Tax Avoidance and Business Location in a State Border Model

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Abstract

Previous studies have struggled to demonstrate that higher taxes deter business activity. We revisit this issue by estimating the effect of cross-border differences in state tax conditions on the tendency for new establishments to favor one side of a state border over the other. Identification is enhanced by several features of the research design. We focus only on companies that locate within easy commuting distance of state borders; we difference activity across adjacent segments of state borders and over time, and we control for multiple sources of tax revenue. Of special importance given the border design, we highlight the impact of previously overlooked state reciprocal agreements that require workers to pay income tax to their state of residence as opposed to their state of employment.

Results indicate that reciprocal agreements have a pronounced effect on companies situated close to a state border. In locations where reciprocal agreements are in force, higher personal income taxes lure companies from across the border, while corporate income taxes and sales taxes have the opposite effect. Where reciprocal agreements are not in place, the results are largely reversed. These patterns are amplified in heavily developed locations, and differ in systematic and anticipated ways by industry and corporate/non-corporate status of the establishment. Overall, the results support the view that entrepreneurs are drawn towards tax sheltered locations, ceteris paribus.

Key Words: Tax deterrence; business location; border models
JEL Codes: H2, H7, R3, R5

The avoidance of taxes is the only intellectual pursuit that carries any reward – John Maynard Keynes, Attributed, A Dictionary of Scientific Quotations (1977), Alan L. MacKay, p.140.

I. Introduction

There is truth in Benjamin Franklin's famous quote, "The only thing certain in life is death and taxes." But for local policy makers, the quote above from John Keynes demands more attention. That is because one way that entrepreneurs and households may seek to avoid taxation is by relocating to more tax advantaged locations. This idea was not lost on Tiebout (1956) and Hamilton (1976) in their seminal papers on the possibility that households may vote with their feet. It has also been the focus of numerous papers that have sought to measure the impact of local tax policy on business location decisions. A notable feature of those studies, however, is their lack of consensus as to whether local taxes discourage business, and the absence of a general structure that accounts for the mixed patterns of results.[1] This paper revisits these issues. We offer several innovations that help to clarify the mixed results in the literature, and which confirm the potential for tax deterrent effects.

Throughout, we focus only on companies that locate within easy commuting distance of state borders. We then difference activity across adjacent segments of state borders and over time. This helps to control for unobserved factors that might be correlated with our tax measures. Given this border design, of special importance, we also highlight the impact of previously overlooked state reciprocal agreements that require workers to pay income tax to their state of residence as opposed to their state of employment. As will become apparent, these agreements provide a powerful source of identification. We also control for multiple sources of tax revenue, and show that tax deterrent effects differ depending on the type of tax and the type of industry in question. Additional models allow for the possibility that

[1] Early literature on the impact of taxes on businesses location typically failed to find evidence of a notable deterrent effect, and in some cases even found that higher taxes "attract" businesses (Carlton (1979, 1983) and Schmenner (1978, 1982)). This began to change in the late 1980s and 1990s as studies by Bartik (1985, 1994), Papke (1991), Hines (1996), and others offered evidence that higher taxes do deter businesses. However, most of the estimates were noisy or small relative to the effect of other policies (see Wasylenko (1997) for a review).

tax deterrent effects differ in heavily versus lightly developed locations. Finally, in all of our models we control for the size of state government.

Our emphasis throughout the paper is on the *sorting* of new business activity into opposite sides of a state border in response to cross-border differences in state tax conditions. This is consistent with a focus on tax avoidance as in the quote above. We conduct our analysis using establishment-level data for roughly 96,000 newly created enterprises in 2002 and 2005. As noted, all of these establishments are within easy commuting distance of a state border. We then evaluate the impact of cross-border differences in state tax conditions on the side of the border chosen by the business owner. Identification is enhanced by breaking state border regions into twenty mile long segments. This allows us to use border-segment fixed effects to control for unobserved time-invariant local (and state-wide) attributes associated with a given border segment. It also allows us to control for observable time-varying local attributes, such as the local level of agglomeration that may amplify or mitigate tax effects. As will become apparent, our research design yields revealing estimates of the deterrent effects of cross-border differences in state tax conditions.[2]

As implied above, we decompose tax conditions into two parts. In the first part, we consider the extent to which the *size* of local government expenditures (per capita) attracts or deters new business activity. We do this because local governments must balance their budgets, and for that reason, a decrease in one tax may require an increase in an alternate tax if government expenditures are to be held constant.[3] This suggests that size of government and the mix of tax measures are correlated, and that estimates of tax deterrent effects may be sensitive to controls for size of government. Nevertheless, most prior studies of tax deterrent effects do not control for size of government. While in principle that omission could account for some of the discrepancies in the literature, our results suggest that that may

[2] A cost of our approach is that we take as given the decision of the entrepreneur to create a new establishment in a given border segment. Our results, therefore, may not generalize to deterrent affects across broad regions.
[3] If state government offers net value to the business community for an additional tax dollar, then larger state government should attract business; if the reverse is true, then larger state government will discourage business activity. This is analogous to early arguments by Brueckner (1979, 1981) who considered the impact of local property taxes on aggregate property values.

not be the case, at least for border-design studies such as ours. In our more simply specified models, smaller state government does appear to attract business arrivals from the opposing side of the border. But in models that take location fixed effects into account, these patterns largely disappear and controls for size of state government have little effect on estimates of tax deterrent effects.

Bearing the above in mind, our primary emphasis is on the *manner* in which state government expenditures are financed. For this portion of the analysis we include separate controls for the corporate income tax, the personal income tax, and the sales tax. These three sources of tax revenue account for an important share of state government revenues and are often at the center of policy debates about the level and composition of local taxes.[4] There is also good reason to expect that industries differ in their sensitivity to the different types of taxation and related state-specific policies.

When considering the sales tax, it is important to recognize that manufacturing, much of the service sector, and a notable segment of other non-retail industries are not subject to a sales tax. Holding constant government expenditures, companies in these industries should be attracted to states that raise more of their revenue through the sales tax. Among retailers, the influence of cross-border differences in state sales taxes likely depends on their location relative to the state border. For locations well into the interior of a state, demand for in-state retail services is likely quite inelastic.[5] For these locations, higher state sales taxes will tend to be passed on to consumers with little impact on retail activity. For companies operating close to a state border, however, the ease of cross-border shopping suggests that demand for in-state retail services is likely elastic relative to cross-border differences in sales tax rates. This suggests that close to the border, retail establishments will be drawn to the low sales tax state.

Companies that are currently incorporated or anticipate becoming so are likely more sensitive to the corporate income tax. As seen in Table 1b, the share of newly established companies that begin as corporations differs by industry (e.g. manufacturing, wholesale trade, services) and accounts for a bit less

[4] Summary measures that characterize the distribution of revenues and tax rates across states for each of the three types of taxes are provided In Table 1a and are discussed later in the paper.

[5] Rosenthal and Ross (2010) provides support for this view for the retail sector. They show that at the metropolitan level, population size is nearly a perfect predictor of retail sector employment, consistent with inelastic demand for retail services overall.

than half of newly established companies in the United States (the rest are established as sole proprietorships and partnerships). The differing rates of incorporation across industries may contribute to differences in deterrent effects arising from state corporate income tax rates and related policies.

All companies rely on labor, including hired workers and the labor effort of the business owner(s). But states differ markedly in their personal income tax rates. With sufficiently mobile workers, employers would bear much of the burden of higher personal income taxes which would then be capitalized into higher nominal wages. Such an outcome would suggest that higher personal income taxes would deter business activity across a broad range of industries. While that may be true, two considerations suggest that such a conclusion could be hasty. The first is that workers may not be sufficiently mobile to push the burden of higher personal income taxes onto employers, at least in the short run. The second is that a number of pairs of adjacent states have reciprocal agreements that require workers to pay personal income tax to the state in which they live as opposed to the state in which they work. A complete listing of states with such agreements is provided in Table 1c. For companies locating within easy commuting distance of the state border, the presence of a reciprocal agreement should mitigate the deterrent effect of the state personal income tax since workers can choose to live on the tax advantaged side of the border while working on the other. Failure to account for reciprocal agreements has the potential to obscure the deterrent effect of the personal income tax and other forms of taxation as will be clear later in the paper.

A further feature of our research design is that we allow tax deterrent effects to vary with the scale of local development. Only a handful of studies have considered this possibility. For at least two reasons, however, it is possible that state government tax effects could differ with the local level of development. The first is that agglomeration economies in heavily developed areas (e.g. Duranton et al (2004), Rosenthal and Strange (2004), Glaeser and Gottlieb (2009), Combes et al (2010)) may swamp any influence of state government expenditure and tax policies: this would argue for more pronounced deterrent effects in lightly developed areas. On the other hand, heavily developed areas typically have higher nominal wages, consistent with a greater degree of labor productivity (e.g. Glaeser and Mare

(2001), Rosenthal and Strange (2008)). With a progressive state income tax code, this would amplify the deterrent effect of the personal income tax in heavily developed locations. These arguments suggest that the relationship between agglomeration and tax-deterrent effects is ambiguous, a priori.

Previous studies have also been plagued by concerns that local taxes may be endogenous to local business activity because of unobserved factors that drive both tax policy and local economic growth. This could arise, for example, if communities that anticipate more robust growth raise taxes to finance an anticipated increase in demand for services. Several features of our research design help to mitigate such concerns. First, we focus on economic activity very close to the state border. To the extent that border regions are small relative to their states, this will reduce the tendency for states to set policy based on anticipated economic growth in the border regions. Second, we lag our tax measures by two years so that they are predetermined relative to when businesses in our data are established. Third, and most important, we difference activity across adjacent 20-mile long segments on opposite sides of a state border, and also between two time periods, 2002 and 2005. This reduces the influence of local (border-segment) time invariant cross-border attributes that might be correlated with changes in cross-border differences in state tax conditions. Fourth, as suggested above, conceptual arguments suggest clear priors regarding the influence of reciprocal agreements across state pairs as well as the influence of an establishment's industry and corporate/non-corporate status. Those priors provide testable hypotheses that also help to illuminate tax deterrent effects.

Before proceeding, it will be useful to provide a brief overview of the manner in which geographic features of the data are specified (further details are provided later in the paper). Throughout, we use establishment-level data for which location is known down to the zipcode level. We focus primarily on activity in zipcodes that lie at least partly within ten miles of a state border (results based on zipcodes that extend to within one mile of the state border are very similar and are mostly not reported for that reason). State borders are broken into approximately 20-mile long segments or "wedges," and zipcodes on opposite side of a state border and which are situated along the same 20-mile wedge are matched and are said to belong to the same "wedge-pair." Existing employment and arrivals of new

businesses in the matched zipcodes are measured using 2-digit SIC industry data from the Dun and Bradstreet Marketplace files for the third quarters of 2002 and 2005. This produces a data file with roughly 96,000 newly established companies, each of which is treated as a separate observation, and each is geocoded to a single wedge-pair that identifies its location along a state border.

