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State Taxation and the Reallocation of Business Activity

By Joshua Rauh

A growing number of companies are moving their headquarters or operations from one state to another. One common — and accurate — storyline either blames the deserted state's taxes for being too high or applauds the lower tax rate in the company's new location.

The narrative played out when Toyota announced the move of its headquarters from California to Texas in 2014 and when Mercedes Benz announced this year that it would move from New Jersey to Georgia. Many mid-size companies supposedly left Illinois after a 2011 tax increase. Gregory Blaise, head of the Illinois Manufacturers' Association, stated that "the only businesses that will benefit are the moving companies that will be helping many of my members move out of this particular state." General

Electric and Aetna have both suggested they might leave Connecticut in response to tax increases that were passed this year.

For all the discussion of this topic, the empirical research on the sensitivity of corporate activities to state taxation has been quite inconclusive. Policy institutes even have difficulty agreeing on how to characterize the literature that has attempted to estimate the impact of state taxation on firm location and economic growth. Do taxes really affect firm location, or are they a sideshow? And how much action is really behind the corporate statements?

Recent findings by Xavier Giroud of MIT-Sloan and me show that tax changes do in fact have substantial near-term effects on firm decisions to locate economic activity in

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About The Author

Joshua Rauh is a Senior Fellow at SIEPR. He is also a Professor of Finance at the Stanford Graduate School of Business, a Senior Fellow at the Hoover Institution, and a Research Associate at the National Bureau of Economic Research (NBER). He formerly taught at the University of Chicago's Booth School of Business (2004–9) and the Kellogg School of Management (2009–12).

Professor Rauh studies corporate investment and financial structure, private equity and venture capital, and the financial structure of pension funds and their sponsors. He has published numerous journal articles and was awarded the 2006 Brattle Prize and the 2011 Smith-Breeden Prize for his research papers in the *Journal of Finance*.



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the state, and we provide new measurements of these effects.¹

Establishing the impact of state business taxation on jobs and investment is difficult for a variety of reasons. First, state business taxation is endogenous and may correlate with changes in economic conditions. Second, high-quality microdata is needed to understand whether firms are relocating their businesses to other regions or reducing the scale of their operations.

Giroud and I use establishment-level data from the U.S. Census Bureau on multistate businesses to track firms' operations across states. We look at responses on both the extensive margin (whether firms change the number of establishments in states when tax rates change) and on the intensive margin (whether firms change the number of employees in their establishments in the states with tax rate changes).

This dataset consists of more than 27 million establishment-year observations. A key feature of these data is that they include the firm's organizational form, specifically whether it pays taxes as a C corporation or a pass-through entity. We also assemble a dataset of state-level business taxation, focusing on corporate and personal income tax rates but also examining

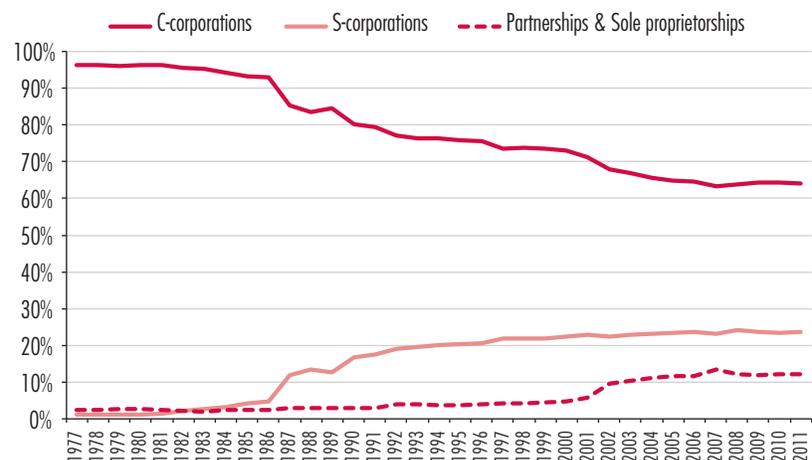
sales tax rates, property tax rates, unemployment insurance premiums, and a new index of tax incentives.

The ability to identify the organizational forms of businesses is key to measuring a response to state-level business income taxation. Figure 1 shows how legal forms of organization have changed over time among multistate businesses over the period 1977-2011. Early in the sample, the vast majority of firms were C corporations, which pay taxes under the corporate income tax code. When capital is returned to owners, either through dividends or endogenously realized capital gains, the owners of C corporations then also pay tax under the personal tax code.

