

# **The Impact and Inefficiency of the Corporate Income Tax: Evidence from State Organizational Form Data**

Austan Goolsbee  
University of Chicago, G.S.B.,  
American Bar Foundation,  
and N.B.E.R.

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## **Abstract**

By double taxing the income of corporate firms but not unincorporated firms, taxes can play an important role in a firm's choice of organizational form. The sensitivity of the decision to tax rates can also be used to approximate the efficiency cost of the corporate income tax. This paper uses new cross-sectional data on organizational form across states compiled in the Census of Retail Trade to test the importance of tax rates on organizational form. The results document that there is a significant impact of the relative taxation of corporate to personal income on the share of economic activity that is done by corporations including sales, employment, and the number of firms. The impacts are an order of magnitude larger than found in the previous empirical literature based on time-series variation and, as a consequence, suggest a larger deadweight loss from the corporate income tax.

JEL Classification: H25 Business Taxes  
L22 Firm Organization and Market Structure

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## 1. Introduction

The corporate income tax generates a distortion by double taxing corporate income. In other words, corporations typically pay income tax on income earned at the corporate level and then shareholders pay personal income tax upon the income when it is distributed to them. The fact that the taxation of corporate income generally exceeds that of personal income raises the question of how distortionary the corporate income tax is—the magnitude of the deadweight loss (DWL) of the corporate income tax.

The issue is central to standard work on the subject such as Harberger (1966), Shoven (1976) or Ballard et al. (1985). In these models, some sectors (e.g., manufacturing) are assumed to be corporate sectors and other sectors to be non-corporate. A tax on the corporate sector will lead to shifting to other sectors and this generates a deadweight loss (DWL). The models are then simulated in computable general equilibrium models and tend to suggest relatively small efficiency costs—less than 20 percent of the revenue generated.

An alternative recent literature has sought to consider the efficiency costs of the corporate income tax in a different setting. In particular, Gravelle and Kotlikoff (1988; 1989; 1993) point out that there can be both corporate and noncorporate production in the same sector. Taxing corporate income may lead to much more shifting within sector between organizational forms than across different sectors. In such a model they predict an extremely large DWL from the corporate income tax, frequently in excess of 100 percent of the revenue generated. The key determinant of the DWL in these models is how much firms in the same industry shift to non-corporate forms in response to the corporate income tax and this is an empirically testable idea.

In principle, it should be possible to estimate the efficiency loss from the corporate income tax by examining how much a corporate tax increase induces firms to shift out of

corporate form. This is the subject of Gordon and Mackie-Mason (1990; 1994; 1997) and Goolsbee (1998) specifically. It is also the general subject of the large literature on how corporate taxes affect organizational form decisions such as Ayers et al. (1996), Carroll and Joulfaian (1997), Gentry (1994), Fullerton and Rogers (1993), Scholes and Wolfson (1990; 1991; 1992), and Plesko (1995; 1997). The results in Gordon and Mackie-Mason and in Goolsbee indicate that across different time periods, there does not seem to be much shifting in response to tax rates, suggesting that the DWL of the corporate income tax is relatively modest overall. (i.e., low shifting implies low distortions).

An underlying empirical problem in much of this literature comes from data constraints. Variation in the corporate tax rate over time has been almost negligible in the last 30 years. Further, the standard approach has been to look at time-series type regressions, typically at a highly aggregated level, though sometimes with a limited panel of firm level data. The problem is that when the corporate tax rate changes, such as in 1986, many other aspects of the tax code change, as well, making it difficult to be sure that one is picking up the effect of tax rates.

This paper turns to a new data source to identify the impact of the corporate income tax using cross-sectional variation in corporate tax rates in order to avoid the typical problems of the time-series based literature. It does this by looking at variations in corporate income taxes across states and combining that with unpublished data from the Department of the Census on the organizational form by 3 and 4 digit SIC code in the retail trade sector across states in 1992.

Although the census data have some problems that traditional tax data do not have, and although there the impact of state and federal corporate income taxes may differ (since firms can move to different locations to avoid more local taxes, for example), this cross-sectional approach allows for a direct estimate of the impact of tax rates on corporate incentives to incorporate while

controlling for aggregate factors. As a further matter, there is considerable interest in the subject of state corporate income taxes themselves.

