Destination Taxation: Road to Economic Success?

William F. Fox*
Center for Business and Economic Research
The University of Tennessee
billfox@utk.edu

Zhou Yang
Department of Economics and Legal Studies
Robert Morris University
yangz@rmu.edu

Abstract

Movement towards destination taxation has been the most significant change in recent state corporation income tax (CIT) policy. This paper explores these changes on both economic activity and CIT revenue. The paper shows that some expansions of destination taxation have tended to increase economic activity as well as CIT revenue, although the positive effect diminishes as state size grows. Increasing sales factor weight expands manufacturing production within a state; however, it does not have a significant impact on the service sector. In general, the effects of destination versus origin taxation depend on the specific ways in which they are imposed.

Keywords: destination taxation, origin taxation, corporate income tax

JEL Codes: H25, H71

*Corresponding author, 715 Stokely Management Center, 916 Volunteer Boulevard, Knoxville, Tennessee 37996; Phone: (865) 974-6112 Fax: (865) 974-3100
The authors are indebted to two anonymous referees, George Zodrow, and William Gentry, for very helpful comments on an earlier draft. The authors are, of course, responsible for remaining errors. The paper is forthcoming in the National Tax Journal.

I. INTRODUCTION

The economic efficiency, business location, and revenue implications of origin versus destination taxation have received considerable attention in both the theoretical and applied tax literatures over the past several decades. As initially discussed by Shibata (1967) and more recently by others such as Inman and Rubinfeld (1996), a good crossing national borders is said to be taxed on a destination (origin) basis if it is taxed at the importing (exporting) country's rate. In general, origin taxation refers to the imposition of a tax based on where a good or service is produced or where the factors are used in production, whereas destination taxation involves the taxation of a good or service based on where it is consumed or received.[1] Origin taxes have their initial effects on cross-state producer prices whereas destination taxes affect cross-state consumer prices, so these alternative structures can have very different implications. One implication of the distinction between origin and destination taxation is that movement toward destination taxation reduces distortions on the locational allocation of inputs but may also alter decisions on what and where to buy. Not surprisingly, in the case of commodity taxation, the structures are only equivalent in the specific situation where taxes are harmonized to be identical in all places (Behrens et al., 2007, 2009).

Policy discussions in both the European Union and the United States have motivated much of the origin/destination tax literature. Deliberations on the best ways to structure cross-country commodity/VAT taxation within the EU as compared to the treatment of cross-border transactions with the rest of the world stimulated the research in the EU (Lockwood, De Meza, and Myles, 1994; Lockwood, 2001). The U.S.-based discussion has focused on sales taxation of

[1] For example, corporate income taxes have both origin and destination components depending on the apportionment formula and sourcing of services. Payroll and property factors are origin components whereas the sales factor is often a destination component (for goods). More detailed discussion is provided in the following section.

remote commerce and the structure of state corporate income tax (CIT) apportionment formulas (Bruce, Fox, and Murray, 2003; Zodrow, 2006; Edmiston, 2002). Four recent bills related to remote commerce having been introduced in Congress and aggressive state actions to enforce destination taxation under the sales tax provide evidence of significant Congressional and state legislative interest. On the other hand, a bill has been introduced in Congress to limit destination taxation under the corporate income tax by only permitting states to impose tax on firms with physical presence in the state, at the same time that states continue to expand the destination components of the corporate income structure.

Recent theoretical work by Behrens et al. (2007, 2009) integrates international trade models with public finance theory and concludes that how state economies are affected by movement from origin to destination taxation is an empirical question since raising tax rates under either regime is likely to reduce home state economic activity. A wide range of changes in state corporate taxes during the past decades make the corporate tax structure a good option for analyzing these alternative tax systems.[2] We exploit these policy changes in the corporate income tax to test the implications of origin versus destination taxation on the location of production and collection of tax revenues based on hypotheses developed in the Behrens et al. papers. In the spirit of McCaffery and Slemrod (2006), we seek to examine the behavioral responses to significant tax policy changes. Our paper is the first to test the effects of a full set of recent policy changes that enhance the destination tax component of the corporate income tax. Moreover, this paper also explores the differential effects of state tax policies on different sectors of the economy. The findings have important policy implications and inform policy making.

[2] It is worth noting that the incidence of the corporate income tax has been a focus of research in public finance for over 50 years. See Gravelle (2011, 2013) for detailed literature reviews on the incidence of corporate income taxes.

The remainder of this paper is organized as follows. Section II introduces the theoretical background. Section III presents empirical specifications and briefly describes the data. Section IV discusses the results, and Section V concludes the paper by examining its policy implications.

II. THEORETICAL BACKGROUND

Behrens et al. (2004, 2007, 2009) develop a general equilibrium international trade model in a public finance setting to analyze the output, trade, and revenue implications of destination versus origin commodity taxation. Their theoretical results generate a series of testable hypotheses that motivate our empirical analysis. The model focuses on cross-country trade, but we apply it without modification to cross-state trade. The model assumes one large and one small jurisdiction and two production sectors, one producing a homogenous good under constant returns to scale and perfect competition and the other producing a differentiated good under increasing returns to scale and monopolistic competition. The model permits market segmentation so that price discrimination can occur across jurisdictions. An important implication of international trade models similar to that constructed by Behrens et al. is that prices in the monopolistically competitive sector will be lower in large jurisdictions without commodity taxes; that is, a home market effect exists because a large number of local suppliers increases price competition.

In particular, Behrens et al. (2004) provide insights on the effects of a change in tax regime. They conclude that destination and origin taxation are never equivalent when product differentiation and market segmentation are present except in the case of full tax harmonization across states; that is, the two tax regimes are only identical when tax rates and tax bases are identical across states. To support the argument, they find four necessary conditions for

equivalence of the two tax regimes to hold (Behrens et al., 2004). We summarize their comparison between destination and origin taxation using

$$(1) \qquad P_{ij}^{d} - P_{ij}^{o} = \kappa(S_j^{d} - S_i^{o}) + f_n(\lambda)(S_H^{o} - S_F^{o}), \; i, j \in \{H, F\},$$

where H denotes the home country and F the foreign country, and d and o represent destination taxation and origin taxation respectively. P_{ij}^{d} (P_{ij}^{o}) is the price paid by a consumer residing in country j for goods produced in country i under the destination (origin) principle. $S_j^{d} - S_i^{o}$ is the tax differential associated with a switch in tax regime: if $i = j$, it is the tax differential under destination versus origin taxation for domestic goods; otherwise, it is the tax differential for foreign goods. $f_n(\lambda)$ captures consumer preference and market conditions, which depend on the spatial distribution of capital (λ) and the specific scenario indicator (n) that corresponds to one of the four possible country combinations for residence and product origins. The conditions clearly suggest that without tax harmonization any switch of the tax regime by either country (home or foreign country) will impact prices and the allocation of resources, thus potentially affecting consumers and/or producers. Furthermore, policymakers should take into account the effects of possible changes in tax regime for both home country and foreign trading partners when proposing a change in tax policy.

The Behrens et al. (2004) analysis has a number of implications for the outcomes under origin and destination tax structures, which we use to motivate our empirical work. We are unable to test precisely some of the theoretical implications derived from their analysis of commodity taxation, since we employ the state corporate income tax to study origin versus destination taxation. Nevertheless, the corporate income tax is a good choice for our study because changes in this instrument over the past 15 to 20 years permit marginal analysis within a single tax instrument with similar administrative practices.

