4)$$

There still exists pair specific time-invariant unobserved factors in Equation 4. I include pair fixed effects to capture these factors as well as year fixed effects to again capture economic trends that affect all county pairs. The final estimated equation becomes:

$$\Delta_t^p Y_{ipt} = \beta \Delta_t^p EITC_{ipt} + \delta \Delta_t^p X_{ipt} + \eta_{ipt} + \tau_t + \Delta_t^p \epsilon_{ipt} \quad (5)$$

The outcomes of interests, $\Delta_t^p Y_{ipt}$ are now in terms of the difference in the number of establishment births, deaths, expansions and contractions per person between the county with the EITC policy and its cross-border neighbor without. The included control variables are the same as in the all county sample but they are also now in terms of the difference between the two counties.

β is still the coefficient of interest, which captures the effect of state Earned Income Tax Credit policies on the difference of establishment births, deaths, expansions, and contractions per person depending on the regression. Given the construction of the contiguous cross-border county sample, there is always one county that is in a state that has a state EITC policy for some duration of the sample period paired with a county that is in a state that never has a state EITC policy during the sample period. This allows for easy interpretation of the EITC variable. It is either an indicator for when the state has such a policy or it is the generosity of the policy for the state with the EITC.

Table 3 presents the descriptive statistics for the cross-border differenced summary statistics for the all border county sample and table 5 does the same for the sample of border counties where one county enacts the EITC and the paired county never does during the sample period. The means for each of the differenced control variables and outcome variables are small. This indicates that these counties are quite similar in their observable characteristics, making the cross-border counties good controls.

Table 2: Summary Statistics for Cross-Border Differences: All Border Counties

Variable	Mean	Std. Dev.	Min.	Max.	N
Diff. Births per 1k	0.041	1.171	-14.664	11.588	18030
Diff. Deaths per 1k	0.052	1.072	-13.529	10.417	18030
Diff. Expansions per 1k	0.14	2.445	-19.935	18.666	18030
Diff. Contractions per 1k	0.153	2.362	-19.266	21.641	18030
Diff. Non-Employers per 1k	1.831	20.298	-127.907	181.819	18030
Diff. in Existence of EITC	0.381	0.508	-1	1	18030
Diff. in Generosity of EITC	6.612	9.532	-15	43	18030
Diff. in med. Jan. Temp	-0.177	2.537	-19	17.8	18030
Diff. in Exist. Estabs. per 1k	0.711	7.816	-56.061	56.76	18030
Diff. in State CIT	0.894	3.822	-10.5	12	18030
Diff in Unemployment Rate	-0.055	2.025	-19.1	12.3	18026
Diff in per capita Income	-143.167	8768.666	-124542.984	124644.953	18030
Diff. in Min. Wage	-0.019	1.011	-4.63	3.55	18030
Diff. in Pop. Densisty	96.645	2741.073	-11149.408	68561.281	18030
Diff. in PSTS Share	-0.334	10.105	-98.876	96.692	18030
Diff. in State Inc. Tax	1.178	4.021	-12	12	18030

Table 3: Summary statistics reported for the entire study period

Table 4: Summary Statistics for Cross-Border Differences: Counties with EITC Paired with Counties without

Variable	Mean	Std. Dev.	Min.	Max.	N
Diff. Births per 1k	0.027	1.072	-5.37	11.588	8085
Diff. Deaths per 1k	0.049	0.997	-5.714	10.417	8085
Diff. Expansions per 1k	0.078	2.385	-9.616	18.666	8085
Diff. Contractions per 1k	0.116	2.308	-10.358	21.641	8085
Diff. Non-Employers per 1k	2.609	20.291	-55.503	181.819	8085
State EITC Indicator	0.758	0.428	0	1	8085
State EITC	9.045	9.409	0	33	8085
Diff. in med. Jan. Temp	-0.143	2.422	-14.5	17.8	8085
Diff. in Exist. Estabs. per 1k	0.708	7.596	-23.21	56.76	8085
Diff. in State CIT	1.722	4.188	-9.99	12	8085
Diff in Unemployment Rate	-0.16	2.089	-12.1	9	8081
Diff in per capita Income	-135.815	6711.71	-49541.488	40736.543	8085
Diff. in Min. Wage	0.145	0.843	-4.4	3.55	8085
Diff. in Pop. Densisty	-81.738	868.899	-11149.408	1825.507	8085
Diff. in PSTS Share	0.22	9.164	-98.876	94.767	8085
Diff. in State Inc. Tax	2.683	3.734	-4.15	11	8085

