Online Appendix

State Taxation and the Reallocation of Business Activity: Evidence from Establishment-Level Data*

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*Any opinions and conclusions expressed herein are those of the author and do not necessarily represent the views of the U.S. Census Bureau. All results have been reviewed to ensure that no confidential information is disclosed.

Appendix A. Calculation of Capital Stock

Following Lichtenberg (1992), capital stock is computed using the perpetual inventory method. This method requires an initial value of real capital stock. For each plant, we select the earliest available book value of capital in the CMF/ASM. To account for depreciation, we multiply this value by the 2-digit SIC adjustment factor from the Bureau of Economic Analysis (BEA). This adjustment factor is the ratio of industry net capital stock in current dollars to industry gross capital stock in historical dollars. The adjusted book value of capital is then divided by the 4-digit SIC investment deflator from the NBER-CES Manufacturing Industry Database. If the earliest available book value of capital corresponds to the year in which the plant was "born" (as identified by the birth flag in the LBD), no adjustment for depreciation is needed. In this case, the book value is simply divided by the 4-digit SIC investment deflator. The initial value of real capital stock is then written forward using the recursive perpetual inventory formula

$$K_{it} = (1 - \delta_{it}) \times K_{it-1} + I_{it},$$

where i indexes plants, t indexes years, K is the value of real capital stock, δ is the 2-digit SIC depreciation rate from the BEA, and I is capital expenditures divided by the 4-digit SIC investment deflator. Until the 1997 Census, all necessary variables are available separately for buildings and machinery. Accordingly, we calculate the capital stock for each asset category, and add them together to obtain the final measure of capital stock. As of 1997, only aggregate capital stock variables are available.

Appendix B. Economic Interpretation of Other Policy Control Variables

In this section we consider the economic interpretation of other policy control variables in the main specifications from Table 3. In these specifications, the sales tax rate has no measured impact on the number of establishments, but UI policy and the property tax share do have statistically significant effects. For UI, the effect is best explained by considering the mean values of the inputs and then calculating the comparative static of changing the UI rate by a certain number of basis points. The mean UI base wage is \$10,658 and the mean UI tax rate is 6.47%, so the log of these means is $\log(10,658 \times 6.47\%) = 6.54$.[1] An increase in the UI rate

[1] Note that this is larger than the average of the log UI contribution shown in Table 2, due to Jensen's

by 100 basis points will increase the log of the UI contribution by 0.14. Since the coefficient in column (1) is –0.189, this implies a 100 basis point increase in the UI tax rate would lead to a decrease in the number of establishments by –0.189 × 0.14 = –0.026 establishments, a magnitude that is between that of the coefficients $\beta_{P,P}$ = –0.016 and $\beta_{C,C}$ = –0.037 above. The property tax share variable indicates that companies have fewer establishments in states with a greater property tax burden. A one-standard deviation (0.05) increase in the property-tax share variable is correlated with 0.019 fewer establishments.

On the labor adjustment margin, we also find an impact of UI contribution requirements. An increase in the UI rate by 100 basis points will increase the log of the UI contribution by 0.14. Since the coefficient in column (4) is –0.022, this implies a 100 basis point increase in the UI tax rate would lead to a decrease in the number of establishments by –0.022 × 0.14 = –0.31%. The tax incentive index also enters with a statistically significant coefficient of 0.0008. A one standard deviation change in this index by 6 points therefore has an effect on employment of 0.5% at existing establishments. Compared to column (1), the tax incentives index seems to have a greater effect on employment within existing establishments than on the setting up of new establishments.

Appendix C. Robustness

In this section, we present analysis that examines the robustness of the results to a number of possible confounding factors.

Persistence properties of state-level corporate tax changes. Appendix Table A1 characterizes the persistence properties of the state-level corporate and personal tax changes. As the table shows, there is essentially no overall mean reversion in personal taxes. In corporate taxes there are no lagged tax changes that are significant, although the sum of the lagged coefficients over 5 years would be consistent with 22-34% of all tax variation being reversed over 5 years.

Net-of-tax elasticities. Appendix Table A2 presents variants of the regressions in columns (1) and (4) of Table 3 using $\log(1-\tau_C)$ and $\log(1-\tau_P)$ instead of τ_C and τ_P, respectively. The similarity in results is unsurprising given that at the typical levels of τ_C and τ_P, the slope of the log net-of-tax rate with respect to the tax rate itself is close to unity.

Conditional logit. In Appendix Table A3 we present conditional logit results. In column (1), we define the binary dependent variable as being equal to one if the state of the firm-state-year

Inequality.

observation is the state with the largest increase in the number of establishments for a given firm in a given year. In column (2), we define the binary dependent variable as being equal to one if the state of the firm-state-year observation is the state with the largest decrease in the number of establishments for a given firm in a given year. We find that for each 100 basis point increase in the corporate tax rate, a given state is 0.5% less likely to be the state in which a corporate firm has the largest increase in the number of corporate establishments for that firm in that year. For each 100 basis point increase in the personal tax rate, a given state is 0.3% less likely to be the state in which a pass-through firm has the largest increase in the number of pass-through establishments for that firm in that year. The parallel specifications that examine the likelihood of being the state with the largest decrease have inverse though somewhat weaker results.

Firm-level regressions. In column (1) of Appendix Table A4, we aggregate the number of establishments at the firm level and regress log(*establishments*) on the firm-level analogs of the tax items—computed as (employee-weighted) averages across all states in which the company has establishments. As is shown, the coefficient of $\overline{\tau}_C \times CCorp$ ($\overline{\tau}_P \times PassThrough$) is –0.0015 (–0.0011), implying that a 100 basis point increase in the corporate (personal) income tax rate corresponds to a decrease in the number of establishments by 0.15% (0.11%). This is a little less than half the magnitude of the estimates in Table 3, consistent with our finding that reallocation across states offsets part of the baseline effect. Column (2) also reports estimates with respect to log(*employees*); columns (3)-(5) report estimates pertaining to the manufacturing sector.

Matching. Appendix Table A5 presents the results of regressions on the sample that is restricted to privately-held firms (identified as those firms without Compustat coverage) whose size lies between the 45th and 55th percentiles of the size of pass-through entities.[2] We do this to address the possibility that the results reflect differential trends in larger versus smaller firms around the time of tax changes, since in the full sample the C-Corps are substantially larger than the pass-through entities. Here we find effects on pass-through entities that are slightly larger on both the extensive and intensive margins. The size-matched C-corps, on the other hand, have elasticities that are about one-third smaller than in the baseline specification. This suggests that smaller C-corps respond less than the larger firms in the full-sample.

Endogeneity of legal form of organization. We next address the question of whether changes

[2] In columns (1)-(2), all firm-year observations of companies that fulfill these criteria are included, whereas in columns (3)-(4), all firm-year observations of companies that *ever* fulfill these criteria are included.

in firms' organizational form could be driving the results. Note first that since the extensive margin specification includes firm-by-state fixed effects and the legal form of organization is constant within a firm across states, the indicator for *C-Corp* in Table 3 reflects the change in the number of establishments when a firm changes its legal form of organization. In these regressions, when companies change to C-Corp status, there is a substantial increase in the number of establishments, which is intuitive as C-Corp status will typically only make sense for larger firms and particularly those with dispersed ownership, which in some cases (e.g., publicly traded corporations) will be required to organize as C-Corps. There is no significant change in the number of employees in existing establishments when a firm switches to C-Corp status.

