# Output Distortions and the Choice of Legal Form of Organization*

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**Abstract**

We study the distortions to aggregate output created by the differential tax treatment of corporations and pass-through entities. We develop a firm dynamic model in which the legal form of organization is an endogenous choice for firms facing trade-offs between the tax treatment of business income, access to external capital, and the evolution of productivity over time. Using the calibrated model, we find that equalizing tax treatments across legal forms while keeping tax revenue constant leads to 1.7% increase in aggregate output. Half of this increase is due to the reallocation of capital between firm types.

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Key words: Output distortions, Legal Form of Organization, pass-through

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# 1 Introduction

How distortionary are capital taxes and how much do we gain from removing these distortions? The output and employment gains from removing capital taxes or from replacing them with consumption taxes can be large, but large-scale changes in the tax system are politically difficult to implement. On the other hand, many countries have implemented legislative reforms regarding taxation of different sources of business income. The impact of these tax structures is less well-understood theoretically, but these taxes can also distort the allocation of capital.

In this paper, we develop a firm dynamic model with an endogenous choice of organizational form and use the distinction between corporate and pass-through income treatment in the US to show that by equalizing the tax treatment of capital income from different sources we can increase aggregate output, while still having the capital tax in place. That is because when tax treatment is a significant determinant of the choice of the legal form of organization, over its economic features, it creates inefficiencies and leads to miss-allocation of capital.

In a pass-through business, the profit is passed entirely to the owners and taxed according to the individual income tax code. In a corporation (C-corporation in the US), profit is taxed first at the business level according to the corporate income tax code. Later, when dividends are paid out or a shareholder realizes a capital gain, the shareholder pays a dividend income tax or a capital gains tax based on the individual income tax code. In the US, from 1986 up until the 2017 Tax Cuts and Jobs Act (TCJA), the individual income tax rate had been lower than the combined corporate and dividend/capital gains tax rates, making the tax burden on pass-through entities lower. This increased the share of pass-through businesses (e.g., S-corporations in the US) among the total number of businesses in the U.S. substantially (Carroll and Joulfaian, 1997; Cooper et al., 2016; Dyrda and Pugsley, 2018; Gordon and Slemrod, 1998; Slemrod, 1996; Smith et al., 2019, 2021; Yagan, 2015). They now constitute over 95 percent of tax returns and 38.8 percent of business tax receipts.[1]

If firms choose a pass-through organizational form just for tax savings reasons, it is important to understand how this choice affects various margins of the economy, such as employment (Chen et al., 2018), corporate sector labor share (Smith et al., 2021), and output growth. This is because differences between legal forms of organization extend beyond the tax treatment and impose limitations on financial structure and availability of external

[1] See https://www.irs.gov/statistics/soi-tax-stats-integrated-business-data

capital. This, in turn, may induce differences in investment decisions, financing decisions, and dividend payout policies. For example, despite lower tax burden, the cost of raising capital is higher for pass-through entities relative to corporations for several reasons. First, S-corporations cannot issue preferred stock to generate capital by attracting venture capital investors (Chen et al., 2018).[2] Second, there is a limit on interest expense for shareholders, which increases the cost of debt financing for S-corporations.[3] These features give rise to a trade-off between two choices (1) having lower costs of raising capital, but facing double taxation (for C-corporations) or (2) having higher costs of capital, but enjoying only single taxation of profits (for pass-through entities).

In this paper, we develop an industry equilibrium model to explore this trade-off. In our model, the change in the legal form of organization leads to changes in the demand for capital, which in turn influences savings and investments. The key contribution of this paper is to provide a role for the choice of the legal form of organization as a mechanism through which changes in the tax legislation distort the capital allocation and aggregate output in the economy. Using our framework we quantify the distortionary effects of the current tax structure on the choice of the legal form of organization, the subsequent impact on the allocation of capital among businesses, and the associated effects on real aggregate output of the US economy.

The majority of theoretical contributions analyzing the distortions created by the corporate tax system take the choice of legal organizational form as given. This is also true in the theoretical models that explore factors that contribute to differences in employment growth across firms (e.g. Clementi and Hopenhayn (2006); David S. Evans (1989); Hopenhayn (1992); Vereshchagina and Hopenhayn (2009)) We follow more recent contributions where the legal organizational form is endogenous and affects risk-sharing and employment in occupational choice models (Chen et al., 2018; Kotlikoff and Miao, 2013). The novelty of our paper is that we add the endogenous choice of legal form of organization to a firm dynamic model with entry and exit. This enables us to evaluate the effects of a variety of tax structures on the aggregate output and firm's choice of organizational forms. In our model, production takes place in two types of plants: C-type plants which represent C-corporations; and P-type plants which represent pass-through entities. These two types are different with respect to their cost of capital, fixed costs of production, and the potential evolution of their

[2]The literature often distinguished between the cost of capital and interest rates for incorporated and unincorporated businesses, e.g., where unincorporated business, such as partnerships and limited liability companies face much higher interest rates and consequently higher cost of capital.

[3]For details see: https://www.irs.gov/instructions/i1120sidm140355076921104.

productivity over time. Also, they receive different tax treatments. The profit of a C-type plant is being taxed at the entity level and, once distributed to shareholders, the after-tax profit is taxed based on the individual income tax code. For a P-type plant, the profit passed to the shareholders is subject to individual income tax.

In each period, plants that are heterogeneous with respect to their productivity, decide if they want to stay for the next period or if they want to exit. If they choose to stay, they can choose their type for the next period, taking into consideration all the differences between a C-type and a P-type plants as well as the switching cost between the two types. At the beginning of each period, potential new plants can enter the market by paying entry costs. Once they pay the cost and enter, they realize their productivity level for that period and then they can choose their type. This makes it feasible for the model to incorporate the trade-off between choosing to be a C-corporation versus a pass-through entity that generates firm dynamics. This also makes the model consistent with empirical evidence documented by Dyrda and Pugsley (2018), who show that the significant increase in pass-through entities is coming from two sources: a secular increase in the share of new businesses which choose the legal form of a pass-through entity, offsetting nearly perfectly a decline in the share formed as traditional corporations; and second, an increase in the share of corporations converting to pass-through entities since the tax reform of 1986.

We calibrate our general equilibrium model to match the salient features of the U.S. economy and use it to study the aggregate impact of both types of firms receiving a uniform tax treatment, thus eliminating the tax advantages of the different legal forms of organization. We use three modified tax structures, keeping the calibrated parameters fixed and the government tax revenue constant at its benchmark level. In the first tax structure, we consider taxing both C-type and P-type plants only at the corporate level, keeping labor income taxation the same as in the benchmark economy. We find that the share of new firms that choose to organize as C-types increases. We also show that the aggregate output of the economy increases by 1.7% compared to the benchmark economy. We find that about 50% of this increase comes from the reallocation of capital to more productive plants, while the rest is attributed to the accumulation of capital. This suggests that output gains from *tax equalization* are not that large. This is because the negative consequences of higher borrowing costs faced by P-type are partially compensated by the more favorable tax treatment that this type receives. Further, equalizing the tax treatment across firms increases the size of the aggregate labor force in the economy, which is consistent with Chen et al. (2018).