Table 5: Summary statistics reported for the entire study period

6 Results

6.1 All County Results

Table 6 presents the results from estimating the effect of the EITC’s existence and generosity on the different outcomes of interest using the all-county sample. Five different specifications are reported, one for each of the outcomes of interest: establishment births, establishment deaths, establishment expansions, establishment contractions, and the number of non-employer establishments. Panel A reports the estimated effects of the existences of a state EITC policy, and Panel B estimates the effect of the generosity of the state EITC policy. The standard errors, in parentheses, are calculated according to Bester, Conley, and Hansen (2011) to account for spatial autocorrelation. I create a continuous grid where each gridcell is 220 by 220 kilometers (2 degrees latitude by 2 degrees longitude). A county belongs to a gridcell if its geographic centroid lies within that cell and then cluster on these gridcells.

Table 6: All-County Sample

	(1)	(2)	(3)	(4)	(5)
	Est. Births per 1k	Est. Deaths per 1k	Est. Expansions per 1k	Est. Contractions per 1k	Non-Employers per 1k
Panel A: Existence					
State EITC Indicator	-0.0262 (0.0202)	0.0269 (0.0176)	0.0147 (0.0363)	-0.0222 (0.0253)	0.352 (0.363)
Controls	YES	YES	YES	YES	YES
CountyFE	YES	YES	YES	YES	YES
YearFE	YES	YES	YES	YES	YES
N	46134	46134	46134	46134	46134
Panel B: Generosity					
State EITC	-0.00227 (0.00152)	0.000604 (0.00130)	-0.00304 (0.00320)	-0.000734 (0.00196)	0.0104 (0.0180)
Controls	YES	YES	YES	YES	YES
CountyFE	YES	YES	YES	YES	YES
YearFE	YES	YES	YES	YES	YES
N	46134	46134	46134	46134	46134

County controls include: existing establishments, unemployment rate, minimum wage, real per capita income, concentration of professional, scientific and technical services employment, population density, state corporate income tax, and median January temperatures. Standard errors are clustered at the 220x220km gridcell. *** p<0.01, ** p<0.05, * p<0.1

Counties in states with an Earned Income Tax Credit policy experience fewer establishment births per one thousand people than in counties without such a policy, which is contrary to the hypothesis that the EITC will lower the costs of hiring and make establishment births more frequent. The number of establishment births decreases by 0.0262 per 1,000 people, a 1.3% decrease relative to the mean, in counties with a state EITC. At the opposite end of the establishment life cycle, there similar increase in the number of establishment deaths per one thousand people: 0.0269 establishment deaths per 1,000 people, 1.3% of the mean. These results suggest that for the marginal establishment, EITC policies make it harder for establishments to hire the first employee and retain the last employee. For the infra-marginal establishments, the state EITC policies do function as a cost saving mechanism. The number of establishments per one thousand people that experience an employment expansion increases by 0.3% on average, and the number of establishments that experience an employment contraction decreases by 0.4% on average. The existence of a state ETIC also increases the number of non-employers per one thousand by 0.352, 0.5% on average. None of these results are statistically significant, however.

The results for the generosity of the EITC policies follow a similar pattern with the exception of the number establishment expansions per one thousand people. Increasing the generosity of the tax credit decreases the number of establishment births, expansions, and contractions as well as increasing the number of establishment deaths and non-employer establishments. Again, none of these results are statistically significant at any conventional levels.

Despite including other factors that partially determine these establishment outcomes, unobserved factors still persist in this sample such as economic interdependence between counties. The all-county sample also assumes that one county chosen at random is as good as a control as any other. This however, is not necessarily the case. These factors may be affecting the accuracy and precision of the estimates. For these reasons, I focus the rest of the analysis on the contiguous cross-border sample.

