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AND THE DEADWEIGHT LOSS OF
THE CORPORATE INCOME TAX

Austan Goolsbee

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ABSTRACT

By changing the relative gain to incorporation, corporate taxation can play an important role in a firm's choice of organizational form. General equilibrium models have shown that substantial shifting of organizational form in response to tax rates implies a large deadweight loss of taxation. This paper estimates the impact of taxes on organizational form using data from 1900-1939. The results indicate that the effect of taxes is significant but small. A corporate rate increase of .10 raises the non-corporate share of capital .002-.03. The implied deadweight loss of the corporate income tax is around 5-10% of revenue.

Austan Goolsbee
Graduate School of Business
University of Chicago
1101 East 58th Street
Chicago, IL 60637
and NBER
goolsbee@gsb.uchicago.edu

1. INTRODUCTION

Partly in response to rate changes of the last fifteen years, new interest has emerged in the interaction between the tax system and the organizational form decisions of firms.¹ Gravelle and Kotlikoff (1988, 1989, 1993) include the response of organizational form decisions to corporate tax rates in their studies of the deadweight loss (DWL) of corporate income taxation. These models differ from standard work on DWL such as Harberger (1966) or Shoven (1976), by allowing both corporate and non-corporate production within the same sector rather than in different sectors. By then assuming a large elasticity of substitution between organizational forms these models generate DWL substantially greater than in conventional studies, often exceeding the total tax revenue. The critical issue for evaluating the distortions and DWL caused by corporate taxation is how much impact tax rates actually have on organizational form decisions.

Gordon and Mackie-Mason (1991) estimate this responsiveness using the share of capital in C corporations since 1957 as a function of the relative taxation of corporate and personal income and find evidence of only modest responsiveness. The results, however, do not completely refute that there is large shifting due to corporate taxation because the variation in relative taxes in this period comes almost entirely from changes to personal tax rates.

This paper is similar to the work of Gordon and Mackie-Mason (GMM) but uses data from 1900-1939. The advantage of these data is that during these decades the corporate tax rate changed repeatedly, as did the personal, dividend and capital gains rates. The obvious disadvantage of such data is that the period may not be comparable to the present. At the least,

¹ See the work of Scholes and Wolfson (1990, 1991, 1992), Gordon and Mackie-Mason (1990, 1994, 1997), or Ayers et al. (1995).

there were fewer organizational forms (there were no S corporations, LLCs and so on).

The results based on these historical data show that, although significant, taxes have only a small impact on organizational decisions. A .10 increase in the corporate tax increases the non-corporate share of capital by only .002-.035. The results imply a DWL from corporate income taxation around 5-10% of tax revenue.

The paper is divided into four sections. Section 1 presents historical background and describes the data. Section 2 gives a simple model of the organizational form decision based on the relative taxation of corporate income and presents the specification. Section 3 gives results by sector, including DWL calculations and long-run impacts and then estimates the impact for firms with and without taxable income. Section 4 concludes.

1. BACKGROUND AND DATA

A. CORPORATIONS

Following the rapid industrialization of the U.S., the corporate form had become widespread by 1900.² There are two major advantages to incorporation. First, corporations can issue public shares. Second, corporations have limited liability. These benefits help explain why the majority of business activity is done by corporations despite the corporate tax penalty. Given the data, though, it is impossible to account for these non-tax benefits empirically so I follow GMM and assume that the non-tax benefits of corporate status do not covary systematically with the time series changes in tax rates. The 1900-39 sample begins before the corporate income tax started, giving a further control on the importance of the non-tax factors.

² The early history of corporations is in Whitten (1983) and Sklar (1988).

The data on capital by organizational form are published by the Bureau of Economic Analysis (U.S. Department of Commerce, 1987) and are available for manufacturing, non-manufacturing, and agriculture.³ A graph of the non-corporate share in non-manufacturing is presented in Figure 1 as an illustration.⁴

B. TAXATION

The U.S. instituted the first corporate income tax of 1% in 1909 and the first individual income tax in 1913. The structure of the personal income tax was a "normal" tax paid on all income above the standard deduction and "surtaxes" whose marginal rates rose with income. These rates are listed in the *Statistics of Income* from 1916-40 (U.S. Department of Treasury, various).