Three different types of models are estimated using these data. The simplest is estimated by ordinary least squares and relies on the single differencing of tax conditions across the state border. A second model adds state-pair fixed effects and identifies tax effects based on changes in cross-border differences in tax conditions over time. A more robust model uses wedge-pair fixed effects that difference away time-invariant unobserved factors at the very local level. Both of these latter models implicitly difference the data twice, across the state border and across time periods.

Our double differencing approach is in the same spirit as recent border studies by Holmes (1998) and Cunningham (2007). These studies considered the impact of state-level right-to-work laws and local land use regulation, respectively.[6] Other even more recent studies by Duranton, Gobillon, and Overman (2011) and Rathelot and Sillard (2008) have used border models to consider the effect of property taxes and local corporate income taxes, respectively.[7] We also build off of three recent papers by Devereux, Griffith, and Simpson (2007), Jofre-Monseny and Sole-Olle (2008), and Brulhart, Jametti, and Schmidheiny (2009). These papers have considered the possibility that agglomeration may mitigate the deterrent effects of business taxes and/or subsidies.[8] Devereux, Griffith, and Simpson (2007), for example, found that government subsidies have less impact on a firm's location decision in more highly developed areas. Our work is further motivated by recent studies in the agglomeration literature which show that nearby activity (even within one mile) matters much more to many entrepreneurs than activity

[6] Holmes (1998) was among the first to use border methods to analyze the impact of local of public policies. He found that states with right-to-work laws in place – which give workers the right to *not* join the union – enjoyed notably higher manufacturing employment growth since the 1940s.
[7] Both Duranton, Gobillon, and Overman (2009) and Rathelot and Sillard (2008) instrument for local tax measures using local political variables such as the share of voters belonging to a more conservative political party. Both studies find that higher taxes negatively affect growth of existing businesses although Duranton et al (2009) do not find an effect on the creation of new businesses.
[8] See also Greenstone and Moretti (2004) and Greenstone, Hornbeck and Moretti (2010) for related work.

outside of the immediate area (e.g. Rosenthal and Strange (2003, 2005), Arzaghi and Henderson (2008)). Our focus on activity very close to the state border echoes this literature.[9]

Taken as a whole, our results provide clear evidence that state-level tax policies do affect the location decisions of entrepreneurs and new business activity, but not in a way that lends itself to a one-size-fits-all summary. As a broad characterization, entrepreneurs and new business activity are drawn to those locations in which they are relatively more sheltered from the cost of financing local government activities. In addition, previously overlooked reciprocal agreements that govern whether individuals pay personal income tax to their state of residence or their state of employment have a pronounced effect on the location patterns of companies situated along state borders.

The following section presents a simple conceptual model that motivates and guides our analysis. Section 3 lays out the empirical approach. Section 4 describes the data including the geocoding procedures used to match zipcodes across state borders. Section 5 presents results and Section 6 concludes.

II. Conceptual motivation

2.1 Overview

This section highlights three key conceptual points that are relevant to the empirical work to follow. The first is that if all establishments were alike, then cross-border differences in tax conditions would be fully capitalized into land values. In this instance, tax differentials would have no effect on the side of a state border on which a business would choose to locate. The second is that with heterogeneous firm-types, cross-border differences in tax conditions are only partially capitalized into land values. Under those conditions, tax differentials do affect where different types of companies locate. The third is that even if a given type of firm does not pay a particular tax, its location decision will be sensitive to the

[9] An additional related literature includes tax competition studies that examine the propensity for jurisdictions to offer tax incentives as a way of attracting new business activity (e.g. Brueckner and Saavedra (2001), Hines (2006), Chirinko, and Wilson (2008), to name just a few). Such policies are based on the presumption that entrepreneurs are drawn to tax advantaged locations.

tax if it competes for space with companies that are subject to the tax in question. We highlight each of these points below.

2.2 One sector bidding for land

Suppose first that there is only one bidder for land which we will refer to as the business sector, land markets are competitive, and all firms are identical. Firms are price takers and sell their product for *P*. Output is produced using one unit of land and public goods that are provided by the state government (*S*), including roads, infrastructure, and other services. All land is owned by absentee investors.

If firms are not taxed they still receive services from *S* given its public good nature, and the firm's profit function is given by,

$$\pi(u,d) = P + \theta_1 A(u,d) + \theta_2 S(u,d) - R(u,d) \tag{2.1}$$

where $d = \{1,2\}$ for side 1 or side 2 of the border, u is the distance to the border, $A(u,d)$ are attributes at a given location, and $R(u,d)$ is the cost of land. More valuable attributes enhance productivity ($\theta_1 > 0$), but we impose no restriction regarding the manner in which A changes with distance and direction from the border. Local government services S are state-specific and change in a discrete fashion upon crossing the state border. For that reason, S is sensitive to d. With competitive markets, profits are driven to zero and the firm's bid-rent is given by,

$$R(u,d) = P + \theta_1 A(u,d) + \theta_2 S(u,d) \tag{2.2}$$

Suppose now that the state on side 1 of the border imposes a tax on firms per unit output (T), which is used to help finance the given level of local government services. We assume that all companies located on side 1 of the border are subject to the tax but that companies on side 2 do not pay the tax. Maintaining the zero profit condition, the bid-rents on sides 1 and 2 of the border are given as below,

$$R(u,1) = P + \theta_1 A(u,1) + \theta_2 S(u,1) - \theta_3 T(1) \tag{2.3a}$$

$$R(u,2) = P + \theta_1 A(u,2) + \theta_2 S(u,2) \tag{2.3b}$$

In Figure 1, we display the bid-rents for land on either side of the state border before and after side 1 imposes its tax. To simplify the exposition, we assume that productive attributes are increasing along a trend line as one moves towards the interior of State 2. For that reason, bid-rent is drawn as upward sloping, but we emphasize that the key points to follow are not sensitive to that assumption.

With T_1 set equal to zero, bid-rent is given by segment $\overline{ab}$. Following the imposition of the side-1 tax, the bid-rent on side 1 shifts down by an amount equal to T_1 and the bid-rent function is given by $\overline{cdeb}$. Implicitly, we are assuming that land is inelastically supplied to firms. Side-1 landowners therefore absorb the entire burden of the tax (T) and the equilibrium land rent function is given by $\overline{cdeb}$. Importantly, in this very simple model, side 1 taxes do not affect the spatial distribution of business activity on either side of the border – landowners absorb the full cost of the tax.

2.3 Two sectors bidding for land

Suppose now that there are two types of companies bidding for land, type-I and type-II. Because the two sectors have different production functions, their valuation of local attributes differs, and this causes their bid rent functions to differ as well. The bid-rent functions for the two sectors are drawn in Figure 2. In the absence of a tax, type-II companies outbid type-I firms for space to the right of point *j* while type-I firms are the high bidders to the left of point *j*. With competitive markets, land goes to the highest bidder and equilibrium land rents are given by the upper envelope of the bid-rent functions, $\overline{agk}$. In this example, type-II companies occupy land to the right of *j* while type-I companies are found to the left of *j*.

Suppose now that a tax *T* is imposed on side 1 of the border, but the tax applies only to type-I firms. With the downward shift in type-I bid-rent on side 1 of the border, the equilibrium land rent function is given by the new upper envelope of the bid-rent functions, $\overline{chnegk}$. As drawn in the figure, type-II firms outbid type-I firms in all locations to the right of point *j* as before, but also for land between

points *m* and *i* which was formerly occupied by type-I firms. Type-I firms occupy land to the left of point *i* (as before), and also a segment of side-2 between points *m* and *j*.

This simple model has several implications for the effect of state-level taxes on conditions close to the state border. First, competition for space between multiple sectors bidding for land mitigates the degree to which taxes are capitalized into lower equilibrium land rents. This is illustrated by the fact that segment $\overline{hd}$ lies below segment $\overline{hn}$: competition between sectors reduces the extent to which taxes are capitalized into lower equilibrium land rents in locations where tax sheltered industries emerge as the high bidder for space.

Second, cross-border differences in tax conditions affect the equilibrium locations for both the industry subject to the tax and the tax sheltered industry. This arises from the sorting equilibrium when land is allocated to the highest bidder. It also suggests that in the empirical work to follow, it is important to consider the impact of different types of tax measures on the location patterns of all industries, even when an industry is not subject to a given tax (as with manufacturing and the sales tax, for example).

III. Empirical Model

As emphasized earlier, the primary goal in the empirical work is to estimate the impact of cross-state border differences in tax conditions on the tendency of newly established companies to favor one side of the border over the other. Throughout, we work with establishment-level records and restrict our sample to newly created enterprises in 2002 and 2005 that are situated within easy commuting distance of a state border.

We begin with the following expression for the likelihood that a given entrepreneur would choose side 2 of a state border over side 1:

$$\mathrm{I}_{it} = \theta_1(S_{1t} - S_{2t}) + \theta_2(T_{1t} - T_{2t}) + \theta_3(\Omega_{1w,t} - \Omega_{2w,t}) \,. \qquad (3.1)$$

In this expression, I_{it} equals 1 if entrepreneur *i* chooses side 2 of the state border and 0 if side 1. The terms $S_{1t} - S_{2t}$ and $T_{1t} - T_{2t}$ are the cross-border differences in state-level government expenditures and

tax conditions corresponding to the border along which establishment *i* is located. The term $\Omega_{1w,t} - \Omega_{2w,t}$ represents the cross-border difference in all other attributes that might affect the profitability of choosing side 1 versus side 2 of the border. The subscript *w* denotes the segment (or "wedge" as described in the Introduction) along the border in which a company is located. The subscript *t* represents the time period in which the company makes its location choice (third quarter of 2002 or third quarter 2005).

For a given set of measures for $S_{1t} - S_{2t}$ and $T_{1t} - T_{2t}$ (which are described in the following section), our primary challenge is to adequately control for the elements of $\Omega_{1w,t} - \Omega_{2w,t}$ so as to ensure that we obtain consistent estimates of the primary parameters of interest, θ_1 and θ_2. We proceed by splitting $\theta_3(\Omega_{1w,t} - \Omega_{2w,t})$ into time-invariant (Ω_w) and time-varying components (e_t). Substituting into (3.1) we obtain,

$$I_{it} = \theta_1(S_{1t} - S_{2t}) + \theta_2(T_{1t} - T_{2t}) + \Omega_w + e_{wt} \quad . \qquad (3.2)$$

Given the specification in (3.2), it is apparent that we can control for Ω_w using border-segment ("wedge-pair") fixed effects given that we have two periods of data. In principle, the remaining term, e_{wt}, could be correlated with the tax measures that are the focus of the study, but for reasons described in the Introduction we believe that such concerns are modest. We estimate (3.2) using a linear probability model.

