

# Income Taxation and Business Incorporation: Evidence from the Early Twentieth Century\*

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## Abstract

If the corporate income tax is set at a different rate from non-corporate income tax, it can play an important role in a firm's choice of organizational form. The impact and interdependency of income tax incentives are crucial factors to take into account when designing efficient tax policies. In this paper I exploit the substantial variation in income taxes across U.S. states in the early twentieth century to estimate these sensitivities. The potential endogeneity of state taxes is addressed using an IV approach. The results demonstrate that the relative taxation of corporate to personal income has a significant impact on the corporate share of economic activities. Raising the entrepreneur's tax cost of incorporation by 10% decreases the mean corporate share of economic activities by about 11-18%. In addition, higher personal tax rates may affect the share of corporate activities through tax evasion and tax progressivity.

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# 1 Introduction

The interplay of corporate and personal income taxes lies at the heart of tax policy design. As entrepreneurs face a choice between corporate and non-corporate forms of doing business, any divergence between rates of corporate and personal tax creates incentives to shift taxable income from the higher to the lower taxed organizational form. A careful study of the impact of taxes on incorporation helps us to understand the implications of income tax on the organization and location of real economic activities, which is an essential step toward the designing of efficient tax policy.

Existing empirical evidence based on a small number of studies, including Gordon and MacKie-Mason (1994), Mackie-Mason and Gordon (1997), Gordon and Slemrod (2000) and Goolsbee (1998, 2004), suggests a small but significant effect of taxes on incorporation decisions of U.S. firms. Most of these studies (with the exception of Goolsbee (2004)) rely on time-series data, where identification of the tax effects is limited by the small variation in statutory tax rates.

In this paper I overcome the problem of limited variation by turning to the early period of income taxation. The first two decades of the twentieth century witnessed tremendous changes in the income tax regimes in the United States. At the federal level, corporate income tax was introduced in 1909 and personal income tax in 1913. Marginal rates in the schedules of both taxes moved frequently and dramatically during this period. The top marginal corporate rate was 1 percent in 1909; by 1919 it had risen to 10 percent. The personal income tax schedule defined 7 income brackets in 1913, with the marginal rate ranging from 1 percent to 7 percent. By 1919, the number of tax brackets had increased to 56 and the marginal rate spanned from 4 percent to 73 percent. The first World War caused major shift in the scope and structure of income taxation, introducing additional variation in the relative taxation of corporate income. Furthermore, during these years (1909-1919) many states enacted modern income tax legislations for the first time, with considerable differences in tax structure across individual states. As a result, there are rich time-series and cross-sectional variations in the tax rates that contributed to this study's identification of the tax effects on business incorporation.

There are some other advantages to focussing on this early period of income taxation. The data on organizational forms are free of measurement errors caused by the kinds of hybrid entities that emerged in the second half of the twentieth century. There is no need to control for the various state regulations that were implemented to curb aggressive state-tax avoidance behavior of the corporations, which were devel-

oped at a much later stage. Therefore, this period offers a context relatively clear of complications for the purpose of this study. On the other hand, while the economic history literature has carefully analyzed the role of government regulation, legal system, and the innate limitation of corporate form in business incorporation during the late nineteenth and early twentieth century, the contribution of income taxes in the spread of corporate form in this period has not yet been systematically studied. (Important studies of corporate forms in this period include but not limited to Lamoreaux and Rosenthal (2005), Lamoreaux and Rosenthal (2006), and Timothy Guinnane and Rosenthal (2007).)

The dataset I construct for the purpose of this study contains details of the effective corporate and personal tax rates for the 48 continental states of the U.S. over the years of 1904, 1909, 1914 and 1919.<sup>1</sup> I analyze three different indicators of corporate activities including the corporate share of establishment, employment and production in the manufacturing sector. Conceivably, if only the very small enterprises respond to tax incentives by switching between the corporate and non-corporate form, income taxes may only affect the corporate share of establishment without changing the share of employment or production. Analysis based on these three different measures of corporate activities offers a more comprehensive picture of the relation between tax incentives and firms' real economic activities in the economy. Controlling for macro-economic effects and unobserved state heterogeneity, the two-way fixed-effect estimation results suggest that the larger the difference between corporate and personal tax rates, the greater the decrease in the corporate share of establishment, employment, and production in the manufacturing sector. Firms that respond to incorporation incentives are, in general, larger than the average firm but slightly smaller than existing corporations in the economy.

In a period of frequent and rapid tax changes, state governments may increase the tax rates in response to an expanding tax base. As a result, the OLS estimates can be either upward or downward biased. I check the robustness of my findings by addressing the potential reverse causality. Conclusions based on the IV estimates remain qualitatively the same while the magnitude of IV estimates is much larger than the OLS results. An increase of one percentage point in the tax cost to incorporate decreases the corporate share of establishment by 1.10 percentage points, employment by 1.79 percentage points, and the value of production by 1.57 percentage points. The size of these tax-cost elasticities is comparable to the largest existing estimates

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<sup>1</sup>The year 1919 is the last time when establishment characteristics by organizational form and state was published by the Census of Manufacturers.

of responsiveness as in Goolsbee (2004), although he studies the responsiveness of firms in a much more mobile sector (the retail trade sector) and uses more recent and confidential data (special tabulation of 1992 Census of Retail Trade data).

At a given tax cost of incorporation, a one percentage point increase in the personal tax rate further increases the corporate share of establishment by 1.31 percentage points, employment by 2.37 percentage points, and production by 2.20 percentage points. The fact that personal tax coefficient remains significant when its impact on the relative taxation of corporate income is properly controlled for suggests that personal taxes may affect incorporation rates through additional channels. For example, a higher personal income tax may induce tax evasion of non-corporate firm owners, decreasing the reported number of unincorporated firms in the sample. Alternatively, the progressive nature of the personal tax schedule can discourage risk taking in the pass-through entities. As a result, entrepreneurs may opt to incorporate rather than develop a non-corporate firm.

The empirical findings remain robust to a wide variety of specifications and checks. Using alternative instruments, weighting observations by the size of manufacturing sector, and allowing for the possibility that marginal investors may face different tax rates all have little effect on the basic conclusions. To the best of my knowledge, this is the first paper that exploits the rich variation in the early period of income taxation in order to analyze the joint role of corporate and personal income taxes in the choice of organizational forms. This is also one of the few studies that directly address the endogeneity of income taxes in studying the incentive effect of taxes on incorporation.

The analysis is organized as follows. Section 2 reviews the existing literature on incorporation. Section 3 uses a simple discrete choice model to illustrate how taxes may affect firms' choice of organizational form. Section 4 discusses the nature of federal and state income taxes in the first two decades of the twentieth century. Section 5 summarizes the data used and presents some descriptive evidence on the effect of tax cost to incorporate. Section 6 reports the basic within-group regression results as well as findings based on IV estimation strategy. Section 7 provides some further robustness checks and Section 8 concludes.

## 2 Previous research

### 2.1 Taxes and firms' organizational forms

Existing empirical evidence suggests that tax plays an important role in the choice of organizational forms in the United States, although no consensus has been reached about the magnitude of the tax effects. By estimating the size of the non-tax benefits of incorporation which would be consistent with the observed incorporation rates, Gordon and MacKie-Mason (1994) conclude that non-tax factors appear to be dominant in the choice of organizational form. Non-corporate firms are concentrated in industries with low non-tax costs, which they interpret as indirect evidence of very limited responsiveness to taxes regarding incorporation decisions. Mackie-Mason and Gordon (1997) further studies the time-series behavior of asset allocation between corporate and non-corporate firms during 1959-1986 and finds that double taxation of corporate income discourages incorporating. Profitable firms move out of the corporate sector when the tax distortion is large, although the tax effect is relatively small: cutting the tax rate on non-corporate income by 10 percentage points causes 0.2 percent of total assets to shift out of corporate form.

One explanation for the small estimated tax effect is that changes in the statutory tax rates, both corporate and personal, have been negligible over the sample period in these studies. To overcome the limited time variation in the federal tax rates, Goolsbee (2004) turns to the cross-state difference in the 1992 tax rates. He finds the relative taxation of corporate to personal income has a significant impact on the corporate share of real economic activity in the retail trade sector. On average, a 10 percentage point increase in corporate income tax reduces the corporate share of economic activity by 1.5 to 2.5 percentage points This is, five to ten times larger than the largest measure of responsiveness found in previous time-series studies.

The non-US evidence, on the other hand, shows that corporate tax systems have a much larger impact on the choice of organizational forms. de Mooij and Nicodeme (2008) exploits differences in the corporate and personal tax system among European countries and shows that lower corporate taxes have a significant and large effect on incorporation. Specifically, it finds that a reduction in the corporate tax rate equivalent to one euro only reduces the corporate tax revenue by 82 cents. Therefore, around 10 to 17 percent of corporate tax revenue can be attributed to income shifting through incorporation.

Egger, Keuschnigg and Winner (2009) models and estimates the determinants of incorporation including taxation. Its empirical results confirm that a higher personal

income tax rate favors incorporation, while a higher corporate tax rate reduces the probability that a European manufacturing firm will incorporate. Overall, an increase in the effective shareholder corporate tax burden by one standard deviation implies a decline of the probability to incorporate of 1.4 percentage points. Freedman and Crawford (2010) specifically considers the effect of taxes on the incorporation decisions of small businesses in the United Kingdom. It presents some clear graphical evidence that incorporation rates of small businesses have surged in subsequent years, following the introduction of a lower corporate tax rate for companies with profits of £10,000 or less in 2000.<sup>2</sup>

Marco Da Rin and Sembenelli (2011) examines the effect of corporate taxation on firm's incorporation decision by analyzing tax-induced changes in the number of new companies in 17 European countries. To the best of my knowledge, this is the only other existing paper that directly addresses the possible endogeneity of taxation using instruments drawn from political economy literature. The authors find a significant negative effect of corporation income taxation on the entry rate of corporations although the impact of corporation (and personal) taxation on entry rates of unincorporated firms is left out of the analysis. Therefore their study provides at most a partial answer to the impact of income taxes on firm's choice of organizational form.