After the Tax Reform Act of 1986, however, there was a shift away from C corporations and toward pass-through entities, such as S corporations, partnerships, and limited liability corporations (LLCs). In a pass-through entity, the profits of the pass-through firms are directly "passed through" to the owners of the firm each year, and they pay tax on those profits under the individual tax code.

Changes in the corporate tax code and the personal tax code at the state level therefore will differentially impact C corporations and pass-through entities. The corporate tax code directly affects only firms incorporated as C corporations and does not have a direct impact on partnerships, S corporations, and pass-through LLCs. The

Figure 1
Legal Forms of Organization Over Time for Multi-state Businesses 1977 – 2011



Note: The sample includes all multi-unit companies in the Longitudinal Business Database (LBD) with at least 100 employees and establishments in at least two states.

¹ See Giroud, Xavier, and Joshua Rauh, 2015, "State Taxation and the Reallocation of Business Activity: Evidence from Establishment-Level Data," Stanford University Working Paper.

personal tax code directly affects the pass-through entities and affects C corporations only insofar as the owners of those C corporations are taxpayers in the state in question and insofar as profits are distributed to them in any given year.

And there have been many changes in state-level corporate and personal tax rates. While the mean corporate rate across states has hovered around 7 percent and the mean personal rate around 5 or 6 percent, Figure 2 shows that in most years there

are states both raising and lowering these tax rates.

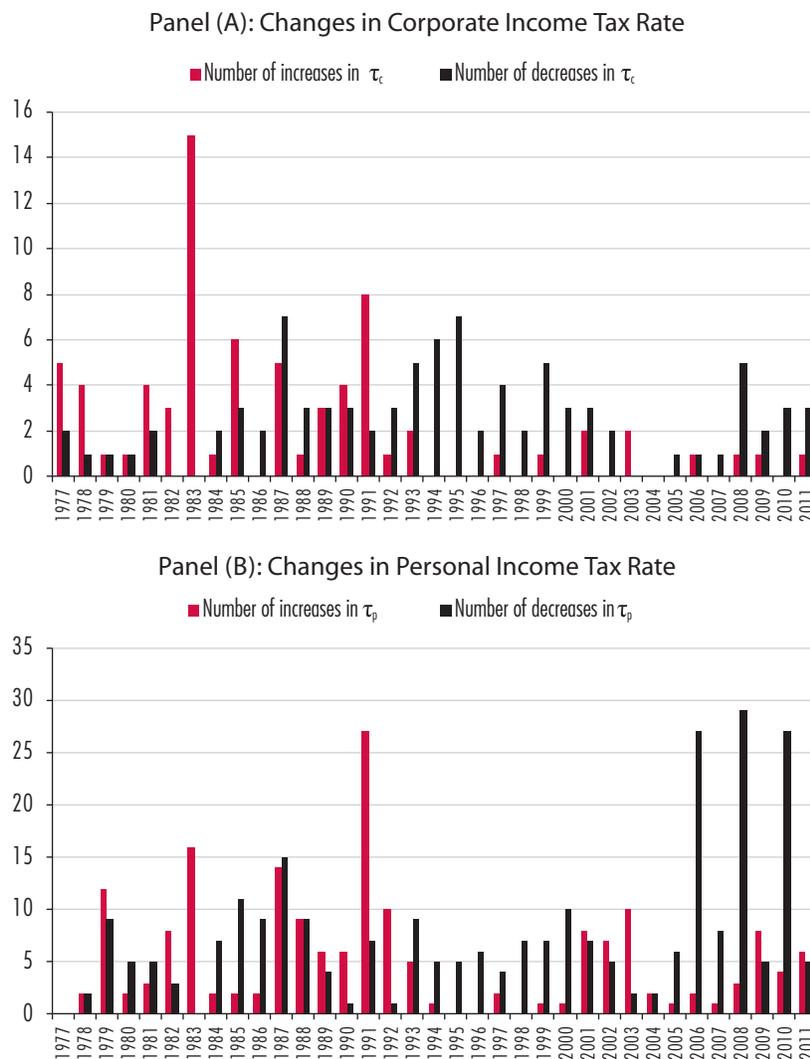
Impact of Tax Rate Changes

Using this variation, we estimate effects of corporate and personal tax rate changes on corporate and pass-through multistate businesses. Table 1 summarizes the results. We find that a 1 percentage point increase in the state corporation tax rate leads to the closing of 0.3-0.4 percent of a C corporation's establishments in the state, as well as a reduction by 0.4 percent of employment at a firm's existing establishments in the state. A 1 percentage point increase in the personal tax rate leads to the closing of 0.2-0.3 percent of a pass-through entity's establishments in the state, in addition to a reduction of 0.2 percent in employment at existing establishments. These results are generally symmetrical for tax increases and decreases.