Each year, 1.4% of C-Corps in our sample become pass-through entities and 1.1% of pass-through entities become C-Corps. It seems unlikely that the state corporate tax code is determining the tax filing status of multi-state companies, given the relative importance of this decision for the firm's liability under the federal tax code. However, we address the possibility that the firm's legal form of organization could be endogenous to state tax policy empirically in several ways. Columns (1) and (4) of Appendix Table A6 include trends in the legal form of organization interacted with year fixed effects, to allow C-Corps and pass-through entities to be on different trends. This addresses the possibility that corporate tax reforms might take place at times when C-Corp activity would have declined independent of the tax reform. Columns (2) and (5) exclude all observations within a 5-year window around any change in the legal form of organization, and the results remain robust.

In Appendix Table A7 we directly consider the question of changes in legal form of organization by showing the results of a linear probability model at the firm-year level. Specifically, we estimate

$$1\left(CCorp_{it}\right) = \alpha_i + \alpha_t + \beta_C\left(\overline{\tau_C}\right) + \beta_P\left(\overline{\tau_P}\right) + \Gamma'\mathbf{X} + \varepsilon_{it},$$

where the dependent variable is an indicator variable that equals one if the firm is a C-Corp, and the tax variables are the average tax rates across states where firm i has establishments. The explanatory variables are the tax variables, computed as (employee-weighted) averages across all states where the firm has establishments. We find that the state-level tax variables have no statistically significant effect on the likelihood of changing organizational form, except that fewer state-level tax incentives may marginally increase the probability of being a C-Corp. Since firms must choose one organizational form for the entire firm, it is reasonable to believe that

federal tax policy has the strongest effect here.

Unpredicted component of state taxation. A further general critique that has been brought against studies that rely on variation in policy parameters is that firms may plan their investment, employment, and location decisions in part in expectation of future changes in government policy (Lucas (1976), or more recently Hennessy and Strebulaev (2015)).[3] More generally, if changes in tax policy are predictable by simple economic variables then it would call the overall identification strategy into question.

To address this, we estimate predicted values of corporate and personal tax rates based on one-year lags of those tax rates and other macroeconomic variables:

$$\tau_{C,t} = \alpha + \lambda_1 \tau_{C,t-1} + \lambda_2 \log(GDP)_{t-1} + \lambda_3 UnemploymentRate_{t-1} + \lambda_4 \%BudgetSurplus_{t-1} + \epsilon_{\tau(C)}$$

$$\tau_{P,t} = \alpha + \lambda_1 \tau_{P,t-1} + \lambda_2 \log(GDP)_{t-1} + \lambda_3 UnemploymentRate_{t-1} + \lambda_4 \%BudgetSurplus_{t-1} + \epsilon_{\tau(P)}$$

where $\%BudgetSurplus$ is calculated as $\frac{Revenues - Expenditures}{Expenditures}$ at the state level using data from the Census of Governments State & Local Finances, and the state-level unemployment rate is obtained from the Bureau of Labor Statistics. The estimates from these regressions are provided in Appendix Table A8.[4] We then re-estimate our primary specifications using $\epsilon_{\tau(C)}$ instead of τ_C and $\epsilon_{\tau(P)}$ instead of τ_P. The results are provided in columns (3) and (6) of Appendix Table A6. The coefficients reflect the effects of tax changes that would be unpredictable based on lags of tax rates, GDP, unemployment, and budget surpluses or deficits. Using only this unpredicted component does not change the results appreciably from the baseline.

Unobserved trends at the regional level. Columns (1) and (4) of Appendix Table A9 include region-by-year fixed effects, to control for possible correlations between shifts in the regional composition of establishments over time and state tax policy.[5] So for example, if tax rates moved relatively lower over time in the Mountain region, while economic activity was on a general upward trend in this region, specifications without region-by-year fixed effects would

[3] For example, if firms expect taxes to increase at date t and then taxes do increase at that date but by less than expected, the tax increase would in effect amount to a tax cut relative to expectations, making estimated coefficients difficult to interpret.

[4] Appendix Table A8 indicates that corporate tax rate increases are weakly correlated with higher lagged GDP growth and a lower lagged unemployment rate, whereas personal tax rate increases are correlated with a smaller lagged budget surplus (or a larger lagged budget deficit).

[5] The regions are the 9 Census regions: Pacific, Mountain, West North Central, East North Central, West South Central, East South Central, South Atlantic, Middle Atlantic, and New England.

attribute all of the increase in economic activity to the tax policy and not to secular regional effects. We find that the inclusion of regional trends if anything strengthens the results.

Unobserved trends at the industry level. Relatedly, columns (2) and (5) of Appendix Table A9 include industry-by-year fixed effects to control for possible correlations between shifts in the industry composition of establishments over time and state tax policy. So for example, if tax rates moved relatively higher in states that had industries in decline for unrelated reasons, specifications without industry-by-year fixed effects would attribute all of the decrease in economic activity to the tax policy and not to the industry declines. The inclusion of industry trends on the extensive margin reduces the magnitude of the corporate tax coefficient from 0.037 to 0.030, and the personal tax coefficient from 0.016 to 0.008. Industries are measured at the two-digit SIC level, so in this specification all variation that is due to changes in the industry composition of economic activity at the state level is absorbed. Similar patterns are observed on the intensive margin.

"Extensive-extensive" margin. In column (3) of Appendix Table A9, the dependent variable is a dummy variable indicating whether the company has at least one establishment in the state—that is, this specification is a linear probability model that examines whether state taxation affects companies at the "extensive-extensive" margin. The overall pattern is again similar. Specifically, we find that a 100 basis point increase in the corporate (personal) income tax rate reduces the probability of C-Corps (pass-through businesses) having any operations in the state by 0.3% (0.2%).

Sample selection. Our baseline sample includes all firm-year units that have at least 100 employees and operate in multiple states. In Appendix Table A10, we extend the sample by including all firm-year units corresponding to companies that fulfill these criteria in *any* year during the sample period. As is shown, our results change little.

Functional form. In our baseline regression at the extensive margin, the dependent variable is the count of establishments at the firm-state-year level. One caveat of this specification is that the dependent variable is not size-adjusted, which may affect the calculation of the tax elasticities. To address this point, we consider alternative functional forms. In column (1) of Appendix Table A11, we scale the count of establishments by the total number of establishments of the firm in the preceding year $\frac{\#\ Establishments_{ist}}{\sum_s \#\ Establishments_{ist-1}}$. As is shown, the coefficient of $\tau_C \times CCorp$ is -0.0009. Since the average number of establishments of C corporations is

51, this implies that the number of establishments decreases by $0.0009 \times 51 = 0.045$, which is in the ballpark of our baseline estimate in Table 3. Similarly, for pass-through entities, the coefficient of $\tau_P \times PassThrough$ corresponds to a decrease in the number of establishments by $0.0008 \times 15 = 0.012$. Again, this is in the ballpark of our baseline estimate in Table 3. In column (2), we consider another variant of our baseline specification in which we use $\log(1 + \#\ Establishments_{ist})$ as dependent variable. As can be seen, the coefficients of $\tau_C \times CCorp$ and $\tau_P \times PassThrough$ are -0.4% and -0.3%, which is again in the ballpark of the elasticities that are implied by our baseline coefficients. Overall, the estimates in Appendix Table A11 indicate that our results are not sensitive to the choice of the functional form.