IV. Data and Summary Statistics

4.1 State tax and expenditure conditions

The model outlined above requires measures of state-level tax conditions in each period, *t*. We address this as follows. State expenditure and population data were obtained from the U.S. Census Bureau website.[10] These data were used to compute state-level government expenditures per capita for each of the sample years, 2002 and 2005, and for each of the states in the continental U.S. Data on state

[10] See http://www.census.gov/govs/state/historical_data.html for links to the data.

tax rates were obtained from the Tax Foundation website while data for state revenues raised through a given tax were obtained from the U.S. Census Bureau website.[11]

As noted earlier, we focus on three prominent sources of state tax revenue: the corporate income tax, the personal income tax, and the sales tax. Panel A of Table 1a displays the share of state government expenditures financed through these three sources of revenue for both 2002 and 2005. It is noteworthy that the personal income tax and the sales tax both account for roughly 13 to 14 percent of state budgets while the corporate income tax contributes a much smaller share, just 2.5 percent in 2005. Together, these three sources of revenue comprise roughly 30 percent of state budgets.[12]

Panel B of Table 1a also demonstrates that there is considerable variation in tax rates across states. For 2000 and 2003, for the sales tax rate, the maximum personal income tax rate, and the maximum corporate income tax rate, the panel reports the median and standard deviation across states, in addition to the number of states for which the tax is not imposed. Notice that for each tax measure, the standard deviation is roughly half the size of the median, indicating that there is quite a bit of variation across states. In addition, for each tax, between four and six states do not levy the tax in question.

We measure tax conditions using the state tax rates in panel B of Table 1a. Specifically, we use each state's maximum corporate income tax rate, the maximum personal income tax rate, and the sales tax rate.[13] Identification of tax deterrent effects then requires that changes in cross-border differences in tax rates are exogenous to the decision of an entrepreneur to choose one side of the state border over the other. While we cannot provide direct empirical evidence to support that assumption, the various features of our research design discussed earlier help to mitigate concerns about endogeneity. These include

[11] For tax rates see, http://www.taxfoundation.org/taxdata/show/230.html. For tax revenues see: U.S. Census Bureau, State & Local Government Finance, Historical Data: 2005, the following URLs: http://www.census.gov/govs/estimate/historical_data_2005.html; http://www.census.gov/govs/state/historical_data.html.

[12] Most of the remaining portion of state budgets is derived from grants from the federal government (roughly 25 percent), all other forms of state taxes and licensing fees (roughly 20 percent), and insurance trust revenue for government retirement and social insurance programs including contributions by state government workers and net earnings on fund investments (roughly 25 percent). See: U.S. Census Bureau, State & Local Government Finance, Historical Data: 2005, http://www.census.gov/govs/estimate/historical_data_2005.html .

[13] Most states specify progressive tax schedules for the corporate and personal income tax rates, in addition to a variety of exemptions, deductions, and other allowances that affect the effective tax rate faced by a given business owner. We use the maximum rates and in doing so, implicitly assume that the maximum rates are correlated with the rates that business owners expect to pay allowing for all other features of a state's tax code.

lagging the tax measures in Panel B of Table 1a by two years relative to which companies in our data are established, the focus on activity very close to the border, and the double differencing strategy in which activity is differenced both across the border and over time.

A second condition required for identification is that there must be sufficient numbers of adjacent states for which one or both of the adjacent states changed their tax rates between 2000 and 2003. Table 1d provides evidence on this point. Observe that between 2000 and 2003, six states changed their maximum corporate income tax rate, 11 states changed their maximum personal income tax rate, and five states changed their sales tax rate. Because most states border on multiple states, the number of instances in which cross-border differences in tax rates changed is much higher: 24 for the corporate income tax rate, 35 for the personal income tax rate, and 23 for the sales tax rate. Evidence presented later in the paper suggests that this level of variation is sufficient to identify tax deterrent effects.

A third condition necessary for identification is that the tax rates used in the analysis must be strong correlates with the unobserved *effective* tax rates that entrepreneur expect to pay. Those effective tax rates depend on the statutory tax rate, including the full progressive schedule of income tax rates, corporate income apportionment formulas (e.g. Goolsbee and Maydew (2000)), and various other state and industry-specific provisions that reduce a company's exposure to a given type of tax (e.g. Slemrod (2004), Grahm (1996)). In this respect, we recognize that the tax rates specified are approximations of the effective tax rates that entrepreneurs expect to pay.[14]

[14] We also estimated all of our models using tax revenue shares to characterize state tax conditions. This was done by dividing gross revenue from each of the three tax instruments (corporate income, personal income, and sales tax) by the level of state government expenditures. This has the appeal of allowing for the full schedule of tax rates and related state-specific provisions that affect the effective tax rates faced by business owners. Several studies in the tax literature have used revenue shares for these reasons, including studies of the impact of cross-country differences in tax conditions for which specification of the full tax code would be difficult (e.g. Slemrod (2004)). However, for other reasons we favored the tax rate approach highlighted above. First, it is the tax rate – not the tax revenue share – that enters into a company's cost function. Second, coefficients on the revenue share variables must be interpreted relative to the omitted revenue category, which in our case is all sources of state revenue apart from the three highlighted tax measures. Third, interpretation of the revenue share coefficients also depends on the position of a state along its Laffer curve. For governments operating on the upward sloping portion of their Laffer curve (as is likely the norm (e.g. Uhlig and Trabandt (2011)), rising tax revenue shares are indicative of increasing effective tax rates, but the reverse is true for governments on the downward

4.2 Matching business activity across state borders

A key feature of our empirical strategy is to match business activity along opposite sides of a state border, restricting our focus to just those locations within easy commuting distance of the border. As discussed in the following subsection, the geographic location of new establishments in our data is reported down to the zipcode level. Both zipcodes and state borders are of irregular shape, and this complicates efforts to match adjacent business activity on opposite sides of a state border. To facilitate, we first use geographic information system (GIS) software to create 1 and 10 mile buffer zones on each side of all of the state borders in the United States. In addition, state borders are broken into segments by laying down a 20 by 20 mile grid across the continental United States. Only grid squares that intersect state borders are retained (see Figure 3), and each is divided into pieces by the intersecting state borders. Each piece is then referred to as a "wedge" and pairs of wedges on opposite sides of a state border that belong to the same grid square are referred to as a "wedge-pair." Figure 4 illustrates using a snapshot of the border region of Nebraska, Kansas, Missouri, and Iowa.

We next overlay a zipcode map for the United States on top of the grid squares, and retain only those zipcodes that intersect or lie entirely within one of the border wedges. Each zipcode is then assigned to the wedge that it most overlaps. Note that multiple zipcodes could be assigned to a single wedge. Business activity associated with each border wedge is determined based on all zipcodes assigned to that wedge using activity throughout *the entirety* of each of the assigned zipcodes. Using this procedure we match business activity in zipcodes on opposite sides of a state border that are situated roughly along a common border segment that is 20 miles in straight-line length.

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sloping portion of their Laffer curves. Fourth, changes in cross-border differences in tax revenue shares are sensitive to changes in state-wide economic activity (e.g. aggregate sales and aggregate income) that may mask the impact of changes in the underlying tax rates. For these reasons, we feel that the tax rate rather than tax revenue approach is more robust. Accordingly, we emphasize the former in the text, but present estimates from the revenue share models in the appendix for review.

4.3 Dun and Bradstreet data and summary measures

Data on business activity for the analysis were obtained from the Dun and Bradstreet (D&B) Marketplace files for the third quarters of 2002 and 2005. The data provide information on different types of establishments aggregated to the zipcode level. Using these data, we measure counts of existing and newly created (in the previous 12 months) establishments and their corresponding employment for different 2-digit SIC (Standard Industrial Classification) industries.

Although we obtain our data aggregated to the zipcode level, we are able to convert the data into establishment level observations. That is because all of the key control measures in our model are state- or wedge-pair level measures for a given 2-digit SIC industry. We know how many newly established companies are present for a given 2-digit SIC/zipcode, denoted here as x. We then create x observations for that 2-digit SIC/zipcode, each of which is associated with the same set of location-specific control variables (e.g. state tax measures). Using these data, we estimate linear probability models as described in Section 3 that evaluate the likelihood that an establishment locates on given side of the state border as a function of wedge-pair and state-level control measures.

Table 2 reports summary measures for newly established businesses in our data. We do this for two different levels of geography. The first is based on zipcodes that lie at least partially within 10 miles of a state border, while the second is based on zipcodes that lie at least partially within 1 mile of a state border. In addition, for each wedge-pair, the side that is situated in the state that appears earlier in alphabetical order is always labeled as side 1 while the other is labeled as being on side 2. This labeling convention is adopted throughout the remainder of the paper.

Observe first that there are fewer newly created establishments in our sample in 2005 than in 2002. In the regression models to follow we address this by including a dummy variable for 2005 in all of the regressions. Also apparent, there are more arrivals on side 2 than on side 1. Given the random assignment of state-pair side-1 and side-2 designations, this difference either reflects a tendency for grid squares to be positioned more on side 2 of the state borders, or for side-2 designated areas to be more heavily developed. To address these possibilities, in some of the models to follow we include a control

for the difference in area between opposing sides of a wedge-pair, calculated as the area of the wedge on side 2 of a wedge-pair (in square miles) minus the area of the wedge on side 1. In our more robust models, this wedge-area difference variable is replaced with wedge-pair fixed effects that further control for any underlying tendency of one side of the wedge-pair to be more heavily developed than the other.

Summing all arrivals associated with a given buffer zone, notice that there are 67,276 new establishments in zipcodes extending into the 0 to 1 mile buffer, and 96,434 new establishments in zipcodes extending into the 0 to 10 mile buffer. In most cases estimates from the regression models to follow are quite similar for the two buffer zone samples, and for that reason, the results based on the 1-mile buffer zone sample are not reported.

As described earlier, Figure 3 displays the border areas that are the focus of this study. Also shown in Figure 3 is the intensity of development along a given segment of a border, with darker regions indicating more intensive development. The figure makes apparent that the density of development along the border region is highly skewed, with relatively few intensively developed areas and many lightly developed regions. Table 3 quantifies that distribution for both the 1 mile buffer and 10 mile buffer samples. For each sample, the table presents the distribution of total employment for the sample of new business arrivals. For both samples, panel A treats each establishment as a separate observation while panel B treats each wedge-pair as a separate observation. The heavily skewed distribution is evident with a very disproportionate share of establishments concentrated in the most heavily developed areas, mirroring the United States overall. We will draw on this stylized fact in some of the model specifications to follow.

V. Results

5.1 Size of state government

We begin with the simplest specification that considers only the impact of the size of state government on the location of newly established enterprises. In Table 4, we present results using both the 1 mile buffer sample and the 10 mile buffer sample. Three sets of estimates are provided for each sample

based on OLS, wedge-pair fixed effect, and state-pair fixed effect specifications. In all cases, the key control measure is the log ratio of the per capita level of state expenditures on side 2 of the border relative to side 1, and in the year in which the establishment is created (2002 or 2005). Also included in the OLS and state-pair fixed effect models is the difference in the square mileage of the two wedges that comprise a given wedge-pair, and a dummy variable for arrivals in the year 2005. When the models are estimated by ordinary least squares (OLS), the t-ratios reported are based on robust standard errors; when wedge-pair or state-level fixed effects are included the standard errors are clustered at the level of the specified fixed effects. In all cases, given the linear specification the estimated coefficients on the slope variables have the usual marginal interpretation.