In the second tax structure, we consider taxing both types of firms at the corporate level with a single tax rate levied on both labor and business incomes. To keep the reform revenue-neutral, the imposed labor income tax is slightly higher than in the benchmark and business income tax lower than in the first tax reform. We show that this increases the aggregate output by 2.5% relative to the benchmark case. This is mainly coming from the lower tax rate that is levied on businesses. For the third tax structure, we consider eliminating the business tax and taxing dividends from both types of firms at the same rate as labor income instead. By this, we effectively impose a uniform consumption tax regime. We find that the aggregate output increases by 9%. The magnitude of this effect is consistent with findings from the optimal tax literature (Altig et al., 2001; Hall and Rabushka, 2013; Raei, 2020; Ventura, 1999).

We then use our model to run a simple policy experiment designed to mimic one of the main changes introduced by the Tax Cuts and Jobs Act (TCJA), i.e., reduction in the tax rate on C-corporations to 21%. The new flat 21% corporate tax rate for C-corporations may induce some pass-through entities to convert to C-corporations. We show that with a tax structure that mimics this feature of the TCJA reform more plants choose to organize as C-type and the employment share of the C-type increases. Also, because of the lower corporate income tax rate, plants increase their production and the aggregate output of the US economy increases by 8.3% compared to the benchmark case. However, this increase in output comes at the cost of an almost 8% decline in government tax revenue. This highlights one of the key trade-offs in substantially reducing the corporate tax rate for a group of firms.

The two papers that are closest to ours are Dyrda and Pugsley (2018) and Chen et al. (2018). The former investigates the effects of changes in the dynamics of legal forms of organization on income inequality. They propose a heterogeneous agent equilibrium model with workers, entrepreneurs, and endogenous choice of the legal form of organization to quantify the contribution of tax reforms on the evolution of income inequality of workers and entrepreneurs through the business reorganization channel. Chen et al. (2018) investigate the effects of corporate tax cuts on employment. Our paper differs in two dimensions. First, while they also endogenize the choice of the legal form of organization, in their model this choice depends on individual ability. This allows them to focus on employment gains. We choose to focus on the effects of differential taxation on the output of plants. This allows us to pin down the *relative* contributions of capital reallocation and capital accumulation mechanisms that drive the increase in output when we equalize tax rates between legal forms. Our model also enables us to evaluate the effects of the tax equalization on employment and we find results consistent with Chen et al. (2018). Second, we add to Chen et al. (2018) by endogenizing the choice of legal form in a firm dynamic model that features firm entry and exit. This enables us to additionally evaluate the effect of tax structure on the extensive margin of firm entry and exit.

More broadly, this paper also contributes to a strand of empirical literature evaluating the effects of taxes on the choice of legal forms of organization. Many of these papers are focused on the elasticity of organizational form with respect to tax rate. For example, Carroll and Joulfaian (1997) show that higher corporate-noncorporate tax rate differentials increase the likelihood that a plant will convert from C- to S-corporation status, where the tax savings are largest for profitable firms (see also (Goolsbee, 1998, 2004; Mackie-Mason et al., 1997; Prisinzano and Pearce, 2018)). Qi and Schlagenhauf (2021) shows that Kansas business tax cuts in 2012-2016 have encouraged the adoption of pass-through status over C-corporation status and this reduced output, capital formation, and employment growth in Kansas. Smith et al. (2021) show that the rise of pass-through entities in the US is associated with a decline in the corporate sector labor share. Using evidence from the UK, Tazhitdinova (2020) shows that different tax liabilities across different organization forms affect business entry and income shifting margins, while Elschner (2013) shows that availability of tax incentives affects incorporation decisions of firms. Empirically, Barro and Wheaton (2020) study the effects of organizational form on productivity and find results consistent with ours.

# 2 Legal Forms of Organization of U.S. Businesses

Businesses in the United States can operate in a variety of organizational forms. The choice of the legal form of organization usually reflects the need to increase capital, flexibility, and the owners' protection from the liabilities that the business takes on. Further, the legal form of organization determines the federal-level tax burden imposed on the business. The main legal forms of organization in the United States are sole proprietorship; general partnership; limited partnership; limited liability company; S-corporation; and C-corporation. In the discussion in this section, we focus on characteristics of the legal form of organization relevant to our model. In particular, we focus on the differences between pass-through entities and C-corporations in terms of (1) their tax treatment and (2) costs of financing new investment. We do not model sole proprietorship, because we want to abstract from the implications of having limited liability. For a more detailed discussion of the pass-through entities and their characteristics based on tax returns and Census data see Dyrda and Pugsley, 2018; Smith et al., 2019, 2021.

C-corporations are subject to corporate income tax both at the federal and state levels and any earnings distributed to shareholders as dividends or capital gains are subject to the second level of taxation at the personal income tax rates. All other forms of organization are pass-through entities for tax purposes. This means that their income passes through to shareholders so that it is subject to a single level of taxation, at the personal level[4].

The cost of raising new capital is lower for C-corporations for several reasons. First, C-corporations have access to the public equity market, while pass-through entities have to rely on their owner's personal funds to finance investments. Second, shareholders of S-corporations must be individuals and U.S. citizens or residents. This makes it harder for S-corporations to obtain equity financing, as venture capital and private equity funds are not eligible shareholders (Chen et al., 2018). These first two points suggest that S-corporations may be unable to raise money through new equity financing. Third, there are limits on investment interest expenses for S-corporations. In particular, when an S-corporation borrows money to finance investment, interest expenses must be filed separately for each shareholder, as these are subject to limited deductions. Finally, C-corporations can accumulate earnings for future expansion at a lower tax cost than other types of entities. As such, retained earnings for S-corporations are taxed at the personal tax rate, while for C-corporations the initial $250,000 is tax-free and the accumulated earnings tax rate is levied at 20%, which is lower than the top personal tax rate bracket.[5]. The latter two points suggest that the cost of capital for investment financed by both borrowing and retained earnings will also be higher for S-corporations.[6]

Since 1980, the overall number of tax returns reporting business income has grown from 13 million to 32.7 million. The number of C-corporation returns has declined by 25 percent, while the total number of corporate returns (C-corporation plus S-corporations) increased. In Figures 1a and 1b we show significant changes in the distribution of legal forms of organizations in the US over the past thirty years. The share of C-corporations in the total number of business entities dropped from 16.6 percent in 1980 to 4.9 percent in 2012, while the share of business receipts of C-corporations in total business receipts decreased from

[4]Some states, most notably California and New York, recognize the pass-through nature of S- corporations but still impose a tax at the entity level.

[5]See https://www.irs.gov/instructions/i1120sidm140355078105664 for details.

[6]Note that the cost of external sources of financing such as debt and new equity is higher than that of internal sources of financing such as retained earnings (Bond and Meghir, 1994; Fazzari et al., 1988; Hennessy and Whited, 2007). Further, Smith et al. (2021) show that S-corporations pay a lot of dividends. This suggests that there may be some S-corporations for which financing constraints may be small. In our context, because pass-through firms consist of partnerships and limited liability companies in addition to S-corporations, the fraction of firms for which financial constraints may not matter is very small.