Size quintiles. In Appendix Table A12, we further examine the relationship between size and our extensive margin estimates. Specifically, we divide the sample into firm-size quintiles (based on the number of employees at the firm level). The upper panel reports the regression estimates, while the bottom panel reports the implied elasticities. As can be seen, higher coefficients tend to map into higher elasticities. This confirms that the quantitative estimates from equation (3) can be compared across firms of different size.[6]

Deductibility of state taxes. State income taxes are deductible from federal taxes. In Appendix Table A13, we take into account the deductibility of state taxes by using $\tau_C - \tau_{C,federal} \times \tau_C$ instead of τ_C, and $\tau_P - \tau_{P,federal} \times \tau_P$ instead of τ_P. (Since the federal tax rate enters multiplicatively, it is not fully absorbed by the year fixed effects.) As is shown, the coefficients are about 1.5 to 1.8 larger than our baseline estimates. This mirrors the fact that the unadjusted tax rates are on average 1.6 to 1.8 larger than the tax rates net of the deductibility of federal taxes.

Permanent versus transitory tax changes. In Appendix Table A14, we account separately for the 12% of the "large" tax changes which we observe ex post were reversed within three years. This table repeats the difference-in-differences analysis from Table 5 (extensive margin difference-in-differences analysis of large tax changes) but now with separate explanatory variables for permanent and transitory treatments. We find little effect for transitory tax changes, and the coefficients on the permanent changes are slightly larger. Notably, large increases in τ_P

[6] In column (6), we further report the regression estimates and implied elasticity pertaining to multinational firms. As can be seen, in terms of their (domestic) presence, multinational firms are comparable to firms in the top quintile of the size distribution. Yet, multinational firms have a somewhat smaller elasticity with respect to the corporate income tax (-0.53% compared to -0.64% for firms in the fifth quintile of size). This could reflect differences in the taxation of domestic versus multinational firms (e.g., if multinational firms have more discretion allowing them to reduce their U.S. tax burden through paper transactions).

have a stronger, statistically significant response of -0.007 when we eliminate the nine cases of reversal. Appendix Table A15 considers $\log(employees)$ as the dependent variable and repeats the difference-in-differences analysis from Table 7 (intensive margin difference-in-differences analysis of large tax changes). Again, the coefficients on the permanent changes are somewhat larger, and we observe no statistically significant effects on the transitory changes.

Ten-year dynamics. Appendix Table A16 shows the 10-year dynamic estimates that are used to produce Figure 6 of the paper. The specification is variants of columns (1) and (4) of Table 3 using ten lags and one lead of the tax variables.

Appendix D. Use of Apportionment-Factor-Adjusted Tax Rates for Manufacturing

An alternative approach to capture incentives from apportionment rules is to calculate apportionment-factor adjusted corporate tax rates for each state and firm. This is only feasible for the manufacturing subsample where we know the values of the firm's capital.

If a company has employees and property (nexus) in one state (i) but sales in many states, all of the profits will be subject to the tax laws of state i, where it has the employees and property. In the absence of a throwback or throwout rule, the effective corporate tax rate in that state would be:

$$\tau_{C(AF\ adj)} = \tau_C^i \times \left[\begin{array}{c} \alpha^i_{payroll} \times \frac{payroll\ in\ i}{total\ payroll} + \alpha^i_{property} \times \frac{property\ in\ i}{total\ property} \\ +\alpha^i_{sales} \times \frac{sales\ to\ i}{total\ sales} \end{array} \right]$$

and analogously for the personal tax rate that applies to pass-through entities.

In the above equation, the company would at first glance appear to have a break in state i, getting a lower effective tax rate than the state's corporate tax rate (τ_C^i) based on the fact that it was selling outside of state i. However, if state i has a throwback rule, all "nowhere" sales (sales to states where the firm's activities are not taxed because the firm has no physical presence) must be added into the final term of the formula:

$$\tau_C^i \times \left[\begin{array}{c} \alpha^i_{payroll} \times \frac{payroll\ in\ i}{total\ payroll} + \alpha^i_{property} \times \frac{property\ in\ i}{total\ property} \\ +\alpha^i_{sales} \times \frac{sales\ to\ i\ +\ nowhere\ sales}{total\ sales} \end{array} \right].$$

If instead the state has a throwout rule, the nowhere sales must be subtracted from the

denominator:

$$\tau_C^i \times \left[\begin{array}{c} \alpha_{payroll}^i \times \frac{payroll\ in\ i}{total\ payroll} + \alpha_{property}^i \times \frac{property\ in\ i}{total\ property} \\ +\alpha_{sales}^i \times \frac{sales\ to\ i}{total\ sales\ -\ nowhere\ sales} \end{array} \right].$$

We are not able to compute "nowhere sales" since we only observe the shipments generated by each establishment, not the geographical distribution of those shipments. The calculation of an apportionment- and throwback-adjusted effective tax rate therefore requires an assumption about the location of the shipments. In this specification, we assume that all the shipments of the plant go to states where the firm has no nexus. The effective tax rate we implement in this case is

$$\tau_{C(AF\ and\ TB\ adj)} = \tau_C^i \times \left[\begin{array}{c} \alpha_{payroll}^i \times \frac{payroll\ in\ i}{total\ payroll} + \alpha_{property}^i \times \frac{property\ in\ i}{total\ property} \\ +\alpha_{sales}^i \times I_{throwback} \end{array} \right].$$

The initial results on the manufacturing sample from column (6) of Table 3 showed a smaller elasticity for manufacturing firms than in the full sample.

Appendix Table A17 revisits this analysis on the manufacturing sample using the AF-adjusted and AF- & TB-adjusted rates. The regression analysis measures the firm's response to a change in the actual tax claim on a dollar of total (national) corporate profit by one percentage point. This is perhaps most analogous to the approach in Goolsbee and Maydew (2000).

When we use effective state tax rates that account for apportionment factors and the firm's share of capital and labor in each state, the coefficient returns to –0.0045 as shown in column (1), slightly above the full-sample estimate using statutory rates. This estimate is again consistent with an elasticity of labor with respect to the state tax rate of around 0.5. Column (2) shows a somewhat lower point estimate of the elasticity of capital with respect to the apportionment-factor adjusted effective tax rate. Columns (3) and (4) additionally implement the throwback rule as shown above, using an effective tax rate that adjusts for both apportionment factors and throwback rules, assuming that all the shipments of the plant go to states where the firm has no nexus or states where there is no corporate tax. The results here are a labor elasticity of 0.48 and a capital elasticity of 0.32.

This estimate is broadly consistent with Goolsbee and Maydew (2000) who estimate employment at the state-by-year level as a function of the payroll burden, which they define as the state tax rate times the payroll apportionment factor. They find an effect on manufactur-

ing employment of 1.1% for a move from single-weighted sales to double-weighted sales, which they interpret as similar to a reduction in the corporate tax rate from 0.073 to 0.055. This would suggest that a one percentage point change in the rate would have an impact of 0.6% on employment.

In these regressions we do not find statistically significant coefficients on the pass-through entity response to the personal tax rate. However, this may to some extent reflect the relatively small number of manufacturing firms operating in multiple states as pass-through entities with more than 100 employees. As shown in Table 1, there are only 11,100 firms in the U.S. that fit this description, compared to 93,300 manufacturing C-Corps.