This paper will examine the impact of corporate income taxes on firms' choice of organizational form decisions and the implied efficiency cost of the corporate income tax in 6 sections. Section 2 gives an overview of the way taxes may affect the organizational form choice and presents a simple model deriving the relative tax term. Section 3 summarizes the specification estimated in the paper and the data used. Section 4 presents the regression results. Section 5 discusses the DWL of the corporate income tax. Section 6 concludes.

## 2. Overview of organizational form choices

### A. Institutional Background

An enterprise that conducts business does not have to declare itself to be a corporation and thus can avoid any double taxation. The firm can be organized as a sole proprietorship or as a partnership in which case any income earned will flow through to the partners' or proprietor's individual income tax. Although this type of flow through entity would appear to have a decided tax advantage for most types of business entities, there are important non-tax factors that lead most business assets to end up in corporate form. The two most important are limited liability and access to capital markets. The investors and managers of corporations do not risk their individual assets or income when they take part in a firm. They are only liable for the amount that they have invested in the company. Corporations also have the right to trade on organized exchanges and typically have easier access to both debt and equity. Discussion of other non-tax factors relating to organizational form choices can be found in Guenther (1992) or Scholes et al (2002).

It is important to note some exceptions to this simple dichotomy of form choice. The first is that within the corporate sector, starting in 1958, certain firms could become S corporations (as opposed to the traditional C corporations). Income from S corporations are flow through entities like traditional partnerships, eliminating the double taxation without losing the limited liability. S corporations limit the number of shareholders to . More details on the comparison of S and C corporations can be found in Gordon and Mackie-Mason (1997). Recent years have seen a considerable expansion in hybrid organizational forms such as the Limited Liability Partnership, etc. which somewhat blur the lines between forms. At the time of this sample (1992), all such forms other than S corporations were very limited. I will present evidence on S corporations below.

## B. A Simple Theory of Organizational Form

The stylized model of a firm's decision about whether to incorporate here follows the work of Gordon and Mackie-Mason (1994) with some extensions. Assume, for simplicity, that the income generated by a firm,  $Y$ , is the same regardless of organization type and that there is some relative non-tax benefit  $G$  associated with being a corporation which is itself a function of firm characteristics,  $x$ . The non-tax benefit is assumed to be non-taxable (e.g., something like the value of limited liability). The after-tax income from operating as a corporation each period is then

$$I_C = G(x) + Y(1 - t_C^{ST})(1 - t_C^F)(1 - t_e)$$

where  $t_C^{ST}$  is the state corporate income tax rate,  $t_C^F$  is the federal corporate income tax rate and  $t_e$  is the tax rate on equity income. That is, a firm gets  $G$  plus income net of corporate and equity taxes and the state tax is deductible from the federal.<sup>1</sup>

The after tax income from a noncorporate firm is then

$$I_{NC} = Y(1 - t_p^{ST})(1 - t_p^F) I_n = Y(I t_p).$$

where  $t_p^{ST}$  is the state personal income tax rate facing the marginal investor and  $t_p^F$  is the federal personal income tax rate facing the marginal investor. In words, a noncorporate firm gets no  $G$  but pays only personal income taxes on the income.

Clearly, the firm will prefer the corporate form whenever

$$G(x) > Y(\tilde{t}_C + (1 - \tilde{t}_C)t_e - \tilde{t}_p)$$

where  $\tilde{t}_i$  is the full marginal tax rate on income type  $i$ —i.e., accounting for state and federal taxation—according to

$$\tilde{t}_i = t_i^{ST} + t_i^F - t_i^{ST}t_i^F$$

The model illustrates that the key tax determinant of the decision of whether to incorporate is the relative taxation of corporate versus personal income. While each of these tax components can, to some degree, be measured, the sign of the relationship depends on whether taxable income is greater than zero and this fact that is not observed in the census data. I will have to use proxies for profitability to examine whether this prediction is born out in the data.

### 3. Data

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<sup>1</sup> This is sufficient for almost all states. In five small states, however, at the time of the sample—Alabama, Iowa, Louisiana, Maryland, and North Dakota—the previous year's federal taxes are also deductible from the state taxes. I account for this in the empirical work.