86.2 percent to 61.2. Over the same period, the share of organizational forms that provide liability protection stayed almost constant. Within these forms, the share of pass-through entities increased significantly in terms of the number of businesses as well as their share of business receipts. Evidence from Figure 1c suggests that the secular change in the roles of organizational forms and economic activities is coming from the sharp decline in the share of C-corporations. While C-corporations reported 74 percent of net income less deficit in 1980, by 2012 that share had declined to 35 percent. The shares for partnerships, mainly limited liability companies, and S-corporations grew over the same period.

The unprecedented expansion of pass-through entities in the US can be linked to legal changes that took place since the Tax Reform Act of 1986 (hereafter TRA86). TRA86 reduced the top individual tax rate below the top combined corporate and dividend tax rate. Hence, C-corporations, are facing a higher tax rate following 1986 (Figure 1d). According to evidence from Dyrda and Pugsley (2018) using micro-level data, there was a spike in the conversion rate of C-corporations to pass-through entities during that period. Recent tax reforms, notably the Tax Cuts and Jobs Act of 2017 have reversed these trends with the corporate tax rate being cut from 35 percent to 21 percent. Since 2017 the combined corporate and dividend tax rates are lower than the top personal income tax rate.

# 3 Economic Environment

To understand the mechanism linking the choice of the legal form of organization and output distortions, we develop a model of firm dynamics featuring an endogenous choice of legal forms of organization. Time is discrete and infinite. The economy consists of a representative household, a unit measure of heterogeneous plants, and a government. We focus on a steady-state analysis of the model.

## 3.1 Preferences

The economy is populated with a unit measure of identical infinitely-lived households, who value the path of consumption and leisure according to the following utility function:

$$\sum_{t=0}^{\infty} \beta^t u(c_t, n_t)$$

where $c_t$ is the consumption in period $t$, $n_t$ is labor supplied in period $t$ and $0 < \beta < 1$ is the time discount factor. We assume that households are endowed with one unit of time in each period.

## 3.2 Technology

In this economy production can take place in two types of plants, one type is a C-corporation, denoted by C-type, and the other type is a pass-through plant, denoted by P-type. Each plant is described by a production function $f(s, k, n)$ that combines capital services $k$ and labor services $n$ to produce homogeneous output. :

$$f(s, k, n) = s^{1-\gamma}(k^{\theta}n^{1-\theta})^{\gamma} \tag{1}$$

We assume the production technology, function $f$, exhibits decreasing returns to scale in capital and labor jointly. The parameter $s$ varies across plants and captures varying technologies. It also varies over time, therefore it can be interpreted as an idiosyncratic productivity shock that each plant receives at each period. We also assume that there is a fixed cost of operation, measured in units of output. Therefore, if the plant wants to remain in existence it must pay the fixed cost. If it does not pay the fixed cost in a period, then it ceases to exist.

C-type and P-type plants use the same production technology, but they differ in their tax treatments. A C-type plant pays tax at the corporate level and the after-tax profit distributed among shareholders is subject to tax at the individual income level. Therefore, the proceeds of C-type plants are subject to tax at two levels. P-type plants do not pay corporate tax but pass the profit/loss to their owners and as part of the owners' income, they are subject to individual income tax.

Apart from receiving different tax treatments, these two types of plants vary along three dimensions:

- Fixed cost of production,
  A C-type plant faces a higher fixed cost of production compared to a P-type plant. C-corporations are required to hold formal board and shareholder meetings and keep minutes of those meetings, they have to use specific accounting systems and their cost of tax filing is higher. For example, the National Society of Accountants[7] estimates that it costs, on average, 5 percent more to file the corporation taxes (IRS Form 1120) for C-corporations compared to an S-corporation (IRS Form 1120S).

- Rental rate of capital,

[7] https://www.nsacct.org/blogs/nsa-admin/2015/01/29/tax-return-preparation-fee-averages-273-for-typic

While C-corporations have access to the public equity market which provides an elastic supply of external equity, a pass-through entity can only rely on its owners' personal funds to use either as equity or as collateral for issuing debt. This feature is captured in the model by introducing a wedge over the rental rate of capital for pass-through entities. Let $R$ be the rental rate of capital in the market, then the $R^p$ is the rate at which pass-through entities can raise capital,

$$R^p = R(1 + \zeta) \tag{2}$$

where $\zeta$ is the wedge that pass-through entities face. This captures the idea that it is harder and therefore, more expensive for pass-through entities to generate external capital.

- Evolution of the productivity shock over time,
  The final difference between the two types of plants is with respect to their productivity paths. Productivity evolves according to an exogenous $AR(1)$ process with an innovation that is independent across plants. The standard deviation for the innovation process is larger for C-type relative to P-type plants. C-corporation is the only legal form that has access to the public equity market. As Fama and Jensen (1983) show, the common stock of C-corporations allows for more efficient risk sharing. This, as portfolio theory implies, lowers the cost of pursuing risk-bearing projects which makes it more likely for C-corporations to take those projects on. As such, they have better opportunities to diversify the risk compared to pass-through entities. We are capturing this in our model by assuming a bigger standard deviation for the innovation process of C-types.

In each period, a new plant can be created by paying cost $c_e$, measured in units of output. After paying this cost, a realization of the initial plant-level productivity parameter is drawn from the distribution which is described with *cdf* $\eta(s)$. Draws from this distribution are *iid* across entrants. After realizing the initial productivity draw, the entrant chooses to be either a C-type or a P-type, and then it will operate similar to an incumbent plant of the same type. In this model, the government collects revenue by taxing labor income, dividend income, taxing C-type plants at the corporate level, and taxing P-type plants at their owners' income level.

# 4 Equilibrium

We focus on the steady-state competitive equilibrium of the model. In the steady state, there will be a stationary distribution of plants across types. To define the equilibrium, we start by describing the decision problems of the agents in the model and developing notation. We describe an algorithm that can be used to solve the equation in Appendix A.

## 4.1 Incumbent Plant's Problem

The state of each plant in any period can be described by a pair $(\Delta, s)$, where $\Delta$ is the type of plant in that period, $\Delta \in \{C, P\}$, and $s$ is the corresponding period productivity shock. At the beginning of each period, an incumbent plant pays the fixed cost of production $C^F$, then the productivity shock for the period, $s$, is realized and the plant decides on its current period capital and labor demand. While productivity evolves exogenously, plants choose their type endogenously. At the end of the period, the plant decides between exiting the market and staying for the next period. If the plant exits, it disappears from the model and receives zero profits in all future periods. If it stays, it can choose its type for the next period; after observing current productivity, $s$, a plant can either continue with the same type or switch to the other type. In this model, the value of each plant is determined by the present value of the stream of after-tax profits that are collected by owners.

**C-type Incumbent Plant:** for a C-type plant with state $(C, s)$ that is subject to the corporate income tax and the dividend tax, the after-tax profit in each period is determined in the following way:

$$\Pi(C,s) = \max_{k,n} \left[ \Big( [f(s,k,n) - wn - C_F^C - \delta k][1-\tau^c] - Rk \Big)(1-\tau^d) \right] \tag{3}$$

where $w$ is the wage rate, $R$ is the rental rate of capital, $\tau^c$ is the corporate tax rate and $\tau^d$ is the dividend tax rate. The value function of a C-type incumbent plant with state $(C, s)$ is denoted by $V(C, s)$ which is given by:

$$V(C,s) = \Big[ \Pi(C,s) + \beta \max_{C,P,exit} \Big\{ \int V(C,s')Q^C(s,ds'), \int V(P,s')Q^P(s,ds') - C_S^C, A \Big\} \Big] \tag{4}$$

Here, $Q^C(s, s')$ is the transition function for the Markov process of shock $s^C$, and $Q^P(s, s')$ is the transition function for the Markov process of shock $s^P$. $A$ is the exit value which we normalize to be zero in our model. $C_S^C$ is the switching cost that the C-corporation has to pay if it chooses to switch type to a pass-through entity for the next period.