6.2 Contiguous Cross-Border Counties

6.2.1 All Border Counties

Table 7 presents the results for the contiguous cross-border for all border counties. This sample of border counties represents the effect of a difference in state EITC policies across a state border. Panel A provides estimates for the difference in the existence in state EITC policies, and Panel B presents estimates for the effect of a difference in generosity between the paired counties.

Table 7: Cross-Border Sample: All Border Counties

	(1)	(2)	(3)	(4)	(5)
	Diff. Births per 1k	Diff. Deaths per 1k	Diff. Expansions per 1k	Diff. Contractions per 1k	Diff. Non-Employers per 1k
Panel A: Existence					
Diff. in Existence of EITC	-0.00179 (0.0368)	0.00982 (0.0232)	-0.0739* (0.0435)	0.000566 (0.0326)	-0.229 (0.428)
Controls	YES	YES	YES	YES	YES
PairFE	YES	YES	YES	YES	YES
YearFE	YES	YES	YES	YES	YES
N	18026	18026	18026	18026	18026
Panel B: Generosity					
Diff. in Generosity of EITC	-0.000592 (0.00252)	-0.000817 (0.00156)	-0.00767** (0.00300)	0.00201 (0.00189)	-0.0239 (0.0290)
Controls	YES	YES	YES	YES	YES
PairFE	YES	YES	YES	YES	YES
YearFE	YES	YES	YES	YES	YES
N	18026	18026	18026	18026	18026

County controls include: existing establishments, unemployment rate, minimum wage, real per capita income, concentration of professional, scientific and technical services employment, population density, state corporate income tax, and median January temperatures. Standard errors are clustered at the 220x220km gridcell. *** p<0.01, ** p<0.05, * p<0.1

As with the all county sample, the existence of a state EITC policy reduces the number of establishments that are born and increases the number of establishments that shut down in a county with the EITC relative to its cross-border counterpart without the EITC. When there is a difference in the existence of EITC policies across a state border, the difference in the number of births per 1,000 people is 0.00179 (4% on average) lower and the difference in number of establishment deaths is 0.00982 (18% on average) greater, but neither result is significant. Unlike the all county sample, the state EITC policies decreases the cross-border difference in the number of non-employer establishments per 1,000 people and increases the difference in the number of establishments per 1,000 people between counties in states with and without an EITC policy (although both are not statistically significant). Also contrary to the results from the all county sample, a difference in the existence of state EITC policies causes the difference in the number of establishments per 1,000 people that have an employment expansion to decrease by 0.0739. The effect of the EITC on the difference in expansions is large, 52.8% relative to the mean. Given that these outcomes of interest are positive before differencing, a decrease in the difference either means that the county in the EITC state has fewer establishment expansions, the county in the non-EITC state has more establishment expansions, or both. All cases suggest that for infra-marginal establishments, the existence of state EITC policies makes hiring more employees less attractive.

I find similar results for the effects of the generosity of the state Earned Income Tax Credits. A more generous policy decreases the difference in establishment births per 1,000 people and the difference in the number of non-employer establishments per 1,000 people, while it increases the difference in establishment contractions per 1,000 people, although none are significant at any conventional levels of significance. The difference in establishment deaths per 1,000 people actually decreases between as the difference in the generosity of state EITC policies increases, contrary to what I found for a difference in the existence of state EITC policies, but neither result is statistically significant. As with the difference in the existence of an EITC policy across state borders the difference in the number of establishments per 1,000 people with an employment expansion decreases as the generosity of state EITC policies increases. For a 10 percentage point increase in the difference in the generosity of the policy, the number of establishment expansions per 1,000 decreases by 0.0767, a 54.8% decrease relative to the mean. An increased difference in the generosity of the EITC policy can represent an expansion of an existing policy becoming more generous than the neighboring policy, or the enactment of a new policy in a state while policy is absent in the neighboring state. The second possibility may explain why the estimates are so similar for both the difference in the existence of the EITC and the difference in the generosity of the EITC policy. Compared to counties in states without an EITC policies or with less generous policies, expanding employment is less attractive because of the generosity of the EITC in the cross-border counterpart. These results suggest that establishments in counties where there is a positive difference in EITC policies (either in existence or generosity) between them and their cross-border counterpart are not able to take advantage of the cost savings associated with the EITC and expand their employment.