Corporate and personal taxes remained low until WWI when Congress raised the corporate rate to 6% and then 12%. Personal rates rose as well and there were also "excess profit" taxes. The corporate tax fluctuated around 12% until the mid-1930s. For individuals, rates on high-income taxpayers were high until the 1920s were reduced and then, in the 1930s, were substantially raised.⁵

Figure 2 shows the corporate income tax rate (listed in Pechman, 1987) and the personal marginal tax rate for an individual with \$30,000 of real income (approximately the top 10% of tax filers in 1917). Changes in the taxation of corporations relative to individuals are clear, albeit

³ The BEA compiles the stock from investment data using the perpetual inventory method. A complete description of the BEA methods is presented in the introduction to U.S. Department of Commerce (1987).

⁴ Variations for agriculture and manufacturing are even smaller than for non-manufacturing and the scale is different so they are not listed in figure 1. The results show the impact of taxes is smaller in those industries, as well.

⁵ For a history of taxation see Ratner (1967).

modest for many of the sample years. I use the rate on \$30,000 income for the marginal investor rather than the maximum personal rate, as commonly used for current data, because in this period the top bracket was *extremely* progressive. In 1918, for example, only four filers qualified for the top marginal rate. Further, people earning \$30,000 or more received approximately 90% of dividend payouts. The assumption, however, did not make much difference to the results.⁶

On equity income, taxes differed. Dividends were consistently taxed at the surtax rate. Capital gains were taxed as regular income until 1921. After 1921, taxpayers could choose the lesser of their personal rate and .125. From 1935-37, the rate on capital gains was the personal rate but with a 70% exclusion for long-term gains. From 1938-39, the exclusion fell to 50%. To calculate a single rate for equity, t_e , I use the equation

$$t_e = s_d t_d + (1 - s_d) \gamma \alpha t_{cg}, \quad (1)$$

where s_d is the share of gains distributed as dividends, α is the taxable share of long-term gains and γ is a factor to account of capital gains deferral and of basis step up at death. The *Statistics of Income* from 1916-1939 indicate that the ratio of dividends to capital gains was roughly two to one so I assume $s_d = 2/3$. Feldstein et al. (1983) estimate γ to be .25 using modern data. Though probably not applicable for this earlier period, it has little impact on the results so I use it here.

2. THEORY, DATA AND SPECIFICATION

⁶ A previous version of this paper (Goolsbee, 1996) using tax rates assuming income levels of \$20,000, \$50,000, or \$100,000 gave almost identical or even smaller results. It is not possible to use the tax rate for the top decile of taxpayers over time because of changes to exemption levels. On the corporate side, using the corporate rate plus war and excess profits taxes also gave similar results.

A. A SIMPLE THEORY OF INCORPORATION

I present a stylized model of the firm's decision about whether to incorporate, following Gordon and Mackie-Mason (1991). 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. Since this could be something like the value of limited liability, it would be more realistic to model G as a function of characteristics of the firm but there are no firm level data so I assume it is the same for all firms within an industry and is not taxed. The after-tax income from operating as a corporation each period is then

$$I_c = G + Y(1 - t_c - (1 - t_e) t_e), \quad (2)$$

where t_e is the tax rate on equity income. That is, a corporation gets G plus the income net of corporate and equity taxes. A non-corporate firm gains no G but pays only personal taxes so

$$I_n = Y(1 - t_p). \quad (3)$$

Comparing the two, the firm will prefer to incorporate if

$$G > Y(t_c + (1 - t_c) t_e - t_p). \quad (4)$$

Equation (3) shows that it is the relative taxation of corporate versus personal income that determines the incentive to incorporate. It also implies that the direction of the incentive will depend on whether taxable income is greater than zero.