The rest of Section II provides a summary of theoretical findings on origin versus destination taxation based on Behrens et al. and discusses testable hypotheses for our paper.[3] Our approach uses real world approximations to destination and origin taxes to test the theories developed for hypothetical tax structures. First, changes in destination taxation imposed in one state have no implications for equilibrium relative prices in other states if markets can be segmented and firms' locations are given. These predictions are consistent with the observations of Kanbur and Keen (1993) and Mintz and Tulkens (1986) that no tax competition occurs if destination taxation can be fully enforced. An increase in origin tax rates, on the other hand, raises prices for both the home and other states.[4] Origin taxes distort production costs, which has implications for prices in both markets regardless of whether markets are segmented. Even without market segmentation, buyers in low destination tax states pay lower consumer prices than in higher tax states.

Second, the overall level of taxes, relative taxes across jurisdictions, and the choice between destination and origin taxation all could have implications for economic activity and tax revenues. Movement toward destination taxation is expected to raise revenues in all jurisdictions, as the effects of tax competition are dampened. Small states would be expected to benefit most if state destination structures move towards harmonization. We are able to test both hypotheses with our data. Although, higher rates under both destination and origin taxation are generally expected to reduce capital in a state (the measure of economic activity used by Behrens et al.), which has the larger effect is an empirical question. They conclude that a state always loses capital to other states when it raises a destination tax rate, though they do not specifically analyze

[3] Behrens et al. assumed that firms could price discriminate across jurisdictions. We recognize that the scope for discrimination may be limited across states in the United States; however, as long as firms have some ability to price discriminate, the qualitative findings of Behrens et al. should hold.
[4] Data limitations prevent a direct test of this hypothesis.

extreme cases, such as if all output is exported.[5] Higher origin taxes are also expected to shift capital to other states, and the degree to which this takes place increases as goods produced in the two states become better substitutes. A greater outflow of capital occurs when goods produced across states are better substitutes, because a higher origin tax rate makes local goods relatively more expensive compared to easily substitutable foreign goods. But the effect could reverse if the goods are poor substitutes, because the higher price imposed by the tax decreases the price elasticity of demand, thus possibly raising revenues for home state businesses and attracting new capital.

Third, the relative size of jurisdictions is important to the effects of tax structures. Increases in market size are always expected to raise a state's share of production, but higher tax rates across the board shift economic activity to smaller jurisdictions. The net effect on production (which equals the share of capital in the Behrens et al. context) due to the movement towards destination taxation depends on both the size of states and their relative tax rates. Furthermore, the home market effect in large states is reduced if they impose high tax rates and increased if they impose low tax rates, suggesting that both the level and relative size of tax rates matter. On the other hand, smaller states should generate more revenue from destination taxes. Large states are likely to impose higher tax rates and as a result are more likely to create a situation where the tax rate difference over small states exceeds the transportation costs so that consumer prices are higher in large states.

We use the origin/destination tax relationships in the state corporate income tax apportionment formula together with the theory to develop a set of testable hypotheses. The commodity tax theory (Behrens et al.) does not correspond perfectly to the corporate tax

[5] As discussed in the paper, this effect is driven by the interplay of market size and tax differentials. A higher commodity tax rate leads to a higher output price and a lower capital share of the corresponding country.

allocation formula, but there are many close parallels. A state corporate income tax can be interpreted as either more origin tax or more destination tax depending on the weights adopted for the factors in the apportionment formula and the situsing rules for where a sale is considered to have occurred. States apportion national corporate income using some variant of the three-factor formula:$\sum_{k=1}^{3} \alpha_{ki}(f_{ki}/f_k)$, where α_{ki} denotes the weight on factor *k* (sales, payroll, and property factors) in state *i*; f_{ki} represents the amount of factor *k* in state *i*, and f_k is the total amount of factor *k* in the nation. The payroll and property factors are imposed at the origin. The sales factor is imposed at either the origin or the destination, depending on whether the sale is attributed to its origin or destination. The level of destination taxation increases as the weight on sales moves towards 1 if situsing is at the destination. For example, increases in the sales factor weight move the corporate income tax towards a destination-based commodity tax on goods because the sales factor is situsing on a destination basis (McLure, 1980).[6] In states with a 100 percent weight on the sales factor, the only state specific values affecting a firm's tax liability are the state's corporate income tax rate and the firm's sales in the state — making the tax operate like a destination-based commodity tax.[7]

Behrens et al. observe that a commodity tax under the origin principle can be viewed as a production tax in the sense that it raises marginal production costs. An origin tax on labor and capital used in the production of goods is imposed through the CIT to the extent that the weight on sales in the formula is less than 100 percent, though the CIT is imposed through excises on the specific factors rather than through a general production tax. An excise tax on all factors is identical to a broad tax on production (Fullerton and Metcalf, 2002).

[6] Situs refers to the place where the sale is attributed for tax purposes.
[7] All transactions are included in apportioning sales, and not only those with final consumers.

States situs the sale of goods at the destination but historically have sitused services at the origin, using language such as the place of production or where the greatest cost of performance occurs.[8] The latter assigns all of the origin tax to a single state while the former apportions the origin tax between states based on where production takes place. Fifteen states have moved the situsing of services to a destination basis during the past decade, permitting analysis of the effects of moving from an origin to a destination tax on services.[9]

III. EMPIRICAL SPECIFICATION AND DATA

A. Effects on GDP and Tax Revenue

We test the theoretical hypotheses discussed above by examining the effects of the state corporate income tax structure on both economic activity and CIT revenue. State private GDP is employed as our main measure of state economic activity, and state private sector (non-government) employment is used as an alternative. We use two-stage least squares (2SLS) regressions to estimate both the GDP (employment) and tax revenue equations controlling for potential endogeneity. CIT revenue is generally expected to follow state economic activity for given tax rates, but the effects can be simultaneous since CIT collections, or the effective CIT rate, could affect economic activity by altering firms' production decisions. In addition, theory suggests that movement from origin to destination taxation affects state economic activity, though current state economic performance may also affect the decision to implement a destination-based tax policy, making adoption of destination taxation endogenous. Two separate 2SLS regressions are performed to examine the effects of state tax policy on GDP and CIT

[8] Financial services, including banking, insurance, and transportation services, are often subject to industry specific apportionment formulas, some of which may be on a destination base.
[9] Lawmakers in Pennsylvania just approved destination sourcing legislation (HB 465).

revenue, respectively.[10] The second stages of the two 2SLS regressions show the effects of destination taxation and other elements of state tax structures on economic activity and revenue. The 2SLS estimation for GDP uses instruments for the two endogenous measures of destination taxation, whereas the 2SLS for the revenue equation requires instrumenting both GDP and destination taxation measures. The empirical specifications for the two 2SLS regressions are

(2) $$LnGDP_{it} = \alpha_0 + \beta_0 LnPop_{it} + \varphi D_{it} + \beta_1 (D_{it} \times LnPop_{it}) + \theta' X_{it} + Y_t + u_i + v_{it},$$

(3) $$LnR_{it} = \gamma_0 + \delta_0 LnGDP_{it-1} + \rho D_{it-1} + \delta_1 (D_{it-1} \times LnGDP_{it-1}) + \phi' S_{it-1} + Y_t + u_i + v_{it},$$

where LnR_{it} is the natural log of state i's corporate income tax revenue in year t, $LnGDP_{it}$ is the natural log of state GDP, $LnPop_{it}$ denotes the natural log of state population, D_{it} indicates destination taxation, X_{it} and S_{it-1} $(S \subset X)$ are vectors of state characteristics, including state CIT structure variables, other state tax variables, state market size relative to neighbors, and other variables discussed below, u_i is a vector of state-fixed effects, Y_t is a vector of year-fixed effects, and v_{it} is the random disturbance. Specific definitions of all variables in the baseline equations are discussed below.