Identification in the OLS models is based on variation across wedge-pair locations *and* across years. For both buffer samples, it is noteworthy that the OLS estimates indicate that larger state government is associated with fewer arrivals: the coefficient on the log ratio expenditure measure is very similar for the two samples: roughly -0.32 and -0.28 for the 1 and 10 mile buffer samples, respectively. Both of these estimates are also highly significant, with t-ratios of 36 and 40, respectively. Taken at face value, this suggests that smaller state government attracts business activity. As suggested earlier, however, a concern with the OLS specification is whether unobserved attributes close to the state borders might bias these estimates.

The second column for each buffer sample includes controls for state-pair fixed effects. Identification in this specification is obtained only from temporal variation in cross-border activity since time-invariant state-pair border attributes are differenced away. Notably, the coefficient on the log ratio of per capita expenditures becomes positive for both samples, but is also small and insignificant in each instance. This is in sharp contrast to the negative coefficients in the OLS model. It also suggests that cross-border differences in state tax conditions are indeed correlated with cross-border differences in unobserved attributes that affect the side of the border on which a company locates.

To explore this issue further, the third column for each sample reports estimates based on the wedge-pair fixed effect specification. This strips away time-invariant state-pair *and* local attributes in the

border segment in which a newly established enterprise is located. Observe that the coefficients on the log ratio of the expenditure variable are nearly identical to the state-pair fixed effect models. This result is suggestive that localized unobserved attributes are not highly correlated with cross-border tax differentials after controlling for state-pair fixed effects.

5.2 State tax conditions

Table 5 extends the model by adding controls for the state tax rates described earlier (the maximum corporate income tax rate, the maximum personal income tax rate, and the sales tax rate). As before, t-ratios reported for the OLS models are based on robust standard errors while for the fixed effect models standard errors are clustered at the level of the specified fixed effects. To conserve space, both in Table 5 and in the tables to follow, only results from the 10-mile buffer sample are reported (results from the 1-mile buffer sample are similar). In addition, for most of the discussion to follow we will focus on qualitative patterns among the estimated coefficients (e.g. signs and relative size). Magnitudes for select specifications will be discussed later.

In Table 5, notice that the coefficients on the log ratio of per capita expenditures are very similar to those reported in Table 4. In addition, dropping the per capita expenditure variable had little effect on the tax coefficients for most of the specifications, both in Table 5 and in the tables to follow.[15] These patterns suggest that the influence of the size of state government on the state of choice for entrepreneurs operating close to the border is largely independent of cross-border differences in the manner in which state governments finance their expenditures. Observe also that the coefficients on the tax rates are similar in the state-pair and wedge-pair fixed effect models (the second and third specifications for each buffer sample). That similarity echoes patterns from Table 4 but does not always persist in the more fully specified models to follow.

Focusing on the coefficient values in Table 5, for the OLS model the tax coefficients are positive and highly significant for all three tax instruments. However, adding location fixed effects to the models

[15] These results are not shown to conserve space.

causes the results to change dramatically. The coefficients on the corporate income and personal income tax rates become negative, small, and not significant. The coefficients on the sales tax rate remain positive and of about the same magnitude, but are now only marginally significant. This latter pattern suggests that on average, the sales tax may tend to *attract* companies from across the state border. We revisit this issue shortly. For now, and more generally, the patterns just noted provide limited support for the idea that local taxes deter arrivals of new businesses.

The findings in Table 5 are broadly consistent with early papers in this literature which also struggled to find evidence of tax deterrent effects. As will become apparent, that characterization changes when additional features of the tax code are taken into account. Most important, in the following section we highlight the influence of reciprocal agreements that affect whether workers pay personal income tax to their state of residence or their state of employment. This is followed by industry-stratified models that further highlight the influence of the sales tax, and models in which companies are stratified by corporate/non-corporate status that highlight the role of the corporate income tax.

5.3 Reciprocal agreements and the personal income tax

Recall that if a reciprocal agreement is in force (e.g. Table 1c), then individuals pay personal income tax to their state of residence, while if a reciprocal agreement is not in force, then individuals pay personal income tax to the state in which they are employed. To our knowledge, these provisions have been completely overlooked by previous studies of tax deterrent effects even though most reciprocal agreements have been in place for many years (see Table 1c, for example). Nevertheless, these provisions provide a powerful source of identification, and especially so when considering activity along a state border.

For companies situated within easy commuting distance of a state border, reciprocal agreements should have a pronounced effect on the state in which an entrepreneur chooses to locate a business, and the related deterrent effect of the personal income tax. To understand why, consider first two adjacent states for which a reciprocal agreement is not in force. In this instance, workers employed on the high

personal income tax side of the border pay higher taxes regardless of where they live. Provided the cross-border difference in tax rates is not fully capitalized into land rents (e.g. Figure 2 of Section 2), individuals employed on the high tax side of the border should receive higher nominal wages.[16] Otherwise, they would seek employment on the low tax side of the border until wages adjust and a spatial equilibrium is attained. If instead, reciprocal agreements are in force, then for establishments within easy commuting distance of the state border, workers could live on the tax-advantaged side of the border regardless of where they work. In this instance, the deterrent effect of the personal income tax should be eliminated.

Recall also (from Section 2) that the equilibrium location of a tax sheltered company is still sensitive to a local tax if it competes for space with sectors that pay that tax. An implication of this principle is that if we eliminate the deterrent effect of the personal income tax – as when reciprocal agreements are in force – then the deterrent effects of the corporate income tax and sales tax are likely to increase since those tax measures would gain in relative importance in driving industry bid-rent functions that affect the equilibrium location of business establishments.

These priors are tested in Table 6 where we present separate regressions for locations with and without a reciprocal agreement in force. To conserve space, only estimates based on the wedge-pair fixed effect specification are presented, both in Table 6 and in the tables to follow.

In Table 6, notice that reciprocal agreements have a dramatic impact on the deterrent effect of state tax rates for companies situated close to the border. With reciprocal agreements in place, the personal income tax attracts companies from across the border while the corporate income tax and the sales tax act as a deterrent. These effects are all statistically significant. In contrast, when reciprocal agreements are not in force, the personal income tax deters new business activity while the sales tax lures companies from across the border, and both are significant. The corporate income tax has a positive

[16] This implicitly assumes that there are multiple types of companies bidding for space, some more sensitive to the personal income tax than others, as described in Figure 2 of Section 2. If instead all companies were alike, then higher personal income taxes should be fully capitalized into lower land rents and would not affect the equilibrium sorting of companies across different sides of the state border.

coefficient, but it is small and not significant. Together, these patterns support the arguments above that the presence of reciprocal agreements mitigates the deterrent effect of the personal income tax while increasing the deterrent effect of other sources of tax revenue.

Why might a tax *attract* business activity from across the border, as with the personal income tax when reciprocal agreements are in force and the sales tax when they are not? The answer is that companies favor locations that raise revenue in ways that impose little cost on their activities relative to the value of government services provided. With reciprocal agreements in place, the personal income tax imposes little direct cost on establishments operating close to a state border. In such instances, companies should favor locations that raise more of their revenue through the personal income tax. Analogously, companies should tend to avoid locations where revenue is raised through taxes from which they are not sheltered, as with the corporate income tax and sales tax when reciprocal agreements are not in place.[17]

5.4 Differences across industries and the sales tax

In this section, we focus on the sales tax for which we have sharp priors about different effects across industries. Recall that most retail activity is subject to whatever sales tax may be in place. In contrast, only a subset of services are subject to the sales tax, and manufacturing establishments only rarely face the sales tax. This suggests that the retail sector ought to be most sensitive to the sales tax and the manufacturing sector should be the least sensitive to the sales tax.

Table 7 enables us to test these priors by repeating the analysis from Table 6 with separate regressions for Manufacturing, Retail, and Services. In Table 7, note that when reciprocal agreements are in place, a higher sales tax rate deters business arrivals. This is true for all three industries, but the coefficient is especially large and significant for retail (-0.149 with a t-ratio of -3.56), moderate for

[17] In Table 6, note also that for locations with a reciprocal agreement in force (the middle column), the coefficient on the size of state government is negative but not significant. When reciprocal agreements are not in force (the third column), the coefficient is positive and marginally significant. On balance, these patterns and related estimates in extensions to follow do not point to a clear and robust pattern. In that sense, based on the estimates in Table 6 and those to follow, we cannot reject the null that larger government has a relatively neutral effect on the tendency to lure companies from across the state border.

services (-0.054 with a t-ratio of -1.57), and much smaller and not at all significant for manufacturing. This is consistent with the view that reciprocal agreements enhance the deterrent effects of tax measures outside of the personal income tax. The patterns just noted also support the view that retail should be more sensitive to the sales tax than are services, which in turn are more sensitive than manufacturing. When reciprocal agreements are not in force, the pattern is quite different. In that instance, the sales tax tends to lure manufacturing and service establishments from across the border (the coefficients are both positive and roughly 0.01 with t-ratios of 1.46 and 1.91, respectively), while the coefficient for retail is positive but close to zero. This is consistent with findings from Table 6 that in the absence of a reciprocal agreement the deterrent effect of the sales tax is reduced.

5.5 Corporate status and the corporate income tax

Table 8 revisits the models in Table 6 once again, but this time separate models are run for establishments that are corporations and those that are either sole proprietorships or partnerships.[18] As discussed earlier in the paper, because only corporations pay corporate income tax, the deterrent effect of the corporate income tax seems likely to be more pronounced for corporations.

In the absence of a reciprocal agreement results are somewhat mixed relative to patterns in the earlier tables. The corporate income tax and the sale tax have small and insignificant effects on both samples. The personal income tax, in contrast, has a highly significant deterrent effect on unincorporated establishments (with a coefficient of -0.0165 and a t-ratio of -3.15) but a smaller, positive, and marginally significant effect on corporations (with a coefficient of 0.01 and a t-ratio of 1.77).

When reciprocal agreements are present, findings are largely consistent with priors. Notice that the personal income tax lures both corporations and unincorporated companies from across the border. This is as before. In addition, the sales tax has a deterrent effect on unincorporated establishments but little effect on corporations. This may reflect some difference in the mix and appeal of larger retail outlets that are incorporated versus smaller outlets that tend to not be incorporated. Most noteworthy, and

[18] We are able to identify the ownership structure for roughly two-thirds of our sample.

consistent with the primary focus of this section, the corporate income tax has a strongly significant deterrent effect for corporations and unincorporated establishments (the t-ratios on the relevant coefficients are -3.15 and -2.51, respectively). Moreover, the deterrent effect is notably larger for corporations with a coefficient value of -0.54 versus -0.28 for unincorporated companies. Once again, therefore, deterrent effects appear to be larger when companies are most sensitive to the tax in question.

5.6 The scale of local development

Table 9 considers a final extension in which we run separate models from Table 6 for lightly developed and heavily developed wedge-pairs in the sample. To facilitate comparisons, also reported in Table 9 are full sample estimates that pool high and low density locations.