Appendix E. Investigations of Pass-Through Ownership and Entity-Level Taxation

Pass-through ownership and crediting. We unfortunately do not observe the state of residence of the owners of multi-state pass-through entities. However, the IRS provides statistics on the number of S corporation, partnership, and total income tax returns by state. For each pass-through firm-year observation in our sample, we use these statistics to assign a predicted resident-state-of-owner to the pass-through entity, based on which of the firm's states of activity has the highest share of S corporation and partnership filings relative to total business filings.[7] We then create a variable for whether the owner is in an above-median personal tax rate state versus a below-median personal tax rate state, for that firm. Using interactions, we test whether the pass-through entities with owners in lower-tax states than most of the rest of their establishments are more or less sensitive to the personal tax rate than pass-through entities with owners in higher-tax states.

As shown in Appendix Table A18, pass-through entities where the owner is in the lower tax states show 1.4 to 1.8 times stronger coefficient responses on both the extensive and intensive margin, consistent with the theory. However, we caution that we do not have enough statistical power to reject the null hypothesis that the coefficients are the same. We hypothesize that a more direct measure of the residence of the state of owner would show this effect in a more pronounced manner. Overall, the phenomenon of pass-through entity crediting may partially

[7] For example, suppose a pass-through entity has establishments in State A and State B, and that A has 6% of its total tax filings coming as pass-through entity filings whereas B has 4% of its business filings coming as pass-through entities. We would impute the predicted state of ownership of this pass-through entity to State A.

explain why the magnitude of our main results is weaker for pass-through entities responding to personal taxes than for C corporations responding to corporate taxes.

Entity-level taxation of S corporations. Some states impose entity-level taxes on S corporations. For example, California imposes a 1.5% entity tax on S corporations' net income. Similarly, New Jersey used to impose a 1.13% tax (which was phased out by 2007). While these taxes are relatively small, they could in theory correlate with τ_C and τ_P, which in turn could affect our estimates. To address this issue, we compile data on the entity-level taxation of S corporations from several sources, including the Book of States and states' administrative records. We then augment our baseline specifications by including $\tau_{S\text{-}Corp} \times$ *S-Corp* as additional control. The results are presented in Appendix Table A19. As is shown, the coefficient of this term is negative, but not significant. This suggests that these entity-level taxes are not first-order for the location decision. Importantly, our baseline estimates are virtually unchanged once we include this control.

Appendix F. Extensions of General Equilibrium Considerations

Appendix Table A20 attempts to arrive at the total elasticity of employment with respect to the tax rates by performing weighted least squares (WLS) estimation, where the weights are given by the number of employees at the establishment level and the number of employees at the firm-state level, for the intensive and extensive margins respectively. The results suggest a total short-run elasticity of employment of $\frac{0.021}{7.1} + 0.24\% = 0.53\%$ with respect to the corporate tax, and $\frac{0.010}{3.7} + 0.14\% = 0.41\%$ with respect to the personal tax (given that C corporations and pass-through entities have on average 7.1 and 3.7 establishments per state, respectively).

In Appendix Table A21 we drop the explicit distinction between intensive and extensive margins and use Davis-Haltiwanger (DH) growth rates (Davis and Haltiwanger (1992)) as the dependent variable, weighting the observations by the corresponding DH weights. The DH growth rate is computed as $DH_{growth} = \frac{employment_{ist} - employment_{ist-k}}{\frac{1}{2}(employment_{ist} + employment_{ist-k})}$. In this calculation, $employment_{ist}$ is the total employment of firm i in state s in year t. Based on our findings in Tables 5 and 7, we conduct this analysis with $k = 2$, to capture the effect of the tax changes over two years. Regardless of the value of k, the DH_{growth} measure is symmetric and bounded between -2 and 2, and captures increases in employment whether or not they are from a base of zero. These results paint a similar picture to the findings in Appendix Table A20 and suggest total elasticities of employment of 0.5 for the corporate tax and 0.2 for the personal tax.

Appendix Table A22 presents another robustness check on the Table 14 regressions which examines general equilibrium at state-LFO-year level. While Table 14 separates the sample into establishments of multi-state firms with more than 100 employees (our main sample for the disaggregated analysis) and all other establishments, Appendix Table A22 looks at all establishments together in column (1) and then the establishments of single-state firms only in column (2). The results are broadly consistent. Single-state firms only have even lower point estimates than the aggregation of single-state firms and multi-state firms with fewer than 100 employees, and in neither case is the result statistically significant.

References in Online Appendix

Davis, Steven J., and John Haltiwanger, 1992, "Gross Job Creation, Gross Job Destruction, and Employment Reallocation," *Quarterly Journal of Economics* 107(3), 819-863.

Goolsbee, Austan, and Edward L. Maydew, 2000, "Coveting Thy Neighbor's Manufacturing: The Dilemma of State Income Apportionment," *Journal of Public Economics* 75(1), 125-143.

Hennessy, Christopher, and Ilya Strebulaev, 2015, "Natural Experiment Policy Evaluation: A Critique," NBER Working Paper #20978.

Lichtenberg, Frank R., 1992, *Corporate Takeovers and Productivity*, Cambridge, MA: MIT Press.

Lucas, Robert, 1976, "Econometric Policy Evaluation: A Critique," in *The Phillips Curve and Labor Markets*, Brunner, Karl, and Allan H. Meltzer, eds., Carnegie-Rochester Conference Series on Public Policy 1(1), 19-46.

Appendix Table A1. Persistence in τ_c and τ_p

This table examines the persistence of the changes in τ_c and τ_p. Each column reports the coefficient γ^k from the following linear projection:

$$\tau_{s,t+k} - \tau_{s,t+k-1} = \alpha^k + \gamma^k (\tau_{s,t} - \tau_{s,t-1}) + \boldsymbol{\beta}^{k\prime}\mathbf{X}_{s,t} + \varepsilon_{s,t+k} \qquad \text{for k = 1, 2, …, 5}$$

where the left-hand side variable, $\tau_{s,t+k} - \tau_{s,t+k-1}$, is the change in the change in the corporate or personal income tax rate in state s from $t + k - 1$ to $t + k$, $\tau_{s,t} - \tau_{s,t-1}$ is the corresponding change in the same-state tax rate k periods earlier, and **X** is the control of vector variables. The last row reports the sum $\gamma^1 + ... + \gamma^5$, which represents the fraction of in-sample state-level tax rate changes that are reversed, on average, within five years. τ is the corporate income tax in columns (1)-(2) and the personal income tax in columns (3)-(4). The sample period is from 1977 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	τ_c		τ_p	
	with controls	without controls	with controls	without controls
	(1)	(2)	(3)	(4)
γ^1	-0.003	0.005	0.039	0.045
	(0.028)	(0.029)	(0.040)	(0.041)
γ^2	-0.034	-0.018	0.068	0.076
	(0.058)	(0.057)	(0.049)	(0.050)
γ^3	-0.083	-0.058	0.002	0.013
	(0.067)	(0.064)	(0.045)	(0.050)
γ^4	-0.127	-0.092	-0.063	-0.049
	(0.081)	(0.083)	(0.052)	(0.059)
γ^5	-0.094	-0.053	-0.111*	-0.095
	(0.083)	(0.090)	(0.064)	(0.074)
$\sum_1 \gamma^1$	-0.341	-0.216	-0.065	-0.010