1. Measures of Economic Activity and Tax Revenue

State private (non-governmental) GDP is employed as the main measure of economic activity. Private employment is used as an alternative measure. Both are broad aggregate measures of economic activity that correspond to critical state policy goals. Government production is excluded because it is generally not subject to corporate income taxation; accordingly, state GDP hereafter refers to non-government GDP, and employment refers to non-

[10] We also considered simultaneously estimating the GDP and revenue equations. However, the results from two separate 2SLS are preferred over simultaneous equation estimates because seven states (states without a standard CIT structure) were excluded in the revenue estimation but not in the GDP estimation.

government employment. We simply refer to GDP in much of the discussion below, but the same points apply to employment.

As mentioned earlier, endogeneity between GDP and CIT revenue is an econometric concern for the revenue equation.[11] We use instrumental variables (IVs) to correct for endogeneity. State GDP is instrumented with a set of socioeconomic variables that have direct effects on GDP but no direct effects on tax revenue (together with all exogenous variables in the second-stage equation). The choice of instruments is consistent with the literature on the determinants of economic activity (Wasylenko and McGuire, 1985; Bruce, Deskins, and Fox, 2007). The literature includes variables such as measures of regional market size, demand, and local production costs. Two input cost measures are employed, annual state manufacturing wages and average state electricity prices.[12] In addition, the percentage of population above age 25 with at least a bachelor's degree is included to control for the productivity of the potential labor force.

2. Destination Taxation

As shown above, corporations' national profits are apportioned among states using shares of property, payroll, and sales that are aggregated using weights that vary among states. Relatively large weights on property and payroll reflect more origin taxation (at least for goods production), whereas a larger weight on the sales factor indicates a greater degree of destination taxation. An increase in the sales factor weight encourages production in a state if destination taxation is less distortionary than origin taxation. Previous literature generally has argued that, for given tax rates, a multi-state corporation prefers locating payroll and property in states with relatively high sales factor weights to avoid the excises on payroll and property (Edmiston, 2002).

[11] A Hausman test for endogeneity indicated that the lagged GDP is endogenous in the CIT revenue equation.
[12] The average electricity prices are provided by U.S. Energy Information Administration. The dataset is available at http://www.eia.gov/electricity/data/state/.

The general equilibrium analysis by Behrens et al., however, suggests the choice is not straightforward, as both origin and destination taxation create distortions. Furthermore, as discussed more below, origin-based rules on situsing services under what is nominally a destination tax mean that more weight on the sales factor does not always lead to greater destination taxation.

By 2009, 32 states placed more than a one-third weight on the sales factor, and 14 states used single sales factor apportionment.[13] For purposes of this study, the weight on the sales factor in percentage points is included as one of the two measures that reflect the extent of destination taxation. Because of potential endogeneity, the sales factor weight is instrumented using three variables: the lagged spatial average manufacturing employment in neighboring states, the lagged spatial average of total private employment in neighboring states, and the lagged spatial average weight on the sales factor.[14] The rationale behind these instruments is that lagged employment and corporate income taxation in neighboring states are correlated with the home state's corporate income taxation due to tax competition, but they have no direct impact on home state GDP.[15] The weight on the sales factor is interacted with the log of GDP ($LnGDP$) in the revenue equation to test the revenue hypothesis that *destination taxation should increase tax revenues in all states with larger effects in small states*. Consistent with this hypothesis, we expect the sales factor weight to have a positive coefficient and the interaction term to have a

[13] By 2013, about 16 states employed single sales factor apportionment.

[14] A weight matrix based on contiguity is used to calculate the spatial averages in neighboring states. In particular, the weight matrix is constructed using the contiguity of states, that is, whether they share a common border. The elements of the weight matrix W are: $\omega_{ij} = \begin{cases} b_{ij} / \sum_j b_{ij}, & i \neq j \\ 0, & i = j \end{cases}$, where b_{ij} equals one when states i and j share a common border and zero otherwise. Diagonal elements are by definition zero. The rows are standardized; therefore, $\sum_{i \neq j} \omega_{ij} x_{jt-1}$ represents a weighted average of a given variable (x) in state i's neighbors in year $t-1$.

[15] Endogeneity tests suggest this destination variable should be properly instrumented and further confirmation is provided by the observation that the 2SLS and ordinary least squares (OLS) estimates differ. In addition, over-identification tests were performed to validate the choice of instruments. The p-value of the Sargan–Hansen test for the GDP equation is 0.1134 and for the revenue equation is 0.2104 using our baseline specifications. Both tests cannot reject the validity of the instruments.

negative coefficient in the revenue equation. In the GDP equation, we interact the sales factor weight with the log of population (*LnPop*) to test the hypothesis that *with harmonization, destination taxation should help the small economy more than the large economy*.[16] A positive coefficient on the sales factor weight provides evidence that destination taxation encourages production within the state, and a negative coefficient on the interaction term indicates that the effect diminishes with state size. In addition, the sales factor weight is interacted with the top marginal corporate income tax rate to allow the effect to vary by the level of corporate income taxation. All interactions with the endogenous sales factor weight are treated as endogenous variables.[17]

Policy changes towards destination taxation include treatment of how sales of services are sitused in addition to changes in sales weighting. Many states have adopted the general provisions of the Uniform Division of Income for Tax Purposes Act (UDITPA) for corporate tax apportionment, though they often deviate from the details of UDITPA sources the sales of goods to the destination state and sources sales, other than sales of tangible personal property, in a state if the income-producing activity is performed in the state or if a greater share of the income-producing activity that is performed occurs in the state than in any other state. As a result, the sales factor for services in almost all states traditionally has been based on origin-based costs of performance. The sales factor in these states reinforces the origin basis of the property and payroll factors, so increases in the weight on the sales factor do not expand tax at the destination and may expand tax at the origin. Destination sourcing for service receipts has been less noticed

[16] State CIT rates are not harmonized but we test whether movement to destination taxation is more beneficial for smaller states even without tax harmonization.