Where do these factors of production go? One idea that has received attention in the public economics literature is that pass-through entities might pick up the slack from C corporations when corporate taxes rise and C corporations may pick up when personal taxes rise. Indeed, the macroeconomic patterns in the relative prevalence of C corporations and pass-through entities reflect changes in the federal tax code that made pass-through entities relatively

Figure 2
Changes in State Corporate and Personal Income Tax Rates Over Time

This figure plots the number of changes in states' corporate income tax rates (τ_c) and personal income tax rates (τ_p) from 1977 to 2011.



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more favored from a tax perspective.

However, as is also shown in Table 1, we find no evidence of pass-through entity responses in a given state to changes in that state's corporate tax rate or of corporate responses in a state to changes in that state's personal tax rate. These coefficients are essentially zero, suggesting that there is not much substitution within states across organizational form in response to tax rate changes. In addition, we find that multistate firms are unlikely to change their organizational form in response to the tax decision of a single state and also that in aggregate, even including single-state firms, there is no evidence of pass-through sector responses to corporate rates or vice versa.

One criticism of research that correlates tax rates with state economic activity is that even in the absence of the

tax change, the firm might have moved anyway, perhaps because legislative decisions are endogenous to the future decisions of firms. For example, if states tend to raise corporate rates at times when they believe firms are about to leave anyway, then one would find a correlation but there would not be a causal relationship. We find, however, that there is no near-term correlation between pass-through activity and corporate tax rates, nor is there such a correlation between C corporation activity and personal tax rates. The idea that state legislatures set their tax rates on the corporate sector versus the pass-through sector in this predictive way is less plausible.

Do Firms Move Operations to Other States?

Next, we examine the extent to which the labor and capital that is cut by firms in a state that increases the tax rate move

to other states. We do this by estimating the sensitivity of firm establishments and employment to the average of the tax rates of other states where the firm has establishments. Table 2 shows this reallocation effect. Specifically, this effect is about half the size of baseline effect, suggesting that around half of the establishments and labor a state loses from tax increases is moved to other states.

Further complicating the analysis of the effects of tax policy on corporate activity are the laws that differ by state as to how taxable income must be apportioned for multistate firms. In contrast to the federal tax treatment of multinational firms, which requires transfer prices for intermediate production inputs moved by the firm across borders, states use apportionment formulas that obviate the need for keeping track of internal prices.

In determining state-level

Table 1
Effects of a One Percentage Point Increase in the State Tax Rates on Establishments and Employees of Multistate Firms

	Extensive Margin: % Change in Establishments	Intensive Margin: % Change in Employees
C-Corp Response to τ_c	-0.44***	-0.38***
Pass-Through Response to τ_c	-0.00	-0.01
C-Corp Response to τ_p	-0.00	-0.03
Pass-Through Response to τ_p	-0.27***	-0.19***

Note: From Giroud and Rauh (2015), Table 4 and Table 7. The coefficients on extensive margin are estimated by ordinary least squares and scaled by the average number of establishments per state for each legal form. See page 27 of Giroud and Rauh (2015) for details.

tax liabilities, a firm must first determine which states have the power to tax the business or, in tax terminology, whether a company has “nexus” in a state. The firm must then consider the apportionment formula for each state in which it has nexus.

Apportionment formulas are typically a function of the location of at least one of three different measures of economic activity: sales, payroll, and property. In essence the apportionment formula changes the corporate income tax into a tax on each of the apportionment formula factors.

To illustrate by way of example: Until 1992, California had a one-third weight on each of sales, payroll, and property. That meant that a firm with nexus in California would calculate the share of sales, share of payroll, and

share of property in California and the average of these three components would yield the percent of the firm’s taxable income apportioned to California. From 1992 to 2010, the weights in California were 50 percent on sales, 25 percent on payroll, and 25 percent on property, so that relative to the previous regime firms with more sales in California but less physical presence had to allow more of their income to be taxed in California. Conversely, firms with few in-state sales but more physical presence saw a reduction in their tax burden.