Review of the patterns in Table 9 indicates that there are both similarities and differences in tax deterrent effects in lightly versus heavily developed areas. When reciprocal agreements are present, deterrent effects from all three types of taxes are mostly similar for both subsamples and similar to the full sample estimates. The primary exception is for the personal income tax which has little effect on establishment location in lightly developed areas but a strong attractive effect in heavily developed locations (with a coefficient of 0.033 and a t-ratio of 3.01). When reciprocal agreements are not present, tax deterrent effects are small and insignificant for all three types of taxes in lightly developed locations, but are enhanced in heavily developed locations and especially so for the personal income tax (which has a coefficient of -0.022 and t-ratio of -4.16).

Summarizing, the patterns in Table 9 indicate that the magnitude of the coefficient on the personal income tax is larger in heavily developed areas regardless of whether a reciprocal agreement is in place or not. That finding is consistent with the possibility suggested in the Introduction that higher labor productivity and wages in densely developed locations (e.g. Duranton and Puga (2004), Rosenthal and Strange (2004), Arzaghi and Henderson (2008), Glaeser and Gottlieb (2009), Combes et al (2010)) may amplify the tendency of companies to reduce their exposure to higher personal income tax rates by choosing the low tax side of the state border.

5.7 Magnitudes

To complete our discussion some brief comments about the magnitude of our estimates is in order. For these purposes we focus on the coefficient estimates in Table 6 which provide the core results upon taking reciprocal agreements into account.

Suppose that reciprocal agreements are not in force and Side 2 of a state border reduces the maximum personal income tax rate by one percentage point relative to the state on the opposite side of the border. Based on the estimates in column three of Table 6, that change would reduce the likelihood that an establishment would locate on Side 2 of the border by 1 percentage point. If instead, the state on Side 2 of the border increased its sales tax rate by one percentage point, that would increase the likelihood that a newly established company would choose Side 2 over Side 1 by roughly 1 percentage point; a change in the corporate income tax has little effect. With a reciprocal agreement in place, an increase in the side-2 personal income tax of one percentage point would increase the likelihood of a company choosing side 2 by 2.2 percentage points. For the sales tax, a one percentage point increase would reduce the probability of a side-2 location by 6.8 percentage points, while for the corporate income tax the analogous effect would be a reduction in the side-2 location probability of roughly 23 percentage points.

It should be emphasized that there is a wide confidence band around most of these estimates. Nevertheless, the weight of evidence in Table 6 and subsequent tables suggests that tax deterrent effects among companies locating close to state borders are both statistically significant and large enough in magnitude to warrant attention by policy makers.

VI. Conclusions

This paper has revisited an old question that has eluded efforts to provide a clear answer: to what extent do local taxes deter business activity? Any number of measurement and econometric issues have made this a challenging question to address for reasons that are well appreciated in the literature. For that reason, our goals throughout the paper have been targeted. Our focus has been on the influence of state

government policy on the *sorting* of establishments across state lines for those companies that operate within easy commuting distance of a state border. In that regard, we do not address the impact of state policy on the overall *level* of business activity close to a state border. Instead, we consider the tendency of entrepreneurs operating close to a state border to avoid adverse tax effects through their choice of state.

New to this paper, we provide the first ever analysis of state reciprocal agreements that require individuals to pay personal income tax to their state of residence as opposed to their state of employment. Controlling for that feature of the tax code proves to be a powerful source of identification. When reciprocal agreements are in force, higher personal income tax rates lure companies from across the border while higher corporate income and sales tax rates act as a deterrent. The reverse is true when reciprocal agreements are not in force. The tendency of higher tax rates to sometimes lure companies from across a state border might seem surprising at first but is actually quite intuitive: for a given set of government services, entrepreneurs will tend to favor locations in which they are relatively sheltered from the taxes used to finance local government activity. Our findings also suggest that tax deterrent effects are large enough in magnitude to be economically important, even allowing for a wide confidence band around the estimates.

Additional findings demonstrate that tax effects differ with the type of tax, the type of industry, ownership structure of the company (e.g. corporate versus non-corporate), and the local level of agglomeration. Given the sensitivity of our estimates to these considerations and also the influence of reciprocal agreements, it is not surprising that many previous studies have struggled to find convincing evidence of tax deterrent effects. Nevertheless, taken as a whole, our research design and estimates suggest that entrepreneurs and new business activity are drawn to locations in which they are relatively more sheltered from the cost of financing local government activities.