6.2.2 Counties with EITC Paired with Counties without

Using the all border county sample gives the effects of differences in policies, but does not give the effects of the state EITC policies themselves. This is because cross-border pairs that both are in state with the tax credit (or the policies are equally as generous) look the same in the data as cross-border pairs in states that do not have the credit. This potentially contaminates the comparison category when attempting to estimate the effect of the EITC policy. In Table 8, I estimate the effects of the EITC policies by focusing the analysis on the sample of border counties where one county is in a state that enacts an EITC and its cross-border counterpart is in a state that never enacts the credit during the sample period. Panel A presents the results for the effects of the existence of the EITC and Panel B presents the results for the effects of the generosity of the policy.

Table 8: Cross-Border Sample: Counties with EITC paired with Counties without EITC

	(1)	(2)	(3)	(4)	(5)
	Diff. Births per 1k	Diff. Deaths per 1k	Diff. Expansions per 1k	Diff. Contractions per 1k	Diff. Non-Employers per 1k
Panel A: Existence					
State EITC Indicator	-0.178*** (0.0472)	-0.0680* (0.0362)	-0.193*** (0.0601)	0.0181 (0.0471)	0.307 (0.679)
N	8081	8081	8081	8081	8081
Controls	YES	YES	YES	YES	YES
Pair:FE	YES	YES	YES	YES	YES
YearFE	YES	YES	YES	YES	YES
Panel B: Generosity					
State EITC	-0.0122** (0.00488)	-0.00428 (0.00323)	-0.0190*** (0.00517)	0.00279 (0.00377)	-0.0313 (0.0656)
N	8081	8081	8081	8081	8081
Controls	YES	YES	YES	YES	YES
Pair:FE	YES	YES	YES	YES	YES
YearFE	YES	YES	YES	YES	YES

County controls include: existing establishments, unemployment rate, minimum wage, real per capita income, concentration of professional, scientific and technical services employment, population density, state corporate income tax, and median January temperatures. Standard errors are clustered at the 220x220km gridcell. *** p<0.01, ** p<0.05, * p<0.1

The effects of the EITC policy is stronger than the effect of a difference in EITC policies, both for the existence of the policy and for the generosity. The EITC causes the difference in establishment births per 1,000 people to decrease by 0.178 between counties in states with the EITC paired with counties in states without the EITC. This effect appears to be small, but considering that these border counties are chosen because they are similar on observable characteristics, these effects are quite large. These results hold for the generosity of the policy as well. Increasing the generosity of the credit by 10 percentage points, decreases the difference in establishment births per 1,000 by 0.122. While both effects are large, the effect for the existence of the EITC on the difference in establishment births is larger, suggesting that the existence of the EITC is more relevant for the establishments seeking to hire their first employee rather than the generosity of the policy. These results suggest that state EITC policies make the transition from non-employer to employer harder relative to counties in state without the tax credit.

I also find that the EITC decreases the difference in establishment expansions per 1,000 people. The existence of a state EITC policy reduces the difference in expansions per 1,000 people by 0.193. This again is a large effect when compared to the mean difference in expansions per 1,000. Increases in generosity of the policies also reduced the difference in establishment expansions between cross-border counties with the EITC and those without. A 10 percentage point increase reduces the difference in the number of establishments with employment expansions per 1,000 people by 0.190. The similarity in magnitudes between the effect of the existence of the EITC and the generosity of the EITC is likely due to the fact that the existence of the policy is the more important margin of the credit for establishments deciding whether to expand or not. For establishments in counties with a state EITC policy, these results suggest that the tax credits are not reducing employment costs enough to increase employment relative to their cross-border partner with the EITC.

The existence of a state EITC policy also reduced the difference in the number of establishment deaths per 1,000 people between counties in states with an EITC policy and their cross-border counterpart without such a policy. The difference declines by 0.0680 establishments per 1,000 people, though this is only significant at the 10% level. Since establishment deaths per 1,000 is always positive, this result suggests there are more establishment deaths in the county without the EITC policy relative to the county with the EITC. The marginal establishment in counties with the EITC are better able to avoid shutdown when compared to the marginal establishment in counties without the tax credit. Again the existence of the credit is the more important effect for the difference in establishment deaths. The effect of the generosity of the policy is smaller in magnitude and is not statistically significant at any conventional level. The existence of the EITC helps prevent more establishments from shutting down compared to establishments in counties without the EITC meaning that these establishments are able to capture some positive benefit from the implementation of the tax credit.