## 2.2 Taxes and the location of firms

This paper is also related to a handful of studies that consider the effect of state taxation on the location of economic activities.<sup>3</sup> Hines (1996) examines the effect of state tax rates on the distribution of foreign direct investment (FDI) in the United States and finds that state tax rates significantly influence the location of inbound FDI. Goolsbee and Maydew (2000) uses panel data for the U.S. states from 1978-1994 and explore the externalities that one state's apportionment formula may have on other states. It finds that while the payroll factor weighting in the apportionment formula influences employment, the income tax rate has no significant impact on the size of a states' employment rates in manufacturing. On the other hand, as established in the earlier literature (see, for example, McLure (1981), Mieszkowski and Zodrow

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<sup>2</sup>The starting rate of the corporation tax was initially set at 10 percent, further reduced to 0 percent in 2002/03, and finally removed in 2006/07, when the UK government recognized that the tax incentive was affecting self-employed individuals, causing them to incorporate for tax reasons rather than because of entrepreneurship or real growth (Freedman and Crawford, 2010).

<sup>3</sup>There is, however, a large literature on the impact of corporate taxation on the location of capital, firms and profit at the national level. Devereux (2007) provides an excellent review of recent empirical evidence on this matter.

(1985), and Gordon and Wilson (1986)), variation in both apportionment formulas and statutory tax rates should at least affect location decisions for employment.

The mobility dimension of the analysis is closest to Feld and Kirchgassner (2003). This study considers the roles that the corporate and the personal income tax burden play in the location and employment of firms in Swiss cantons, but does not distinguish firms by organizational forms. It finds that corporate and personal income taxes contribute significantly to the rationale for the regional distribution of firms and of regional difference in employment in Switzerland.

### 2.3 The incentive effect of taxes in historical context

Goolsbee (1998) is the only other paper I am aware of that utilizes the rich variation in U.S. federal tax rates during the early period of income taxation. He estimates the impact of taxes on the non-corporate share of capital using aggregate time-series data in 1900-1939. The empirical results suggest that taxes do matter for organizational form decisions but the magnitude of the effect is small. A ten percentage point increase in the corporate tax rate raises the non-corporate share of capital between 0.2 and 3 percentage points.

Romer and Romer (2011) focuses on the later inter-war period and considers the responsiveness of reported taxable income to changes in marginal personal rates. It finds an elasticity of income with respect to the change in the log after-tax share of 0.2. It also presents some evidence that large swings in marginal personal tax rates have influenced the number of business incorporations in the inter-war era.

## 3 Theoretical framework

I start by using a simple model to illustrate how firms make decisions about whether to incorporate based on comparison of the profits they are likely to obtain from each organizational form. The framework is based on the stylized model developed in Mackie-Mason and Gordon (1997), Goolsbee (2004), and de Mooij and Nicodeme (2008). First let's consider the impact of taxation on firm's organizational form only. The taxation of firms differs by organizational form. An entrepreneur organizing a non-corporate firm in state  $i$  earns gross income  $I_{gross,p}^i$  and is taxed at the ordinary personal income rate  $\tau_p^i$ . The entrepreneur can also organize as a corporation with gross income  $(I_{gross,c}^i)$  taxed both at the firm and person level, and the after-tax net

income ( $I_c^i$ ) is

$$I_c^i = (1 - \tau_c^i)(1 - \tau_e^i)I_{gross,c}^i,$$

where  $\tau_c^i$  is the corporate tax rate in state  $i$ , and  $\tau_e^i$  is the tax rate on equity income.

From the usual assumption that firms maximize their profits subject to certain constraints, each firm chooses its organizational form with a higher profit, i.e.  $I^* = \max(I_p^i, I_c^i)$ . In particular, a firm will incorporate if the net corporate profit is higher than the net non-corporate profit in state  $i$ ,

$$(1 - \tau_c^i)(1 - \tau_e^i)I_{gross,c}^i > (1 - \tau_p^i)I_{gross,p}^i. \quad (1)$$

Approximating  $I_{gross,c}^i$  to be proportional to  $I_{gross,p}^i$  by  $(1 + G_c^i)$ , where  $G_c^i$  represents the non-tax cost and benefit associated with incorporation in state  $i$ , we get

$$I_{gross,c}^i = (1 + G_c^i)I_{gross,p}^i. \quad (2)$$

Combining equations (A1)-(A3), a firm will choose to incorporate in its current state if

$$(1 + G_c^i) > \frac{(1 - \tau_p^i)}{(1 - \tau_c^i)(1 - \tau_e^i)}, \quad (3)$$

Ex ante, it is unclear what the sign of  $G_c^i$  is. Compared to a non-corporate form, a corporation entails benefits as well as costs. As a legal entity independent of the identity of their shareholders, business corporations solve a key weakness of the partnership form: the likelihood that otherwise profitable enterprises would suffer untimely dissolution (Lamoreaux and Rosenthal, 2005).<sup>4</sup> But to the extent that corporation concentrates power in a small number of managers in the firm, problems of delegated management and minority oppression naturally arise in accordance with the choice of particular corporate form.<sup>5</sup>

Another key advantage of incorporation is that it allows firms to raise external funds on the equity markets. Corporations also benefit from limited liability, although in order to gain access to credit, studies show that most corporations depended on their stockholders personally to endorse their debts in this period, which imposed costs that could affect the firm's access to credit and its flexibility to make decisions

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<sup>4</sup>The U.S. legal system didn't grant partnership limited liability until the Revised Uniform Partnership Act in 1992.

<sup>5</sup>A large literature on corporate governance directly addresses this issue: for example, see Demsetz and Lehn (1985), Zwiebel (1995), Pagano and Roell (1998), and Tirole (2001).



(Lamoreaux and Rosenthal, 2006). Incorporation also requires additional legal fees and paperwork to comply with corporate law, implying a higher cost of administration and operation. Finally, when it comes to dissolving or closing down the incorporated business, the firm needs to follow a procedure that is far more complicated than that for other forms of business. In summary, apart from the effect of income taxes on business organizational form, a wide range of non-tax factors play a role in shaping the decision to incorporate.

## 4 Income tax in the early twentieth century

In this section I explain some essential features of the federal and state income taxation in the early twentieth century. The rich time-series and cross-state variation in the tax variables provide excellent sources for identification in the empirical estimation.

### 4.1 Federal income taxes

The federal corporate income tax was established by the Tariff Act of 1909. It was first formatted as a special tax on the privilege of conducting business as a corporation and taxed the net income of corporations over \$5,000 at one percent.<sup>6</sup> The validity of corporate income tax was affirmed by the Supreme Court in 1911. Shortly after the ratification of the Sixteenth Amendment, the Revenue Act of 1913 introduced federal personal income tax. The following decade was a period of major and frequent changes in income tax legislations. Table B2 and B3 list all the acts that affected corporate and personal income taxes, respectively, during 1909-1919, . Each table describes the tax rate and schedule in some detail.

Figure 1 plots the time-series of the top statutory corporate tax rate, top personal tax rate, and marginal personal rates at incomes of \$20,000 and \$10,000 during 1909-1919. The left vertical axis represents the scale of top statutory corporate rate and marginal personal rates at incomes of \$20,000 and \$10,000, and the right vertical axis represents the top personal rate at a larger scale. Over time, there is an evident upward trend in the corporate tax rates, with the corporate and individual income tax rates starting to diverge from 1916. However, two major changes in the taxation of corporate income are not reflected in Figure 1. First, the Revenue Act of 1917 introduced the war profits tax and excess profits tax, both targeted at income

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<sup>6</sup>The Payne-Aldrich Tariff Act, 1909, ch. 6, 36 Stat. 11.

of corporations.<sup>7</sup> Though temporary in nature, these war taxes demonstrated some clear disincentives on corporate activities. For example, the number of manufacturing corporations reporting to the Bureau of Internal Revenue was significantly lower in 1918-19 compared with 1916-17, reflecting a disincorporation movement to avoid the excess-profits tax (Schmidt and Young, 1943).<sup>8</sup> Second, unlimited deduction for corporate interest payments was introduced in 1918 as a temporary measure to compensate for the effects of the excess profits tax.<sup>9</sup> But when the excess profits tax was repealed in 1921, the full interest deduction remained as part of the corporate income tax without any formal justification from Congress.<sup>10</sup>

Movement of the three personal tax series in Figure 1 suggests that statutory personal income tax experienced frequent and significant increases during this period. Two components of the personal tax rate— a flat normal tax for all income above exemption and a progressive surtax ranging from 2 to 73 percent—both contributed to the increasing spread between the corporate and personal tax rates.

Another key feature of personal income tax in this period is that it is extremely progressive at the federal level. Between 1913 and 1919, the number of income tax brackets increased from 7 to 56, and the top marginal rate increased from 7 to 73 percent. Dividend income was exempted from normal personal tax but not from the surtax.<sup>11</sup> Theoretically, this treatment was intended to shield corporate income from double taxation. Income from realized capital gains, on the other hand, were taxed at the same rate as regular personal income.<sup>12</sup>

## 4.2 State income taxes

The passage of a permanent federal income encouraged the enactment of income taxes at the state level. Wisconsin passed the first modern state income tax law in 1911 and many other states followed in the next few years.<sup>13</sup> Tables B4 and B5 list all the state income laws that were enacted between 1911 and 1919. Five states had imposed

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<sup>7</sup>The war profits tax was eliminated in January 1919, and the excess-profits tax remained in place until 1921.

<sup>8</sup>Schmidt and Young (1943) mainly considered the effect of World War I on business financing but also noted that excess profits taxes might have decreased the number of manufacturing and trade corporations between 1914 and 1920.

<sup>9</sup>Before then, only limited offsets against corporate income could be applied for interest payments.

<sup>10</sup>For a discussion of the historical impact of the corporate interest deduction, see Warren (1974).