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Figure 1: One Sector

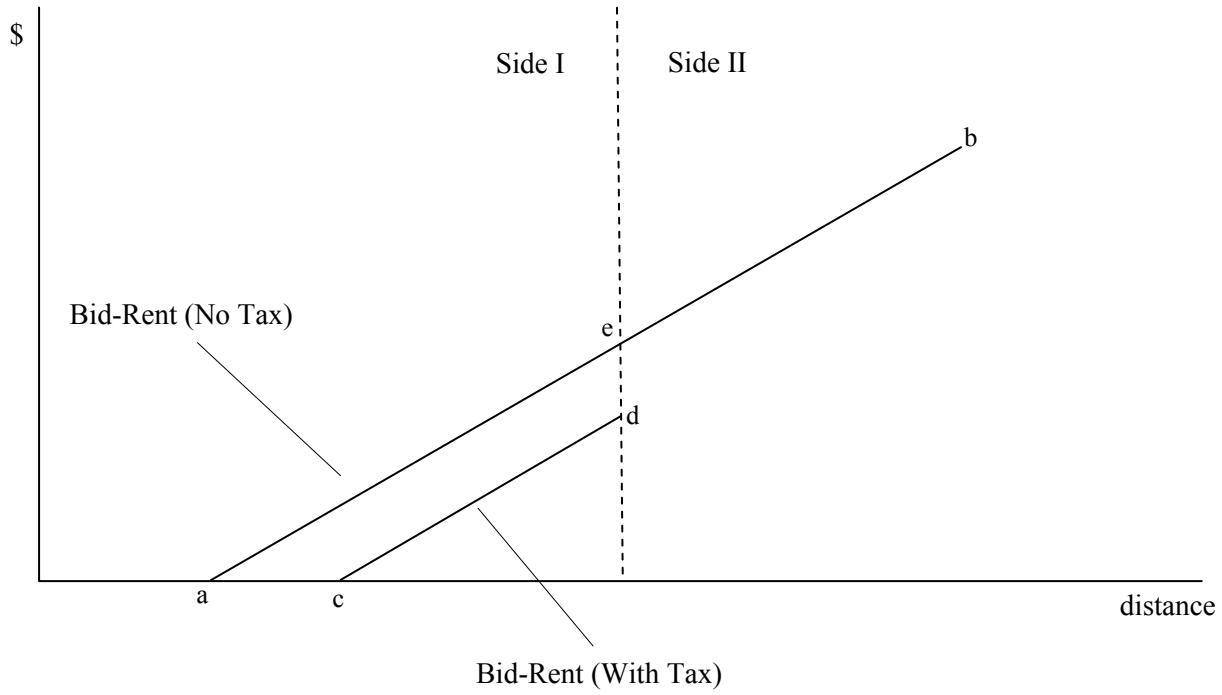

Figure 2: Two Sectors

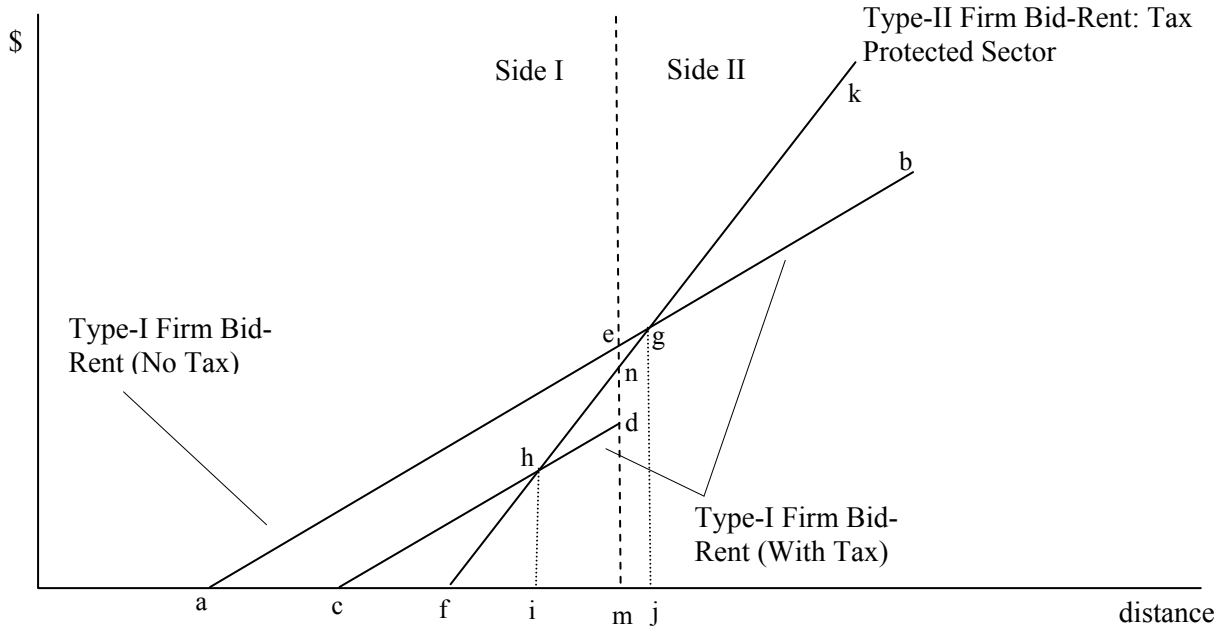

Figure 3: Border Region Total Employment

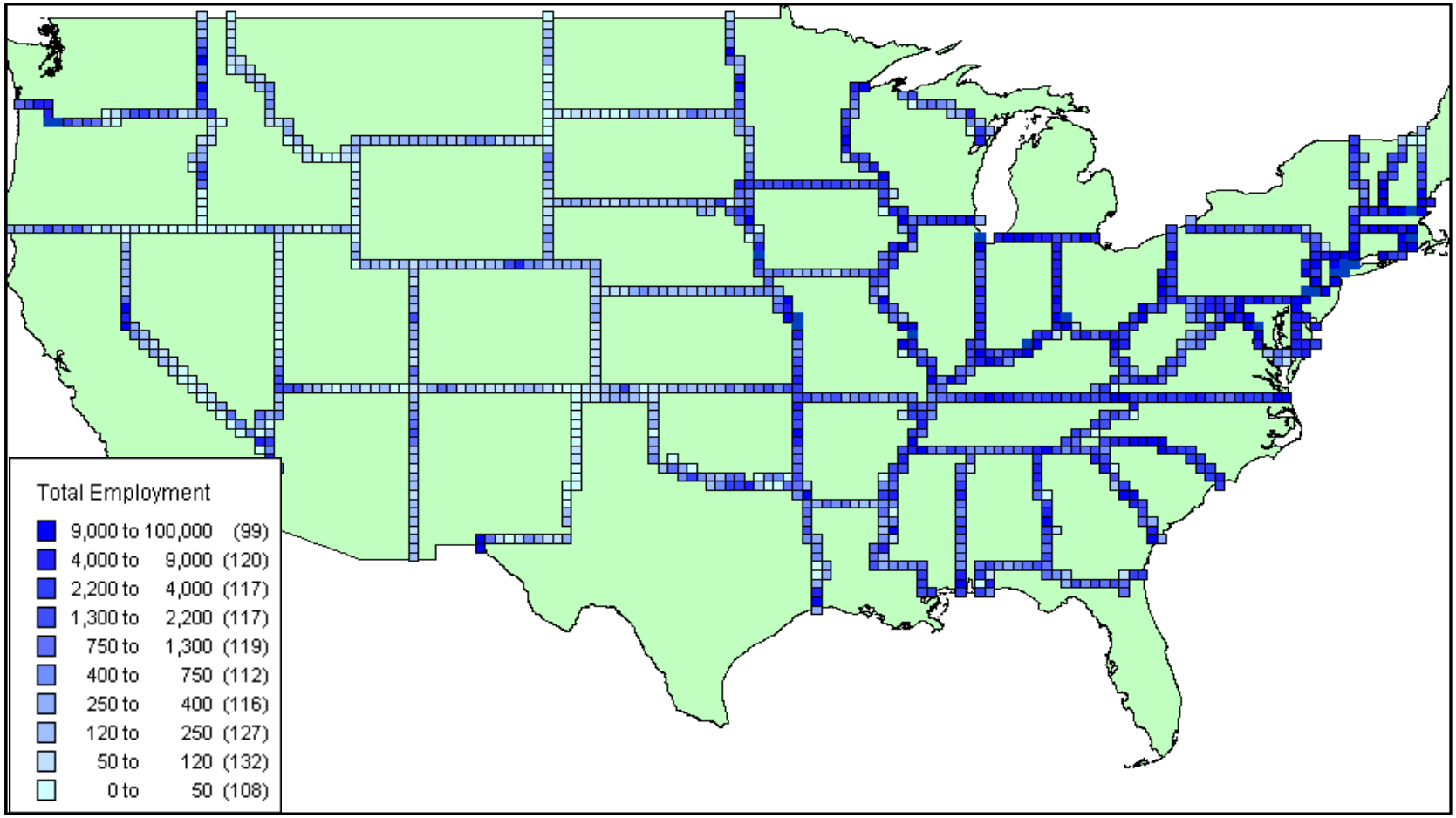

Figure 4: 20-by-20 mile Grid Squares Overlaid on 10-mile State Border Buffers

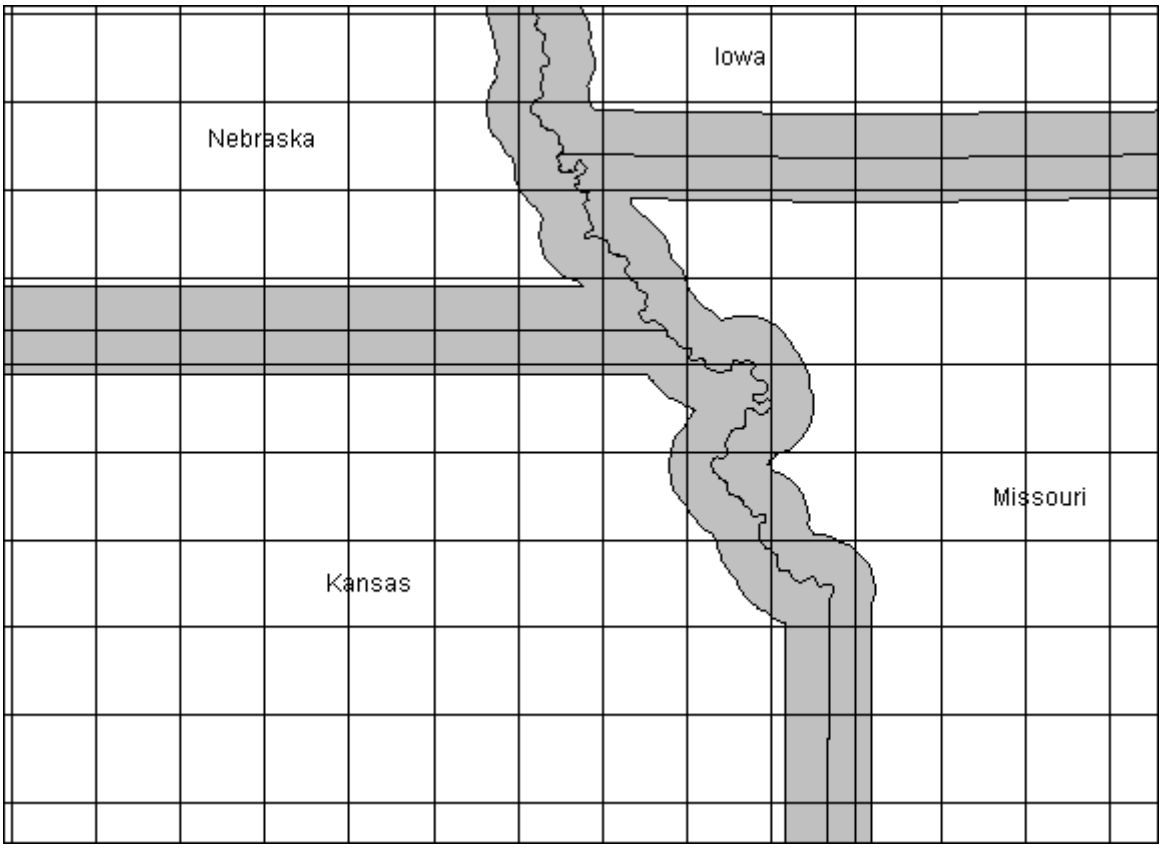

Table 1a: State Tax and Expenditures for the 48 Contiguous States

Panel A: State Revenue Shares and Expenditures for the 48 Contiguous States[a]

Year	Sales Tax Revenue Relative to Expenditures[a]	Household Income Tax Revenue Relative to Expenditures[a]	Corporate Income Tax Revenue Relative to Expenditures[a]	Expenditures per Capita
2002	0.135	0.129	0.018	$4,650
2005	0.139	0.136	0.025	$5,207

Panel B: State Tax Rates for the 48 Contiguous States[b]

	Sales Tax Rate			Maximum Personal Income Tax Rate			Maximum Corporate Income Tax Rate		
Year	Median	Std. Dev.	States with No Tax	Median	Std. Dev.	States with No Tax	Median	Std. Dev.	States with No Tax
2000	5%	1.737	4	6%	2.709	6	7%	2.986	5
2003	5%	1.705	4	6%	2.750	6	7%	2.939	5

[a] Using 2005 as an example, other major sources of state government revenue include: Intergovernmental grants, primarily from the federal government and to a much lesser extent local government, roughly 24 percent; All other sources of tax, licensing, and general revenue, roughly 20 percent; State-owned utilities and liquor stores, roughly 1 percent; Insurance trust revenue for government retirement and social insurance programs including contributions by government workers and net earnings on fund investments, roughly 25 percent. See: U.S. Census Bureau, State & Local Government Finance, Historical Data: 2005, http://www.census.gov/govs/estimate/historical_data_2005.html .
[b] Tax rate values were obtained from the Tax Foundation website for 2000 and 2003 at the following URL: www.taxfoundation.org.

Table 1b: Corporate Share of New Business Arrivals in the United States[a]

	2002:Q3		2005:Q3	
Variable	Total	Percent Corporations	Total	Percent Corporations
Manufacturing	19,399	0.439	12,790	0.482
Wholesale Trade	15,489	0.463	11,481	0.486
Retail	63,601	0.266	36,831	0.373
Finance & Insurance	21,014	0.437	19,283	0.543
Services	122,968	0.325	100,429	0.473
Total	242,471	0.337	180,814	0.462

[a]Sample includes all establishments created in the previous 12 months throughout the United States. Data are from the Dun and Bradstreet MarketPlace file.

Table 1c: State Income Tax Reciprocal Agreements[a]

State	Has Reciprocal Agreement with	Year of Inception	State	Has Reciprocal Agreement with	Year of Inception
Illinois	Iowa	1973	Maryland	Pennsylvania	1990
	Kentucky	1971		Virginia	1992
	Michigan	1971		West Virginia	1988
	Wisconsin	1973	Michigan	Minnesota	1984
Indiana	Kentucky	1977		Ohio	1972
	Michigan	1968		Wisconsin	1967
	Ohio	1977	Minnesota	North Dakota	1958
	Pennsylvania	1977		Wisconsin	1968
	Wisconsin	1977	Montana	North Dakota	1982
Kentucky	Michigan	1968	New Jersey	Pennsylvania	1978
	Ohio	1972	Ohio	Pennsylvania	1978
	West Virginia	1965		West Virginia	1972
	Wisconsin	1968	Pennsylvania	Virginia	1982
	Virginia	1964		West Virginia	1972
			Virginia	West Virginia	1988

[a]The reciprocal agreement data comes from www.gaebler.com. Note that Washington DC is not included in this list despite having reciprocal agreements because Washington DC is not included in this study.

Table 1d: Changes in State Tax Rates Between 2000 and 2003

	States that Changed Their Tax Rate	Adjacent States for Which the Cross-Border Difference in Tax Rate Changed
Maximum Corporate Income Tax Rate	6	24
Maximum Personal Income Tax Rate	11	35
Sales Tax Rate	5	23

Table 2: Total Number of New Business Arrivals

Variable	2002 Side 1	2002 Side 2	2005 Side 1	2005 Side 2	Total
1 Mile Buffer Sample[a]	14,645	21,353	13,947	17,331	67,276
10 Mile Buffer Sample[a]	21,860	29,712	20,566	24,296	96,434

[a]As described in the text, the 1-mile buffer sample includes new business establishments throughout the entirety of any zipcode that is at least partially within one mile of the state border. The 10-mile buffer sample is analogous and is based on a ten mile buffer.

Table 3: Wedge-Pair Employment Counts in 2002:Q3

Panel A: Each Establishment Treated as a Separate Observation

Percentile	1 Mile Buffer Sample[a]	10 Mile Buffer Sample[a]
5th	10,594	13,779
25th	32,596	48,854
50th	82,441	139,607
75th	288,511	465,073
95th	3,522,033	3,936,475
Mean	547,247	620,103
Observations	67,276	96,434

Panel B: Each Wedge-Pair Treated as a Separate Observation

Percentile	1 Mile Buffer Sample[a]	10 Mile Buffer Sample[a]
5th	2,620	2,647
25th	7,375	7,723
50th	14,033	16,013
75th	30,203	35,424
95th	91,815	135,454
Mean	33,428.48	44,868.15
Observations	832	869

[a]As described in the text, the 1-mile buffer sample includes new business establishments throughout the entirety of any zipcode that is at least partially within one mile of the state border. The 10-mile buffer sample is analogous and is based on a ten mile buffer.