**P-type Incumbent Plant:** for a P-type incumbent plant with state $(P, s)$, that is subject only to individual tax, the after-tax profit in each period is determined in the following way:

$$\Pi(P, s) = \max_{k,n} \Big[ (f(s, k, n) - wn - C_F^P - \delta k)(1 - \tau^i) - R^P k) \Big] \tag{5}$$

where $\tau^i$ is the individual tax rate. The value function of a P-type incumbent plant with state $(P, s)$ is denoted by $V(P, s)$ which is given by

$$V(P, s) = \Big[ \Pi(P, s) + \beta \max_{C,P,exit} \Big\{ \int V(P, s')Q^P(s, ds'), \int V(C, s')Q^C(s, ds') - C_S^P, A \Big\} \Big] \tag{6}$$

Here, $C_S^P$ is the switching cost for a pass-through entity. We assume that capital used in the C- and P- corporate sectors is equity-financed and following Bhandari and McGrattan (2020) that only depreciation is tax-deductible.[8]

## 4.2 Entering Plant's Problem

Potential entering plants make their entry decision knowing that they face a distribution over potential draws for the initial productivity level, $\eta(s)$. Let $V^e$ represent the present discounted value of a potential entrant. Then we have

$$V^e = \int_s \max\{V(C, s), V(P, s)\}\eta(ds) - c_e \tag{7}$$

where the max inside the integral reflects the fact that a potential entrant will optimally decide about its type after observing the realized draw of the productivity shock. After

[8]This assumption allows us to capture the distortionary effect of capital tax. As such, both $Rk$ and $R^P k$ are not tax-deductible.

paying a one-time entry cost of $c_e$ and then realizing the productivity draw, an entrant chooses its type and its problem is equivalent to an incumbent plant with the same type that faces the productivity shock $s$.

As value functions are increasing in the level of productivity shock, we can show that there exists a threshold value of shock, $\overline{s}$, such that for a productivity shock above that value, a new entrant chooses to be a C-type firm and for a productivity shock below that level, a new entrant chooses to be a P-type firm.

In an equilibrium with an entry, $V^e$ must be equal to zero, otherwise additional plants would enter. Therefore it is referred to as a free entry condition. As we describe in the algorithm in Appendix A, this condition determines the wage rate.

The plant's decision problem for both types produces four decision rules: the optimal choice of capital $k(\Delta, s)$, the optimal choice of labor $n(\Delta, s)$, stay or exit decision $\mathbb{1}_{exit}$, and the decision to switch the type $\mathbb{1}_{switch}$ ($\mathbb{1}$ is an indicator function).

## 4.3 Consumer's problem

In this economy, consumers/households rent their labor and capital to plants. They are also the owners of the plants and receive their profits. The state of households can be described with the capital $K$ and the plant ownership given by a measure $x$ over plant types. The decision problem of a household with state $(K, x)$ can be written as

$$H(K, x) = \max_{c, K'} \{u(c, n) + \beta H(K', x')\} \tag{8}$$

s.t.

$$c + M\, C_e + K' \leqslant wn(1 - \tau^i) + (1 + R)K + \Pi + Tr$$

$$\begin{aligned} x'(C, \mathcal{S}) = &\int (1 - \mathbb{1}_{switch}(C, s))(1 - \mathbb{1}_{exit}(C, s))Q^C(s, \mathcal{S})x(C, ds) \\ &\int \mathbb{1}_{switch}(P, s)(1 - \mathbb{1}_{exit}(P, z))Q^C(s, \mathcal{S})x(P, ds) \\ &+ M \int_{\overline{s}} (1 - \mathbb{1}_{switch}(C, s))(1 - \mathbb{1}_{exit}(C, s))Q^C(s, \mathcal{S})\eta(ds) \\ &+ M \int^{\overline{s}} \mathbb{1}_{switch}(P, s)(1 - \mathbb{1}_{exit}(P, z))Q^C(s, \mathcal{S})\eta(ds) \end{aligned} \tag{9}$$

$$x'(P,\mathcal{S}) = \int (1-\mathbb{1}_{switch}(P,s))(1-\mathbb{1}_{exit}(P,s))Q^P(s,\mathcal{S})x(P,ds) \tag{10}$$
$$+ \int \mathbb{1}_{switch}(C,s)(1-\mathbb{1}_{exit}(C,z))Q^P(s,\mathcal{S})x(C,ds)$$
$$+ M\int^{\bar{s}} (1-\mathbb{1}_{switch}(P,s))(1-\mathbb{1}_{exit}(P,s))Q^P(s,\mathcal{S})\eta(ds)$$
$$+ M\int_{\bar{s}} \mathbb{1}_{switch}(C,s)(1-\mathbb{1}_{exit}(C,z))Q^P(s,\mathcal{S})\eta(ds)$$

where $\Pi$ is the total after-tax profit of all plants and $Tr$ is the transfer to the household.[9], and $M$ is the mass of new entrants. Equations (9) and (10) describe the next period ownership of plants $X'$. The first integral in equation (9), represents the incumbent plants of type $C$, who stayed and did not switch type in period $t$, the second integral represents the incumbent plants of type $P$, who stayed but switched to other types in period $t$. The third line shows the new entrants who choose $C$-type for the current period and keep their type for the next period as well. And finally, the last line represents the mass of new entrants who choose $P$-type in the current period but decide to switch to $C$-type for the next period. Equation (10) can be interpreted in a similar way. Note that profit is represented here as the after-tax profit of all plants.

## 4.4 Definition of Equilibrium

Given that plants are heterogeneous with respect to their types ($\Delta \in \{C, P\}$) and productivity level ($s \in S$), we define a measure $x(\Delta, s)$, which is the mass of plants with state $(\Delta, s)$. This defines the distribution over plant's state space.

A steady state equilibrium is a collection of decision rules $n^*(\Delta,s)$, $k^*(\Delta,s)$, $\mathbb{1}_{exit}(\Delta,s)$ and $\mathbb{1}_{switch}(\Delta,s)$, $K'(K,x)$, $N(K,x)$ and $x'(K,x)$, factor prices $w$ and $R$, transfer $Tr^*$ and aggregate capital $K$, government consumption $G$, such that:

- $n^*(\Delta,s)$, $k^*(\Delta,s)$, $\mathbb{1}_{exit}(\Delta,s)$ and $\mathbb{1}_{switch}(\Delta,s)$ are optimal decision rules.