<sup>11</sup>Specifically, retained earnings were not subject to the progressive surtax until distributed as a dividend. The dividend exemption remained in effect until the Revenue Act of 1936 mandated that corporate dividends paid to individuals should be taxed as ordinary personal income.

<sup>12</sup>Until the Revenue Act of 1921 introduced a preferred capital gains rate of 12.5% (Auten, 1999).

<sup>13</sup>Laws of Wisconsin, 1911, ch. 658.

income taxes by 1913; by 1919, 14 states had either corporate, or personal, or both income taxes in place. The general scope of income taxes follows:

- Combined personal and corporation income tax laws: Alabama (1919), Mississippi(1912), Missouri(1917), New Mexico(1919), North Dakota(1919), Virginia(1916), Wisconsin(1911).
- Personal income tax laws and distinct corporate income tax laws: Massachusetts(1917), New York(1917).
- Personal income tax laws, but no corporation income tax laws: Delaware(1917), Oklahoma(1913).
- Corporations taxed on income basis, but no personal income tax: Connecticut(1915), Montana(1917) and West Virginia(1915).

In principle, each state allocated the corporation income tax for both domestic and foreign corporations. Specific measures of income allocation and apportionment, on the other hand, varied across states. Five states (Mississippi, Missouri, Montana, Virginia, and Wisconsin) allowed taxation of corporate income on separate accounting, a measure that assures the most accurate income basis for corporations that can make a separate accounting. Other states used formulary apportionment based on property, cost of production, and gross sales, with gross sales the most common measure for income allocation.

Figure 2 illustrates the relative taxation of corporate income at state level in 1919 by plotting corporate tax rate against personal tax rate. Six states are above the 45 degree line, taxing corporate income relatively heavily in comparison with their taxation of personal income. Delaware and North Dakota, on the other hand, are below the 45 degree line and tax corporate income comparatively lightly. The rest of the states locate on the 45 degree line, taxing corporate and personal income at the same rate. Within each state, there were frequent tax legislation changes related to the exemption threshold and marginal tax rates. The substantial variation in state tax codes provides this study with ample exogenous variation for identifying the incentive effect of income taxes.<sup>14</sup>

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<sup>14</sup>In fact, variation in state rates can be extreme in the cross-section since 34 states did not impose a tax on income during the sample period. Lutz (1920), Bigham (1929), and Blakey and Johnson (1941) discuss the progress of the state income taxation since 1911. Rising property tax rates in the 1920's, significant property tax delinquencies in the 1930's, and further efforts to reach intangibles prompted further adoptions of income taxes. 33 states had an individual and/or corporate income tax by 1940 (Blakey and Blakey, 1940, p. 131).

## 5 Data and descriptive analysis

### 5.1 Degree of incorporation

The quinquennial Census of Manufacturers provides state-level data on the legal organizational form of manufacturing enterprises for 1904, 1909, 1914, and 1919.<sup>15</sup> It categorizes an establishment into one of the following three forms:

- Individual ownership with no limit to personal liability.
- Corporations with limited liability.
- All other forms including establishments operated by firms, cooperative associations, and miscellaneous forms of ownership that are not subject to corporate income tax.<sup>16</sup>

For each organizational form, aggregate information is available for the number of active establishments, the number of wage earners, the value of production, and value-added by manufacturing. The fact that ownership is counted by establishment offers a key advantage for my analysis. Unlike firms that may have several plants in different states, an establishment is located in the state of actual taxation, since location of the plant is closely tied to the common measures of income allocation such as property and sales.<sup>17</sup> As a result, the tax variables are free of measurement noise that may arise from taking the weighted average of tax rates for multi-state firms.<sup>18</sup>

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<sup>15</sup>The *Census of Manufacturers* classifies data by establishment which is defined as follows: “As a rule, the term ‘establishments’ signifies a single plant or factory. However, in some cases, it refers to two or more plants operated under a common ownership and located in the same city, or in the same county but in different municipalities or in unincorporated places having fewer than 10,000 inhabitants. On the other hand, separate reports are occasionally obtained for different lines of manufacturing carried on in the same plant, in which event a single plant is counted as two or more establishments. In every industry, however, the difference between the number of establishments and the actual number of plants or factories is negligible” (*Census of Manufacturers*, 1919, p.5). The *Census* excluded establishments with an annual product value of \$500 or less.

<sup>16</sup>*Census of Manufacturers*, 1919, pp. 340.

<sup>17</sup>For example, Wisconsin attributed the following two classes of sales as in-state income: (1) goods manufactured within the state, sold to customers outside the state, and delivered from the factory within the state; and (2) goods manufactured within the state, shipped to branches outside the state, sold to customers outside the state, and delivered to these customers from the branches outside the state.

<sup>18</sup>Unfortunately, after 1921 questions about the ownership status by establishment are removed from the *Census* schedule, and the data in our study is the most extensive public record of ownership characteristics at the state level.

To compute the corporate share of various economic activities, I divide establishments operated by corporations by the sum of establishments in all forms and derive three indicators for the share of corporate activities in the economy as follows:

- The corporate share in the total number of establishments.
- The corporate share in employment measured by the number of wage earners.
- The corporate share in the value of new products.

By 1919, the manufacturing sector had 21.9 percent of total corporations in the U.S. and produced more than 50 percent of corporate income. Within the manufacturing sector, corporations played an important role as measured by their share of economic activities. But manufacturing is by no means the only sector dominated by corporations. Using the 1919 *Statistics of Income* (SOI) tax return data on the distribution of corporate and individual income, I compute the percentage of corporate returns and gross income by industrial groups. As illustrated in Figure 3, corporations are equally important in trade, finance, banking and insurance, and mining and quarry sectors.

## 5.2 Tax variables

To compute the tax cost of incorporation, I first calculate a combined income tax rate as the sum of the federal and the effective state tax rate, where the effective state rate reflects the deductibility of federal income taxes at the state level. Consequently, the state-specific tax cost to incorporate ( $T_c$ ) is

$$T_c = t_c + (1 - t_c)t_e - t_p,$$

with  $t_c$  the combined corporate tax rate,  $t_p$  the combined personal tax rate, and  $t_e$  the tax rate on equity income.

Data on federal income tax rates are collected from the *U.S. Federal Individual and Corporate Income Tax Rates History* tables published by the Tax Foundation.<sup>19</sup> Data on state income tax rates are determined from state income tax legislations of various years. The marginal corporate tax rate is computed as the sum of the normal federal income tax rate, the average excess-profits tax rate, and the top statutory state rate. An average excess-profits tax rate measure is calculated using the SOI tax

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<sup>19</sup><http://www.taxfoundation.org/research/show/151.html>

return data.<sup>20</sup> Specifically, an average 1919 rate is computed by taking the ratio of the excess-profits tax paid by corporations to the sum of net income and excess-profits tax. The average excess-profits tax rate was 15.21% in 1919.

Some assumptions are required to measure the marginal personal tax rate. Unlike analysis that uses the maximum personal rate for contemporary data, I cannot rely on changes in the top marginal rate since the top bracket was extremely progressive in this period. In 1919, for example, only 65 filers were subjected to the 73 percent top marginal rate. Instead, I use the marginal tax rate for filers with a net income of \$20,000. This threshold is the lowest income bracket above which the surtax rates apply. In 1914, the first year that personal returns were collected, individuals with an annual income of \$20,000 and above were at approximately the top 9 percent of income distribution and received more than 80 percent of dividend payouts.<sup>21</sup> For robustness, personal tax rates at \$10,000 and \$30,000 income levels are also considered. As discussed in the previous section, dividend income was exempt from normal personal income tax but not from surtax. I calculate the dividend tax rates in each case accordingly and include it as part of the tax burden for shareholders. Because capital gains are taxed upon realization, I assume a zero tax rate on capital gains in the basic specification. Estimation results using a weighted average of dividend and capital gains tax are very similar and hence not reported.

### 5.3 Control variables

A few variables are included to capture the non-tax reasons to incorporate. I use the size of the manufacturing sector as an indicator for the infrastructure and development of industrial policy. Well-developed infrastructure and industrial policies may enable firms to generate agglomeration rents, implying somewhat easier access to external finance. The size of the industrial sector is measured by the percentage of employment in manufacturing relative to that in agriculture and mining. This information is available in the *Workers' Compensation Data Set* compiled by Fishback and Kantor (2000).

Secondly, I control for the average size of establishment to account for the fact that firms tend to incorporate as they grow larger and become more complex. This size effect is recognized by Fama and Jensen (1983*a,b*) and empirically tested by Gordon

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<sup>20</sup>For instance, the excess profits tax were assessed as 20 percent of net income above the excess-profits credits, which is a fixed \$3,000 plus 8 percent of invested capital in the current year.

<sup>21</sup>For comparison, one needs a household income of \$100,000 or above to be at the same percentile of the income distribution in 2007.

and MacKie-Mason (1994). The size of the average establishment in manufacturing is measured by the average number of workers per establishment. In addition, the average capital intensity in manufacturing is included as a proxy for demand for external funds, which is considered more important for corporations (Egger, Keuschnigg and Winner, 2009). The capital intensity variable is computed as the ratio of the capital input to the sum of capital input and wage and salary payment, with data on factor inputs taken from the Census of Manufacturers in relevant years.

If firms relocate to a neighboring state with attractive tax policies, differences in the business market conditions across states need to be controlled for. Following Feld and Kirchgassner (2003) and Goolsbee (2004), I compute measures of difference in the own-state and neighboring-state demographic variables including the share of foreign born population, the share of the state population that is illiterate, the share of black/urban population. Data on these variables are available in Fishback and Kantor (2000). Definitions of control variables are summarized in Table B1.

#### **5.4 Summary statistics and descriptive analysis**

The final dataset covers 48 continental states and has 196 state-year observations, with summary statistics of all variables summarized in Table 1. As noted above, the economic importance of corporations is indicated by their portion of employment (78.92%) and value of production (81.5%) rather than the share of establishment (28.40%). On average, the effective corporate tax rate is 7 percent in the analysis sample, the average effective personal rate is 4.92 percent, and the dividend tax rate is 2.79 percent. Accounting for the double taxation of corporate income, one dollar was taxed about five cents more if it was earned in the form of corporate income rather than personal income during the sample period.