Table 4: Size of State Government
Dependent Variable is 1 if arrival on side 2 and 0 if arrival on side 1
(t-stats are reported in parentheses[b])

	1 Mile Buffer Sample[a]			10 Mile Buffer Sample[a]		
	OLS	State Pair FE	Wedge-Pair FE	OLS	State Pair FE	Wedge-Pair FE
$Log(PerCapExp_2/PerCapExp_1)$[c]	-0.3267	0.0982	0.0821	-0.2795	0.0322	0.0363
	(-36.47)	(1.15)	(1.47)	(-40.23)	(0.45)	(0.68)
$Area_2 - Area_1$ (sq miles)[d]	0.0071	0.0091	-	0.0021	0.0024	-
	(166.30)	(6.41)	-	(179.28)	(10.13)	-
Year 2005	-0.0363	-0.0234	-0.0179	-0.0286	-0.0191	-0.0172
	(-10.27)	(-2.73)	(-3.73)	(-9.89)	(-2.65)	(-3.72)
Observations	67,276	67,276	67,276	96,434	96,434	96,434
State Fixed Effects	-	105	-	-	104	-
Wedge-Pair Fixed Effects	-	-	832	-	-	869
Adj. R-Squared (total)	0.15	0.24	0.42	0.19	0.30	0.46

[a]As described in the text, the 1-mile buffer sample includes new business establishments throughout the entirety of any zipcode that is at least partially within one mile of the state border. The 10-mile buffer sample is analogous and is based on a ten mile buffer.
[b]Robust standard errors are used for the OLS model. Standard errors are clustered at the level of the fixed effects for the state-pair and wedge-pair fixed effect models.
[c]$PerCapExp_1$ and $PerCapExp_2$ are the state per capita levels of expenditures on sides 1 and 2 of the border.
[d]$Area_2$ and $Area_1$ are the square mileage of the wedges from sides 2 and 1 that belong to a given wedge pair.

Table 5: Tax Measures

Dependent Variable is 1 if arrival on side 2 and 0 if arrival on side 1
(10 mile buffer sample[a]; t-stats are reported in parentheses[b])

	OLS	State Pair FE	Wedge-Pair FE
$Log(PerCapExp_2/PerCapExp_1)$[c]	-0.3275	0.05351	0.0579
	(-43.40)	(0.73)	(1.07)
Max Corp Tax Rate (Side 2 – Side 1)	0.0042	-0.0020	-0.0016
	(5.52)	(-0.21)	(-0.23)
Max Personal Tax Rate (Side 2 – Side1)	0.0068	-0.0020	-0.0013
	(8.96)	(-0.32)	(-0.25)
Sales Tax Rate (Side 2 – Side 1)	0.0100	0.0073	0.0080
	(13.17)	(1.53)	(1.71)
$Area_2 – Area_1$ (sq miles)[d]	0.0021	0.0023	-
	(178.06)	(10.09)	-
Year 2005	-0.0249	-0.0195	-0.0172
	(-8.63)	(-2.94)	(-3.97)
Observations	96,434	25,012	71,422
State-Pair Fixed Effects	-	104	-
Wedge-Pair Fixed Effects	-	-	869
Adj. R-Squared (total)	0.36	0.42	0.34

[a]As described in the text, the 10-mile buffer sample includes new business establishments throughout the entirety of any zipcode that is at least partially within ten miles of the state border.
[b]Robust standard errors are used for the OLS model. Standard errors are clustered at the level of the fixed effects for the state-pair and wedge-pair fixed effect models.
[c]$PerCapExp_1$ and $PerCapExp_2$ are the state per capita levels of expenditures on sides 1 and 2 of the border.
[d]$Area_2$ and $Area_1$ are the square mileage of the wedges from sides 2 and 1 that belong to a given wedge pair.

Table 6: Reciprocal Agreements

Dependent Variable is 1 if arrival on side 2 and 0 if arrival on side 1
(10 mile buffer sample[a]; t-stats are in parentheses[b])

	Full Sample	Reciprocal Agreements	No Reciprocal Agreements
$Log(PerCapExp_2/PerCapExp_1)$[c]	0.0579	-0.2043	0.0852
	(1.07)	(-0.89)	(1.53)
Max Corp Tax Rate (Side 2 – Side 1)[d]	-0.0016	-0.2298	0.0021
	(-0.23)	(-2.27)	(0.36)
Max Personal Tax Rate (Side 2 – Side1)[d]	-0.0013	0.0226	-0.0092
	(-0.25)	(2.54)	(-1.97)
Sales Tax Rate (Side 2 – Side 1)[d]	0.0080	-0.0678	0.0082
	(1.71)	(-2.27)	(1.80)
Year 2005	-0.0172	0.0018	-0.0205
	(-3.97)	(0.22)	(-4.42)
Observations	96,434	25,012	71,422
Wedge-Pair Fixed Effects	869	195	674
Adj. R-Squared (total)	0.36	0.42	0.34

[a]As described in the text, the 10-mile buffer sample includes new business establishments throughout the entirety of any zipcode that is at least partially within ten miles of the state border.
[b]Robust standard errors are used for the OLS model. Standard errors are clustered at the level of the fixed effects for the state-pair and wedge-pair fixed effect models.
[c]$PerCapExp_1$ and $PerCapExp_2$ are the state per capita levels of expenditures on sides 1 and 2 of the border.
[d]Exp_1 and Exp_2 are the state levels of expenditures on sides 1 and 2 of the border.

Table 7: Reciprocal Agreements and Stratification by Industry

Dependent Variable is 1 if arrival on side 2 and 0 if arrival on side 1
(10 mile buffer sample[a]; t-stats are in parentheses[b])

	Reciprocal Agreements			No Reciprocal Agreements		
	Manufacturing	Retail	Services	Manufacturing	Retail	Services
Log($PerCapExp_2$/$PerCapExp_1$)[c]	-0.1899	-0.3517	-0.2483	-0.1228	-0.0154	0.0590
	(-0.22)	(-0.93)	(-0.82)	(-0.48)	(-0.16)	(0.91)
Max Corp Tax Rate (Side 2 – Side 1)	-0.3637	-0.1600	-0.2947	0.1778	0.0007	-0.0007
	(-1.11)	(-1.32)	(-2.11)	(1.25)	(0.09)	(-0.10)
Max Personal Tax Rate (Side 2 – Side1)	-0.0283	0.0293	0.0313	-0.0076	-0.0091	-0.0064
	(-1.42)	(3.19)	(2.51)	(-0.59)	(-1.57)	(-1.20)
Sales Tax Rate (Side 2 – Side 1)	-0.0160	-0.1495	-0.0536	0.0108	0.0028	0.0090
	(-0.18)	(-3.56)	(-1.57)	(1.46)	(0.67)	(1.91)
Year 2005	-0.0654	0.0296	0.0013	-0.0009	-0.0190	-0.0230
	(-1.76)	(2.07)	(0.12)	(-0.06)	(-2.56)	(-4.13)
Observations	937	4,705	12,690	2,744	16,105	32,072
Wedge-Pair Fixed Effects	73	161	180	187	547	600
Adj. R-Squared (total)	0.41	0.4	0.42	0.32	0.34	0.34

[a]As described in the text, the 10-mile buffer sample includes new business establishments throughout the entirety of any zipcode that is at least partially within ten miles of the state border.
[b]Robust standard errors are used for the OLS model. Standard errors are clustered at the level of the fixed effects for the state-pair and wedge-pair fixed effect models.
[c]$PerCapExp_1$ and $PerCapExp_2$ are the state per capita levels of expenditures on sides 1 and 2 of the border.

Table 8: Reciprocal Agreements and Corporate Versus Non-Corporate Status

Dependent Variable is 1 if arrival on side 2 and 0 if arrival on side 1
(10 mile buffer sample[a]; t-stats are in parentheses[b])

	Reciprocal Agreements		**No Reciprocal Agreements**	
	Corporations	Sole Proprietorships and Partnerships	Corporations	Sole Proprietorships and Partnerships
$Log(PerCapExp_2/PerCapExp_1)$[c]	-0.2699	0.2251	0.0611	0.0720
	(-0.78)	(0.70)	(0.58)	(0.90)
Max Corp Tax Rate (Side 2 – Side 1)	-0.5406	-0.2849	-0.0025	0.0027
	(-3.15)	(-2.51)	(-0.32)	(0.45)
Max Personal Tax Rate (Side 2 – Side1)	0.0157	0.0421	0.0108	-0.0165
	(1.47)	(2.46)	(1.77)	(-3.15)
Sales Tax Rate (Side 2 – Side 1)	0.0088	-0.0685	0.0033	0.0087
	(0.23)	(-1.75)	(0.86)	(1.15)
Year 2005	-0.0361	0.0273	0.0016	-0.0234
	(-4.16)	(2.41)	(0.20)	(-3.62)
Observations	10,116	9,807	27,956	28,177
Wedge-Pair Fixed Effects	185	188	611	654
Adj. R-Squared (total)	0.41	0.42	0.33	0.35

[a]As described in the text, the 10-mile buffer sample includes new business establishments throughout the entirety of any zipcode that is at least partially within ten miles of the state border.
[b]Robust standard errors are used for the OLS model. Standard errors are clustered at the level of the fixed effects for the state-pair and wedge-pair fixed effect models.
[c]$PerCapExp_1$ and $PerCapExp_2$ are the state per capita levels of expenditures on sides 1 and 2 of the border.

Table 9: Reciprocal Agreements and Stratification by Agglomeration

Dependent Variable is 1 if arrival on side 2 and 0 if arrival on side 1
(10 mile buffer sample[a]; t-stats are in parentheses[b])

	Reciprocal Agreements			No Reciprocal Agreements		
	Full Sample	Lightly Developed (< 95th Percentile)[d]	Heavily Developed (> 95th Percentile)[d]	Full Sample	Lightly Developed (< 95th Percentile)[d]	Heavily Developed (> 95th Percentile)[d]
$\text{Log}(\text{PerCapExp}_2/\text{PerCapExp}_1)$[c]	-0.2043	-0.1091	-0.3173	0.0852	0.0618	0.1761
	(-0.89)	(-0.40)	(-0.52)	(1.53)	(0.97)	(1.53)
Max Corp Tax Rate (Side 2 – Side 1)	-0.2250	-0.1180	-0.3594	0.0021	-0.0028	0.1476
	(-2.27)	(-1.42)	(-1.75)	(0.36)	(-0.45)	(2.02)
Max Personal Tax Rate (Side 2 – Side1)	0.0226	-0.0077	0.0330	-0.0092	-0.0007	-0.0217
	(2.54)	(-0.62)	(3.01)	(-1.97)	(-0.13)	(-4.16)
Sales Tax Rate (Side 2 – Side 1)	-0.0678	-0.0583	-0.0922	0.0082	0.0015	0.0192
	(-2.27)	(-2.29)	(-1.25)	(1.80)	(0.59)	(2.94)
Year 2005	0.0018	0.0065	0.0065	-0.0206	-0.0196	-0.0177
	(0.22)	(0.50)	(0.62)	(-4.42)	(-3.36)	(-1.53)
Observations	25,012	10,682	14,330	71,422	37,403	34,019
Wedge-Pair Fixed Effects	195	180	15	674	646	28
Adj. R-Squared (total)	0.42	0.39	0.44	0.34	0.36	0.33

[a]As described in the text, the 10-mile buffer sample includes new business establishments throughout the entirety of any zipcode that is at least partially within ten miles of the state border.
[b]Robust standard errors are used for the OLS model. Standard errors are clustered at the level of the fixed effects for the state-pair and wedge-pair fixed effect models.
[c]PerCapExp_1 and PerCapExp_2 are the state per capita levels of expenditures on sides 1 and 2 of the border.
[d]Lightly and heavily developed locations are defined as those less than or greater than the 95th percentile as defined in Panel B of Table 3.