## A. Specification

The basic regression of the paper will explain the corporate share of industry activity  $Y$ , say employment or revenue, for state  $s$  and industry  $i$  according to

$$\frac{Y_{is}^{Corporate}}{Y_{is}^{Total}} = \mathbf{a}_i + \mathbf{b}(TAX_s) + \Gamma' X_{is} + \Lambda' Z_s + \mathbf{e}_{is},$$

where  $TAX$  is the measure of the relative taxation of corporate income from the model

above,  $(\tilde{t}_C + (1 - \tilde{t}_C)t_e - \tilde{t}_P)$ ,  $X$  is a vector of state-industry characteristics that may influence the gains to incorporation, and  $Z$  is a vector of state level factors that may influence the likelihood of incorporation.

## B. Data on Organizational Form Across States and Industries

The data on organizational form come from the Census of Retail Trade for 1992. This economic census is conducted every five years and is meant to provide comprehensive coverage of the sector. Retail trade is an enormous part of the economy. In 1992, total sales in the retail trade sectors included in this sample exceeded 1.7 Trillion dollars and employment was almost 17.5 million. This was divided between 8 broad classes of retail trade as shown in table 1. According to the BEA, in 1992 retail trade made up almost 9 percent of national GDP and the BLS reports that it employed about 16.5 percent of the national workforce.

The census of retail trade asks firms about their organizational form. The choices are corporate, partnership, sole proprietorship, and other. I will use the sum of all the non-corporate categories as the non-corporate share. One drawback of the Census data compared to tax return data is that the Census does not distinguish any of the hybrid organizational forms, most importantly, it does not differentiate S corporations from C corporations. The S corps are flow

through entities so changes to the relative tax term may lead businesses to shift from C to S corporations in response to the tax but this will not show up as a change in the Census data since the firm will remain a corporation in both cases. This will no doubt bias the estimated impact of taxes on organizational form choices toward zero in the current sample. It is not possible to determine how important a factor this is because there is no publicly available information on the share of S corporations by state. The Statistics of income for 1992 for the entire nation, however, shows that the share of corporate returns in the wholesale and retail trade sector that are S corporations is about 20 percent. The share of total revenues in the corporate sector from S corporations is about 5 percent. On average, then, the misclassification of corporations is relatively small, though they may be more sensitive on the margin than are other corporations.

I received a special tabulation from the Census Bureau for each reported SIC code and each variable (employment, payroll, sales, firms, establishments) the totals by organizational form type. I will use the corporate share of the industry total as the dependent variable in the regressions. These special tabulations are subject to non-disclosure requirements meaning that the Census does not reveal information that could be used to learn about specific companies. So, for example, SIC code 5943, Stationery Stores is missing information on employment and sales in several smaller states. The missing observations are concentrated among the small states and the small industries, of course. In the 76 industries 3-digit industries, of the 1900 possible industry-state combinations, 15 have data on the number of corporate firms and establishments withheld for disclosure reasons. More of the employment, payroll and sales observations are withheld with about 210 of the 1900 possible observations missing for the corporate sector in these areas.



The data include information on the SIC codes listed in the Appendix table. I will mainly focus on the 3 digit SIC code level, though I will also present some results at the 2- and the 4- digit level. At lower levels of aggregation, not all the industries are covered.

## B. Data on Taxes and Other Control Variables

The components of the tax term are computed as follows: the combined federal and state tax on personal income for the marginal investor is the highest marginal rate in the state, combining federal and state taxation, as computed by the NBER TAXSIM for the year 1992 as reported in NBER (2002). For the corporate rate, I use the information in the Book of the States (1994) as well as Significant Features of Fiscal Federalism (ACIR, 1994) and compute the highest corporate marginal rate in the state, taking account of the deductibility of state taxes from the federal and the reverse in the relevant states. Michigan does not have conventional corporate income tax so I exclude it from the results. To calculate a single rate for equity,  $t_e$ , I take a weighted average of the tax on dividends and the tax on capital gains corrected for the deferral of capital gains realization according to Feldstein, Dicks-Mireaux and Poterba (1983) who suggest the true rate is about 1/4 of the statutory. The tax rate on dividends is the maximum personal rate. The statutory rate on capital gains in the state is also given by NBER (2002). and I take the dividend share to be 2/3 as in Goolsbee (1998).