Figure 4 offers descriptive evidence that the tax cost to incorporate discourages corporate activities. The figure groups the corporate share of economic activities by the tax cost to incorporate in different states and considers changes in the average number of establishments, employment, and value of production between 1904 and 1919, all relative to the 1904 levels. Each bar indicates average sample values. The figure illustrates that increases in the relative importance of corporate activities are greater in low-tax states than in high-tax states. There is a clear association between a lower tax cost to incorporate and larger increases of corporate activities.

## 6 Empirical analysis

### 6.1 Econometric model

The empirical specification is derived by taking log on both sides of equation (3):

$$\log(1 + G_c^i) > \log(1 - \tau_p^i) - \log(1 - \tau_c^i - \tau_e^i + \tau_c^i \tau_e^i).$$

Since  $\log(1 + t) \simeq t$ , a firm will incorporate in state  $i$  if

$$G_c^i > \tau_c^i + (1 - \tau_c^i)\tau_e^i - \tau_p^i. \quad (4)$$

The differential term,  $\tau_c + (1 - \tau_c)\tau_e - \tau_p$ , in equation (4) summarizes the relative taxation of corporate to non-corporate income, namely, the tax cost to incorporate. At the firm level, a lower tax cost to incorporate is associated with a higher probability to incorporate. At the state level, the fraction of corporations is modeled as a function of the tax cost to incorporate  $T_c$  and personal tax rate  $T_p$ . The basic specification of interest is

$$\ln S_{it} = \alpha_t + \beta_1 T_{c,it} + \beta_2 T_{p,it} + Z_{it}\gamma + \lambda_i + \varepsilon_{it}, \quad (5)$$

where  $S_{it}$  is the corporate share of firms in state  $i$  in year  $t$ , and  $Z_{it}$  is a vector of non-tax factors that may influence the incorporation decision. The variable  $\alpha_t$  is a time effect that is modelled as year dummies, which captures the potential impact of progressive movement and macroeconomic shocks on corporate activities. The turn of the twentieth century was a time of tremendous change in social reform, government regulation and technological advancement in transportation and communication. Such time-specific macroeconomic shocks could obscure the incentive effects of changes in marginal rates if time dummies were not included (Romer and Romer, 2011). The state dummies (the  $\lambda_i$ 's) represent the unobserved factors that vary across states but can reasonably be thought to be constant during the sample period (e.g. legal and regulatory environment).

### 6.2 Within-group regressions

Table 2 presents regression results from estimating Eq. (5) with standard errors robust to heteroskedasticity of arbitrary form. There is a strong relationship between business incorporation and income taxes. A larger difference between corporate and personal tax rates reduces the fraction of economic activities undertaken by corpora-



tions, presenting evidence that firms shift from corporate to non-corporate status in response to a higher tax cost to incorporate. For a given tax cost to incorporate, a higher personal tax rate raises incorporation rates. The significance of the two tax variables is robust to inclusion of state-level covariates.

Taken at face value, for every unit decrease in the tax cost to incorporate, the corporate share of establishment increases by 1.84 percent. Given that the mean establishment share is around 28.4 percent during this period, this increase corresponds to a 0.52 percentage point increase in the corporate share of establishment. Similarly, a 1 percentage point decrease in the tax cost to incorporate increases the corporate share of employment by 1.11 percentage points and the corporate share of production by 1.00 percentage point. Firms that incorporate in response to tax incentives have a higher share of employment and production relative to the share of establishment. The operation scale of the new corporations is larger than the average firm in the economy but slightly smaller compared with their existing counterparts.

Measures of the non-tax factors have the expected sign but are often estimated with imprecision. The presence of a large manufacturing sector encourages corporate hiring but has negligible effect on incorporation rates or corporate output. A higher capital intensity is associated with a larger scale of corporate production, consistent with the hypothesis that firms with high investment and growth demand benefit more from incorporation. The establishment size coefficient is positive and significant in all three equations, consistent with the empirical regularity that large companies tend to incorporate for better monitoring and governance mechanism.

### **6.3 Addressing the endogeneity of taxation**

An important issue for the estimation of the causal impacts of tax rates on incorporation is the exogeneity of changes in income tax rates. Any observed correlation between tax rate and tax base can be driven by reverse causation; that is, when states enact an income tax, or change the tax rate, in response to a relatively expanding tax base. Positive feedback of this form tends to bias the OLS estimates of the tax effects toward zero. To identify the causal effect of income taxes on incorporation, I exploit exogenous changes in tax rates that are unlikely to be correlated with contemporaneous changes in the corporate tax base.

At the turn of the twentieth century, general property taxes were not as effective at tapping new forms of wealth. In response, state legislators started to consider

alternative tax measures such as franchise and income taxes.<sup>22</sup> One of the clearest statements of this motivation comes from the 1907 *Wisconsin State Tax Commission Annual Report*, which stated:

The very inefficient manner in which the personal property tax has been assessed and the resulting gross inequalities in taxation, as well as the agitation of the subject of credit exemption, have brought about the pending constitutional amendment authorizing a graduated income tax (p. 30).

Intuitively, the revenue-raising capacity of general property tax is directly linked with a state's propensity to increase income taxes. Alternatively, the per-capita property tax bill may reflect the state's long-run revenue need. Relying on these insights, I use one-year lagged per-capita property tax as an instrument for the income tax variables. Annual data on property tax are collected from the *Statistical Abstract of the United States*, from across various years.

The fiscal conditions of the state can also shed light on the legislative motivation for taxing income. Romer and Romer (2011) points out that most federal income tax changes during the inter-war period were tied to spending changes. Conceivably, states with budget deficits should also be more likely to raise income tax rates to fund spending. Following this argument, I construct a deficit dummy variable equal to one for states with current-year expenditure exceeding revenue and equal to zero for those states with current-year expenditure below revenue. Data on state revenue and expenditure are collected from *Sources and Uses of Funds in State and Local Government in the United States, 1790-1915* (ICPSR9728). In contrast with per-capita property tax revenue, the deficit dummies are most likely to capture the revenue needs of a state over the short term.

Between 1880 and 1907, agricultural and industrial states developed distinctive approaches to taxing corporations. While urban and industrial states taxed corporations to fund increased public spending, agricultural states in the South and Great Plains spent far less on schools, asylums, and other public improvements and did not initiate significant corporation taxes (Pegram, 2004). Such differences reflected the fundamental difference in their political ideologies between the north and south. To capture the impact of political ideology in shaping income tax policies, I use the share of employment in agriculture to measure the strength of agricultural interest in each

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<sup>22</sup>Property taxes remained as the most important source of state and local finance. By 1902, property taxes accounted for 57 percent of all state revenues and 73 percent of all revenues raised at the local level(Wallis, 2000).

state.<sup>23</sup>

In this framework, it is important that the proposed instruments are valid in the sense that: they i) significantly explain part of the variation in both the corporate and individual income tax rates, and ii) are uncorrelated with the unobserved determinants of incorporation rates. The first issue is a statistical one that, as shown below, is satisfied since each individual instrument is a strong predictor of the tax variables while jointly the instruments are significant as indicated by the F statistic. Regarding the second issue, it is unlikely that any of these instruments are critical determinants of the decision to incorporate by individual firms. Companies in a deficit state might well anticipate the passage of new tax measures, but there is no clear evidence that firms would expect the passage of income taxes in particular.<sup>24</sup>

The proposed instruments directly address the potential endogeneity of the tax rate *levels*. I am less concerned about the endogeneity of the *differences* between the corporate and personal tax rate. At the state level, such differences tend to arise from the deductibility of federal income tax at the state level, which is exogenous from the state's perspective. To illustrate, suppose that in a given state corporate and personal income are taxed at the same flat rate  $t^s$ , accounting for the deductibility of federal income tax, the effective state corporate and personal rate is  $(1 - t_c^f)t^s$  and  $(1 - t_p^f)t^s$ , respectively. The difference in the effective tax rates  $(t_p^f - t_c^f)t^s$  is a by-product of the difference in the federal tax rates augmented by the level of income tax across different states.

## 6.4 Instrumented regressions and the additional role of personal income tax

Table 3 presents the IV regressions with state-year fixed effects. Columns (1)-(2) present the first-stage results using the instruments described above. The strength of

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<sup>23</sup>The party of the governor is a possible alternative instrument for this purpose: but this variable has limited variation within a state during this period and is weakly correlated with the respective state's income tax rates.

<sup>24</sup>Take the state of Missouri for example: It continued with a policy of deficit spending during the first two decades of the twentieth century and considered various new sources of revenue to cope with its poor financial condition. However, between 1905 and 1909, no significant tax legislation or reform occurred. In 1909, Governor Hadley asked the legislature to enact four major tax measures including a tax on capital stock of corporations, increased inheritance taxes, an oil inspection tax and a tax on the inspection of spirits or liquors. The legislature acted only on the oil inspection tax. Income taxes were not in place until 1917, when the legislature approved six out of a package of nine major tax proposals including the corporation franchise tax, an individual tax, the first income tax, a general and revised inheritance tax, a secured debt tax, a soft drink inspection tax, and a wholesale liquor dealers tax.

the first stage is indicated by the relevant coefficients and the  $F$  statistics. The effects of the instruments on the income tax rates are consistent with previous discussions. The  $p$ -value of Hansen's J statistic in each specification exceeds the conventional significance level, suggesting that the instruments are exogenous with respect to the income tax rates.<sup>25</sup>

Columns (3)-(6) present the IV estimates. The signs of the tax coefficients remain unchanged. The IV estimates of the tax coefficients are significantly larger than those obtained using ordinary least squares, consistent with reverse causality biasing the OLS estimates toward zero. A 1 percentage point increase in the tax cost to incorporate decreases the corporate share of establishment by 3.89 percent, employment by 2.27 percent, and value of production by 1.93 percent. Computed with the mean shares of corporate activities, these estimates translate to an elasticity of establishment share of 1.10, employment share of 1.79, and production share of 1.57. The magnitude of these estimates is comparable to the largest existing estimates of responsiveness in Goolsbee (2004), although that study focuses on a much more mobile sector and uses more recent and confidential data.