[9]In the equilibrium, the transfer $Tr$ is equal to

$$Tr = (R^p - R)(\int k(P,s)x(P,ds) + \int^{\bar{s}} k(P,s)\eta(ds)) \tag{11}$$

- Taking plants decisions, prices, and $M^*$ as given, households solve for $K' = K^*$, $N = N^*$, $x' = x^*$
- Market clearing conditions are satisfied:

$$K^* = \int k^*(\Delta, s)x^*(d\Delta \times ds) + M^* \int k^*(\Delta, s)\eta(ds) \tag{12}$$

$$N^* = \int n^*(\Delta, s)x^*(d\Delta \times ds) + M^* \int n^*(\Delta, s)\eta(ds) \tag{13}$$

$$\begin{aligned} c^* + I^* + M^*C_e + G^* = &\int (f(s, k^*(\Delta, s), n^*(\Delta, s)) - C_f^{\Delta})x^*(d\Delta \times ds) + \\ &M^* \int (f(s, k^*(\Delta, s), n^*(\Delta, s)) - C_f^{\Delta})\eta(ds) \end{aligned} \tag{14}$$

- Law of motion of distributions is consistent with plant decision rules:

$$\begin{aligned} x'(C, \mathcal{S}) = &\int (1 - \mathbb{1}_{switch}(C, s))(1 - \mathbb{1}_{exit}(C, s))Q^C(s, \mathcal{S})x(C, ds) \\ &\int \mathbb{1}_{switch}(P, s)(1 - \mathbb{1}_{exit}(P, z))Q^P(s, \mathcal{S})x(P, ds) \\ &+ M \int_{\overline{s}} (1 - \mathbb{1}_{switch}(C, s))(1 - \mathbb{1}_{exit}(C, s))Q^C(s, \mathcal{S})\eta(ds) \\ &+ M \int^{\overline{s}} \mathbb{1}_{switch}(P, s)(1 - \mathbb{1}_{exit}(P, z))Q^P(s, \mathcal{S})\eta(ds) \end{aligned} \tag{15}$$

$$\begin{aligned} x'(P, \mathcal{S}) = &\int (1 - \mathbb{1}_{switch}(P, s))(1 - \mathbb{1}_{exit}(P, s))Q^P(s, \mathcal{S})x(P, ds) \\ &+ \int \mathbb{1}_{switch}(C, s)(1 - \mathbb{1}_{exit}(C, z))Q^C(s, \mathcal{S})x(C, ds) \\ &+ M \int^{\overline{s}} (1 - \mathbb{1}_{switch}(P, s))(1 - \mathbb{1}_{exit}(P, s))Q^P(s, \mathcal{S})\eta(ds) \\ &+ M \int_{\overline{s}} \mathbb{1}_{switch}(C, s)(1 - \mathbb{1}_{exit}(C, z))Q^C(s, \mathcal{S})\eta(ds) \end{aligned} \tag{16}$$

- Government budget is balanced:

$$
\begin{aligned}
G^* =&\tau^c\Big[\int(f(s,k^*(C,s),n^*(C,s)) - wn^*(C,s) - C_F^C - \delta k^*(C,s))x(C,ds) \\
&+\int_{\underline{z}}(f(s,k^*(C,s),n^*(C,s)) - wn^*(C,s) - C_F^C - \delta k^*(C,s))\eta(ds)\Big] \\
&+\tau^d\Big[\int(f(s,k^*(C,s),n^*(C,s)) - wn^*(C,s) - C_F^C - \delta k^*(C,s))(1-\tau^c) \\
&- Rk^*(C,s))x(C,ds) \\
&\int_{\overline{s}}(f(s,k^*(C,s),n^*(C,s)) - wn^*(C,s) - C_F^C - \delta k^*(C,s))(1-\tau^c) \\
&- Rk^*(C,s))\eta(ds)\Big]+ \\
&\tau^i\Big[\int(f(s,k^*(P,s),n^*(P,s)) - wn^*(P,s) - C_F^P - \delta k^*(P,s))x(P,ds)+ \\
&\int^{\overline{s}}(f(s,k^*(P,s),n^*(P,s)) - wn^*(P,s) - C_F^P - \delta k^*(P,s))\eta(ds) + w * N^*\Big]
\end{aligned}
\tag{17}
$$

# 5 Parametrization

In this section, we detail the parametrization of the model and motivate the choice of targets. Panel A in Table 1 summarizes parameters that are set independently. The parameters that are calibrated jointly are reported in panel B. We choose parameters such that the model is consistent with firm dynamic features of the U.S. economy over the period 2008-2010.[10] We let a period in the model correspond to one year in the data. We target a real rate of return of 4 percent which implies a value of 0.96 for $\beta$. The value of parameter $\gamma$ which controls returns to scale is set to 0.8 which is within the bounds used in literature.[11] Then parameter $\theta$, which controls the capital share, is set such that the model, consistent with the data, assigns 1/3 of income to capital and 2/3 to labor.

The depreciation rate, $\delta$, is the total depreciation of private fixed assets by corporate firms, partnerships, and sole proprietorships (NIPA Fixed Asset Table 6.4 lines 2, 6, and 7) divided by the total private fixed assets of corporate firms, partnerships, and sole proprietorships (NIPA Fixed Asset Table 6.1 lines 2, 6, and 7). This yields the estimated annual depreciation rate to be 8.1 percent. Tax rates are set to their statutory values during the period 2008 to 2010, i.e. the corporate tax rate is 35%, the dividend tax rate is 15%, and

[10] We choose this period to have the maximum set of moments to use as targets in our calibration.
[11] See for instance Guner et al. (2008), Atkenson et al. (1996), and Veracierto (2001) among others.

the top marginal income tax rate for individuals is 35%.

The other component of the calibration is the range of values for plant-level productivity. In the benchmark economy, there is a one to one mapping between the plant-level productivity and employment which suggests that we can discipline the range of productivity level with the plant-level employment.

Using Statistics of U.S. Businesses (2010), which is one of the few data sets that reports statistics by the legal form of organization, we assume a grid of productivity values with 450 points and plant size that ranges from 1 to 6151 workers.[12] We use the relative average size and the employment share of each type as targets. Figure 2 compares the distribution of firm size (Panel a) and employment share (Panel b) across the two types.

Households' period utility function depends on the choices of consumption and labor in that period. We use the following functional form for period utility

$$u(c,l) = \log(c) - \frac{l^{1+1/\kappa}}{1+1/\kappa}$$

where $\kappa$ is a Frisch elasticity which we set to be 1 to be compatible with the macro estimates of that parameter in the literature (Keane and Rogerson, 2012; Raei, 2020; Reichling and Whalen, 2012).

We assume the log productivity shock, $s$, follows an $AR(1)$ process with the persistency of $\rho$ and standard deviation of $\sigma$. The shock process differs by plant's type; persistency parameter is common between the two, but the standard deviation of the innovation is different.

$$\log(s') = \rho \log(s) + \epsilon_\Delta \;\; where \;\; \epsilon_\Delta \sim N(0, \sigma_\Delta^2)$$

We use the method developed in Tauchen (1986) to construct a first-order Markov process approximation. We use the County Business Pattern, Statistics of U.S. Businesses and IRS tax return data to capture moments of plant-size distribution for each organizational form. More specifically, we use the shares of employment, output, income and the number of plants of each type in all businesses to choose the parameters that shape the productivity profile for each type. It is worth mentioning that the IRS data is at the aggregate level. It can only be used to infer the share of business receipts, number of returns and net income for each

[12]In SUSB data, plants with more than 500 workers are top-coded. Following Restuccia and Rogerson (2008), we obtain a maximum of 6151 by assuming plants are uniformly distributed between 500 and this maximum to reproduce the average employment size of 3325 workers in this bin.

type.