[17] For the revenue equation, we instrument the interaction between *LnGDP* and sales factor weight with the interaction between the predicted *LnGDP* and predicted sales factor weight. All other interactions between the sales factor weight and exogenous variables in the revenue/GDP estimation are instrumented as well. See Appendix Table A for the list of instruments for each endogenous variable.

in the broader movement toward destination-based taxation. A dummy variable indicating whether states employ destination-sourcing for services is included. Destination-sourcing of services is found to be endogenous with GDP and is instrumented with two internet accessibility measures.[18] First, we expand the internet penetration panel (adding recent observations) created by Goolsbee, Lovenheim, and Slemrod (2010) and use this measure as one of our instruments. This variable measures the share of respondents who were internet connected in each state and year.[19] Second, the other instrument captures neighbors' accessibility to broadband services. In particular, this variable measures the average broadband connections in neighboring states.[20] The intuition for these two instruments is that the first is a proxy for the possibility that buyers in the home state consume services provided remotely (e.g., from other states), whereas the second is a proxy for the capability that neighboring states have for providing services remotely, which collectively influence the incentive for a given state government to adopt destination-sourcing of services.[21]

3. Other Corporate Tax Structure Variables

No single measure of state effective tax rates exists; therefore, several components of the CIT structure that could have both direct and indirect effects (through state GDP) on CIT revenue are included. The top statutory CIT rate is an obvious choice. Dummy variables for combined reporting requirements, addback provisions, throwback rules, and interactions between combined reporting, throwback rules, and the CIT rate are included to account for other factors determining the effective tax rate.[22] Combined reporting requires multistate corporations to

[18] The Hausman test suggests that destination-sourcing of services is endogenous.
[19] See Goolsbee, Lovenheim, and Slemrod (2010) for details about this measure.
[20] The data were collected from U.S. Federal Communications Commission Internet Access Services reports.
[21] Both IVs are statistically significant in the first stage regression, and the F-statistic on the excluded instruments in the first stage suggests they are strong instruments.
[22] We include the most common and visible policies discussed in the literature. In particular, states may adopt other policies to lessen avoidance opportunities (Bruce, Deskins, and Fox, 2007).

include the income and apportionment factors of all unitary businesses when calculating the taxable income attributable to the state.[23] Combined reporting reduces tax planning opportunities, such as using passive investment companies (PICs), in order to isolate income into separate corporations,[24] but has other effects such as allowing firms to offset profits in one set of subsidiaries with losses in others. The net effect of combined reporting on revenues is thus an empirical issue. Furthermore, a variable indicating whether more than half of geographic neighbors require combined reporting is constructed to control for the effect of neighbors' status on combined reporting. The rationale behind this variable is that firms serving neighboring markets that are mostly in combined reporting states face a higher effective tax rate for sales into the states, which could limit the attractiveness of nearby markets.

Some states require the addback of certain deductions, such as expenditures related to the use of intangibles or intercompany interest expenses, when calculating taxable income in the state. Among other goals, these provisions are intended to limit the use of related party transactions, often employing PICs, to reduce a corporation's tax liability. Addback rules are clearly expected to raise CIT burdens because they lower deductions. Throwback rules situs sales in the origin state in cases where the destination state cannot or chooses not to tax the income.[25] Throwback rules by their very design raise the extent of origin taxation, even in cases where the CIT is otherwise structured on a destination basis. Finally, some states allow corporations to deduct their federal CIT liability, which lowers the effective CIT rate. A dummy variable is included to denote the deduction of the federal CIT from the state CIT base.

4. Other Control Variables

[23] See Fox and Luna (2010) for a detailed discussion of combined reporting.
[24] Under separate accounting, corporations can set up subsidiaries (often through the PIC structure) to shift profits from high-tax states into low-tax states by isolating the income in separate entities in low-tax states.
[25] PL-482, for example, may prevent a state from taxing firms that only solicit for sale of tangible personal property in the destination state.

A number of other control variables are used. The state general sales tax rate is included because it represents the largest state tax liability for many firms (Cline et al., 2003a, 2003b, 2005).[26] In addition, the top marginal personal income tax (PIT) rate is included because of the potential to shift income between the corporate and unincorporated sectors.[27] Finally, a measure of relative market size on the border is included to control for the influence of potential out-of-state demand for goods and services in adjacent areas. This relative market size variable measures the ratio of a state's own population in border counties to the population of geographic neighbors in counties on the shared border (in percentage points). A bigger home market relative to neighboring markets implies fewer opportunities, in relative terms, to sell to localized markets outside the state.

All regressions include state- and year-fixed effects to control for state and time specific factors not included in the model. Tax revenue data are analyzed from 1994 through 2010 using GDP and other data from 1993 through 2009. Table 1 provides summary statistics for all data used in the paper. The GDP analysis uses the 48 continental states plus the District of Columbia (DC). For the revenue analysis, the second-stage equation employs 41 states plus DC because seven states do not levy a standard CIT structure.[28] All 48 states are included in the first-stage equation in the revenue analysis to allow for the effect of differences in business tax structure. In addition, three dummy variables are included in the GDP estimation to control for recent tax regime changes in Ohio, Texas, and Michigan.[29]

[26] As discussed in the literature, the sales taxation of business inputs is important. There may be a potential tradeoff between high retail sales tax rates and exclusions of business inputs from the sales tax.
[27] A rich literature exists on income shifting between corporate and personal tax bases because of tax rate differentials (Gordon and Slemrod, 2002; Auerbach, 2006).
[28] For example, four states (Nevada, South Dakota, Washington, and Wyoming) never had a corporate tax structure, and three states changed the tax regime near the end of our sample period (Michigan, Ohio, and Texas).
[29] Michigan replaced the Single Business Tax (addition VAT) with the Michigan Business Tax (a variant of a gross receipts tax). Ohio replaced the CIT with the Commercial Activities Tax (a gross receipts tax). Texas replaced the Texas Franchise Tax with the Texas Margin Tax. Three variables were used instead of a single dummy variable for

B. Effects on the Service and Manufacturing Sectors

To further explore the impact of destination taxation on state economies, we separately investigate how tax policies affect different sectors of the economy. Dissimilar results are expected across sectors since goods are sitused at the destination in all states, but services are sitused at the origin in most states, particularly for most of our panel years. The analysis is limited to the period from 1997 to 2009 because of the industry classification changes arising from the movement from SIC to NAICS codes.[30] Recent literature on trade in services shows that liberalization of services provides a major potential source of gains in manufacturing productivity and facilitates the coordination of activities among and within firms (Francois and Hoekman, 2010). In addition, improvements in the manufacturing sector could induce new demand for services. As a result, a simultaneous equation approach is used to jointly examine the effects of state tax structures on both the service and manufacturing sectors. The estimation follows the approach suggested by Cornwell, Schmidt, and Wyhowski (1992), which essentially uses three-stage least squares (3SLS) estimators[31]

$$(4) \quad LnManu_{it} = a_0 + b_0 LnService_{it} + c_0 D_{it} + \eta' X_{it} + Y_t + u_i + \epsilon_{it},$$

$$(5) \quad LnService_{it} = a_1 + b_1 LnManu_{it} + c_1 D_{it} + \psi' Z_{it} + Y_t + u_i + v_{it},$$

where $LnManu_{it}$ and $LnService_{it}$ denote the natural log of GDP in the manufacturing and service sectors, respectively, for state i in year t,[32] D_{it} is a vector of destination measures as in the previous analysis, these measures being the weight on the sales factor and whether the state

changes in the business taxes because of cross-state differences in the tax regimes before and after the reforms. For each of the three dummies, the value is 1 for the specific state and years that the alternative tax was implemented and zero otherwise.

[30] We also ran the baseline model using the data from 1994–2009. The year-fixed effects would control for changes in the industry classification assuming that changes affect all states in the same way. The results are similar to those in Table 4.

[31] Cornwell, Schmidt, and Wyhowski (1992) provide estimators that generalize Baltagi (1981) estimators.

[32] To avoid any potential concerns with selecting particular service industries, we use the broadest definition of services based on NAICS codes. In particular, we include all private service industries on the list starting from wholesale trade to all other non-government services.

sources services on a destination basis, and the interaction between the sales factor weight and state population ($LnPop$), X_{it} and Z_{it} are vectors of state characteristics including tax structure. State- and year-fixed effects are also included in the model. Specific details for the additional variables that were not used in the baseline (GDP) model are discussed below.