Appendix Table A2. Specifications with Log(1 – τ)

This table presents variants of the regressions in columns (1) and (4) of Table 3, using log(1 – τ_c) and log(1 – τ_p) instead of τ_c and τ_p, respectively. The sample period is from 1977 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	# Establishments	Log(employees)
	(1)	(2)
Log(1 - τ_c) × C-Corp	0.035***	0.0040***
	(0.003)	(0.0004)
Log(1 - τ_c) × Pass-through	0.001	0.0002
	(0.002)	(0.0009)
Log(1 - τ_p) × C-Corp	0.001	0.0005
	(0.002)	(0.0004)
Log(1 - τ_p) × Pass-through	0.015***	0.0022**
	(0.003)	(0.0009)
Controls	Yes	Yes
Year FE	Yes	Yes
Firm-state FE	Yes	No
Establishment FE	No	Yes
R-squared	0.73	0.88
Observations	32,997,200	27,600,100

Appendix Table A3. Conditional Logit

This table presents variants of the regression in column (1) of Table 3, except that the dependent variable is a dummy variable indicating the state with the largest increase (and decrease, respectively) in the number of establishments for a given firm in a given year. The regressions are estimated using a conditional logit. The sample period is from 1977 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	1(largest increase in # establishments)	1(largest decrease in # establishments)
	(1)	(2)
$\tau_c \times$ C-Corp	-0.005***	0.003***
	(0.001)	(0.001)
$\tau_c \times$ Pass-through	-0.001	-0.000
	(0.001)	(0.001)
$\tau_p \times$ C-Corp	0.000	-0.001
	(0.001)	(0.001)
$\tau_p \times$ Pass-through	-0.003**	0.002
	(0.001)	(0.001)
Controls	Yes	Yes
Regression type	C-logit	C-logit
Observations	32,997,200	32,997,200

Appendix Table A4. Firm-Level Regressions

This table presents firm-level analogues of the regressions in Tables 3 and 4. $\bar{\tau}_C$ refers to the average corporate income tax rate in all states in which the company has operations. The average is computed using the share of the company's employees in each state as weights. $\bar{\tau}_P$ is computed analogously. The sample period is from 1977 to 2011. Standard errors are clustered at the firm level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	LBD (all sectors)		ASM/CMF (manufacturing)		
	Log(establ.)	Log(employees)	Log(establ.)	Log(employees)	Log(capital)
	(1)	(2)	(3)	(4)	(5)
$\bar{\tau}_c$ × C-Corp	-0.0015***	-0.0023***	-0.0017*	-0.0020**	-0.0016*
	(0.0004)	(0.0006)	(0.0010)	(0.0010)	(0.0009)
$\bar{\tau}_c$ × Pass-through	0.0003	0.0000	-0.0000	0.0001	0.0002
	(0.0006)	(0.0009)	(0.0022)	(0.0021)	(0.0020)
$\bar{\tau}_p$ × C-Corp	-0.0002	-0.0001	-0.0001	-0.0002	-0.0000
	(0.0003)	(0.0005)	(0.0008)	(0.0008)	(0.0009)
$\bar{\tau}_p$ × Pass-through	-0.0011*	-0.0015*	-0.0012	-0.0014	-0.0011
	(0.0006)	(0.0009)	(0.0024)	(0.0023)	(0.0022)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
R-squared	0.87	0.88	0.82	0.86	0.90
Observations	647,000	647,000	104,400	104,400	104,400

Appendix Table A5. Matching

This table presents variants of the regressions in columns (1) and (4) of Table 3, restricting the sample to i) firms whose size (i.e., the number of employees) lies between the 45th and 55th percentiles of the size of pass-through entities, and ii) private firms. Private firms are those without coverage in Standard & Poor's Compustat. Compustat is matched to the LBD using the SSEL-Compustat Bridge maintained by the U.S. Census Bureau. In columns (1)-(2), all firm-year observations of companies that fulfill these criteria are included (contemporaneous matching); in columns (3) and (4), all firm-year of companies that *ever* fulfill these criteria are included (non-contemporaneous matching). The sample period is from 1977 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	Contemporaneous matching		Non-contemporaneous matching	
	# Establishments	Log(employees)	# Establishments	Log(employees)
	(1)	(2)	(3)	(4)
τ_c × C-Corp	-0.020***	-0.0028***	-0.022***	-0.0028***
	(0.006)	(0.0010)	(0.005)	(0.0009)
τ_c × Pass-through	-0.010	-0.0005	-0.009	-0.0008
	(0.009)	(0.0010)	(0.009)	(0.0010)
τ_p × C-Corp	-0.010	-0.0010	-0.010	-0.0010
	(0.008)	(0.0011)	(0.007)	(0.0011)
τ_p × Pass-through	-0.018**	-0.0026**	-0.018**	-0.0025**
	(0.009)	(0.0010)	(0.008)	(0.0010)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm-state FE	Yes	No	Yes	No
Establishment FE	No	Yes	No	Yes
R-squared	0.65	0.89	0.66	0.89
Observations	2,459,900	871,500	2,663,100	964,500

Appendix Table A6. Robustness

This table presents variants of the regressions in columns (1) and (4) of Table 3. In columns (1) and (4), the regressions include LFO-by-year fixed effects, where LFO is the Legal Form of Organization—C-Corp or Pass-through. In columns (2) and (5), we exclude firm-year observations within a five-year window around a change in LFO. In columns (3) and (6), we replace τ_c and τ_p by their respective residuals from the predictive regressions provided in Appendix Table A8. The sample period is from 1977 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	# Establishments			Log(employees)		
	LFO trends	Excluding 5-year window around LFO change	Unpredicted component of τ_c and τ_p	LFO trends	Excluding 5-year window around LFO change	Unpredicted component of τ_c and τ_p
	(1)	(2)	(3)	(4)	(5)	(6)
τ_c × C-Corp	-0.035***	-0.036***	-0.030***	-0.0042***	-0.0040***	-0.0039***
	(0.003)	(0.003)	(0.003)	(0.0004)	(0.0005)	(0.0005)
τ_c × Pass-through	-0.001	-0.003	-0.001	-0.0005	-0.0005	-0.0005
	(0.002)	(0.003)	(0.003)	(0.0009)	(0.0010)	(0.0010)
τ_p × C-Corp	-0.002	-0.003	-0.002	-0.0005	-0.0007	-0.0006
	(0.002)	(0.002)	(0.002)	(0.0004)	(0.0004)	(0.0004)
τ_p × Pass-through	-0.016***	-0.014***	-0.009***	-0.0024**	-0.0025**	-0.0015*
	(0.003)	(0.003)	(0.003)	(0.0008)	(0.0009)	(0.0009)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm-state FE	Yes	Yes	Yes	No	No	No
Establishment FE	No	No	No	Yes	Yes	Yes
LFO × year FE	Yes	No	No	Yes	No	No
R-squared	0.76	0.75	0.74	0.88	0.88	0.88
Observations	32,997,200	30,288,100	32,398,000	27,600,100	26,416,300	27,175,000