Figure 1 plots  $\tilde{t}_C + (1 - \tilde{t}_C)t_e$  for each state on the y-axis and  $\tilde{t}_p$  on the x-axis. The difference between the two is the tax term so states like Pennsylvania, Connecticut, New Hampshire and Alaska, which are on the top side of the graph, are places where the tax term is large and corporate income is taxed heavily relative to personal income. States like Alabama,

Missouri and Kansas on the bottom side of the graph are places where the taxation of corporate income is relatively light.

Industry characteristics that might influence the probability of incorporation (through, say, increasing the value of limited liability or access to capital markets) might be average firm size, pay, number of establishments per firm and the like. To keep it as general as possible, I will include the log of total industry sales, employment, payroll, number of firms and number of establishments. I tried including various ratios instead of the logs and the results were the same. Note that because there are dummies for every SIC code, the specifications fully account for any industry level variation in nontax reasons for incorporation.

There may also be state characteristics that might influence the probability of incorporation in all industries. It is impossible to include state dummies since the tax rate does not vary across industries but I will include information on the log of the Gross State Product in the state in the year of the sample (1992) and the previous year (1991) from the BEA, the log of the land area and the log of population in the state from the U.S. Statistical Abstract and the share of the state population born outside the state (either domestic or foreign born) and the share of the people born in the state that are still living in the state both at the time of the 1990 census, calculated from (U.S. Department of the Census, 2002). The view is that state income levels or growth rates, tax competition pressures from neighboring states or a higher transient/new population all might influence the probability of incorporation. All of the state level data, including the tax rates, summarized in Table 2.

## 4. Results

### A. Basic Results

Results from the basic specification explaining the corporate share of firms, establishments, employment, payroll, and sales in a given industry in a given state as a function of the relative tax term and the other control variables are reported in table 3. This is for 38 different industries at the 3-digit SIC code level. There are SIC code dummies for the industries so the coefficients indicate the impact that a state having a higher relative tax on corporations has on its share of corporate activity relative to other states in that same industry. For each of the types of economic activity, the coefficient on taxes is negative and significant indicating that increasing the relative burden on corporations reduces the corporate share of activity.

The coefficient on firms indicates that every .01 rise in the relative tax term reduces the corporate share of firms by .0092. Note that at the mean tax rate on equity, this increase in the relative tax term is the equivalent of raising the federal corporate income tax by .0136 or a state's corporate income tax (which is deductible from the federal) by .018. Interestingly, the results indicate that the share of firms responds much more to the tax term than does the share of establishments. Similarly, the share of employment, payroll and sales respond but by even less (especially relative to the mean of the dependent variable which is higher for these variables).

This pattern suggests, perhaps, responses by firms with low number of establishments and small employment and sales relative to the typical firm in the industry. The magnitudes of the tax coefficients are not precisely comparable to the effects estimated in the literature by Gordon and Mackie-Mason (1994; 1997) or Goolsbee (1998) because those papers dealt with the corporate share of capital or the share of reported income whereas these are for the number of firms and establishments and the level of sales, employment and payroll. That said, the coefficients on the tax term here are much larger than on the same tax term in those papers. The coefficients of the tax term on the share of industrial activity done by corporations here ranges

from -.32 to -.91. The equivalent coefficients in the previous literature (on the overall corporate share of capital assets) generally ranged from -.001 to -.15.

## B. Robustness

Next, in table 4, I examine the results at different levels of aggregation. For brevity, I will look at the corporate share of firms, employment and sales and leave establishments and payroll out of the tables. The results are highly related, just as in the previous table. At the 2-digit SIC code level, there is data available for all of the industries, although there are only 8 SIC codes. The results, presented in columns (1)-(3) are noisier but show a similar pattern and similar magnitudes—large negative coefficients that are more sensitive on firms than on sales and employment. For a subset of industries, there is more detailed data, i.e., down to the 4-digit SIC code level. These are concentrated only in the 2-digit SIC codes 57, 58 and 59. Looking at these 30 industries in columns (4)-(6) shows the same, indeed slightly larger, effect as in the 3-digit results.

In table 5, I deal with the robustness questions that might arise from weighting state-industries equally despite dramatically varying sizes. In theory, since the regressions are controlling for size of population of the state and the size of the sector, this should not matter but there may be differences in the responsiveness for different sized industries. Columns (1)-(3) reestimate the regressions but weight them by state population size. The coefficients are, if anything, of greater magnitude than previously. Columns (4)-(6) present results from a median regression on the same data which again show that the magnitudes are not being driven by a small number of outliers or a few small states where industry is very sensitive.