Table 2 describes data moments that are used as targets and compares them with moments generated by the model. We show that calibrated model fits the data well, as it matches the employment share and the output share of the C-corporations.

# 6 Discussion

In this section, we discuss how the differences between P-type and C-type plants — fixed costs, the variances of productivity shocks, and capital rental rates — affect the plant size distribution generated by the model. In Panel A of Figure 3 we compare the distribution of C-type and P-type plants from our model at each productivity level. The red line represents the distribution of P-types and the dashed blue line represents the distribution of C-types. We show that for lower levels of productivity, most plants choose to organize as P-types. As productivity increases, we see more plants choose to organize as C-types. However, with very high levels of productivity, the P-type structure is again more prevalent.

There are two potential reasons that can explain this choice of organizational form for most productive plants. First, productivity level determines the demand for factors of production, such as capital and labor. Therefore, by choosing to be a P-type, most productive plants face a higher cost of capital. However, the higher tax burden associated with a C-type creates a large disadvantage at the highest levels of productivity. This means that despite the higher cost of capital, P-type is the optimal form of organization for these plants. This highlights the negative impact of the higher tax burden on C-corporations. Second, the production process is different between P-type and C-type plants. This means that for a plant that already has high productivity, a smaller productivity shock is preferable. The interplay between the three factors that drive the difference between C-type and P-type plants, plays a crucial role in generating the distribution of plants for each type. For instance, if we equalize the fixed cost of operation between types, plants with smaller productivity shock would choose to organize as C-types.

# 7 Counterfactual experiments

In this section, we do two types of experiments. First, we use the benchmark model to study the aggregate impact of three modified tax structures, keeping the calibrated parameters fixed and the government tax revenue constant at its level in the benchmark economy.

Those experiments change the nature of the tax base compared to the benchmark tax system, with both types of firms receiving a uniform tax treatment. Thus, we eliminate the tax advantages of one type over the other. In one of those exercises, we also equalize the tax treatment across factors of production. The goal of these exercises is to highlight the quantitative importance of each type of tax we have in the model and to understand the mechanism through which the differential tax treatments distort the choice of the organizational form. Second, we introduce a policy experiment that reduces the tax rate on C-corporations to 21%. In that, we mimic one of the main changes introduced by the Tax Cuts and Jobs Act (TCJA). The goal for this exercise is to evaluate one of the aspects of that policy change using our model.

## 7.1 Uniform business income taxation

In this exercise, the benchmark tax structure is replaced with a tax system in which both C-type and P-type plants receive the same tax treatment. The dividend tax for C-type is abolished and both types pay business income tax at the entity level, at the same rate $\tau_1$, which is chosen such that tax revenue is the same as in the benchmark economy. Also, labor income is taxed at the same rate as in the benchmark economy. As such, we eliminate the tax advantage of type-P over the other type, while still having the (distortionary) tax at the entity level.

Using our model, we find that equalizing the tax treatment of all businesses increases the aggregate output of the economy by 1.7 percent (column 2 in Table 3). In this tax regime, as productivity level increases, we see more plants choose to be a C-type (see Panel B in Figure 3). We also find that the share of new plants that choose to be C-type increases compared to the benchmark case. Organizing as a C-type allows a plant to hire capital at a lower rate without being penalized by a higher tax burden. As a result, the employment share of C-type increases from 60.2% to 74% relative to the benchmark case. around 45% of this increase is contributed on extensive margin. The calculated tax rate, $\tau_1$, is 0.36, which is higher than the tax rate levied on both types in the benchmark economy, 0.35.[13] Despite this higher tax rate, the aggregate output increases. Note that in our setup, P-type plants face higher borrowing costs but a lower tax burden and a lower fixed costs. Hence, the tax differential has a mitigating effect on capital misallocation caused by the differential

[13]If we equalize the tax treatment of both organizational types and keep it at 0.35 instead, the change in the aggregate output will be 2.5 percent. This suggest that the majority of the output gain in our benchmark experiment is coming from plants choosing different organizational form, rather than the small change in the tax rate.

borrowing costs. However, tax differences could still be distortionary if they over-correct the distortions coming from borrowing costs. This explains the relatively small size of output gain in this exercise.

**Capital reallocation or capital accumulation?** By equalizing tax treatment for both types of plants in our model we are removing the tax advantage of P-type plants and therefore reducing the incentive for firms to be organized as P-type. This uniform tax increases the output by 1.7% and capital stock by 1.8%. Since both types of plants are still subject to business income tax, the increase in aggregate output is due to both *accumulation* of capital within plants and *reallocation* of capital across plant types. As such, the 1.7 percent gain in the output is coming from the total factor productivity (TFP) gain *and* an increase in the capital stock.

To understand the significance of each of those channels for increasing aggregate output, we conduct an experiment in which we shut down the capital accumulation channel by imposing a flat tax on the capital stock. Specifically, we impose a flat tax on the investment and we choose the tax rate such that the level of the capital stock stays at the same level as in the benchmark case and we rerun the "uniform business taxation" exercise. This means that we equalize the tax treatment across both types of firms, i.e. remove the tax disadvantage for C-type, while keeping the capital stock constant at the initial level. This allows us to isolate the effect of capital reallocation across plants types under the new tax regime. We find that in this exercise output increases by 0.88 percent compared to 1.7 percent in the original exercise. This suggests that around 50 percent of the estimated output gain in the original experiment is due to capital reallocation, i.e. TFP improvement, and the rest is due to an increase in the capital stock.

## 7.2 Uniform tax regime

In this exercise, we equalize the tax structure across plant types and factors of production. We impose a similar tax structure to the previous exercise, except that both labor income and business income are taxed at the same rate $\tau_2$, which is chosen to keep the tax revenue constant. The calculated tax rate $\tau_2$ is 0.355, which is lower compared to the calculated tax rate in the uniform business income taxation ($\tau_1 = 0.36$). However, the tax rate on labor income in this regime is higher than the labor income tax in the benchmark economy (0.35). This increases the aggregate output by 2.5% relative to the benchmark model (column 3 in Table 3). Similar to the previous exercise, with this tax regime more plants choose to be

C-type as productivity increases.

Here, the small decrease in the tax rate on business income comes at the cost of a a small increase in the tax rate on labor income. Because labor supply is an endogenous choice in our framework, the magnitude of the output change also depends on the parameter that controls the labor supply elasticity. We rerun this exercise with a higher level of Frisch elasticity and the gain in output is lower. This is because it is more costly for households to provide labor in this scenario.[14]

## 7.3 Uniform consumption tax regime

In this exercise, we eliminate taxation at the entity level, i.e. the tax base is comprised of dividends from both types of entities and labor income. Dividends from both types of plants are taxed at the same rate as the labor income, $\tau_3$, which is set to keep tax revenue constant at its benchmark level. Note that this tax code is effectively a consumption tax system and the optimal tax literature already discusses gains of such a system at length. Here, we demonstrate that our model generates similar output gains to the previous literature.