Appendix Table A7. Changes in Legal Form of Organization

The dependent variable is a dummy indicating whether the company is a C-corporation. $\bar{\tau}_C$ refers to the average corporate income tax rate in all states in which the company has operations. The average is computed using the share of the company's employees in each state as weights. The other tax items are computed analogously. The sample period is from 1977 to 2011. Standard errors are clustered at the firm level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	C-Corp
$\bar{\tau}_c$	-0.0009
	(0.0010)
$\bar{\tau}_p$	0.0006
	(0.0011)
Sales tax rate	0.0011
	(0.0020)
Log(UI contribution)	-0.0099
	(0.0085)
Property tax share	-0.0114
	(0.0377)
Tax incentives index	-0.0009*
	(0.0005)
Log(GDP)	0.0025
	(0.0040)
Year FE	Yes
Firm FE	Yes
R-squared	0.79
Observations	647,000

Appendix Table A8. Predictive Regressions for τ_c and τ_p

This table reports the regressions underlying the calculation of the "unpredicted component" of τ_c and τ_p used in columns (3) and (6) of Appendix Table A6. *GDP* is the state's gross domestic product (from the BEA). *Unemployment rate* is the state unemployment rate (from the BLS). *Budget surplus* is the state's budget balance, computed as (revenues – expenditures) / expenditures, using data from the U.S. Census Bureau's State & Local Finances database. All other variables are defined in Table 2. The sample period is from 1978 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	$\tau_{c,t}$	$\tau_{p,t}$
$\tau_{c,t-1}$	0.9930***	
	(0.0058)	
$\tau_{p,t-1}$		0.9636***
		(0.0087)
Log(GDP)_{t-1}	-0.0141*	0.0172
	(0.0076)	(0.0194)
$\text{Unemployment rate}_{t-1}$	0.0087*	-0.0004
	(0.0047)	(0.0115)
$\text{Budget surplus}_{t-1}$	-0.0785	-0.2837***
	(0.0906)	(0.0939)
R-squared	0.98	0.96
Observations	1,734	1,734

Appendix Table A9. Additional Robustness

This table presents variants of the regressions in columns (1) and (4) of Table 3. In columns (1) and (4), the regression includes region by year fixed effects. Regions are partitioned according to the nine Census regions. In columns (2) and (5), the regression includes industry-by-year fixed effects. Industries are partitioned according to 2-digit SIC codes. In column (3), the dependent variable is an indicator variable equal to one if the company has at least one establishment in the state. The sample period is from 1977 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	# Establishments		I(# Establ. > 0)	Log(employees)	
	Regional trends	Industry trends	"Extensive-extensive" margin	Regional trends	Industry trends
	(1)	(2)	(3)	(4)	(5)
τ_c × C-Corp	-0.037***	-0.030***	-0.0033***	-0.0049***	-0.0032***
	(0.003)	(0.003)	(0.0012)	(0.0005)	(0.0005)
τ_c × Pass-through	-0.001	0.000	0.0006	-0.0010	-0.0012
	(0.002)	(0.003)	(0.0013)	(0.0009)	(0.0009)
τ_p × C-Corp	-0.001	-0.001	0.0001	-0.0003	-0.0001
	(0.002)	(0.002)	(0.0006)	(0.0004)	(0.0004)
τ_p × Pass-through	-0.015***	-0.008**	-0.0020*	-0.0020**	-0.0018**
	(0.003)	(0.003)	(0.0012)	(0.0008)	(0.0008)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Firm-state FE	Yes	Yes	Yes	No	No
Establishment FE	No	No	No	Yes	Yes
Region × year FE	Yes	No	No	Yes	No
Industry × year FE	No	Yes	No	No	Yes
R-squared	0.76	0.76	0.75	0.90	0.90
Observations	32,997,200	32,997,200	32,997,200	27,600,100	27,600,100

Appendix Table A10. Sample Selection

This table presents variants of the regressions in columns (1) and (4) of Table 3, except that the sample includes all firms that ever have at least 100 employees or ever have operations in more than one state during the sample period (1977 to 2011). Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	# Establishments	Log(employees)
	(1)	(2)
τ_c × C-Corp	-0.033***	-0.0040***
	(0.003)	(0.0005)
τ_c × Pass-through	-0.001	-0.0004
	(0.003)	(0.0010)
τ_p × C-Corp	-0.000	-0.0006
	(0.002)	(0.0005)
τ_p × Pass-through	-0.010***	-0.0021**
	(0.003)	(0.0010)
Controls	Yes	Yes
Year FE	Yes	Yes
Firm-state FE	Yes	No
Establishment FE	No	Yes
R-squared	0.71	0.90
Observations	58,622,800	30,708,300

Appendix Table A11. Functional Form

This table presents variants of the regression in column (1) of Table 3 using alternative dependent variables. In column (1), the dependent variable is the ratio of the number of establishments (of a given firm in a given state and year) divided by the total number of establishments of the firm in the previous year. In column (2), the dependent variable is the logarithm of one plus the number of establishments (of a given firm in a given state and year). The sample period is from 1977 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	# Establishments relative to firm size	Log (1 + # Establishments)
	(1)	(2)
τ_c × C-Corp	-0.0009***	-0.0043***
	(0.0001)	(0.0004)
τ_c × Pass-through	-0.0000	-0.0001
	(0.0001)	(0.0003)
τ_p × C-Corp	-0.0001	-0.0001
	(0.0001)	(0.0002)
τ_p × Pass-through	-0.0008***	-0.0025***
	(0.0001)	(0.0005)
Controls	Yes	Yes
Year FE	Yes	Yes
Firm-state FE	Yes	Yes
R-squared	0.36	0.83
Observations	28,224,700	32,997,200

Appendix Table A12. Size Quintiles

This table presents variants of the regressions in column (1) of Table 3, except that in columns (1)-(5) the sample is split in quintiles of firm size (the number of employees at the firm level). In column (6), the sample includes only multinational firms with coverage in Standard & Poor's Compustat (that is, firms that have non-domestic segments in the Compustat Segment file). The bottom rows of the table report the average number of establishments in a given state for the corresponding C-corp and Pass-through firms, along with the implied elasticity with respect to rate τ_c and τ_p, respectively. The sample period is from 1977 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	# Establ.	# Establ.	# Establ.	# Establ.	# Establ.	# Establ.
	1st size quintile	2nd size quintile	3rd size quintile	4th size quintile	5th size quintile	Multinational firms
	(1)	(2)	(3)	(4)	(5)	(6)
τ_c × C-Corp	-0.007	-0.013**	-0.025***	-0.042***	-0.083***	-0.057***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.012)
τ_c × Pass-through	-0.001	-0.003	-0.002	-0.001	0.001	
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	
τ_p × C-Corp	-0.004	-0.003	-0.002	-0.002	0.001	-0.002
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.005)
τ_p × Pass-through	-0.005	-0.003	-0.009	-0.012**	-0.051***	
	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm-state FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.57	0.70	0.78	0.88	0.79	0.86
Observations	6,611,600	6,604,200	6,589,400	6,594,800	6,597,200	1,394,800
Implied elasticities						
Mean (# Establ., C-Corp)	2.1	3.4	4.1	5.4	12.9	10.7
Mean (# Establ., Pass-through)	2.0	2.3	2.7	3.3	7.7	-
Ealsticity (# Establ. of C-Corp, τ_c)	-0.33%	-0.38%	-0.61%	-0.78%	-0.64%	-0.53%
Ealsticity (# Establ. of Pass-through, τ_p)	-0.25%	-0.13%	-0.33%	-0.36%	-0.66%	-