### C. Explaining Differing Tax Sensitivities

In table 6, I explore two things that ought to influence the tax sensitivity of various state-industries. The theory demonstrated that the impact of the tax term should have opposite signs for tax loss firms as for tax gain firms. In the Census data, of course, there is not even accounting profit information, much less reported taxable income. As a proxy, though, I will use the ratio of total operating expenses relative to sales. Total operating expenses include payroll, benefits, costs of goods sold, materials and supplies, depreciation, leases, fuel and electricity but not capital expenditures. The payroll information is in the state level census data, the other operating expenses come from the national edition of the Census of Retail Trade-Assets and Expenditures Series. Some of those data are given at only the 2-digit level so I assume all SICs in the same 2-digit category have the same operating expense ratio in these cases. The measure of total expenses ranges from 71 percent of sales for Department Store Retailers to more than 98 percent of sales for Radio, Television and Music stores and for Grocery Stores.

Columns (1)-(3) interact this measure of operating expenses with the relative tax term. If the percent of sales revenue remaining after subtracting total operating expenses is a crude measure of profitability then the tax term should be less important in industries with higher expense ratios. In other words, the interaction term should be positive if the measured tax term is less important for firms making losses (i.e., with high expense ratios). The results have the correct signs although they are clearly noisy, especially as regards employment and sales.

The last 3 columns then explore whether sensitivity to tax rates is related to the physical size or to the population of the state. At the outset, I noted that the sensitivity to state corporate income taxes might be greater than to federal income taxes because corporate firms can move locations as well as change organizational status in response to local variation. In small or

sparsely populated places like Vermont, firms may react very negatively to a tax increase whereas in a place like California they may want to remain in the market and as corporations no matter what the cost. To explore this, I interact the tax term with the log of population and the log of land area in the state. For the corporate share of firms in the state-industry, both variables matter. For employment and for sales, only the physical size of the state matters. In every case, the smaller the state, the greater is the sensitivity to relative tax differentials. The magnitudes are quite large. Take corporate employment. For a state in the 5th percentile of the size distribution (Connecticut), raising the relative tax term by .01 reduces the share of corporate employment in the state-industry by .015. For a state in the 95th percentile, the effect is zero (the point estimate is -.0004).

#### 5. DWL of the state corporate income tax--\*\*section needs some serious revision\*\*

The first thing to note is why it is possible to use the impact of taxes on the choice of organizational form to approximate the DWL of the corporate income tax at all when we have no information about whether corporate production is inherently any more productive than noncorporate production. If they were perfect substitutes, for example, then changes to tax rates would lead to large shifting but there would be no DWL. The key to the analysis is to note that currently the industries are treated differently—there is a tax disadvantage to being a corporation and yet a majority of business is conducted that way—but the industries are not on a corner solution. Therefore the envelope theorem says that there must be costs associated with switching to the noncorporate form and we can estimate those for a small change by how much they lead firms to shift away from corporate form when the price of corporate income rises.

The typical approximation of the excess burden in an industry arising from the corporate tax would be  $-.5 * TAX_i * \Delta K_{ni}$ . Where  $\Delta K_{ni}$  is the change in the corporate share of capital induced by eliminating corporate taxation and TAX is the tax distortion. The problem is determining what the corporate tax revenue is when we do not observe capital stock or income.

The SOI Bulletin for 1995 indicates that in Wholesale and Retail Trade, total income for the sector was about 1.4 percent of total business receipts for C corporations as well as for S corporations in 1992. For any activity A that remains in constant proportion to income, the DWL as a share of revenue will become

$$\frac{DWL}{REV} = \frac{-.5(t)(c)(\Delta A_T)}{(t)(c)(A_T)} = -.5 \left( \frac{\Delta A_T}{A_T} \right)$$