Appendix: Supplemental Tables Based on Tax Revenue Measures

Table A-1: Tax Measures

Dependent Variable is 1 if arrival on side 2 and 0 if arrival on side 1
(10 mile buffer sample[a]; t-stats are in parentheses[b])

	OLS	State FE	Wedge-Pair FE
$Log(PerCapExp_2/PerCapExp_1)$[c]	-0.2611 (-32.08)	0.0434 (0.58)	0.0523 (0.98)
$CorpTaxRev/Exp_2 - CorpTaxRev/Exp_1$[d]	-0.4212 (-3.65)	0.7819 (0.93)	1.013 (1.86)
$IncTaxRev/Exp_2 - IncTaxRev/Exp_1$[d]	-0.0052 (-0.24)	-0.2148 (-1.36)	-0.2233 (-1.72)
$SalesTaxRev/Exp_2 - SalesTaxRev/Exp_1$[d]	0.1631 (7.22)	0.5000 (3.46)	0.4751 (3.30)
$Area_2 - Area_1$ (sq miles)[e]	0.0021 (170.19)	0.0024 (10.09)	- -
Year 2005	-0.0299 (-10.27)	-0.0171 (-2.55)	-0.0140 (-3.20)
Observations	96,434	25,012	71,422
State-Pair Fixed Effects	-	105	-
Wedge-Pair Fixed Effects	-	-	869
Adj. R-Squared (total)	0.19	0.30	0.46

[a]As described in the text, the 10-mile buffer sample includes new business establishments throughout the entirety of any zipcode that is at least partially within ten miles of the state border.
[b]Robust standard errors are used for the OLS model. Standard errors are clustered at the level of the fixed effects for the state-pair and wedge-pair fixed effect models.
[c]$PerCapExp_1$ and $PerCapExp_2$ are the state per capita levels of expenditures on sides 1 and 2 of the border.
[d]Exp_1 and Exp_2 are the state levels of expenditures on sides 1 and 2 of the border.
[e]$Area_2$ and $Area_1$ are the square mileage of the wedges from sides 2 and 1 that belong to a given wedge pair.

Table A-2: Reciprocal Agreements

Dependent Variable is 1 if arrival on side 2 and 0 if arrival on side 1
(10 mile buffer sample[a]; t-stats are in parentheses[b])

	Full Sample	Reciprocal Agreements	No Reciprocal Agreements
$Log(PerCapExp_2/PerCapExp_1)$[c]	0.0523	-0.1987	0.1181
	(0.98)	(-0.78)	(2.24)
$CorpTaxRev/Exp_2 - CorpTaxRev/Exp_1$[d]	1.013	-2.060	1.976
	(1.86)	(-2.02)	(3.47)
$IncTaxRev/Exp_2 - IncTaxRev/Exp_1$[d]	-0.2233	-0.6233	-0.1129
	(-1.72)	(-1.22)	(-0.90)
$SalesTaxRev/Exp_2 - SalesTaxRev/Exp_1$[d]	0.4751	0.0879	0.6539
	(3.30)	(0.09)	(4.87)
Year 2005	-0.0140	-0.0281	-0.0146
	(-3.20)	(-3.00)	(-2.97)
Observations	96,434	25,012	71,422
Wedge-Pair Fixed Effects	869	195	674
Adj. R-Squared (total)	0.4556	0.2836	0.5166

[a]As described in the text, the 10-mile buffer sample includes new business establishments throughout the entirety of any zipcode that is at least partially within ten miles of the state border.
[b]Robust standard errors are used for the OLS model. Standard errors are clustered at the level of the fixed effects for the state-pair and wedge-pair fixed effect models.
[c]$PerCapExp_1$ and $PerCapExp_2$ are the state per capita levels of expenditures on sides 1 and 2 of the border.
[d]Exp_1 and Exp_2 are the state levels of expenditures on sides 1 and 2 of the border.

Table A-3: Reciprocal Agreements and Stratification by Industry

Dependent Variable is 1 if arrival on side 2 and 0 if arrival on side 1
(10 mile buffer sample[a]; t-stats are in parentheses[b])

	Reciprocal Agreements			No Reciprocal Agreements		
	Manufacturing	Retail	Services	Manufacturing	Retail	Services
$Log(PerCapExp_2/PerCapExp_1)$[c]	-2.1504	-0.0879	-0.2313	-0.1480	-0.0045	0.1053
	(-1.74)	(-0.19)	(-0.76)	(-0.66)	(-0.05)	(1.74)
$CorpTaxRev/Exp_2 - CorpTaxRev/Exp_1$[d]	-2.9976	-2.0789	-2.1746	-1.7941	0.8342	2.6259
	(-0.81)	(-1.34)	(-1.75)	(-0.77)	(0.85)	(4.06)
$IncTaxRev/Exp_2 - IncTaxRev/Exp_1$[d]	-2.8034	-0.6110	-0.6709	0.1467	-0.1027	-0.1824
	(-1.00)	(-0.61)	(-1.10)	(0.26)	(-0.38)	(-1.38)
$SalesTaxRev/Exp_2 - SalesTaxRev/Exp_1$[d]	6.4390	1.2754	-0.8489	0.4401	0.4592	0.7558
	(1.46)	(0.77)	(-0.79)	(1.63)	(3.10)	(5.36)
Year 2005	-0.0966	-0.0023	-0.0363	-0.0280	-0.0160	-0.0139
	(-2.34)	(-0.15)	(-3.11)	(-1.55)	(-2.12)	(-2.42)
Observations	937	4,705	12,690	2,744	16,105	32,072
Wedge-Pair Fixed Effects	73	161	180	187	547	600
Adj. R-Squared (total)	0.41	0.4	0.42	0.32	0.34	0.34

[a]As described in the text, the 10-mile buffer sample includes new business establishments throughout the entirety of any zipcode that is at least partially within ten miles of the state border.
[b]Robust standard errors are used for the OLS model. Standard errors are clustered at the level of the fixed effects for the state-pair and wedge-pair fixed effect models.
[c]$PerCapExp_1$ and $PerCapExp_2$ are the state per capita levels of expenditures on sides 1 and 2 of the border.
[d]Exp_1 and Exp_2 are the state levels of expenditures on sides 1 and 2 of the border.

Table A-4: Reciprocal Agreements and Corporate Versus Non-Corporate Status

Dependent Variable is 1 if arrival on side 2 and 0 if arrival on side 1
(10 mile buffer sample[a]; t-stats are in parentheses[b])

	Reciprocal Agreements		**No Reciprocal Agreements**	
	Corporations	Sole Proprietorships and Partnerships	Corporations	Sole Proprietorships and Partnerships
$Log(PerCapExp_2/PerCapExp_1)$[c]	-0.7365	0.2518	0.1575	0.0923
	(-1.94)	(0.77)	(1.39)	(1.19)
$CorpTaxRev/Exp_2 - CorpTaxRev/Exp_1$[d]	-2.2333	-1.3207	1.8628	1.9642
	(-1.44)	(-0.83)	(1.61)	(2.36)
$IncTaxRev/Exp_2 - IncTaxRev/Exp_1$[d]	0.0031	-0.9314	0.4322	-0.1839
	(0.01)	(-1.30)	(1.67)	(-0.80)
$SalesTaxRev/Exp_2 - SalesTaxRev/Exp_1$[d]	-1.1302	-0.3560	0.3762	0.7486
	(-0.98)	(-0.28)	(2.38)	(3.09)
Year 2005	-0.0630	-0.0106	-0.0009	-0.0150
	(-4.64)	(-0.75)	(-0.13)	(-2.25)
Observations	10,116	9,807	27,956	28,177
Wedge-Pair Fixed Effects	185	188	611	654
Adj. R-Squared (total)	0.41	0.42	0.33	0.35

[a]As described in the text, the 10-mile buffer sample includes new business establishments throughout the entirety of any zipcode that is at least partially within ten miles of the state border.
[b]Robust standard errors are used for the OLS model. Standard errors are clustered at the level of the fixed effects for the state-pair and wedge-pair fixed effect models.
[c]$PerCapExp_1$ and $PerCapExp_2$ are the state per capita levels of expenditures on sides 1 and 2 of the border.
[d]Exp_1 and Exp_2 are the state levels of expenditures on sides 1 and 2 of the border.

Table A-5: Reciprocal Agreements and Stratification by Agglomeration

Dependent Variable is 1 if arrival on side 2 and 0 if arrival on side 1
(10 mile buffer sample[a]; t-stats are in parentheses[b])

	Reciprocal Agreements			No Reciprocal Agreements		
	Full Sample	Lightly Developed (< 95th Percentile)[e]	Heavily Developed (> 95th Percentile)[e]	Full Sample	Lightly Developed (< 95th Percentile)[e]	Heavily Developed (> 95th Percentile)[e]
$Log(PerCapExp_2/PerCapExp_1)$[c]	-0.1986	-0.2359	-0.3361	0.1180	0.05158	0.2572
	(-0.78)	(-0.93)	(-0.50)	(2.24)	(0.77)	(2.65)
$CorpTaxRev/Exp_2 - CorpTaxRev/Exp_1$[d]	-2.0601	-3.7418	-3.2733	1.9757	1.5944	2.4236
	(-2.02)	(-3.74)	(-1.19)	(3.47)	(2.00)	(4.22)
$IncTaxRev/Exp_2 - IncTaxRev/Exp_1$[d]	-0.6233	-0.1744	-1.5136	-0.1129	0.1234	-0.2115
	(-1.22)	(-0.30)	(-1.53)	(-0.90)	(0.70)	(-1.27)
$SalesTaxRev/Exp_2 - SalesTaxRev/Exp_1$[d]	0.0878	0.7495	0.4717	0.6538	0.3388	0.9301
	(0.09)	(0.81)	(0.24)	(4.87)	(1.55)	(5.77)
Year 2005	-0.0281	-0.0056	-0.0602	-0.0145	-0.0157	-0.0220
	(-3.00)	(-0.49)	(-3.91)	(-2.97)	(-2.40)	(-2.96)
Observations	25,012	10,682	14,330	71,422	37,403	34,019
Wedge-Pair Fixed Effects	195	180	15	674	646	28
Adj. R-Squared (total)	0.42	0.39	0.44	0.34	0.36	0.33

[a]As described in the text, the 10-mile buffer sample includes new business establishments throughout the entirety of any zipcode that is at least partially within ten miles of the state border.
[b]Robust standard errors are used for the OLS model. Standard errors are clustered at the level of the fixed effects for the state-pair and wedge-pair fixed effect models.
[c]$PerCapExp_1$ and $PerCapExp_2$ are the state per capita levels of expenditures on sides 1 and 2 of the border.
[d]Exp_1 and Exp_2 are the state levels of expenditures on sides 1 and 2 of the border.
[e]Lightly and heavily developed locations are defined as those less than or greater than the 95th percentile as defined in Panel B of Table 3.