B. SPECIFICATION

Motivated by (3), the relative tax term $(t_c + (1 - t_c) t_e - t_p)$ should empirically influence the organizational form decision and the non-corporate share of capital within a sector. The basic

specification to be estimated is

$$S_{it} = \alpha_i + \gamma_i \text{tax}_{it} + \beta_{i1}(\text{time}) + \beta_{i2}(\text{time})^2 + \beta_{i3} \text{GNP}_t + \epsilon_{it}, \quad (5)$$

where S_{it} is the non-corporate share of capital for sector i in time t . Tax_{it} is the relative tax term listed on the right hand side of equation (3) and GNP is the GNP growth rate. The coefficient on taxes should be positive if higher relative corporate taxation leads to more non-corporate activity. The time trends account for changing value of non-tax benefits or other trends. This is the same equation estimated in Gordon and Mackie-Mason but with further controls for GNP growth.⁷

3. RESULTS

A. BASIC RESULTS

Estimates from a standard specification for the non-corporate share of capital in manufacturing are (time and time squared coefficients are multiplied by 100 for simplicity):

$$\begin{array}{ccccccc} \text{NC}_t = & .071 & + & .030 * \text{TAX} & + & .037 * t & - .0018 * t^2 + .0037 * (\text{GNP GROWTH}) \\ & (.001) & & (.015) & & (.014) & (.0003) & (.0053) & R^2 = .79 \end{array}$$

The coefficient on taxes indicates that raising the corporate rate significantly increases the non-corporate share of capital but the magnitude is small. An increase in the corporate income tax of .10 increases the non-corporate share of capital around .003. The tax coefficient from this specification for each of the three sectors is listed in column (1) of Table 1. All indicate effects that are significant but small. A .10 corporate tax increase raises the non-corporate share of non-

⁷ Including other macroeconomic variables such as the unemployment rate or the interest rate had no impact on the estimated tax results that follow so they are left out for simplicity.

manufacturing by .035 and of farming by .002. These regressions include GNP growth to deal with the Great Depression. Column (2) shows that restricting the sample to pre-1929 does not increase the estimates. A .10 corporate increase raises the non-corporate share .003-.016.

GMM, using 1957-1986 data on the share of assets held by C corporations, get very similar coefficients of .05-.10. They also show that the Gravelle and Kotlikoff model predicts a .45 corporate tax should increase the non-corporate capital share by .63. The results in this paper suggest per unit shifts which are between 5 and 50 times smaller.

B. LONG-RUN EFFECTS

With fixed costs to changing organizational form, temporary tax changes will have smaller effects than permanent ones. Since taxes changed frequently in this sample, this could explain the low estimates. To examine this, column (3) includes lags and leads of tax policy in the regressions. Unfortunately, the variability of the relative tax term means that identifying “permanent” effects is difficult. The individual coefficients are imprecisely estimated as seen in the regression for manufacturing (coefficients on the non-tax terms are not reported for simplicity):

$$NC_t = .072 - .028(\text{tax}_{t+1}) + .034(\text{tax}_t) + .011(\text{tax}_{t-1}) + .009(\text{tax}_{t+2}) + .006(\text{tax}_{t+3})$$

$$(.002) (.024) \quad (.029) \quad (.033) \quad (.035) \quad (.028)$$

The point estimates indicate that anticipated increases to the corporate rate reduce the non-corporate share today followed by gradual increases upon passage. The sum of the coefficients for the contemporaneous tax change and then the sum for all the coefficients are reported by sector in column (3). The p -value is for an F -test of whether the sum equals zero.

For manufacturing and farming, the impact of tax changes after three years is larger than in the contemporaneous period. For non-manufacturing the sum is, oddly, smaller in the long run.

In each of the specifications, however, the long-run effects are quite modest in economic terms.