There is no effect of state Earned Income Tax Credits on the difference in establishment contractions per 1,000 people or the difference in non-employer establishments per 1,000

people. The difference in establishment contractions per 1,000 people is positive for both the existence and the generosity of the EITC, but neither result is statistically significant. Despite the potential for the EITC to reduce employment costs, the causes for employment reductions will still persist. Reducing the salary of existing employees is more challenging than layoffs, so the lack of a result for the effect of the EITC on the difference in employment contractions makes sense. Similarly, the effect of the existence of the EITC and its generosity are not statistically significant on the difference in the number of non-employer establishments. This second set of insignificant results, when combined with the effect of the EITC on the difference in establishment births per 1,000 people, suggests that state EITC policies do little to support new establishments — both employer and non-employer. For existing establishments, these policies do not affect employment contractions, but they do make employment expansions decrease while also decreasing the number of establishment deaths relative to counties without such policies. Overall, the number of establishments which are hiring — either the first or subsequent employees — declines in counties with the EITC relative to the cross-border counties with a state EITC. Establishments are not able to effectively capture the surplus from these policies to support hiring, but may be able to capture some to avoid shutting down.

6.3 Heterogeneous Effects by County Type

Since many of the counties along state borders are larger and more rural, especially in the West, these results may be different for different type of counties. To examine whether there are heterogeneous effects of state EITC policies by type of county, I divide the sample of counties with the EITC paired with counties that never have a state EITC policy into metropolitan counties, micropolitan counties and rural counties. I use the county delineations for metropolitan and micropolitan provided by the Census Bureau for determining which counties belong to which category. A metropolitan county is a county that is part of a metropolitan statistical area — an area with a core of 50,000 or more population. A micropolitan county is similarly defined as a county that is part of a micropolitan statistical area which has an urban core with a population of at least 10,000 people but fewer than 50,000. Any county that is not classified as either metropolitan or micropolitan is classified as rural. These distinctions are likely to be important since the labor market dynamics will be different for each group.

Table 9 presents the contiguous cross-border county results for metropolitan, micropolitan, and rural counties. Panels A and B provide the results for metropolitan counties for the existence of a state EITC policy and its generosity respectively. Panels C and D repeat the analyses for micropolitan counties and Panels E and F do the same for rural counties.

Table 9: Cross-Border Sample: Counties with EITC paired with Counties without EITC by County Type

	(1)	(2)	(3)	(4)	(5)
	Diff. Births per 1k	Diff. Deaths per 1k	Diff. Expansions per 1k	Diff. Contractions per 1k	Diff. Non-Employers per 1k
Panel A: Metropolitan: Existence					
State EITC Indicator	-0.0255 (0.0484)	0.0189 (0.0404)	-0.220*** (0.0681)	0.0418 (0.0545)	1.893* (1.072)
N	2839	2839	2839	2839	2839
Panel B: Metropolitan: Generosity					
State EITC	-0.00185 (0.00485)	0.00304 (0.00367)	-0.0188*** (0.00629)	0.00559 (0.00458)	0.00292 (0.0907)
N	2839	2839	2839	2839	2839
Panel C: Micropolitan: Existence					
State EITC Indicator	-0.172** (0.0706)	-0.115* (0.0689)	-0.234*** (0.0872)	-0.0250 (0.0887)	-1.594 (1.102)
N	1903	1903	1903	1903	1903
Panel D: Micropolitan: Generosity					
State EITC	-0.0197** (0.00811)	-0.0183** (0.00830)	-0.0240** (0.00926)	0.000259 (0.0102)	-0.221* (0.129)
N	1903	1903	1903	1903	1903
Panel E: Rural: Existence					
State EITC Indicator	-0.312*** (0.0806)	-0.102 (0.0639)	-0.159 (0.114)	0.0407 (0.0869)	-0.0610 (0.704)
N	3339	3339	3339	3339	3339
Panel F: Rural: Generosity					
State EITC	-0.0170** (0.00822)	-0.00377 (0.00480)	-0.0164* (0.00867)	0.00377 (0.00689)	0.00328 (0.0682)
N	3339	3339	3339	3339	3339