In particular, average shares of manufacturing and of services (as a percentage of GDP) in neighboring states are included to control for any agglomeration effects in each sector. Additional instruments for the log of GDP in the service sector include average service firm establishments and annual payroll in neighboring states, whereas additional instruments for the log of GDP in the manufacturing sector include neighbors' average manufacturing firm establishments and annual payroll. Appendix Table A provides a detailed explanation for all instruments used in the paper.

IV. RESULTS AND DISCUSSIONS

We first focus on the effects of origin versus destination taxation on state GDP and employment, and then examine the implications of origin versus destination taxation on the services and manufacturing sectors separately. Next, we analyze effects of the two tax regimes on corporate income tax revenues. Finally, the baseline model is modified by using the CIT rate differential, measuring the rate difference between the top CIT rate in a given state and the average top rate in its neighboring states, as suggested by Behrens et al.[33]

A. Influence on the Overall Economy

Table 2 reports the estimated effects of origin/destination taxation on GDP based on OLS and 2SLS regressions. For comparison purposes, we include the results from two specifications

[33] This is consistent with the Behrens et al. argument that both tax levels and tax differentials can affect economic activity. The average top rate in neighboring states is calculated using the same contiguity weight matrix discussed in footnote 14.

for the 2SLS regressions: a parsimonious model and a comprehensive model.[34] The parsimonious model excludes a number of variables that could influence the effective CIT rate and focuses on the key origin/destination variables. The comprehensive model accounts for the determinants of the effective CIT rate and destination situsing. The 2SLS regressions serve as our baseline because they account for the potential policy endogeneity arising from the destination variables. In addition, a comparison between the comprehensive and parsimonious 2SLS results suggests controlling for other features of the corporate income tax system can help reduce omitted variable bias and provide a richer explanation; thus, our preferred baseline model uses the full set of controls for the corporate income tax structure.

The results provide evidence that state efforts to stimulate the economy through destination rather than origin taxation might be successful depending on the specific policy movement toward destination taxation. The coefficient on the sales factor weight is positive and significant in the 2SLS regression with a full set of controls, and as expected the interaction term between the sales factor weight and the size of state (measured by population) is negative and significant. For most states, the combined effect is positive. The combined effect becomes negative at a population of about 15.9 million in the baseline model (Column 4 of Table 2), which means greater weight on the sales factor increases GDP in all but the four largest states.[35] The interaction between the top CIT rate and the weight on the sales factor is insignificant in all models.

Greater weight on the sales factor increases destination taxation if sales are sitused where the buyer is located, which traditionally has only been true for manufacturing firms. Thus, in most states, a larger sales weight moves toward destination taxation only for manufacturing firms.

[34] The 2SLS estimates shown in Tables 2 through 6 are the second-stage results of each 2SLS estimation.
[35] Recent theoretical work by Fajgelbaum et al. (2015) finds that sales factor weight has a negative impact on economic activity. Our results suggest that the effect also depends on the size of the state economy.

We demonstrate in our analysis by sector below that the manufacturing sector is enhanced by greater weight on the sales factor while the service sector is unaffected. Finally, destination sourcing of services, which is necessary for destination taxation of services, has a significant positive effect on state economic performance in the 2SLS parsimonious regression, but the significance drops in the 2SLS regression with the full set of controls (Column 4).

Throwback rules, which create origin taxation even in a state that otherwise situses on a destination basis, increase GDP, but have a significant and negative effect on economic activity in states that also impose a combined reporting requirement. Combined reporting only reduces the economy in states with the greater origin taxation associated with throwback rules. States with more than half of their neighbors imposing combined reporting do not appear to be harmed, though the coefficient is significant and negative in the OLS regression.

Higher PIT rates adversely affect state economies. Higher PIT rates affect incentives for pass through entities that are subject to personal income taxes, and may also affect the number or quality of workers and the wage rate in states. A higher sales tax rate increases costs for taxable input purchases and could also shift some purchases out of state (Fox, Luna, and Schaur, 2014). The coefficient on the sales tax rate is insignificant in the 2SLS regressions. Deductibility of federal CIT liability from the state CIT has no effect on private sector economic activity.

Other control variables in the GDP equation deserve some attention. As anticipated from the theoretical analysis by Behrens et al., states with broader markets, as measured by larger populations, tend to grow faster. Higher wages for manufacturing workers are associated with increased economic activity, as the wage variable may partially account for the quality of workers. Higher earnings can also expand domestic demand, particularly if manufacturers are

generally able to build the wages into higher prices in out-of-state markets. Higher government expenditures promote a larger economy.[36]

As a robustness check, we replace state GDP with state private sector employment. The results reported in Table 3 often mirror those for GDP, though the payroll factor in the apportionment formula creates an excise effect on employment that does not exist for GDP directly. For comparison purposes, estimates from all three regressions are presented and the specification with the broader set of controls is our preferred one, as discussed in the GDP analysis. A noticeable difference from the GDP results is that the direct effect of the corporate income tax rate is significantly negative in the 2SLS regressions, but its positive interaction term with sales weighting indicates that the distortionary effect of high corporate tax rates is mitigated as emphasis on destination taxation rises. The combined employment effect of raising the weight on the sales factor is negative.

B. Differential Effects across Sectors

Division of the economy into the service and manufacturing sectors provides clarity for the results previously discussed in Table 2. Comparison of Columns 2 and 3 in Table 4 reveals that tax policies differentially affect these two sectors. Consistent with the difference in situsing of manufacturing sales and service sales in most states, an increase in the sales factor weight promotes manufacturing activity, but the effects decline with the CIT rate and population size. The combined impact of the sales factor weight is positive in states with a population below 15.9 million (when calculated at the average CIT rate), again consistent with the Behrens. et al. expectation that smaller states benefit more from destination taxation. Greater sales weighting lowers service sector GDP but at a level of statistical significance slightly below the

[36] It is worth noting that the type of government expenditures matters for economic growth. Helms (1985) showed not only that taxes influence business location but also how the revenues are spent can shift the balanced budget impact.

conventional one. Thus, the effect on GDP that was discussed above arises solely from the manufacturing sector. As expected, the coefficient on destination-sourcing of services is positive in the regression for service sector activity in the state, but it is insignificant. The lack of significance may partially be driven by the fact that about 38 percent of states with destination sourcing of services adopted this treatment near the end of our sample period. In addition, destination-sourcing of services does not significantly influence the manufacturing sector.

The mix of tax policies is generally important to discerning the effects of different policies. Higher CIT rates reduce service sector economic activity in states with throwback rules. The effect of a higher CIT rate is negative for the manufacturing sector and rises with the weight on the sales factor and with combined reporting.

Combined reporting often hurts the economy, though the degree depends on the mix of state policies. Combined reporting unambiguously lowers manufacturing sector GDP in states with CIT rates higher than 7.02 percent, but only impedes the service sector in states that have throwback rules and CIT rates lower than 5.8 percent. The sectoral differences suggest that the effects of combined reporting depend on the specific firms and industries affected. Similarly, the higher degree of origin taxation created by throwback rules negatively affects the service sector in states with higher CIT rates, and the effects become even more detrimental with combined reporting. Throwback rules ensure greater origin taxation, even with destination situsing. On the other hand, surprisingly throwback rules are positively associated with economic activity in the manufacturing sector but are only marginally significant. Addback rules harm economic activity in the manufacturing sector but have no significant impact on the service sector.