Appendix Table A13. Deductibility of State Taxes

This table presents variants of the regressions in columns (1) and (4) of Table 3, except that the tax rates take into account the deductibility of state taxes from federal taxes. The sample period is from 1977 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	# Establishments	Log(employees)
	(1)	(2)
$(\tau_c - \tau_{c,\,federal} \times \tau_c) \times$ C-Corp	-0.056***	-0.0066***
	(0.005)	(0.0008)
$(\tau_c - \tau_{c,\,federal} \times \tau_c) \times$ Pass-through	-0.004	-0.0008
	(0.005)	(0.0019)
$(\tau_p - \tau_{p,\,federal} \times \tau_p) \times$ C-Corp	-0.005	-0.0012
	(0.004)	(0.0007)
$(\tau_p - \tau_{p,\,federal} \times \tau_p) \times$ Pass-through	-0.029***	-0.0041***
	(0.005)	(0.0015)
Controls	Yes	Yes
Year FE	Yes	Yes
Firm-state FE	Yes	No
Establishment FE	No	Yes
R-squared	0.73	0.88
Observations	32,997,200	27,600,100

Appendix Table A14. Extensive Margin: Permanent versus Transitory Treatments

This table presents variants of the regressions in Table 5, decomposing the large tax changes ("treatments") into permanent and transitory treatments. A tax change is coded as transitory if it is reversed within three years. Otherwise, it is coded as permanent. The sample period is from 1977 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	# Establishments			
	Large cuts in τ_c	Large increases in τ_c	Large cuts in τ_p	Large increases in τ_p
	(1)	(2)	(3)	(4)
Treatment (permanent)	0.027***	-0.015***	0.020***	-0.007**
	(0.006)	(0.005)	(0.004)	(0.003)
Treatment (transitory)	0.003	0.002	0.007	0.002
	(0.015)	(0.007)	(0.008)	(0.005)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Establishment FE	Yes	Yes	Yes	Yes
R-squared	0.88	0.92	0.87	0.86
Observations	1,748,600	3,144,600	3,561,900	4,697,400

Appendix Table A15. Intensive Margin: Permanent versus Transitory Treatments

This table presents variants of the regressions in Table 7, decomposing the large tax changes ("treatments") into permanent and transitory treatments. A tax change is coded as transitory if it is reversed within three years. Otherwise, it is coded as permanent. The sample period is from 1977 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	Log(employees)			
	Large cuts in τ_c	Large increases in τ_c	Large cuts in τ_p	Large increases in τ_p
	(1)	(2)	(3)	(4)
Treatment (permanent)	0.0036***	-0.0035***	0.0010*	-0.0028***
	(0.0007)	(0.0006)	(0.0006)	(0.0004)
Treatment (transitory)	0.0003	-0.0003	0.0004	-0.0010
	(0.0014)	(0.0017)	(0.0010)	(0.0009)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Establishment FE	Yes	Yes	Yes	Yes
R-squared	0.94	0.95	0.93	0.94
Observations	1,326,800	1,950,600	2,420,100	3,364,500

Appendix Table A16. Ten-Year Dynamics

This table presents variants of the regressions in columns (1) and (4) of Table 3, using ten lags and one lead of the tax variables. The sample period is from 1977 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	# Estab.	Log(emp.)		# Estab.	Log(emp.)
τ_c (t + 1) × C-Corp	-0.003	-0.0002	τ_p (t + 1) × Pass-through	-0.001	0.0001
	(0.006)	(0.0007)		(0.004)	(0.0009)
τ_c (t) × C-Corp	-0.011	-0.0005	τ_p (t) × Pass-through	-0.005	-0.0004
	(0.006)	(0.0006)		(0.005)	(0.0008)
τ_c (t - 1) × C-Corp	-0.018**	-0.0016**	τ_p (t - 1) × Pass-through	-0.008*	-0.0014*
	(0.007)	(0.0006)		(0.004)	(0.0008)
τ_c (t - 2) × C-Corp	-0.016**	-0.0015**	τ_p (t - 2) × Pass-through	-0.007	-0.0011
	(0.006)	(0.0007)		(0.004)	(0.0008)
τ_c (t - 3) × C-Corp	-0.010	-0.0010*	τ_p (t - 3) × Pass-through	-0.005	-0.0006
	(0.006)	(0.0006)		(0.005)	(0.0009)
τ_c (t - 4) × C-Corp	-0.008	-0.0004	τ_p (t - 4) × Pass-through	-0.002	-0.0003
	(0.006)	(0.0007)		(0.005)	(0.0008)
τ_c (t - 5) × C-Corp	-0.004	-0.0006	τ_p (t - 5) × Pass-through	-0.004	-0.0001
	(0.006)	(0.0007)		(0.005)	(0.0009)
τ_c (t - 6) × C-Corp	-0.002	-0.0007	τ_p (t - 6) × Pass-through	-0.001	-0.0004
	(0.007)	(0.0006)		(0.005)	(0.0009)
τ_c (t - 7) × C-Corp	-0.008	-0.0005	τ_p (t - 7) × Pass-through	-0.003	0.0001
	(0.007)	(0.0007)		(0.005)	(0.0010)
τ_c (t - 8) × C-Corp	-0.005	-0.0001	τ_p (t - 8) × Pass-through	0.000	0.0000
	(0.007)	(0.0007)		(0.005)	(0.0010)
τ_c (t - 9) × C-Corp	0.001	-0.0002	τ_p (t - 9) × Pass-through	0.001	-0.0001
	(0.007)	(0.0007)		(0.005)	(0.0010)
τ_c (t - 10) × C-Corp	-0.002	-0.0001	τ_p (t - 10) × Pass-through	0.000	-0.0001
	(0.006)	(0.0007)		(0.005)	(0.0009)
Cumulative 10-year effect	-0.083***	-0.0071***		-0.034***	-0.0044**
	(0.021)	(0.0025)		(0.011)	(0.0021)
Controls				Yes	Yes
Year FE				Yes	Yes
Firm-state FE				Yes	No
Establishment FE				No	Yes
R-squared				0.85	0.93
Observations				9,806,600	4,599,600

Appendix Table A17. Apportionment Factors and Throwback Rules—Manufacturing

This table presents variants of the regressions in columns (4), (6) and (7) of Table 3. The sample is restricted to establishments in the ASM/CMF. τ_c *(AF-adjusted)* is the apportionment factor-adjusted corporate income tax rate. τ_c *(AF-& TB-adjusted)* is the apportionment factor and throwback rule-adjusted corporate income tax rate. τ_p *(AF-adjusted)* and τ_p *(AF & TB-adjusted)* are defined analogously. The sample period is from 1977 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	Apportionment factors		Apportionment factors and throwback rules	
	Log(employees)	Log(capital)	Log(employees)	Log(capital)
	(1)	(2)	(3)	(4)
τ_c (AF-adj.) × C-Corp	-0.0045***	-0.0030***		
	(0.0012)	(0.0008)		
τ_c (AF-adj.) × Pass-through	-0.0011	-0.0003		
	(0.0023)	(0.0015)		
τ_p (AF-adj.) × C-Corp	-0.0010	-0.0003		
	(0.0008)	(0.0005)		
τ_p (AF-adj.) × Pass-through	-0.0028	-0.0015		
	(0.0022)	(0.0015)		
τ_c (AF- & TB-adj.) × C-Corp			-0.0048***	-0.0032***
			(0.0013)	(0.0010)
τ_c (AF- & TB-adj.) × Pass-through			-0.0013	-0.0005
			(0.0025)	(0.0017)
τ_p (AF- & TB-adj.) × C-Corp			-0.0012	-0.0004
			(0.0008)	(0.0005)
τ_p (AF- & TB-adj.) × Pass-through			-0.0026	-0.0015
			(0.0023)	(0.0015)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Establishment FE	Yes	Yes	Yes	Yes
R-squared	0.92	0.96	0.92	0.96
Observations	854,700	854,700	854,700	854,700