C. DEAD WEIGHT LOSS

We can approximate the excess burden in an industry arising from the corporate tax by $-.5 * TAX_i * \Delta K_{ni}$, where ΔK_{ni} is the change in the non-corporate share of capital induced by eliminating corporate taxation and TAX is the tax distortion. Performing this calculation using the coefficients above shows the long-run DWL is around 3-5% of revenue rather than the 110% in Gravelle and Kotlikoff.⁸ Even using the largest estimates of form shifting for each sector, the DWL is less than 3% for manufacturing and agriculture and 15% for non-manufacturing.

D. TAXABLE GAINS AND LOSSES

The theory indicates that the impact of tax rates should depend on the income status of firms. When the corporate rate rises, firms have an incentive to get taxable gains out of corporate form. There are no good data to explore this issue for 1900-39 as there are very little data on non-corporate firms. There are data from 1916-1934, however, on the share of corporate returns with taxable income. When the relative taxation of corporate income rises, the shifting to the non-corporate sector should be concentrated among firms *with taxable income*. The remaining corporate sector should have a higher share of firms without taxable income.

The share of corporate returns reporting no taxable income depends critically on the macro economy, so I estimated regressions including as control variables the GNP growth rate, the real level of GNP and the real interest rate (the commercial paper rate minus the rate of

⁸ Two reasons the DWL is so large in Gravelle and Kotlikoff (1993) are (1) they use the full corporate rate as the tax distortion rather than the smaller, relative tax term and (2) they assume that corporate and non-corporate firms produce slightly different products and that the elasticity of substitution between the two is 30. Goolsbee (1996) structurally estimated the Gravelle and Kotlikoff model and found this elasticity to be less than 2 (implying less shifting and smaller DWL).

inflation) and also estimated regressions only for the years before the depressions. The coefficients were significant or borderline significant and ranged from $-.5$ to $-.9$, indicating that increasing the corporate tax by $.10$ reduces the fraction of corporate returns reporting taxable income by $.05$ -. $.10$, larger than the estimated impacts on actual capital share.

4. CONCLUSIONS

This paper has presented evidence on the question of how tax rates affect the decision to incorporate. The evidence indicates that taxes played a statistically significant role in organizational form decisions from 1900-39 but the magnitude was quite small. A $.10$ increase in the corporate income tax increases the non-corporate share of capital by $.001$ -. $.007$ for farming and manufacturing and $.002$ -. $.04$ for non-manufacturing; the magnitudes do not appear to be much larger in the long run. There is also evidence that firms with taxable income are more responsive to changes in the corporate rate than those without taxable income--as the theory would predict.

Overall, these small effects on organizational form imply that the excess burden from the corporate income tax is around 5% and not the greater than 100% implied by Gravelle and Kotlikoff. The results here imply that the organizational form impacts of corporate taxation are simply not of first-order importance.