When taxing non-corporate income at a different rate than corporate income, personal income tax affects the choice of organizational form by changing the expected after-tax net income. If this is the only channel through which personal income tax can affect incorporation, its impact should be fully captured in the tax cost term. However, this is not what we observe from the estimation results. The fact that personal tax coefficient remains significant when controlling for the tax cost term suggests that the personal tax rates may influence the choice of organizational form through other channels. For example, a positive personal tax coefficient is consistent with the existence of tax evasion. To the extent that individual income tax is much easier to evade than the corporate tax, unincorporated firms are more likely to underreport their activities when facing a higher personal tax rate. They may stop filing tax returns and other related government surveys, disappearing all together from the sample data. If this is the case, the higher share of corporation could be a mere artifact of fewer reported unincorporated firms in the state.

The combination of progressive personal income tax rates and flat corporate tax rates encouraged substitution of non-corporate forms with corporations, a hypothesis theoretically formalized in Cullen and Gordon (2007) and empirically tested in Gen-

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<sup>25</sup>A reduced-form regression of the instruments on incorporation variables suggests the agricultural interest variable to be a relatively weak instrument. I run a separate set of IV regressions with two instruments: in this case, the tax coefficients are exactly identified. The quantitative effect of the tax coefficient remains quite similar.

try and Hubbard (2005). When facing a progressive tax schedule, firms would require a higher pretax expected return on more risky projects to offset a higher expected tax payment. In this case, the positive personal tax coefficient captures the impact of personal tax progressivity on incorporation. To test this hypothesis, I replace the effective personal tax rate with a measure of personal tax progressivity, a variable defined as the difference between the marginal tax rates at \$20,000 and the marginal rate at income level the 25th percentile of income distribution. The regression results are summarized in Table 4. As expected, the tax progressivity coefficient is positive and highly significant. However, when the regression includes both the personal tax rate and tax progressivity measure, neither estimate is significant due to multicollinearity.

Last but not least, a non-corporate firm can move to a neighboring state and stay unincorporated when facing a higher personal tax rate in its current state of residence. Therefore the personal tax variable may also capture the potential tax savings for firms moving to a lower-taxed jurisdiction. I modify the theory model to incorporate tax-induced relocation and the full derivation is included in the Appendix. Allowing for the possibility that firms may relocate across different states, the decision to incorporate now depends on the own-state tax cost to incorporate, the own-state personal tax rate, and the personal tax rate in the neighboring states. The estimation equation is modified by including the difference between the own-state and average neighboring-state personal tax rate, controlling for average differences in a few demographic characteristics across states. The regression results are summarized in Table 5. Interestingly, while the tax cost term remains significant, neither personal tax rate turns out to be statistically significant. The small value of the  $F$  statistic, however, suggests that instruments for the average personal tax rates are quite weak. A more intuitive explanation for the insignificant coefficients, is that these tax differences are very likely to be temporary in the growing wave of new state income tax legislations. Consequently, tax savings associated with relocating to a low-tax state are very likely to be transient and miniscule compared to the cost of relocation.

## 7 Robustness and further discussion

Table 6 provides some evidence for the robustness of the findings. As the agriculture interest variable seems to be a weak IV, I repeat the IV regression with two instruments. In this case the IV estimates are exactly identified. The results are summarized in panel A and are very similar to the main results shown in Table 3. Regression in panel B recognizes that in a panel setting the tax incentives are re-

stricted to have the same effect across all states. It is possible that firms are less sensitive to tax incentives in rural and less industrial states. To see if the results are mainly driven by incorporation in the urban and industrial states, I generate manufacturing importance weighted (MIW) estimates and place more weight on those states with a large manufacturing sector. Specifically, each observation is weighted by the share of employment in manufacturing. The MIW results are given in panel B. The tax coefficients remain very similar to the main IV results.

In panel C and D I use alternative personal tax rates at incomes of \$30,000 and \$10,000. While the pattern of the results remains qualitatively the same, tax rates have a smaller effect at the lower income bracket. This is consistent when the net advantage faced by a potential entrepreneur in a high personal tax bracket is larger. When personal tax rates are more dispersed, those in the highest tax brackets face stronger tax incentives to become entrepreneurs while those in the lowest tax brackets face stronger tax disincentives (Gordon, 1998). As a result, during such a period, entrepreneurs are more likely to be drawn from the top tax brackets.

## 8 Conclusion

Understanding the importance of taxes in influencing firms' incorporation and location decisions is very important for public policy. Study of the early period of income taxation offers some unique advantages for the purpose of such analysis. Both corporate and personal income taxes were introduced at the federal level in this period. Many states enacted the income tax legislations for the first time. Changes in marginal tax rates were large, frequent and heterogeneous across states. This period is also a relatively clean setting to study the impact of taxes on income shifting through incorporation. The organizational form data are free of measurement errors caused by hybrid entities such as limited liability partnerships. The analysis is also less likely to suffer from omitted variable bias that may arise from various state anti-avoidance regulations that have been implemented at a much later stage.

The results show that the relative taxation of corporate to personal income plays an important role in the share of corporate establishments, employment and production, while personal income tax can affect the choice of organizational form through additional channels. Firms that have responded to the incorporation incentives offered by the tax system are larger than the average firm in the economy. The incentive effects of the corporate and personal income taxes are precisely estimated and their robustness to the potential reverse causality between the tax rates and income tax

base has been demonstrated.

The obvious disadvantage of using the early period of income taxation, as also pointed out by Romer and Romer (2011), is that the economic environment was very different from that of today. Since that time, firms have become much more mobile, and hybrid business entities such as the S corporation have proliferated in the U.S. To this end, the tax-cost elasticity estimates presented in this study can be interpreted as upper bounds on firms' responsiveness of the choice of organizational form to tax incentives in today's economy. Just as U.S. states compete with each other in generating income tax revenues in the early twentieth century, countries at present compete in the global capital market by setting their corporate tax rates strategically. Therefore, analysis based on historical data can still help us to understand the role of taxes in the allocation of capital across organizational forms and locations in the current economic environment.

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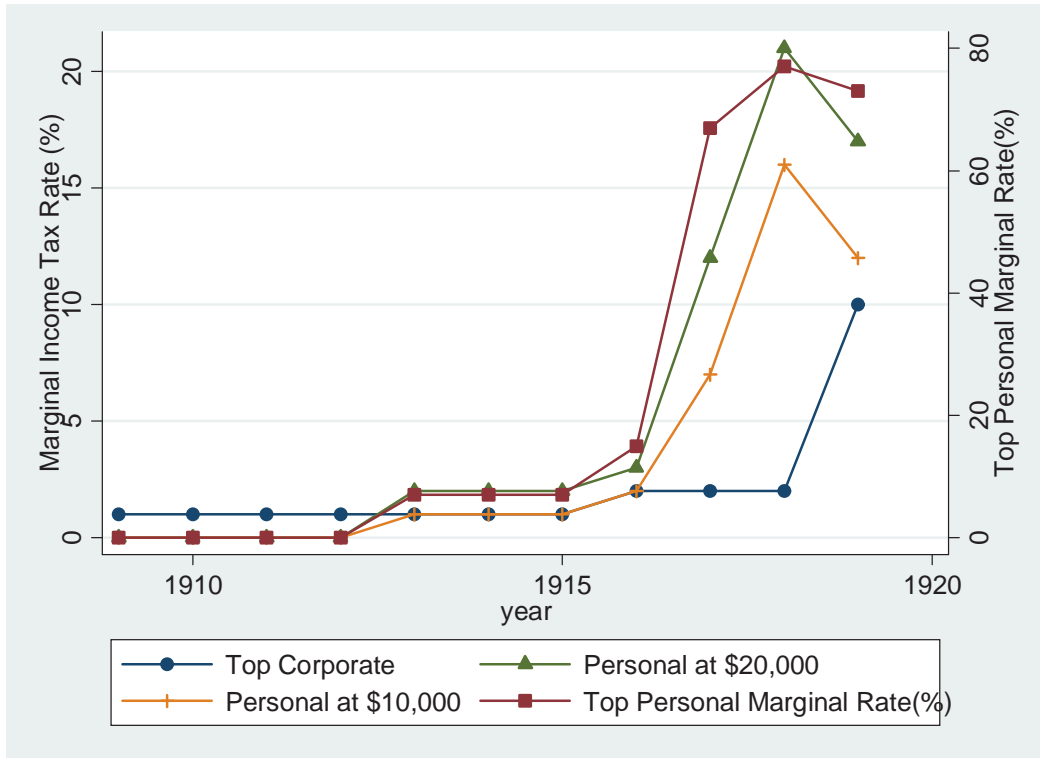