A larger relative market size on the border expands the service sector. This is consistent with the expectation of a large home market effect (Einav et al., 2014). Nevertheless, we do not

find a significant home market effect for the manufacturing sector, perhaps because the sector is more likely to produce for external markets. An increase in government expenditures helps the service sector but harms the manufacturing sector, perhaps indicating the relative importance of public services in private service provision versus goods production. This may also indicate outsourcing of government services. A greater share of population with higher education benefits the service sector only. Consistent with recent trade literature, service provision and manufacturing production are reinforcing, promoting both sectors. Furthermore, the manufacturing sector is more responsive to expansions in the service sector rather than vice-versa.

C. Impact on CIT Revenue

Data are only available for aggregate revenues, so we cannot separately estimate tax revenue equations for the services and manufacturing sectors. Table 5 reports estimates on the relationship between destination taxation and CIT revenue, again using three estimation methods: OLS, 2SLS with a narrow set of CIT characteristics, and 2SLS with a broad set of CIT characteristics. The OLS results often differ from the 2SLS results with the same set of control variables. State CIT revenue significantly rises with the size of a state's private economy (GDP), with an elasticity close to one.

The direct impact of more weight on the sales factor is positive but insignificant. The interaction between GDP and sales factor weight is negative, which may suggest an inability to enforce destination taxation in cases such as where firms sell into states where they have relatively little physical presence. Nevertheless, an indirect positive effect on revenue exists for all but the largest states due to an increase in GDP attributable to a higher sales factor weight (Table 2). Destination sourcing of services has a significant and positive effect on revenues in the

2SLS regression with the full set of controls, implying that revenues increase when services are taxed where they are used rather than where they are produced.

The significant and positive coefficient on throwback rules suggests that the direct impact on CIT revenues is positive; however, this effect is reduced in states that also require combined reporting and those with higher CIT rates. The negative interactions indicate that the greater origin taxation imposed by the throwback rules reduces revenues in states with CIT rates higher than 7.0 percent and a combined reporting requirement. Surprisingly, combined reporting has no direct influence on CIT revenues, but it reduces revenues in states with throwback rules.[37] Addback rules do not have the expected significant influence on revenues, though the coefficient is positive in both the OLS and 2SLS regressions (and significant in the OLS regression). To sum up, among the three policy tools intended to raise revenues, throwback rules can achieve their intended results depending on the overall policy mix, but also reduce economic activity. Combined reporting harms economic activity without necessarily increasing revenues, and addback rules have no significant effect except in the OLS regression.

Higher CIT rates increase tax revenues in states, though the effect is mitigated by the presence of throwback rules. States tend to generate additional CIT revenue if more than half of their neighbors require combined reporting (holding GDP constant). This may indicate tax planning in the form of moving economic activity out of combined reporting states and into nearby markets. States with relatively larger home markets do not appear to generate more CIT revenues. Allowing the deduction of federal CIT liability reduces state CIT revenues as expected. Sales tax and PIT rates appear to have no significant impact on CIT revenue.

D. Alternative Specifications Using CIT Rate Difference

[37] Most of the states that have added combined reporting have done so at the end of our panel, and the time period may be too short to fully analyze how combined reporting affects revenues.

Behrens et al. (2004) argue that tax differentials as well as tax levels affect GDP and tax revenues; therefore, in alternative models, we replace the top CIT rate with the difference between each state's top CIT rate and the average top tax rate in neighboring states, and we interact the rate difference with throwback rules and combined reporting to control for effective rate differences. The average tax rate is measured by the spatial average of top statutory CIT rates in contiguous neighbors.[38] Table 6 reports the second-stage results for both GDP and revenue estimations from our preferred 2SLS regressions with the full set of controls.

1. GDP Results

The results are qualitatively similar to those in Table 2 with some reduction in significance levels for certain variables, indicating that the direction of impacts from destination taxation is generally the same whether analyzed with tax rates or tax differences. A larger weight on the sales factor raises GDP, and the benefit from raising the sales factor weight diminishes with state population size, but the effects are no longer significant (Column 2 in Table 6). The positive coefficient on destination sourcing of services becomes statistically significant in the alternative specification. Consistent with our previous findings, throwback rules negatively affect state economic activity when combined reporting is also required — these two increase the effective CIT rate. Addback rules significantly harm state economic development — again, by raising the effective tax rate. As previously found, GDP declines in states with higher PIT rates. The findings for all other control variables are the same as those obtained in the baseline model.

2. Corporate Income Tax Revenue Results

We found some differences between the tax differentials and tax levels revenue models. Column 3 of Table 6 shows that situsing services on a destination basis significantly raises CIT revenue as previously found, but the direct effect of a higher sales factor weight becomes

[38] That is, $\sum_{i \neq j} \omega_{ij} CIT_{jt}$; see footnote 14 for the discussion of the spatial weights ω_{ij}.

significant and negative, adding to the negative interaction term with GDP. State private GDP significantly influences CIT revenue with an elasticity close to one. Combined reporting is now found to have a positive effect on revenues through its interaction with CIT rate. Addback rules have a positive but insignificant influence on tax revenue as previously found.

V. CONCLUSION

Many states have expanded destination taxation based on a presumption that economic activity would be stimulated relative to maintaining the traditional corporate tax structure. However, theoretical research finds that both origin and destination taxes can distort economic activity, making the issue of which approach is preferable an empirical question at least to some extent. Our results are somewhat mixed. We find limited evidence that expanded destination taxation (greater weight on the sales factor and destination situsing of services) positively affects GDP but sometimes with marginal statistical significance, and the effect of sales weighting seems confined to the manufacturing sector. The impact of increasing sales weighting also depends on state size with greater benefits for small states. Results for destination taxation through sales weighting do not hold up for employment. Moving away from origin- to destination-based sourcing of services does not significantly encourage growth of the service sector (a positive but insignificant coefficient), nor does it directly influence economic performance in the manufacturing sector. However, this policy change is significant in our alternative specification (for the overall economy), but only when using tax rate differences rather than tax levels. Other tax structure alternatives that can be viewed as increasing origin taxation, such as throwback rules, tend to be associated with lower GDP and employment, though the specific outcome depends on the overall policy mix. On the revenue side, greater weight on the sales factor is associated with less revenue, suggesting that destination taxation is

not fully enforced in some cases. Destination situsing of services and imposition of throwback rules raise revenues.

Not surprisingly, states are left with a potential tradeoff between revenues and economic activity. These results provide suggestive evidence that the effects of destination versus origin taxation likely depend on the specific ways in which the alternative tax structures are imposed. The effects may also vary across industries, so that the net outcome is an aggregation of heterogeneous impacts at the sectoral level. State policy changes are likely to affect economic sectors differentially because of how they alter the mix of destination and origin taxation, but are also based on responses to underlying production and demand relationships.