The median corporate share of sales in the 3-digit SIC code sample is .874 and the mean relative tax term is .196. Using the coefficients in table 3, eliminating the corporate income tax completely and setting the relative tax term equal to zero would increase the corporate share of sales by .086 to .96 (derived by multiplying the coefficient on the tax term in the sales regression of -.439 by the change in the tax term of -.196). This implies that the DWL as a share of revenue of around 5 percent from having the current corporate tax structure. This varies from 6.2 to 8.7 percent in the other 3-digit sales specifications. The number is larger using the share of firms that are corporations. Here the implied DWL is between 15 and 20 percent of the revenue raised.<sup>2</sup>

## 6. Conclusion

This paper has shown that in new, cross-sectional census data across states and industries in the retail trade sector, the relative taxation of corporate to personal income plays an important

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<sup>2</sup> This requires the assumption that income per firm remains constant. Such an assumption is perhaps less persuasive than assuming a constant income to sales ratio, for example.

role in the share of firms, employment and sales that are done by corporations versus partnerships and sole proprietorships. An increase in the corporate tax rate by .10 reduces the corporate share of firms by 7-10 percent and the corporate share of sales and employment by 3-6 percent. Given the lack of data on S corporations in the census data, this is likely to be an underestimate of the true shifting. This impact of tax rates is an order of magnitude larger than previous estimates based on time-series variation in the tax rate and suggests a DWL from corporate taxation that is that much larger.



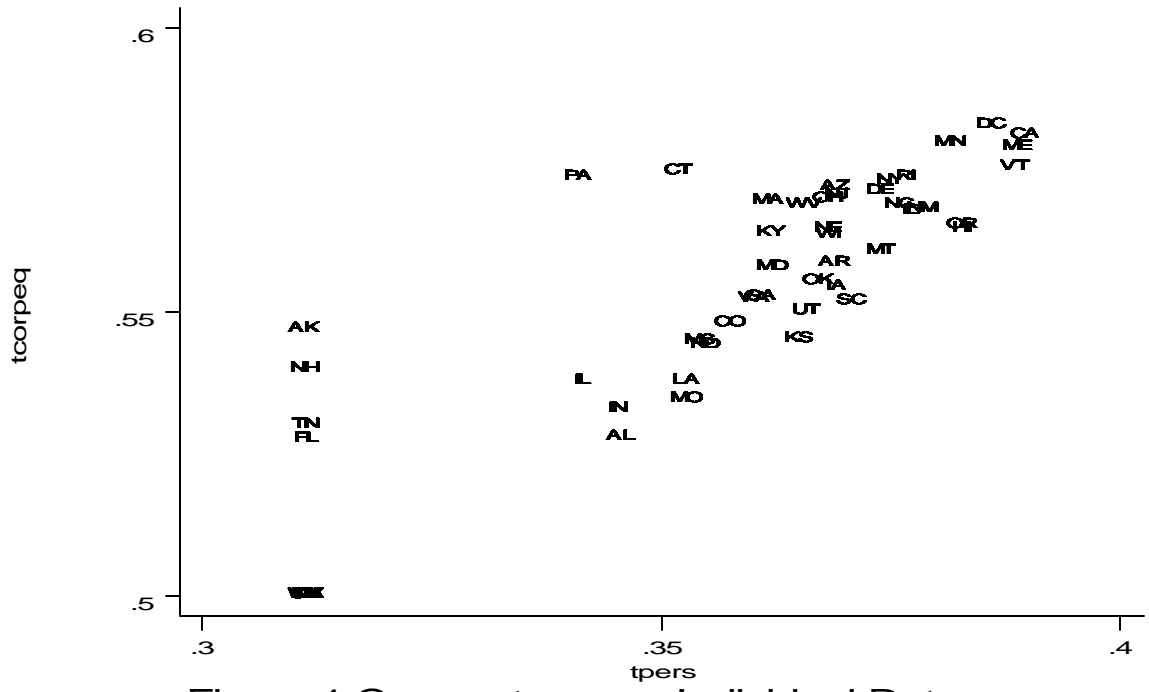


Figure 1: Corporate versus Individual Rates

**Table 1: Census of Retail Summary**

SIC CODE	Firms	Sales (000s)	Employees (000s)
52: Building Materials & Garden Stores	56,431	98,730	665
% Corporate	.694	.905	.887
53: General Merchandise Stores	11,520	245,100	2,076
% Corporate	.564	.989	.985
54: Food Stores	129,100	368,600	2,964
% Corporate	.478	.904	.882
55: Auto Dealers	80,213	393,300	1,261
% Corporate	.728	.930	.918
56: Apparel and Accessory Stores	69,500	101,400	1,141
% Corporate	.613	.903	.905
57: Furniture and Home Furnishing Stores	82,310	92,970	701
% Corporate	.633	.870	.849
58: Eating and Drinking Places	335,285	194,300	6,522
% Corporate	.538	.791	.791
59: Miscellaneous Retail	240,015	183,400	1,764
% Corporate	.546	.808	.786