Appendix Table A18. Pass-Through Ownership

This table presents variants of the regressions in columns (1) and (4) of Table 3, interacting $\tau_p \times$ *Pass-through* with two dummy variables indicating whether the pass-through entity owner resides in a state whose tax rate is above or below the median across all states in which the company has operations. We infer the owner's state of residence as the state with the highest percentage of S corporations and partnership tax filings (among all states in which the company has operations) using data from the IRS Data Book. The sample period is from 1977 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	# Establishments	Log(employees)
	(1)	(2)
$\tau_c \times$ C-Corp	-0.037***	-0.0041***
	(0.003)	(0.0005)
$\tau_c \times$ Pass-through	-0.002	-0.0004
	(0.003)	(0.0010)
$\tau_p \times$ C-Corp	-0.003	-0.0007
	(0.002)	(0.0004)
$\tau_p \times$ Pass-through $\times$ (Owner in high-tax state)	-0.011***	-0.0020*
	(0.003)	(0.0011)
$\tau_p \times$ Pass-through $\times$ (Owner in low-tax state)	-0.020***	-0.0027***
	(0.003)	(0.0010)
Year FE	Yes	Yes
Firm-state FE	Yes	No
Establishment FE	No	Yes
R-squared	0.73	0.88
Observations	32,997,200	27,600,100

Appendix Table A19. Entity-Level Taxation of S Corporations

This table presents variants of the regressions in columns (1) and (4) of Table 3, including $\tau_{S\text{-}corp} \times S\text{-}Corp$ as additional control, where $\tau_{S\text{-}corp}$ is the entity-level tax on the income of S Corporations, and *S-Corp* is a dummy variable indicating whether the firm is an S corporation. $\tau_{S\text{-}corp}$ is obtained from the Book of States and states' administrative records. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	# Establishments	Log(employees)
	(1)	(2)
$\tau_c \times$ C-Corp	-0.037***	-0.0041***
	(0.003)	(0.0005)
$\tau_c \times$ Pass-through	-0.001	-0.0001
	(0.003)	(0.0011)
$\tau_p \times$ C-Corp	-0.003	-0.0007
	(0.002)	(0.0004)
$\tau_p \times$ Pass-through	-0.017***	-0.0024***
	(0.003)	(0.0008)
$\tau_{S\text{-}corp} \times$ S-Corp	-0.006	-0.0009
	(0.005)	(0.0007)
Year FE	Yes	Yes
Firm-state FE	Yes	No
Establishment FE	No	Yes
R-squared	0.73	0.88
Observations	32,997,200	27,600,100

Appendix Table A20. Weighted Least Squares

This table presents variants of the regressions in columns (1) and (4) of Table 3, but using weighted least squares (WLS) estimation. The weights are given by the number of employees at the establishment and firm-state level, respectively. Weights are winsorized at the 5% level. The sample period is from 1977 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	# Establishments	Log(employees)
	(1)	(2)
τ_c × C-Corp	-0.021***	-0.0024***
	(0.003)	(0.0003)
τ_c × Pass-through	0.005	-0.0001
	(0.004)	(0.0009)
τ_p × C-Corp	-0.004	0.0005
	(0.005)	(0.0005)
τ_p × Pass-through	-0.010***	-0.0014**
	(0.003)	(0.0007)
Controls	Yes	Yes
Year FE	Yes	Yes
Firm-state FE	Yes	No
Establishment FE	No	Yes
R-squared	0.78	0.89
Observations	32,997,200	27,600,100

Appendix Table A21. Davis-Haltiwanger Growth Rates

In this table, we regress the two-period Davis-Haltiwanger growth rate in employment at the firm-state level on the two-period differences in the right-hand side variables used in the baseline specification in column (1) of Table 3. The regression is estimated by WLS using as weights the number of employees at the firm-state level. The sample period is from 1977 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	Davis-Haltiwanger growth rate
$\Delta \tau_c \times$ C-Corp	-0.0048***
	(0.0015)
$\Delta \tau_c \times$ Pass-through	0.0003
	(0.0012)
$\Delta \tau_p \times$ C-Corp	-0.0005
	(0.0010)
$\Delta \tau_p \times$ Pass-through	-0.0022**
	(0.0010)
Controls	Yes
Year FE	Yes
Firm-state FE	Yes
R-squared	0.20
Observations	3,641,600

Table A22. General Equilibrium—Extensions

This table presents variants of the regressions in Table 14 at the state-LFO-year level. In column (1), all LBD establishments are included. In column (2), all establishments of single-state firms are included. The sample period is from 1977 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	Log(employees)	
	(1)	(2)
	All establishments	Establishments of single-state firms
τ_c × C-Corp	-0.0032**	-0.0012
	(0.0016)	(0.0012)
τ_c × Pass-through	0.0004	0.0004
	(0.0014)	(0.0012)
τ_p × C-Corp	-0.0002	-0.0001
	(0.0009)	(0.0007)
τ_p × Pass-through	-0.0013*	-0.0007
	(0.0007)	(0.0006)
Controls	Yes	Yes
Year FE	Yes	Yes
LFO-state FE	Yes	Yes
R-squared	0.90	0.88
Observations	3,600	3,600

Table A23. ERTA81 and TRA86 Treatments with Marginal Effective Tax Rates

This table presents variants of the regressions in Tables 6 and 8, except that the treatment indicators are set to one for firms whose marginal effective tax rate (ETR) changes by more than 100 basis points in response to the large tax changes. The sample period is from 1977 to 2011. Standard errors are clustered at the state level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	Large increases in ETR_c		Large cuts in ETR_p		Large increases in ETR_p	
	# Establishments	Log(employees)	# Establishments	Log(employees)	# Establishments	Log(employees)
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment (ERTA81)	-0.012*	-0.0044**				
	(0.007)	(0.0020)				
Treatment (TRA86)			0.017**	0.0010	-0.006	-0.0016
			(0.009)	(0.0014)	(0.020)	(0.0023)
Treatment (other exogenous)	-0.016***	-0.0040***	0.020**	0.0012	-0.004	-0.0029***
	(0.006)	(0.0008)	(0.010)	(0.0010)	(0.007)	(0.0011)
Treatment (endogenous)	-0.014**	-0.0033***	0.018	0.0012	-0.005	-0.0024*
	(0.007)	(0.0009)	(0.013)	(0.0010)	(0.018)	(0.0014)
Treatment (unclassified)	-0.014***	-0.0035**	0.015**	0.0014	-0.005	-0.0025**
	(0.005)	(0.0015)	(0.007)	(0.0018)	(0.009)	(0.0013)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm-state FE	Yes	No	Yes	No	Yes	No
Establishment FE	No	Yes	No	Yes	No	Yes
R-squared	0.92	0.95	0.87	0.93	0.86	0.94
Observations	3,144,600	1,950,600	3,561,900	2,420,100	4,697,400	3,364,500