These changes went even further in 2011, when California implemented a 100 percent weight on sales. Under a pure “single-sales” apportionment factor, the only variable that would matter in apportioning income to the state (assuming

the firm has any physical presence) is what percent of the firm’s sales were in the state itself.²

This analysis in Table 1 and Table 2 abstracts away from differences in the ways that states treat firms that operate in multiple states, essentially providing average treatment effects across different apportionment regimes. But if a state has a high sales apportionment weight, then moving employees or plants to another state should have a muted effect on its tax burden. Table 3 presents these results, showing smaller elasticities of -0.15 to -0.18 when sales apportionment is 100 percent

² This is complicated by the existence of so-called throwback and throwout rules, under which companies that have sales in states where they do not have physical presence may need to apportion profits arising from those sales to states where they do.

Table 2
Reallocation Effects of Changes in State Tax Rates in Other States Where a Firm Has Operations

	Extensive Margin: % Change in Establishments	Intensive Margin: % Change in Employees
C-Corp Response in State to Average τ_c in Other States	0.23***	0.20***
Pass-Through Response in State to Average τ_c in Other States	-0.00	-0.00
C-Corp Response in State to Average τ_p in Other States	0.00	-0.00
Pass-Through Response in State to Average τ_p in Other States	0.05**	0.01

Note: From Giroud and Rauh (2015), Table 6 and Table 7. The coefficients on extensive margin are estimated by ordinary least squares and scaled by the average number of establishments per state for each legal form.

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and with the magnitude changing by -0.05 to -0.06 for every 10 percent decline in sales apportionment. For a state with 50 percent sales apportionment, the estimated effect on establishments of a 1 percent increase in the C corporation tax rate is $-0.15 + 5 * (-0.05) = -0.40$, and the estimated effect on labor is $-0.18 + 5 * (-0.06) = -0.48$.

We explore several additional analyses in a smaller sample of 161 large tax changes at the state level, which we define as tax rate changes of at least 1 percentage point. Including only those observations around the time of these changes allows us to examine whether there is any evidence of differential trends in C corporation versus pass-through employment and business activity around the times that states change these tax rates and to observe the time pattern of the effects.

Figure 3 shows the differences between the evolution of C corporation versus pass-through

employment for states that implement large tax rate changes in each direction (increases and decreases) for each sector (C corporation versus pass-through). The elasticities are very similar to what is found in the full sample. The figures show no evidence of trends before the tax change. Around half of the effects of the tax changes are felt in the first year that the tax change takes effect and the other half in the following year.

We also undertake a study of the reasons for these large tax changes, using archives of national and local newspapers available in electronic databases. One classification that is commonly used is that of Romer and Romer (2010), who study federal tax changes and separate those changes that deal with an inherited budget deficit or target a long-run goal from those that are directly connected with changes in government spending. We find similar effects among these different categories of policy changes.

We further develop a new approach that exploits two federal tax reforms — the Economic Recovery Tax Act of 1981 (ERTA81) and the Tax Reform Act of 1986 (TRA86) — that triggered changes in state tax policies. ERTA81 implemented the accelerated cost recovery system (ACRS). Effectively, ACRS accelerated depreciation schedules, thereby reducing tax revenues for states that followed federal rules. To offset this reduction, four states increased their corporate income tax (Aronson and Hilley, 1986).

Similarly, TRA86 broadened the tax base for the federal income tax, thus creating a revenue windfall for states that follow the federal definition of the tax base. As a result, 10 states and Washington, D.C., reduced their personal income tax (Ladd, 1993). For two states, Utah and Montana, the reform created a negative shock to the fiscal position, and these states raised their personal income tax in response.

The results we find using this

Table 3
Baseline with Single-Sales and Apportionment

	# Establishments	# Employees
C-Corp Baseline Effect for Single-Sales Apportionment	-0.18**	-0.15*
C-Corp Additional Effect Per 10% Reduction in Sales Apportionment	-0.06***	-0.05***

Note: From Giroud and Rauh (2015), Table 13. The coefficients on extensive margin are estimated by ordinary least squares and scaled by the average number of establishments per state for each legal form.

variation in state tax policy that was a direct response to federal tax reforms are consistent with the results in the larger samples.