County controls are included in every specification. County controls include: existing establishments, unemployment rate, minimum wage, real per capita income, concentration of professional, scientific and technical services employment, population density, state corporate income tax, and median January temperatures. Standard errors are clustered at the 220x220km gridcell. *** p<0.01, ** p<0.05, * p<0.1

There are significant differences in the effects of state EITC policies across the different classifications of counties. The effect of the EITC on the difference in establishment births per 1,000 people is the strongest in rural counties. The existence of an EITC policy in a rural county reduces the difference between it and its cross-border partner without the policy by 0.312 establishments per 1,000 people. Compared to the mean difference in establishment births for rural counties (0.069), this is a reduction of about 452%. For rural counties the bigger factor is the existence of the tax credit. The generosity of the credit also reduces the difference in establishment births. A 10 percentage point increase in the generosity of the credit reduces the difference by 0.17 establishments per 1,000 people, a reduction of about 246% relative to the mean. State Earned Income Tax Credits also significantly reduce the difference in establishment births for micropolitan counties. The existence of a state credit reduces the difference by 0.172 (mean: -0.0014) establishments per 1,000 people. The effect is also strong for increases in generosity of the policy — a 10 percentage point increase in the generosity reduces the number of establishment births per 1,000 people by 0.197. There are no statistically significant effects for metropolitan counties. Since labor markets are generally thicker in metropolitan counties than in micropolitan or rural counties, and hiring the first employee is harder given the associated fixed costs, it makes sense that the effects of the EITC on establishment births are the strongest in those sparser non-metropolitan county labor markets. Thinner labor markets means that there are less opportunities to open a successful establishment, and that pool of potential first employees is smaller. Both of these factors contribute to making hiring the first employee more difficult and resulting in fewer establishment births compared to metropolitan counties.

For the difference in establishment deaths, there is also heterogeneity in the effect of the EITC across the different types of counties. The observed decline in the difference in establishment deaths per 1,000 people from testing the policy effect is driven entirely by metropolitan counties. The existence of a state EITC policy reduces the difference in establishment deaths per 1,000 people by 0.115, a decline of 287.5% relative to the mean difference (-0.040). The effect for micropolitan counties is stronger for the generosity of the policy: a 10 percentage point increase in the generosity of the policy reduced the difference in establishment deaths by 457.5% relative to the mean. This means that relative to the paired counties, fewer establishments are closing down in counties with the EITC on average. This result is possibly explained again by the thickness of the labor markets in each of the county classifications. Micropolitan counties may not be large enough or small enough that the marginal establishment has a harder time staying open. These counties are too large to have a high enough degree of monopsonistic competition to keep wages lower, so the cost savings enabled by the EITC make a difference. These counties are also not large enough that there is enough demand for their goods and services to afford the higher wages associated with being in a moderately sized market.

Again, there are differing effects of the EITC by county classification on establishment expansions per 1,000 people. Contrary to the results for establishment births, the effect of state EITC policies on establishment expansions is the strongest in the more populous counties. In metropolitan counties with a state EITC policy, the existence of the credit

reduces the difference in establishment expansions per 1,000 people by 0.220 (550% relative to the mean of 0.04). For micropolitan counties the implementation of the EITC reduces the amount of cross-border difference in establishments with employment expansions per 1,000 people by 0.234 (about 100% relative to the mean difference for micropolitan counties of 0.235). The generosity of these policies also matters for all counties. Increasing the generosity of the tax credit by 10 percentage points reduces the difference in establishment expansions per 1,000 people by 0.188 (470%) in metropolitan counties, by 0.240 (102.1%) in micropolitan counties, and by 0.164 (863.2%) in rural counties though the last result is only significant at the 10% level. The impacts primarily being in the metropolitan and micropolitan counties can also be explained by the thickness of labor markets in those counties. Since employment expansions do not have the high fixed costs that are associated with hiring the first employee, expansions are more elastic and the opportunity to expand later is greater, so establishments do not feel the need to capture the surplus from the EITC in order to expand after its implementation.

Across all categories of counties there are no significant effects of state EITCs on the difference in establishment contractions. The conditions for employment contractions are the same across counties — mismatch of skills, technological change, economy-wide factors, etc. — and these factors are likely to persist despite the potential to save on employment costs by capturing some of the surplus associated with the EITC.