The most noticeable change relative to other reforms is a very large increase in the aggregate output. Replacing the benchmark tax system with this uniform dividend and labor income tax code increases output by 9% (column 4 in Table 3). This is consistent with the estimates provided in the literature for migrating to the consumption tax (see Altig et al. (2001), Hall and Rabushka (2013), Ventura (1999), Raei (2020) among others) Comparing this tax reform with the previous reforms highlights the distortionary effect of capital income taxation on capital accumulation. Abolishing capital income taxation removes the distortion on capital accumulation. At the same time, equalizing the tax treatment of both types of entities additionally removes part of the distortion on capital allocation, similar to the uniform business tax experiment in column 2. Although the calculated tax rate in this experiment is the highest among the three reforms, 0.42, the increase in output is larger than in the first two cases, highlighting the distortionary effect of taxing capital income over consumption.

[14]Specifically, we find that a 50 percent increase in the elasticity of labor supply decreases the output gain by about 15 percent.

### 7.4 Policy application: a reform similar to the TCJA

In this exercise, we replace the benchmark tax structure with one that mimics one of the main features of the Tax Cuts and Jobs Act. As such, we introduce a flat 21% corporate tax rate for C-corporations. At the same time, we keep the top income tax rate, which affects the P-type entities and labor income, at 35% and dividend tax rate at 15%. With the lower tax rate on C-corporations, many businesses find it optimal to choose C-type and as a result, we see the employment share for this form increase from 60% to 94.7% (column 5 in Table 3). The output increases by 8.3%, because of the lower tax burden on corporations. However, this increase in output comes at the cost of an almost 8% decline in the government tax revenue relative to the benchmark economy. Further, with lower tax rate on C-type, more plants choose that organizational form, despite being subject to double taxation. This implies that plants care more about the overall tax burden than the tax structure. These results highlight key trade-offs that are involved in substantially reducing the corporate tax rate for a specific type of firms.

Note that the TCJA reform introduced several other, important, changes to both corporate and personal income tax codes. In this paper, we do not model all of the aspects of this reform but illustrate the effect of the tax rate reduction on one type of business on the output. Barro and Furman (2018) and Sedlacek and Sterk (2019) model these various aspects of TCJA in more detail.

## 8 Conclusion

In this paper, we argue that choosing a legal form of organization based on the tax treatment of businesses distorts the capital allocation and affects the size of the aggregate output. We develop a model of firm dynamics in which the legal form of organization is an endogenous choice for businesses that are heterogeneous with respect to their productivity. The model captures the trade-off between tax treatments of each form of organization and the access to capital. It also features an endogenous labor supply. We calibrate the model to be consistent with the firm dynamic characteristics of the U.S. businesses and the contributing share of each legal form to total employment. Using the calibrated model and taking into consideration the general equilibrium effect under the assumption of revenue neutrality, we find that unifying the tax treatment across all legal forms of businesses increases aggregate output by 1.7 percent in the long run. About half of this increase in output is due to the reallocation of capital toward more productive businesses which can be interpreted as an increase in total factor productivity. This is because removing the tax distortion affecting the choice of the legal form of organization reallocates capital towards more productive firms and improves the aggregate output. Capital accumulation contributes to the other half of the output gain.

From a policy perspective, the reform that generates the largest output increase, while remaining revenue neutral, is the consumption tax that removes the corporate tax altogether. While such a reform might be optimal for generating large growth of the economy, it may be politically challenging. This is because revenue neutrality requires the tax rates to be set at a much higher level than they currently are. For this reason, a uniform business tax regime, which equalizes the tax treatment between P- and C-type firms, may be more politically feasible. This tax regime increases the tax rate only marginally but removes differential taxation between firm types. However, as we demonstrate in this paper, the output gains from this type of tax regime are much smaller than those from consumption tax.

# References


Altig, D., Auerbach, A. J., Koltikoff, L. J., Smetters, K. A. and Walliser, J. (2001). Simulating fundamental tax reform in the united states, *American Economic Review* **91**(3): 574–595.

Atkenson, A., Khan, A. and Ohanian, L. (1996). Are data on industry evolution and gross job turnover relevant for macroeconomics?, *Carnegie-Rochester Conference Series on Public Policy*, Vol. 44, Elsevier, pp. 215–250.

Barro, R. J. and Furman, J. (2018). Macroeconomic Effects of the 2017 Tax Reform, *Brookings Papers on Economic Activity* **49**(1 (Spring): 257–345.

Barro, R. J. and Wheaton, B. (2020). Taxes, Incorporation, and Productivity, *Tax Policy and the Economy* **34**(1): 91–111.

Bhandari, A. and McGrattan, E. R. (2020). Sweat Equity in U.S. Private Business, *The Quarterly Journal of Economics* **136**(2): 727–781.

Bond, S. and Meghir, C. (1994). Dynamic Investment Models and the Firm's Financial Policy, *Review of Economic Studies* **61**(2): 197–222.

Carroll, R. and Joulfaian, D. (1997). Taxes and Corporate Choice of Organizational Form, *Working papers*.

Chen, D., Qi, S. and Schlagenhauf, D. (2018). Corporate Income Tax, Legal Form of Organization, and Employment, *American Economic Journal: Macroeconomics* **10**(4): 270–304.

Clementi, G. L. and Hopenhayn, H. A. (2006). A theory of financing constraints and firm dynamics, *The Quarterly Journal of Economics* **121**(1): 229–265.

Cooper, M., McClelland, J., Pearce, J., Prisinzano, R., Sullivan, J., Yagan, D., Zidar, O. and Zwick, E. (2016). Business in the united states: Who owns it, and how much tax do they pay?, *Tax Policy and the Economy* **30**(1): 91–128.

David S. Evans, B. J. (1989). An estimated model of entrepreneurial choice under liquidity constraints, *Journal of Political Economy* **97**(4): 808–827.

Dyrda, S. and Pugsley, B. (2018). Taxes, regulations of businesses and evolution of income inequality in the us, *Working paper* .

Elschner, C. (2013). Special tax regimes and the choice of organizational form: Evidence from the european tonnage taxes, *Journal of Public Economics* **97**: 206 – 216.

Fama, E. F. and Jensen, M. C. (1983). Agency problems and residual claims, *The Journal of Law  Economics* **26**(2): 327–349.
**URL:** *http://www.jstor.org/stable/725105*

Fazzari, S. M., Hubbard, R. G. and Petersen, B. C. (1988). Investment, Financing Decisions, and Tax Policy, *American Economic Review* **78**(2): 200–205.

Goolsbee, A. (1998). Taxes, organizational form, and the deadweight loss of the corporate income tax, *Journal of Public Economics* **69**(1): 143–152.

Goolsbee, A. (2004). The impact of the corporate income tax: evidence from state organizational form data, *Journal of Public Economics* **88**(11): 2283 – 2299. Trans-Atlantic Public Economics Seminar.

Gordon, R. H. and Slemrod, J. (1998). Are "Real" Responses to Taxes Simply Income Shifting Between Corporate and Personal Tax Bases?, *NBER Working Papers 6576*, National Bureau of Economic Research, Inc.

Guner, N., Ventura, G. and Yi, X. (2008). Macroeconomic Implications of Size-Dependent Policies, *Review of Economic Dynamics* **11**(4): 721–744.

Hall, R. E. and Rabushka, A. (2013). *The flat tax*, Hoover Press.

Hennessy, C. A. and Whited, T. M. (2007). How Costly Is External Financing? Evidence from a Structural Estimation, *Journal of Finance* **62**(4): 1705–1745.