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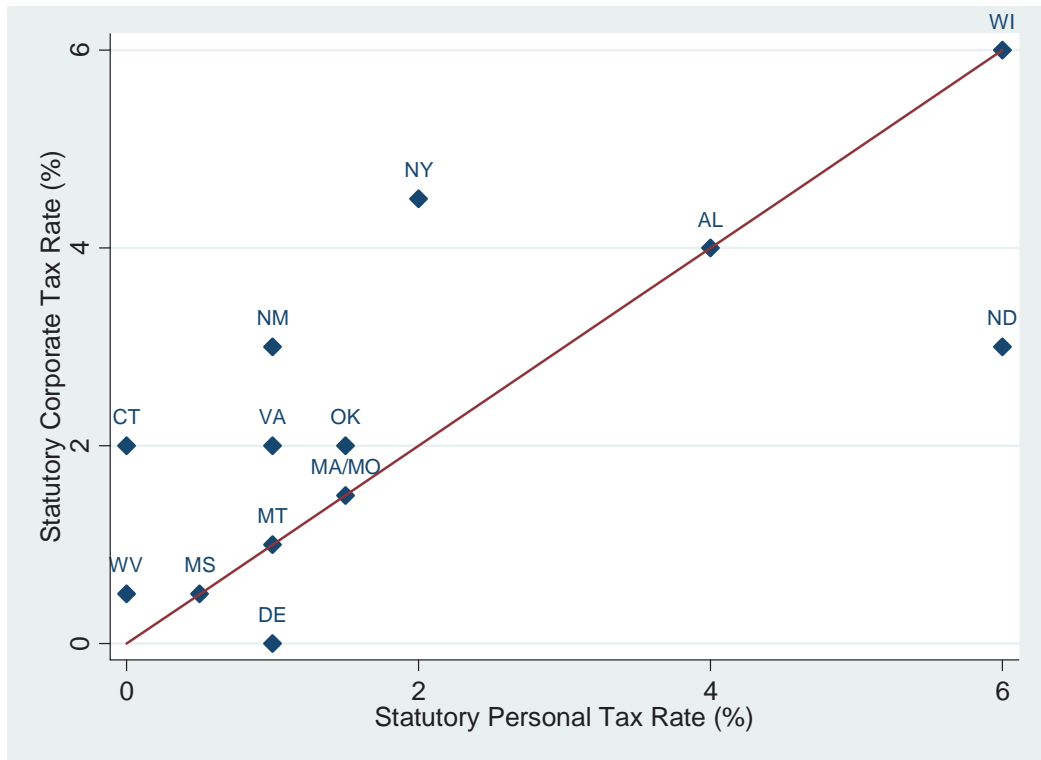
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Figure 1: Marginal Federal Income Tax Rate, 1909-1919



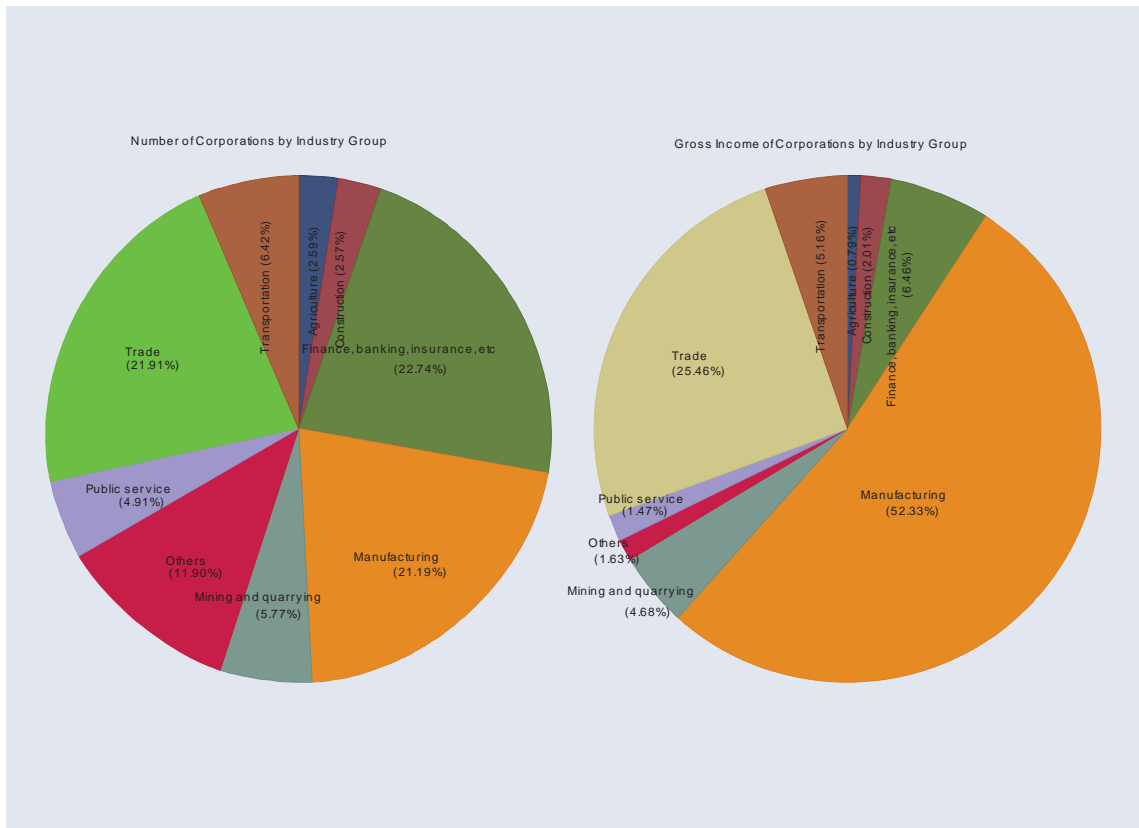
Source: the *U.S. Federal Individual Income Tax Rates History, 1913-2011* and *Federal Corporate Income Tax Rates, Income Years 1909-2008*, the Tax Foundation.

Figure 2: State Income Tax Rates in 1919



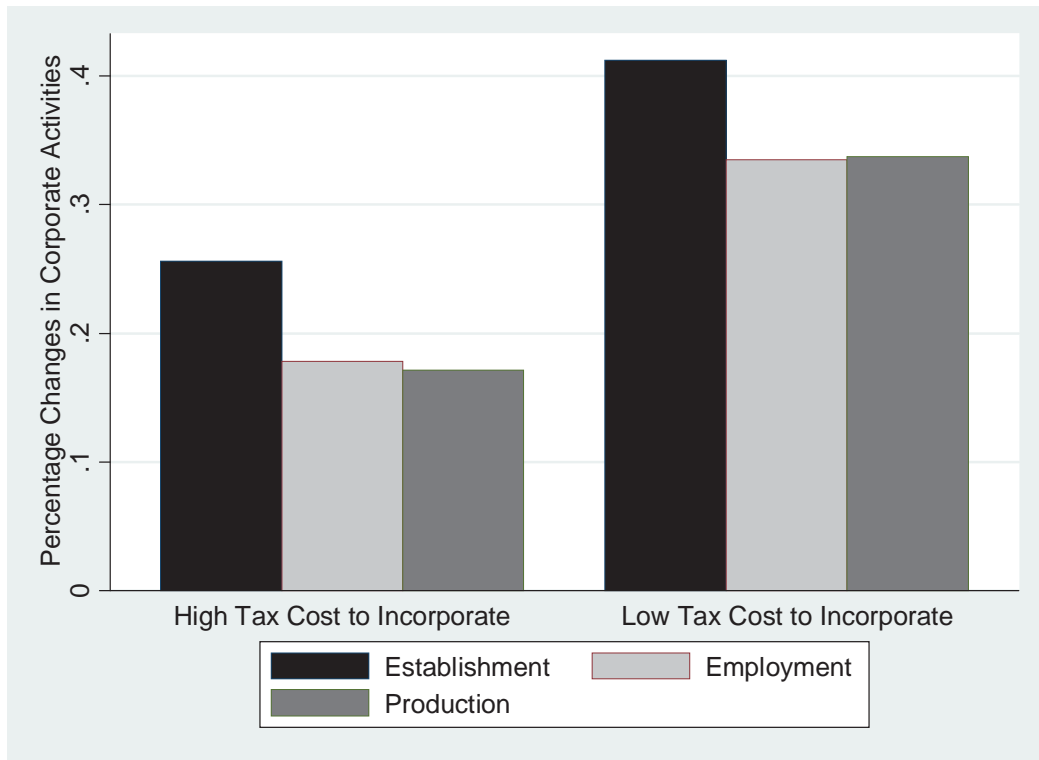
Source: the *State Income Tax Act*, various years.

Figure 3: Distribution of Corporations by Industrial Group in 1919



Source: author's calculation based on data from the 1919 SOI *Distribution of Corporation and Individual Income by Industrial Groups*.

Figure 4: Corporate Activities and State Income Taxes



Note: This figure displays percentage changes in the mean corporate share of economic activities for high and low levels of tax cost to incorporate. Percentage change in the corporate share of economic activities is the ratio of the difference between 1919 and 1904 value to the 1904 value. Tax cost to incorporate is defined as High/Low if the corporate income tax is above/below the personal income tax at the state level.

Table 1: Summary Statistics

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Corporate Share of Establishment	196	0.284	0.063	0.160	0.507
Corporate Share of Employment	196	0.789	0.102	0.452	0.943
Corporate Share of Production	196	0.815	0.098	0.459	0.966
Tax Cost to Incorporate	196	0.049	0.078	0.000	0.204
Effective Corporate Income Tax	196	0.070	0.109	0.000	0.297
Effective Personal Income Tax	196	0.049	0.074	0.000	0.220
Effective Dividend Tax	196	0.028	0.042	0.000	0.130
Size of Manufacturing Sector	192	1.430	2.540	0.077	16.659
Avg. Establishment Size	196	23.155	12.630	3.462	60.184
Capital Intensity	196	4.145	1.054	1.788	10.295

Note: Please refer to Table B1 for a complete list of variable definitions.