**Table 2: State Level Data Summary**

Ln (GSP 1991)	11.174 (1.039)
Ln (GSP 1992)	11.118 (1.040)
GSP Growth 1991 to 1992	.058 (.026)
% 1990 Population Born in state	.610 (.141)
% Born in the state still there in 1990	.635 (.084)
Relative Tax Term	.196 (.013)
t <sub>Corporate</sub> (including federal)	.391 (.020)
t <sub>Personal</sub> (including federal)	.356 (.024)
t <sub>Capital Gains</sub> (including federal)	.324 (.024)
Number of observations	49

**Table 3: Basic Results-3 Digit SIC Code Level for Corporate Share**

	(1) Firms	(2) Estab	(3) Employment	(4) Payroll	(5) Sales
Tax Term	-.914 (.192)	-.669 (.188)	-.512 (.175)	-.319 (.181)	-.439 (.193)
ln (GSP 91)	.081 (.103)	.039 (.101)	.056 (.093)	.130 (.097)	.045 (.103)
ln (GSP 92)	-.051 (.110)	-.002 (.108)	-.049 (.100)	-.137 (.102)	-.062 (.109)
% Stay in State	-.186 (.050)	-.084 (.050)	-.094 (.045)	-.109 (.046)	-.071 (.050)
% Born in Stay	-.108 (.020)	-.085 (.020)	-.035 (.018)	-.035 (.019)	-.051 (.020)
ln (land area)	-.056 (.002)	-.044 (.002)	-.026 (.002)	-.020 (.002)	-.024 (.002)
ln (population)	.013 (.019)	-.011 (.018)	-.002 (.017)	.010 (.018)	.017 (.019)
ln (employment)	-.079 (.019)	-.104 (.019)	-.021 (.018)	-.002 (.019)	.003 (.020)
ln (# firms)	-.024 (.011)	-.102 (.011)	-.036 (.010)	-.003 (.010)	-.014 (.011)
ln (# establish.)	-.066 (.016)	.025 (.016)	-.057 (.015)	-.070 (.015)	-.094 (.016)
ln (sales)	-.025 (.016)	-.031 (.015)	-.040 (.014)	-.064 (.015)	-.052 (.016)
ln (payroll)	.179 (.021)	.124 (.020)	.169 (.020)	.157 (.021)	.177 (.022)
Industry Dums.	Yes (38)	Yes (38)	Yes (38)	Yes (38)	Yes (38)
obs	1783	1783	1647	1647	1647
R2	.71	.71	.66	.57	.63
Mean of Dep Var	.626	.698	.860	.826	.830

**Table 4: Results at Different Levels of Aggregation**

	(1) SIC 2-digit Firms	(2) SIC 2-digit Empl.	(3) SIC 2-digit Sales	(4) SIC 4-digit Firms	(5) SIC 4-digit Empl.	(6) SIC 4-digit Sales
Tax Term	-.793 (.307)	-.298 (.161)	-.283 (.257)	-.988 (.234)	-.543 (.183)	-.556 (.222)
Other Controls Industry Dums.	11 Vars Yes (8)	11 Vars Yes (8)	11 Vars Yes (8)	11 Vars Yes (30)	11 Vars Yes (30)	11 Vars Yes (30)
obs	391	391	1647	1343	1216	1216
R2	.72	.79	.57	.62	.70	.62

**Table 5: Robustness**

	(1) Pop weight Firms	(2) Pop weight Empl.	(3) Pop weight Sales	(4) Median Firms	(5) Median Empl.	(6) Median Sales
Tax Term	-1.044 (.235)	-.751 (.189)	-.773 (.208)	-1.273 (.254)	-.580 (.112)	-.600 (.141)
Other Controls Industry Dums.	11 Vars Yes (38)	11 Vars Yes (38)	11 Vars Yes (38)	11 Vars Yes (38)	11 Vars Yes (38)	11 Vars Yes (38)
obs	1783	1647	1647	1783	1647	1647
R2	.67	.67	.63	--	--	--