Conclusions

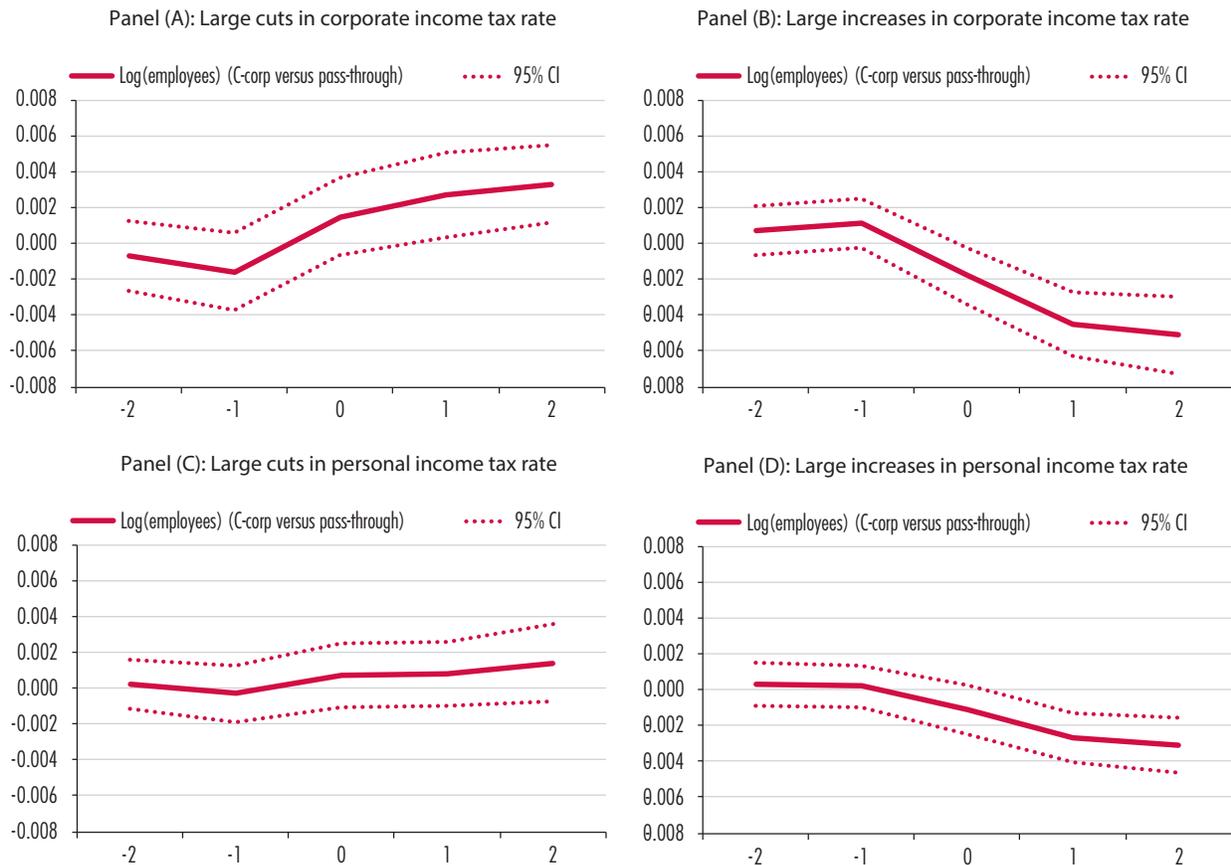
The findings in this research provide evidence that tax changes have near-term effects on firm decisions to locate economic activity in

the state. Of the roughly half of the effect that is not due to reallocation to other states, further research is required to understand whether firms are moving operations abroad or shutting them down entirely. Examining aggregate data that combines single-state with multistate firms, we find little evidence that smaller entities or

pass-through entities pick up the slack released by the firms in the multistate sample when taxes are increased — nor vice versa when they are decreased. Understanding the general equilibrium, incidence, and longer-term effects of changes in tax policy is an important topic for further research.

Figure 3
Dynamic Effect of Large Tax Changes on Employment

This figure plots the coefficients (and 95% confidence intervals) corresponding to the dynamic analysis in Table 11 of Giroud and Rauh (2015).



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