Table 2: OLS Regression: Corporate Share of Economic Activities

Dependent variable (in log of shares):	Establishment	Employment	Production
(1)	(2)	(3)	(3)
Tax Cost to Incorporate	-1.843*** (0.502)	-1.409*** (0.244)	-1.221*** (0.227)
Personal Tax Rate	2.397*** (0.573)	1.940*** (0.271)	1.767*** (0.264)
Size of Manufacturing Sector	0.031 (0.019)	0.013* (0.007)	0.007 (0.007)
Avg. Establishment Size (in log)	0.325*** (0.066)	0.154*** (0.032)	0.144*** (0.030)
Capital Intensity	0.001 (0.007)	0.009 (0.008)	0.017*** (0.005)
Constant	2.274*** (0.199)	3.817*** (0.097)	3.858*** (0.090)
State/Year Effects?	Yes	Yes	Yes
$R^2$	0.531	0.531	0.512

Note: N=192. The sample size dropped by 4 as there is no control available for the District of Columbia. Dependent variables are measured in log of shares. Robust standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 3: The Causal Effect of Income Taxes on Incorporation

Dependent variable:	First Stage		IV-2SLS		
	Tax Cost to Incorporate (1)	Personal Tax Rate (2)	Establishment (3)	Employment (in log of shares) (4)	Production (5)
Property Tax Per Capita	0.010*** (0.001)	0.009*** (0.001)			
Deficit Dummy	0.028*** (0.006)	0.013** (0.006)			
Size of Agricultural Sector	-0.005*** (0.002)	-0.005*** (0.002)			
Tax Cost to Incorporate			-3.890*** (1.283)	-2.273*** (0.837)	-1.930** (0.837)
Personal Tax Rate			4.634*** (1.297)	3.004*** (0.816)	2.696*** (0.821)
Size of Manufacturing Sector	0.004 (0.003)	0.004 (0.003)	0.023 (0.015)	0.006 (0.007)	-0.001 (0.009)
Average Establishment Size (in log)	-0.024 (0.030)	-0.031 (0.026)	0.298*** (0.063)	0.118*** (0.037)	0.102** (0.040)
Capital Intensity	-0.022** (0.008)	-0.018** (0.008)	-0.004 (0.012)	0.009 (0.008)	0.018** (0.007)
State/Year fixed effects?	Yes	Yes	Yes	Yes	Yes
$R^2$	0.808	0.844	0.486	0.498	0.478
Hansen $J$ statistics $p$ value			0.504	0.073	0.276
Weak identification statistic			12.767	12.767	12.767

Note:  $N=192$ . A constant is included in the first-stage regression. Robust standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Instruments included property tax revenue per capita, deficit dummy, and percentage of employment in agriculture, all in one-year lag.

Table 4: The Causal Effect of Income Taxes on Incorporation: Impact of Tax Progressivity

Dependent variable:	First Stage		IV-2SLS		
	Tax Cost to Incorporate (1)	Personal Tax Progressivity (2)	Establishment (3)	Employment (in log of shares) (4)	Production (5)
Property Tax Per Capita	0.010*** (0.001)	0.007*** (0.000)			
Deficit Dummy	0.028*** (0.006)	0.013*** (0.005)			
Size of Agricultural Sector	-0.005*** (0.002)	-0.004*** (0.001)			
Tax Cost to Incorporate			-5.854*** (1.959)	-3.202** (1.274)	-2.840** (1.259)
Personal Tax Progressivity			8.758*** (2.621)	5.217*** (1.662)	4.782*** (1.658)
Size of Manufacturing Sector	0.004 (0.003)	0.003 (0.003)	0.023 (0.015)	0.006 (0.008)	-0.002 (0.010)
Average Establishment Size	-0.024 (0.030)	-0.020 (0.021)	0.284*** (0.066)	0.108*** (0.039)	0.093** (0.041)
Capital Intensity	-0.022** (0.008)	-0.014** (0.006)	-0.002 (0.011)	0.011 (0.009)	0.020** (0.008)
State/Year fixed effects?	Yes	Yes	Yes	Yes	Yes
$R^2$	0.808	0.833	0.418	0.430	0.402
Hansen $J$ statistics $p$ value			0.763	0.049	0.198
Weak identification statistic			10.212	10.212	10.212

Note:  $N=192$ . A constant is included in the first-stage regression. Robust standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Instruments included property tax revenue per capita, deficit dummy, and percentage of employment in agriculture, all in one-year lag.

Table 5: Incorporation vs. Relocation: Second-Stage Results

Dependent variable (in log of shares):	Establishment (1)	Employment (2)	Production (3)
Tax Cost to Incorporate	-3.1725*** (1.2280)	-2.7462*** (0.8885)	-2.2192** (0.9009)
Personal Tax Rate	-1.4791 (6.2823)	5.4325 (3.3096)	4.1032 (3.4240)
Average Personal Tax Rate: Neighboring States	5.4142 (5.8646)	-2.0290 (2.8712)	-1.1981 (2.9852)
Size of Manufacturing Sector	0.0199 (0.0184)	0.0092 (0.0073)	0.0011 (0.0096)
Average Establishment Size	0.3057*** (0.0606)	0.1211*** (0.0397)	0.1137*** (0.0413)
Capital Intensity	-0.0008 (0.0119)	0.0076 (0.0064)	0.0171** (0.0067)
<i>Difference in State Characteristics:</i>			
Illiteracy Rate	-0.0147 (0.0193)	0.0061 (0.0073)	0.0035 (0.0075)
Population	0.0112* (0.0061)	0.0022 (0.0032)	-0.0023 (0.0034)
% of Immigrants	-0.0334 (0.0280)	-0.0089 (0.0153)	-0.0048 (0.0158)
% of Black Population	-0.0200 (0.0144)	-0.0228* (0.0119)	-0.0168** (0.0085)
% of Urban Population	0.0054 (0.0060)	0.0071* (0.0038)	0.0043 (0.0037)
State/Year fixed effects?	Yes	Yes	Yes
$R^2$	0.483	0.498	0.474
Hansen $J$ statistics $p$ value	0.9882	0.2599	0.2739
Weak identification statistic	1.1904	1.1904	1.1904

Note: N=192. A constant is included in the regression. Robust standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 6: Robustness Checks

Dependent variable (in log of shares):	Establishment (1)	Employment (2)	Production (3)
Panel A: Exact identification			
Tax Cost to Incorporate	-4.3800*** (1.5618)	-1.6882* (0.9080)	-1.4218* (0.8495)
Personal Tax Rate	5.2728*** (1.6035)	2.3659*** (0.9021)	2.1224** (0.8559)
Panel B: MIW			
Tax Cost to Incorporate	-3.8769** (1.6294)	-1.5887* (0.9323)	-1.4496* (0.8600)
Personal Tax Rate	4.8916*** (1.6831)	2.3034** (0.9339)	2.1263** (0.8730)
Panel C: \$30,000 Income Bracket			
Tax Cost to Incorporate	-5.6712*** (2.0134)	-2.2572* (1.1575)	-1.9193* (1.0822)
Personal Tax Rate	4.8146*** (1.4978)	2.1724*** (0.8364)	1.9368** (0.7908)
Panel D: \$10,000 Income Bracket			
Tax Cost to Incorporate	-2.9739*** (1.0951)	-1.0816* (0.6427)	-0.8670 (0.5959)
Personal Tax Rate	5.7123*** (1.6906)	2.5787*** (0.9501)	2.2734** (0.8936)
State/Year Fixed Effects?	Yes	Yes	Yes

Note: N=192. All regressions include a constant. Covariates included but not shown in this table are the size of manufacturing sector, average establishment size in manufacturing, and average capital-labor ratio in manufacturing. Instruments included in panel A but not shown are one-year lagged property tax per capita and deficit dummies, and percentage of employment in agriculture. Instruments included in panel B and C are one-year lagged property tax per capita, deficit dummies, and percentage of employment in agriculture. Robust standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

## Appendix

### A Theoretical Framework: Incorporation vs. Relocation

In this section I modify the theoretical model to illustrate how firms make decisions about whether to incorporate and where to locate by comparing after-tax profits from each combination of organizational form and location. Taxation of firms now differs by organizational form and location. An entrepreneur organizing a non-corporate firm in state  $i$  earns gross income  $I_{gross,p}^i$  and is taxed at the ordinary personal income rate  $\tau_p^i$ . The entrepreneur can also organize as a corporation with gross income  $I_{gross,c}^i$  taxed both at the firm and person level, and the after-tax net income is

$$I_c^i = (1 - \tau_c^i)(1 - \tau_e^i)I_{gross,c}^i,$$

where  $\tau_c^i$  is the corporate tax rate in state  $i$ , and  $\tau_e^i$  is the tax rate on equity income.

Given an increase in  $\tau_p^i$ , a firm can choose to (i) stay unincorporated in its current state; (ii) incorporate in its current state; or (iii) stay unincorporated but move to a different state  $j$ . If the firm moves to state  $j$  and stays unincorporated, the associated non-corporate income  $I_{gross,p}^j$  is taxed at  $\tau_p^j$ , the personal tax rate in state  $j$ :

$$I_p^j = (1 - \tau_p^j)I_{gross,p}^j.$$

From the usual assumption that firms maximize their profits subject to certain constraints, each firm chooses its organizational form and location if profits are highest such that  $I^* = \max(I_p^i, I_c^i, I_p^j)$ . In particular, a firm will incorporate in state  $i$  if  $I_c^i$  yields the maximum profits. Specifically, the following two conditions need to be satisfied. First, the net corporate profit is higher than the net non-corporate profit in state  $i$ ,

$$(1 - \tau_c^i)(1 - \tau_e^i)I_{gross,c}^i > (1 - \tau_p^i)I_{gross,p}^i, \quad (\text{A1})$$

and second, the net corporate profit is higher than any potential non-corporate income in state  $j$ :

$$(1 - \tau_c^i)(1 - \tau_e^i)I_{gross,c}^i > (1 - \tau_p^j)I_{gross,p}^j. \quad (\text{A2})$$

We approximate that  $I_{gross,c}^i$  is proportional to  $I_{gross,p}^i$  by  $(1 + G_c^i)$ :

$$I_c = (1 + G_c)I_{nc}. \quad (\text{A3})$$

where  $G_c^i$  again represents the non-tax cost and benefit associated with incorporation in state  $i$ . Similarly, we approximate  $I_{gross,p}^i$  to be proportional to  $I_{gross,p}^i$  by  $(1 + G_p^j)$  :

$$I_{gross,p}^j = \frac{(1 + G_p^j)}{(1 - \delta_s)} I_{gross,p}^i, \quad (\text{A4})$$

where  $G_p^j$  captures the non-tax reasons to have an unincorporated business in state  $j$  relative to state  $i$  such as favorable market or regulation conditions. Combining equations (A1)-(A4), a firm will choose to incorporate in its current state if

$$(1 + G_c^i) > \frac{(1 - \tau_p^i)}{(1 - \tau_c^i)(1 - \tau_e^i)}, \quad (\text{A5})$$

and

$$\frac{(1 + G_c^i)}{(1 + G_p^j)} > \frac{(1 - \tau_p^j)}{(1 - \tau_c^i)(1 - \tau_e^i)}. \quad (\text{A6})$$