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Table 1
Summary Statistics

Variable	Unit	Obs	Mean	Min	Max
Ln CIT revenue	$Thousand	714	12.88	10.25	16.29
Ln GDP	$Billion	833	4.66	2.37	7.44
Ln GDP in service	$Million	637	11.31	8.81	14.10
Ln GDP in manufacturing	$Million	637	9.63	5.36	12.32
Weight on the sales factor	Percentage point	833	42.69	0	100
Destination-sourcing of services	Dummy	833	0.09	0	1
Top CIT rate	Percentage point	833	6.59	0	12
Combined reporting	Dummy	833	0.31	0	1
Throwback rule	Dummy	833	0.46	0	1
Addback rule	Dummy	833	0.11	0	1
Federal CIT deductibility	Dummy	833	0.12	0	1
More than half neighbors with combined reporting	Dummy	833	0.20	0	1
Relative market size	Percentage point	833	49.04	9.70	115.80
Top personal income tax rate	Percentage point	833	5.67	0	12.00
Sales tax rate	Percentage point	833	4.85	0	7.25
Ln population	Person	833	15.09	13.07	17.43
Manufacturing wage	$Thousand	833	41.68	21.93	80.77
Percent of population with at least college education	Percentage point	833	24.98	11.40	48.50

Table 2
GDP Results

Variable	OLS	2SLS Parsimonious (Second Stage)	2SLS Full Model (Second Stage)
Weight on the sales factor	0.0045	0.0168	0.0945**
	(0.0041)	(0.0248)	(0.0469)
Weight on the sales factor × Ln population	-0.0003	-0.0014	-0.0057**
	(0.0002)	(0.0013)	(0.0026)
Destination-sourcing of services	0.0053	0.2365*	0.3373
	(0.0124)	(0.1221)	(0.2143)
Top CIT rate	0.0044	-0.0404	-0.0105
	(0.0072)	(0.0379)	(0.0683)
CIT rate × weight on the sales factor	0.0000	0.0008	-0.0000
	(0.0001)	(0.0009)	(0.0016)
CIT rate × combined reporting	-0.0081		0.0132
	(0.0068)		(0.0151)
CIT rate × throwback rule	-0.0089		-0.0039
	(0.0056)		(0.0083)
Combined reporting	0.0937		-0.0167
	(0.0580)		(0.1254)
Throwback rule	0.1146**		0.3313**
	(0.0542)		(0.1352)
Combined reporting × throwback rule	-0.0526*		-0.3704**
	(0.0296)		(0.1490)
Addback rule	-0.0309***		-0.0569
	(0.0078)		(0.0380)
Federal CIT deductibility	-0.0310**		-0.0915
	(0.0123)		(0.0592)
More than half neighbors with combined reporting	-0.0397**		0.0090
	(0.0155)		(0.0343)
Relative market size	0.0036***	0.0068***	0.0101***
	(0.0008)	(0.0017)	(0.0028)
Top personal income tax rate	-0.0107***	-0.0150***	-0.0219***
	(0.0028)	(0.0051)	(0.0079)
Sales tax rate	-0.0112**	0.0016	0.0174
	(0.0046)	(0.0073)	(0.0122)
Michigan	-0.1682***	-0.1270***	-0.0506
	(0.0317)	(0.0321)	(0.0599)
Ohio	-0.0997*	-0.3482	-0.0456
	(0.0558)	(0.2897)	(0.5015)
Texas	0.0291	-0.1314	0.0165
	(0.0447)	(0.1863)	(0.3205)
Ln population	0.8369***	0.8979***	0.8444***
	(0.0429)	(0.0730)	(0.1294)
Government expenditure	0.0256***	0.0286***	0.0374***
	(0.0033)	(0.0071)	(0.0103)
Manufacturing wage	0.0057***	0.0062***	0.0102***
	(0.0009)	(0.0016)	(0.0024)
Percent of population with at least college education	0.0021*	-0.0004	0.0003
	(0.0011)	(0.0016)	(0.0023)
Observations	833	833	833
Adjusted R^2	0.9695	0.9579	0.9018

Notes: Entries are coefficient estimates with standard errors in parentheses. State- and year-fixed effects are included. Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) levels.

Table 3
Employment Results

Variable	OLS	2SLS Parsimonious (Second Stage)	2SLS Full Model (Second Stage)
Weight on the sales factor	0.0036*	-0.0206	0.0245
	(0.0022)	(0.0189)	(0.0213)
Weight on the sales factor × Ln population	-0.0003***	0.0002	-0.0023*
	(0.0001)	(0.0011)	(0.0012)
Destination-sourcing of services	0.0051	-0.0647	0.0465
	(0.0064)	(0.0757)	(0.0789)
Top CIT rate	0.0008	-0.0932***	-0.0661***
	(0.0038)	(0.0267)	(0.0248)
CIT rate × weight on the sales factor	0.0002***	0.0021***	0.0016***
	(0.0001)	(0.0006)	(0.0006)
CIT rate × combined reporting	-0.0032		0.0045
	(0.0035)		(0.0073)
CIT rate × throwback rule	-0.0139***		-0.0111***
	(0.0029)		(0.0040)
Combined reporting	0.0739**		0.0486
	(0.0302)		(0.0641)
Throwback rule	0.1374***		0.2145***
	(0.0282)		(0.0700)
Combined reporting × throwback rule	-0.0708***		-0.1927***
	(0.0154)		(0.0721)
Addback rule	-0.0088**		0.0071
	(0.0041)		(0.0138)
Federal CIT deductibility	-0.0171***		-0.0192
	(0.0064)		(0.0223)
More than half neighbors with combined reporting	0.0031		0.0015
	(0.0081)		(0.0155)
Relative market size	0.0018***	0.0013	0.0038***
	(0.0004)	(0.0016)	(0.0012)
Top personal income tax rate	-0.0087***	-0.0050*	-0.0093***
	(0.0014)	(0.0030)	(0.0035)
Sales tax rate	-0.0064***	-0.0085	0.0005
	(0.0024)	(0.0060)	(0.0041)
Michigan	-0.1016***	-0.1227***	-0.0769***
	(0.0165)	(0.0294)	(0.0227)
Ohio	-0.0839***	-0.7889***	-0.5291***
	(0.0290)	(0.1869)	(0.1868)
Texas	0.0270	-0.4219***	-0.2722**
	(0.0233)	(0.1254)	(0.1180)
Ln population	0.7750***	0.8828***	0.8547***
	(0.0223)	(0.0460)	(0.0515)
Government expenditure	0.0146***	0.0099***	0.0141***
	(0.0017)	(0.0034)	(0.0040)
Manufacturing wage	-0.0009*	-0.0013	0.0004
	(0.0005)	(0.0012)	(0.0011)
Percent of population with at least college education	0.0004	0.0006	-0.0001
	(0.0006)	(0.0011)	(0.0009)
Observations	833	833	833
Adjusted R^2	0.9824	0.7575	0.8278

Notes: Entries are coefficient estimates with standard errors in parentheses. State- and year-fixed effects are included. Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) levels.