While there were no significant effects of the EITC on the difference in non-employer establishments in the combined sample of counties, when the counties are disaggregated the EITC does affect the difference in non-employer establishments. Implementing a state Earned Income Tax Credit policy increases the difference in non-employer establishments per 1,000 people by 1.893, an increase of nearly 270% relative to the mean (-0.704). At the mean, this increase erases the deficit in non-employer establishments and creates a positive difference between the counties with the EITC and their cross-border counterpart without. This metropolitan county increase in the number of non-employer establishments is consistent with the literature on the EITC increasing the number of self-employed individuals to maximize the amount of their credit (LaLumia 2009; Saez 2010). Micropolitan counties, however, see a decrease in the difference in the number of non-employer establishments as the generosity of state credit increases. A 10 percentage point increase in the generosity of the tax credit reduces the difference in the number of non-employer establishments per 1,000 by 2.21 establishments (153% relative to the mean of -1.44), though this effect is only marginally significant. The thinner labor market in micropolitan counties means that there are less opportunities to begin a successful entrepreneurial endeavor and the more generous state credit may also increase total compensation of the individual making them less likely to start a business and consume more leisure. In the cross-border partner counties, the need to start a non-employer establishment may be greater since there isn't the additional tax credit benefit. The EITC does not significantly affect the difference in non-employer establishments in rural counties. When pooled together these individual effects are masked, but when taken separately the EITC does support some entrepreneurship in certain types of counties.

6.4 Potential Mechanisms

Previous research has found that employers are able to capture some of the surplus in the form of paying lower wages to their employees. It would follow that more establishments would be able to use this surplus to hire their first employee or expand their establishment by hiring more employees. I however do not find that this is the case. I find that the EITC cause fewer new establishments to be born and fewer establishments expand employment relative to their cross-border counterparts. I explore some potential mechanism through which the EITC could affect these outcomes. Table 10 tests whether the EITC affects the cross-border difference in state corporate income tax rates, cross-border difference in individual state tax rates, and the cross-border difference in minimum wages. All regressions include the same county controls as in the main analysis.

Table 10: Potential Mechanisms

	(1)	(2)	(3)	(4)	(5)	(6)
	Diff. State CIT	Diff. State CIT	Diff. State Income Tax	Diff. State Income Tax	Diff. Minimum Wage	Diff. Minimum Wage
State EITC Indicator	0.502*** (0.169)		-0.557*** (0.0770)		-0.145* (0.0767)	
State EITC		0.0657*** (0.0140)		-0.0208*** (0.00677)		-0.0134*** (0.00466)
Observations	8081	8081	8081	8081	8081	8081

County controls include: existing establishments, unemployment rate, minimum wage, real per capita income, concentration of professional, scientific and technical services employment, population density, state corporate income tax, and median January temperatures. Standard errors are clustered at the 220x220km gridcell. *** p<0.01, ** p<0.05, * p<0.1

Results in table 10 indicate that the EITC has a significant impact on the difference in state corporate income taxes. The existence of a state EITC policy increase the difference in state corporate income taxes by 0.502 percentage points between counties with the EITC and their cross border counterpart that does not. The more generous the credit is the larger the difference in corporate tax rates. A 10 percentage point increase in the EITC increases the difference in corporate tax rate by 0.657 percentage points, suggesting that states increase corporate taxes as a way of funding the more generous EITC policy. This result indicates that corporate income tax rates increase after a state EITC policy is enacted. Since the EITC is a policy that is focused on providing income assistance to low income working individuals and is not designed to provide a surplus to businesses, the EITC is not as salient to establishments as the corporate income tax is. The increased tax rate would discourage establishments from hiring their first or subsequent employees because their costs have increased and can not afford more employees causing fewer establishment births and fewer establishment expansions.