Taking log on both sides of equation (A5) and (A6) yields

$$\log(1 + G_c^i) > \log(1 - \tau_p^i) - \log(1 - \tau_c^i - \tau_e^i + \tau_c^i \tau_e^i),$$

and

$$\log(1 + G_c^i) - \log(1 + G_p^j) > \log(1 - \tau_p^j) - \log(1 - \tau_c^i - \tau_e^i + \tau_c^i \tau_e^i).$$

Since  $\log(1 + t) \simeq t$ , a firm will incorporate in its current state  $i$  if

$$G_c^i > \tau_c^i + (1 - \tau_c^i)\tau_e^i - \tau_p^i, \quad (\text{A7})$$

and

$$G_c^i - G_p^j > \tau_c^i + (1 - \tau_c^i)\tau_e^i - \tau_p^j. \quad (\text{A8})$$

The differential term,  $\tau_c + (1 - \tau_c)\tau_e - \tau_p$ , in equation (A7) summarizes the relative taxation of corporate to non-corporate income, i.e., the tax cost to incorporate. Further, the likelihood that a firm will incorporate in its current state decreases with the personal tax rate of neighboring states.



## B Appendix Tables

Table B1: Variable List

Variable	Definition	Sources
<i>Measures of corporate activities</i>		
Corporate share of establishment	Percentage of corporate establishment	U.S. Census of Manufacturing
Corporate share of employment	Percentage of workers employed by corporations	
Corporate share of production	Percentage of production by corporations	
<i>Tax variables</i>		
Corporate income tax rate	Combined federal-state top marginal corporate tax rate	Federal Corporate/Personal Income Tax Rates History Tables;
Personal income tax rate at \$30,000/\$20,000/\$10,000	Combined federal-state marginal personal tax rate at \$30,000/\$20,000/\$10,000	Revenue Acts of Individual States
<i>Control variables at the state level</i>		
Size of manufacturing sector	Percentage of workers in manufacturing relative to percentage of workers in agriculture and mining	Fishback and Kantor (2010)
Average establishment size in manufacturing	Average number of workers in a manufacturing establishment	U.S. Census of Manufacturing
Capital intensity	Cost of capital inputs relative to total cost of capital and labor	U.S. Census of Manufacturing
Percentage of urban population	The percent urban in the population	Fishback and Kantor (2010)
Illiteracy rate	The percent illiterate in the population	Fishback and Kantor (2010)
Percentage of immigrants	The percent foreign born in the population	Fishback and Kantor (2010)
<i>Instrumental Variables at the state level</i>		
Property tax per capita (in \$)	Per-capita general property taxes of state, municipal and local government	Statistical Abstract of the United State
Deficit dummy	Defined 1 if the current year revenues exceed expenditures and 0 otherwise	ICPSR 9728
Agriculture interest	Percentage of workers in agriculture	Fishback and Kantor (2010)

Table B2: Federal Corporate Income Tax Legislation, 1909-1919

Act	Exemption	Normal Income Tax	Rate	Excess Profit Tax (1917-1919 Only)
Tariff Tax of 1909	\$5,000		1%	
Revenue Act of 1913	The smaller of: (1) \$3000 for domestic corporations only; (2) 8% of the invested capital		1%	
Revenue Act of 1916	The smaller of: (1) \$3000 for domestic corporations only; (2) 8% of the invested capital		2%	
Revenue Act of 1917	1. Interest on U.S. obligations not excluded from net income. 2. War profits and excess profits taxes imposed for the same taxable year		6%	Rates applicable to 1918: Tax equal to sum of 1. 30% of net income in excess of excess profits credits but less than 20% of invested capital 2. 65% of net income in excess of 20% of invested capital
Revenue Act of 1918 (as Amended in 1919)	1. Interest on U.S. obligations not excluded from net income. 2. \$2000 for domestic corporations only		12% in 1918 10% in 1919	Rates applicable to 1919 and 1920 Tax equal to sum of 1. 20% of net income in excess of excess profits credits but less than 20% of invested capital 2. 40% of net income in excess of 20% of invested capital

Note: The Revenue Act of 1918 also imposed a war profits tax in the amount of 80% net income in excess of war profits credits, applicable to taxable income in 1918 only.

Table B3: Federal Personal Income Tax Legislation, 1909-1919

Act	Exemption for		Normal Rates	Rates	
	Normal Tax	Normal Tax		Normal Rates	Surtax Rates
Revenue Act of 1913 (applicable to incomes of 1913, 1914, 1915)	\$ 4,000-Head of family	All classes	1%	Minimum \$20,000-50,000	1%
	\$3,000-All others			Maximum over \$50,000	6%
Revenue Act of 1916 (applicable to incomes of 1916)	\$ 4,000-Head of family	All classes	2%	Minimum \$20,000-40,000	1%
	\$3,000-All others			Maximum over \$2,000,000	13%
Revenue Act of 1917 (applicable to incomes of 1917)	\$ 2,000-Head of family	\$2,000 and under	2%	Minimum \$5,000-7,500	1%
	\$1,000-All others	Over \$2,000	4%	Maximum over \$2,000,000	63%
	\$200-Each dependent				
Revenue Act of 1918 (applicable to incomes of 1918, 1919, 1920)	\$ 4,000-Head of family	Applicable to 1918:		Minimum \$5,000-6,000	1%
	\$3,000-All others	\$4,000 and under	6%	Maximum over \$1,000,000	65%
		Over \$4,000	12%		
		Applicable to 1919, 1920			
		\$4,000 and under	4%		
		Over \$4,000	8%		

Note: Dividends of corporations remained taxable on personal net income during this period.

Table B4: State Corporate Income Tax, 1911-1920

State	Year of Enactment	Exemptions	Rate Structure	Notes
Wisconsin	1911	no exemption	2-6%	Soldier's surtax: 6% (1919) Educational bonus surtax: 1.2% (1919-1922)
Mississippi	1912	\$2,500	0.50%	A combined personal and corporation income tax
Oklahoma	1913	\$3,000	first \$10,000 1% \$10,000-25,000 2% \$25,000-50,000 3% \$50,001-100,000 4% above \$100,000 5%	
	1917 (amended)		first \$10,000 3/4% \$10,000-25,000 1.5% above \$25,000 2%	
Connecticut	1915	-	2%	Tax only on mercantile and manufacturing corporations; no personal income tax

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Table B4 – continued from previous page

State	Year of Enactment	Exemptions	Rate Structure	Notes
West Virginia	1915	no exemption	0.5%	Tax only on corporate incomes derived from sources within the state; no personal income tax
Virginia	1870/1916	\$ 600 (1870-1907) \$1,000 (1908-1909) \$2,000 (1910-1915) \$1,200 (1916-1926)	1% flat till 1919 in 1919: 3%	Old type income tax: 1870 Modern corporate income tax: 1916
Massachusetts	1917	\$3,000	1.50%	
Montana	1917	\$10,000 (1917) \$2,500 (1919)	1%	A license tax on the basis of net income; no personal income tax
Missouri	1917	\$3,000 (1917) \$1,000 (1919)	0.50% 1.50%	A combined personal and corporation income tax
New York	1917	-	3% in 1917 4.5% in 1919	A general franchise tax on manufacturing and mercantile corporations; value of

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Table B4 – continued from previous page

State	Year of Enactment	Exemptions	Rate Structure	Notes
New Mexico	1919	\$5,000	\$5,000-10,000 0.5% over \$50,000 3%	franchise measured by net income A combined personal and corporation income tax
North Dakota	1919	no exemption	3%	Indefinite allocation rule
Alabama	1919	-	4%	Ruled unconstitutional in 1920

Note: Author's summary based on National Industrial Conference Board  
(1930).

Table B5: State Personal Income Tax, 1911-1920

State	Year of Enactment	Exemptions	Rate Structure	Notes
Wisconsin	1911	\$800	Graduate rate the lowest bracket 1%	
Mississippi	1912	\$2,500	0.50%	a combined personal and corporation income tax
Oklahoma	1908	\$3,500	0.50%	
	1913 (amended)	\$3,000	first \$10,000 3/4% \$10,000-25,000 1.5% above \$25,000 2%	
	1917 (amended)		first \$10,000 3/4% \$10,000-25,000 1.5% above \$25,000 2%	
Delaware	1917	\$1,000	1%	tax only on personal income no corporate income tax

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Table B5 – continued from previous page

State	Year of Enactment	Exemptions	Rate Structure	Notes
Massachusetts	1917	\$3,000	1.50%	
Missouri	1917	\$3,000 (1917) \$1,000 (1919)	0.50% 1.50%	a combined personal and corporation income tax
New York	1919	\$1,000	first \$10,000 1% \$10,000 - 50,000 2% above \$50,000 3%	
New Mexico	1919	\$1,000	\$5,000-10,000 0.5% over \$50,000 3%	a combined personal and corporation income tax
North Dakota	1919	\$1,000	below \$10,000 1/4% \$10,000-20,000 5% \$20,000-30,000 6% \$30,000-40,000 8% above \$40,000 10%	
Alabama	1919	-	4%	held unconstitutional in 1920

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Table B5 – continued from previous page

State	Year of Enactment	Exemptions	Rate Structure	Notes
Virginia	1870/1919	\$ 600 (1870-1907)	1%	Old type income tax: 1870 Modern personal income tax: 1919
		\$1000 (1908-1909)		
		\$2,000 (1910-1915)		
		\$1,200 (1916-1926)		

Note: Based on author's summary of National Industrial Conference Board (1930).