Table 4
Service and Manufacturing Sectors Using Simultaneous Equation Model

Variable	Ln GDP in Service	Ln GDP in Manufacturing
Ln GDP in manufacturing	0.1054***	
	(0.0238)	
Ln GDP in service		3.4154***
		(0.8965)
Weight on the sales factor	-0.0139	0.1938***
	(0.0097)	(0.0665)
Weight on the sales factor × Ln population	0.0006	-0.0097***
	(0.0005)	(0.0033)
Destination-sourcing of services	0.0540	-0.1286
	(0.0385)	(0.2575)
Top CIT rate	-0.0170	0.2113
	(0.0209)	(0.1295)
CIT rate × weight on the sales factor	0.0005	-0.0050*
	(0.0005)	(0.0028)
CIT rate × combined reporting	0.0121**	-0.1098***
	(0.0061)	(0.0330)
CIT rate × throwback rule	-0.0136***	0.0579*
	(0.0051)	(0.0321)
Combined reporting	-0.0511	0.7699**
	(0.0557)	(0.3149)
Throwback rule	0.1160**	-0.2631
	(0.0474)	(0.3162)
Combined reporting × throwback rule	-0.0702***	0.1269
	(0.0250)	(0.1875)
Addback rule	0.0130	-0.1326***
	(0.0080)	(0.0486)
Federal CIT deductibility	0.0050	-0.1668**
	(0.0112)	(0.0703)
More than half neighbors with combined reporting	0.0076	-0.0775
	(0.0110)	(0.0643)
Relative market Size	0.0035***	-0.0070
	(0.0008)	(0.0061)
Top personal income tax rate	-0.0060***	0.0099
	(0.0020)	(0.0141)
Sales tax rate	0.0108***	-0.0529**
	(0.0038)	(0.0236)
Michigan	-0.0752***	0.1735
	(0.0228)	(0.1580)
Ohio	-0.1629	1.4717
	(0.1473)	(0.9335)
Texas	-0.0994	1.0438*
	(0.0987)	(0.6103)
Ln population	0.7300***	-2.1997***
	(0.0477)	(0.7813)
Government expenditures	0.0196***	-0.0586**
	(0.0027)	(0.0274)
Percent of population with at least college education	0.0017**	-0.0066
	(0.0009)	(0.0054)
Average service share of neighbors	0.0078	
	(0.3435)	
Manufacturing wage		0.0125**
		(0.0052)
Average manufacturing share of neighbors		5.4314*
		(2.8800)
Observations	637	637
Adjusted R^2	0.9994	0.9861

Notes: Entries are coefficient estimates with standard errors in parentheses. State- and year-fixed effects are included. Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) levels.

Table 5
Revenue Results

Variable	OLS	2SLS Parsimonious (Second Stage)	2SLS Full Model (Second Stage)
Ln GDP	0.7610***	0.8835***	0.6374*
	(0.1576)	(0.3180)	(0.3300)
Ln GDP × weight on the sales factor	-0.0011	-0.0014***	-0.0013***
	(0.0009)	(0.0005)	(0.0005)
Weight on the sales factor	0.0038	0.0013	0.0321
	(0.0062)	(0.0223)	(0.0271)
Destination-sourcing of services	0.0663	0.5761	0.7711*
	(0.0554)	(0.4333)	(0.4553)
Top CIT rate	0.1438***	0.0395	0.3094**
	(0.0323)	(0.1293)	(0.1497)
CIT rate × weight on the sales factor	-0.0001	-0.0002	-0.0040
	(0.0005)	(0.0030)	(0.0034)
CIT rate × combined reporting	0.0693**		0.0563
	(0.0303)		(0.0507)
CIT rate × throwback rule	-0.1566***		-0.1540***
	(0.0253)		(0.0314)
Combined reporting	-0.0781		0.0823
	(0.2581)		(0.4987)
Throwback rule	1.5064***		1.5415***
	(0.2469)		(0.2868)
Combined reporting × throwback rule	-0.4532***		-0.4885***
	(0.1346)		(0.1668)
Addback rule	0.1044***		0.0210
	(0.0340)		(0.0704)
Federal CIT deductibility	-0.1045*		-0.1714*
	(0.0579)		(0.0931)
More than half neighbors with combined reporting	0.1221*		0.1654
	(0.0694)		(0.1153)
Relative market size	0.0033	0.0047	0.0019
	(0.0045)	(0.0052)	(0.0061)
Top personal income tax rate	0.0012	0.0190	-0.0045
	(0.0123)	(0.0164)	(0.0224)
Sales tax rate	-0.0408*	-0.0303	-0.0194
	(0.0220)	(0.0304)	(0.0363)
Observations	714	714	714
Adjusted R^2	0.8095	0.8074	0.7469

Notes: Entries are coefficient estimates with standard errors in parentheses. State- and year-fixed effects are included. Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) levels.

Table 6
Alternative Model Using CIT Rate Difference

Variable	2SLS on GDP (Second Stage)	2SLS on Revenue (Second Stage)
Ln GDP		0.9798***
		(0.3785)
Ln GDP × weight on the sales factor		-0.0014***
		(0.0005)
Weight on the sales factor	0.0877	-0.0244*
	(0.1043)	(0.0136)
Weight on the sales factor × Ln population	-0.0050	
	(0.0071)	
Destination-sourcing of services	0.4665*	0.6934*
	(0.2693)	(0.4137)
Top CIT rate difference	-0.0001	0.0580***
	(0.0235)	(0.0204)
Top CIT rate difference × weight on the sales factor	0.0002	-0.0011**
	(0.0005)	(0.0005)
Top CIT rate difference × combined reporting	-0.0081	0.0197*
	(0.0101)	(0.0114)
Top CIT rate difference × throwback rule	-0.0008	-0.0103
	(0.0038)	(0.0087)
Combined reporting	-0.1204	0.6117
	(0.3476)	(0.3956)
Throwback rule	0.2533*	-0.1318
	(0.1425)	(0.2891)
Combined reporting × throwback rule	-0.3373**	-0.0833
	(0.1571)	(0.2463)
Addback rule	-0.0618*	0.0212
	(0.0315)	(0.0468)
Federal CIT deductibility	-0.0967	-0.0022
	(0.0712)	(0.0903)
More than half neighbors with combined reporting	0.0204	0.1513
	(0.0440)	(0.1240)
Relative market size	0.0131	-0.0142
	(0.0086)	(0.0102)
Top personal income tax rate	-0.0213***	0.0125
	(0.0082)	(0.0163)
Sales tax rate	0.0183	-0.0161
	(0.0144)	(0.0342)
Michigan	-0.0269	
	(0.0771)	
Ohio	0.0489	
	(0.1950)	
Texas	0.0830	
	(0.0879)	
Ln population	0.8144***	
	(0.1918)	
Government expenditure	0.0425***	
	(0.0125)	
Manufacturing wage	0.0104***	
	(0.0029)	
Percent of population with at least college education	-0.0012	
	(0.0029)	
Observations	833	714
Adjusted R^2	0.8639	0.7320

Notes: Entries are coefficient estimates with standard errors in parentheses. State- and year-fixed effects are included. Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) levels.

Appendix Table A: List of Instruments

Endogenous Variable	Instrument
Weight on the sales factor	Lagged spatial average manufacturing employment in neighboring states
	Lagged spatial average of total private employment in neighboring states
	Lagged spatial average weight on the sales factor in neighboring states
Weight on the sales factor × ln population	Lagged spatial average manufacturing employment in neighboring states × lagged ln population
	Lagged spatial average of total private employment in neighboring states × lagged ln population
Weight on the sales factor × CIT	Lagged spatial average manufacturing employment in neighboring states
	Lagged spatial average of total private employment in neighboring states
Destination sourcing of service	Share of respondents who were Internet connected in each state and year
	Average broadband connections in neighboring states
Ln GDP	State manufacturing wage
	Average state electricity price
	Share of population above 25 with at least a bachelor's degree
Ln GDP × weight on the sales factor	Predicted Ln GDP × predicted sales factor weight
Ln GDP in service	Spatial average of service firm establishments in neighboring states
	Spatial average of service annual payroll in neighboring states
Ln GDP in manufacturing	Spatial average of manufacturing firm establishments in neighboring states
	Spatial average of manufacturing annual payroll in neighboring states