Table 10 also shows that the EITC is also significantly correlated with a decrease in the difference between individual state income tax rates. Individual tax rates may be an important factor because many small business pass their profit through to the individual and therefore the individual tax rate may also be a salient factor when deciding to hire employees, especially the first employee since those are smaller establishments by definition. The EITC decreases the difference between cross-border pairs with and without the policy by 0.557 percentage points. Increasing the generosity of the credit by 10 percentage points reduces the difference by 0.208 percentage points. This means that individual tax rates are lower in counties with the EITC relative to counties without. While these effects are significant, they are not necessarily a mechanism through which the EITC functions. The reduction in the difference may be due to the counties in states without the EITC increasing their taxes and reducing the cross-border gap while the EITC treated counties keep their tax rates constant. Even though the difference is decreasing, individuals are not necessarily saving on their taxes which may explain why this decreased difference does not translate into an increased difference in the number of establishments that are hiring.

The minimum wage is another potential mechanism through which observed declines in differences in establishment births and expansions functions. States that are enacting EITC policies may also attempt to help their low income citizens by legislating higher minimum wages at the same time as passing the tax credits, and the higher minimum wage would be more salient for establishments than the EITC. I however do not find this to be the case. The difference in minimum wages between counties with a state EITC and those without decreases by \$0.145 after the EITC is enacted. Relative to the mean difference this is a 100% decrease, eliminating any gap between the counties. Similarly, a 10 percentage point increase in the EITC reduces the difference in minimum wages by \$.134 (or 92%). The decline in minimum wages does make sense as a mechanism for a decrease in the difference in the number of establishment births and establishment expansions. The elimination of the average minimum wage gap could be causing workers to be willing to commute across state lines for jobs in counties without the EITC. This is consistent with Shirley (2018) who

finds that a \$1 minimum wage differential increases the probability of commuting by 0.5 to 1 percentage points. The smaller difference in minimum wages expands the job opportunities for individuals making them more likely to find a job in the county without the EITC. This would increase the number of establishment births and establishment expansions in those counties, thereby reducing the difference in both establishment births and establishment expansions between counties with the EITC and those without.

7 Conclusions

In this paper, I use a local identification strategy that takes advantage of differences in state Earned Income Tax Credit policies between pairs of contiguous cross-border counties. This approach addresses omitted variable bias that is caused by spatial trends that affect neighboring counties, as well as better modeling the establishment location selection process.

For contiguous cross-border pairs, the strongest effect of the Earned Income Tax Credit is a decrease in the difference in the number of establishment births and establishment expansions. The relative declines in the number of establishment births and expansions is responsive to both the existence of the EITC policy as well as increases in the generosity of these policies. There is some evidence that the existence of the state tax credit reduces the difference in the relative number of establishment closures as well; this effect does not depend on the generosity of the policy though. These combined results suggest that the state Earned Income Tax Credit policies reduce the amount of hiring for both new and existing establishments, but also helps prevent existing establishments from shutting down.

Since the characteristics of labor markets are different for different county sizes and populations, I examine how the state EITC policies affect different categories of counties by dividing counties into metropolitan, micropolitan, and rural contiguous cross-border counties. The declines in the number of establishment, births, expansions, and deaths are primarily driven by the micropolitan and rural counties, with the largest effects coming from the rural counties. These findings suggest that there is limited effectiveness in using state EITC policies to increase labor demand in rural counties.

On the surface, these results appear counterintuitive. Previous research has shown that employers are able to capture a portion of the EITC surplus by paying their employees lower wages. This would seem to suggest that employers would want to lower their wage bill by locating in counties in states with an Earned Income Tax Credit policy and even more would locate in states with a more generous state policy. This would also make it more likely that these counties would have more establishments with employment expansions since hiring an additional worker is now less expensive. However, this is not what occurs. I explore some potential mechanisms and find that the EITC is correlated with an increased corporate income tax differential and a decreased minimum wage differential. Since corporate taxes may be increasing to fund the EITC policies, and these are plausibly more salient to establishment owners, these could be a reason for the observed decrease in the difference in establishment births and expansions. The increase in the minimum wage differential may

also account for some of the decline in these outcomes due to workers commuting across state lines due to the increased minimum wage.

The labor supply effects of the the Earned Income Tax Credit are well documented: individuals increase their labor force participation following expansions of the tax credit. This works suggests that, at least for state EITC policies, there is a trade off between the increased labor supply effect of the EITC and a decline in labor demand. This trade off suggests that state EITC policies may be limited in their effectiveness to increase entrepreneurship and help struggling regions.

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