**Table 6: Explaining Tax Sensitivity Across States and Industries**

	(1) Firms	(2) Empl.	(3) Sales	(4) Firms	(5) Empl.	(6) Sales
Tax Term	-5.281 (2.301)	-3.380 (2.128)	-2.656 (2.352)	-10.784 (1.567)	-5.214 (1.450)	-5.009 (1.604)
<u>Tax Term</u> <u>Interacted with:</u> Industry-Level Expenses/Sales	4.664 (2.449)	3.062 (2.265)	2.367 (2.503)			
Ln (land)				.870 (.141)	.442 (.132)	.434 (.146)
Ln (population)				.452 (.176)	-.045 (.163)	-.078 (.180)
Other Controls Industry Dums.	11 Vars Yes (38)	11 Vars Yes (38)	11 Vars Yes (38)	11 Vars Yes (38)	11 Vars Yes (38)	11 Vars Yes (38)
obs	1783	1647	1647	1783	1647	1647
R2	.71	.66	.63	.72	.66	.63

## APPENDIX TABLE: SIC CODES INCLUDED

### 2-Digit SIC code regressions

5200	Building Materials and Garden Supplies Stores
5300	General Merchandise Stores
5400	Food Stores
5500	Automotive Dealers
5600	Apparel and Accessory Stores
5700	Furniture and Homefurnishings Stores

### 3-Digit SIC code regressions

5210	Lumber & Other Building Mtrls Dealers	5550	Boat Dealers
5230	Paint, Glass, and Wallpaper Stores	5560	Recreational Vehicle Dealers
5250	Hardware Stores	5570	Motorcycle Dealers
5260	Nurseries, Lawn & Garden Stores	5590	Automotive Dealers, N. E. C.
5270	Manufactured (Mobile) Home Dealers	5610	Men's Clothing & Accessory Stores
5310	Department Stores	5620	Women's Clothing Stores
5330	Variety Stores	5630	Women's Accessory & Specialty Stores
5390	Misc. General Merchandise Stores	5640	Children's and Infants' Wear Stores
5410	Grocery Stores	5650	Family Clothing Stores
5420	Meat and Fish (Seafood) Markets	5660	Shoe Stores
5430	Fruit and Vegetable Markets	5690	Misc. Apparel and Accessory Stores
5440	Candy, Nut, and Confectionery Stores	5720	Household Appliance Stores
5450	Dairy Products Stores	5730	Radio, TV, Computer, & Music Stores
5460	Retail Bakeries	5910	Drug and Proprietary Stores
5490	Miscellaneous Food Stores	5920	Liquor Stores
5510	New and Used Car Dealers	5930	Used Merchandise Stores
5520	Used Car Dealers	5940	Miscellaneous Shopping Goods Stores
5530	Auto and Home Supply Stores	5960	Nonstore Retailers
5540	Gasoline Service Stations	5980	Fuel Dealers

### 4-Digit SIC code regressions

5712	Furniture Stores	5946	Camera and photographic supply stores
5713	Floor Covering Stores	5947	Gift, novelty, and souvenir shops
5714	Drapery, Curtain, Upholstery Stores	5948	Luggage and leather goods stores
5719	Miscellaneous Homefurnishings Stores	5949	Sewing, needlework, piece good stores
5731	Radio, TV, and Electronics Stores	5961	Catalog and Mail-Order Houses
5734	Computer and Software Stores	5962	Automatic Merchandising Machine Ops.
5735	Record and Prerecorded Tape Stores	5963	Direct Selling Establishments
5736	Musical Instrument Stores	5983	Fuel Oil Dealers
5812	Eating Places	5984	Liquefied Petroleum Gas Dealers
5813	Drinking Places	5989	Fuel Dealers, N. E. C.
5941	Sporting Goods and Bicycle Shops	5992	Florists
5942	Book Stores	5993	Tobacco Stores and Stands
5943	Stationery Stores	5994	News Dealers and Newsstands
5944	Jewelry Stores	5995	Optical Goods Stores
5945	Hobby, toy, and game shops	5999	Miscellaneous Retail Stores, N.E.C.

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