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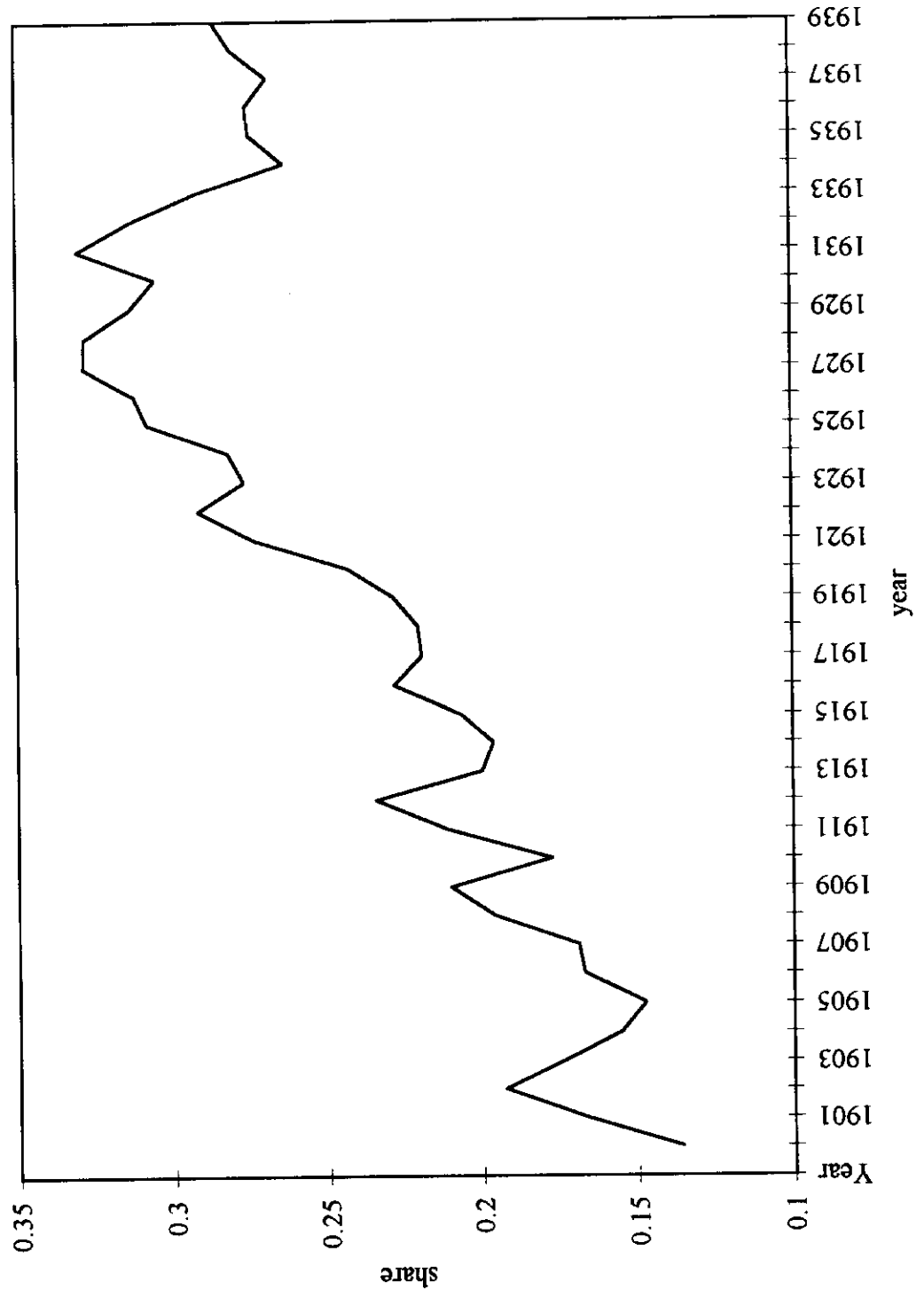
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TABLE I:
TAX COEFFICIENTS FOR SHARE OF CAPITAL IN NON-CORPORATE FORM
(Standard Errors in Parentheses)

	(1) 1900-1939	(2) 1900-1928	(3) Long-Run Effects: 1900-1939 (p-value in brackets)	
			<u>Contemp</u>	<u>Three Years</u>
Manufacturing	.0304 (.0152)	.0459 (.0145)	.0066 [p=.80]	.0323 [p=.17]
Non-Manufacturing	.3567 (.1521)	.1615 (.1103)	.3423 [p=.13]	.1823 [p=.36]
Farming	.0209 (.0094)	.0340 (.0103)	.0102 [p=.43]	.0495 [p=.0002]

Notes: The dependent variable in each case is the share of non-corporate to total capital. Columns (1) and (2) list the coefficient on the tax term in the regression for the sector listed on the row. Column (1) includes the full sample while (2) is restricted to pre-1929. In (3), each entry is the sum of the coefficients on the tax terms of various lag lengths, as described in the paper. The first entry sums the contemporaneous and one lead coefficients while the second adds coefficients from one, two and three lags. The sample is 1900-1939. The p-value listed in brackets is from an F-test that the sum of the coefficients is equal to zero.

**Figure 1: Non-Corporate Share of Capital
for Non-Manufacturing Industries**



**Figure II: Individual and Corporate Tax Rates
(Assuming \$30,000 Real Income for Individual)**