Hopenhayn, H. A. (1992). Entry, Exit, and Firm Dynamics in Long Run Equilibrium, *Econometrica* **60**(5): 1127–1150.

Keane, M. and Rogerson, R. (2012). Micro and macro labor supply elasticities: A reassessment of conventional wisdom, *Journal of Economic Literature* **50**(2): 464–76.

Kotlikoff, L. J. and Miao, J. (2013). What Does the Corporate Income Tax Tax? A Simple Model Without Capital, *Annals of Economics and Finance* **14**(1): 1–19.

Mackie-Mason, K, J. and Gordon, R. H. (1997). How Much Do Taxes Discourage Incorporation?, *Journal of Finance* **52**(2): 477–505.

Prisinzano, R. and Pearce, J. (2018). W2018-2 tax based switching of business income, *Penn Wharton Budget Model working paper 2018-2* .
**URL:** *https://pwbm.squarespace.com/s/PWBM$_W$2018 − 2.pdf*

Qi, S. and Schlagenhauf, D. (2021). The kansas tax experiment: The matter of legal form of organization, *Journal of Economic Dynamics and Control, forthcoming* .

Raei, S. (2020). Gradual tax reforms: If you like it, you can keep it, *Journal of Economic Dynamics and Control* **111**: 103793.

Reichling, F. and Whalen, C. (2012). Review of estimates of the frisch elasticity of labor supply.

Restuccia, D. and Rogerson, R. (2008). Policy distortions and aggregate productivity with heterogeneous establishments, *Review of Economic Dynamics* **11**(4): 707–720.

Sedlacek, P. and Sterk, V. (2019). Reviving american entrepreneurship? tax reform and business dynamism, *Journal of Monetary Economics* **105**(C): 94–108.

Slemrod, J. (1996). *High-Income Families and the Tax Changes of the 1980s: The Anatomy of Behavioral Response*, University of Chicago Press, pp. 169–192.

Smith, M., Yagan, D., Zidar, O. and Zwick, E. (2019). Capitalists in the Twenty-First Century, *The Quarterly Journal of Economics* **134**(4): 1675–1745.

Smith, M., Yagan, D., Zidar, O. and Zwick, E. (2021). The rise of pass-throughs and the decline of the labor share, *American Economic Review: Insights, forthcoming* .

Tauchen, G. (1986). Finite state markov-chain approximations to univariate and vector autoregressions, *Economics Letters* **20**(2): 177–181.

Tazhitdinova, A. (2020). Are changes of organizational form costly? income shifting and business entry responses to taxes, *Journal of Public Economics* **186**: 104187.

Ventura, G. (1999). Flat tax reform: A quantitative exploration, *Journal of Economic dynamics and Control* **23**(9-10): 1425–1458.

Veracierto, M. (2001). Employment Flows, Capital Mobility, and Policy Analysis, *International Economic Review* **42**(3): 571–595.

Vereshchagina, G. and Hopenhayn, H. A. (2009). Risk taking by entrepreneurs, *American Economic Review* **99**(5): 1808–30.
**URL:** *https://www.aeaweb.org/articles?id=10.1257/aer.99.5.1808*

Yagan, D. (2015). Capital tax reform and the real economy: The effects of the 2003 dividend tax cut, *American Economic Review* **105**(12): 3531–63.

Table 1: Calibrated Parameters.

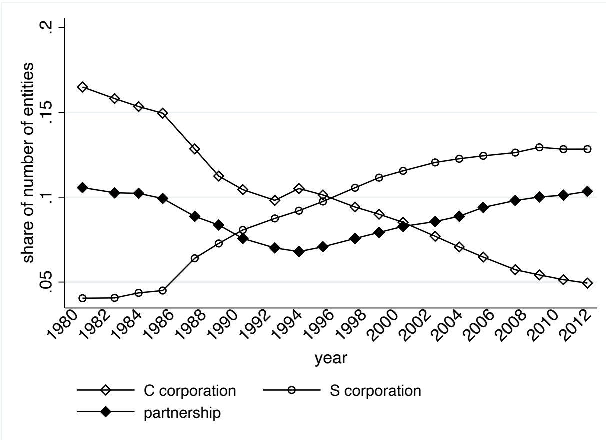
| Parameter | Value | |
|---|---|---|
| **Panel A: Parameters Calibrated Independently** | | |
| $\beta$ | 0.94 | set the real interest rate to 4 percent |
| $\gamma$ | 0.8 | Return to scale |
| $\theta$ | 0.4 | Importance of capital |
| $\delta$ | 0.08 | Depreciation rate (NIPA tables) |
| $\kappa$ | 1 | Frisch elasticity |
| $\tau^c$ | 0.35 | Corporate tax rate |
| $\tau^d$ | 0.15 | Dividend tax rate |
| $\tau^i$ | 0.35 | Individual income tax rate |
| **Panel B: Parameters Calibrated Jointly** | | |
| $\rho$ | 0.97 | Persistency of productivity shock, targeting firm-size distribution |
| $\sigma_C$ | 0.46 | Std. deviation of productivity shock for C-type, targeting size distribution of C-corporations |
| $\sigma_P$ | 0.36 | Std. deviation of productivity shock for P-type, targeting size distribution of pass-thorough entities |
| $C_F^C$ | 1.74 | Fixed cost of production, C-type *, targeting average size of C-corporations |
| $C_F^P$ | 0.85 | Fixed cost of production, P-type *, targeting average size of Pass-thorough entities |
| $C_e$ | 6.2 | Fixed entry cost *, targeting employment share of new entrants |
| $\zeta$ | 0.17 | Markup on capital rent for P-type, targeting relative output share of each type |
| $C_{switch}^C$ | 0.46 | Cost of switching from C-type to P-type *, targeting the share of C-corporations that switch |

Note: *, these cost are reported in output unit.

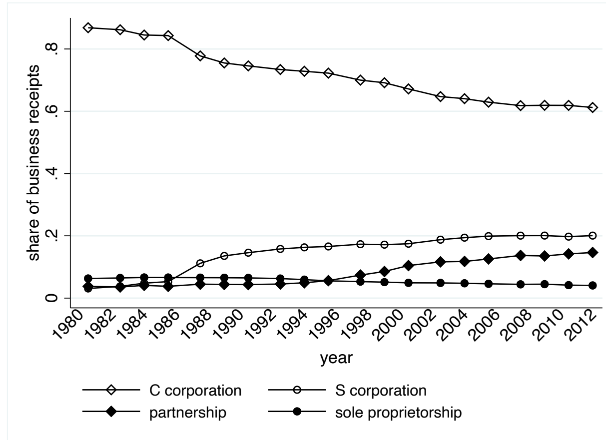
Table 2: Data moments: targets vs model.

| Statistic | Data | Model |
|---|---|---|
| Capital output ratio | 2.35 | 2.35 |
| Fraction of C corporation | 0.39 | 0.39 |
| Output share of C corporations | 0.59 | 0.60 |
| Employment share of C corporations | 0.57 | 0.60 |
| Fraction of switching C corporations | 0.05 | 0.06 |
| Firms exiting rate | 0.08 | 0.07 |
| Relative size of C corporations to Pass-through entities | 2.36 | 2.34 |

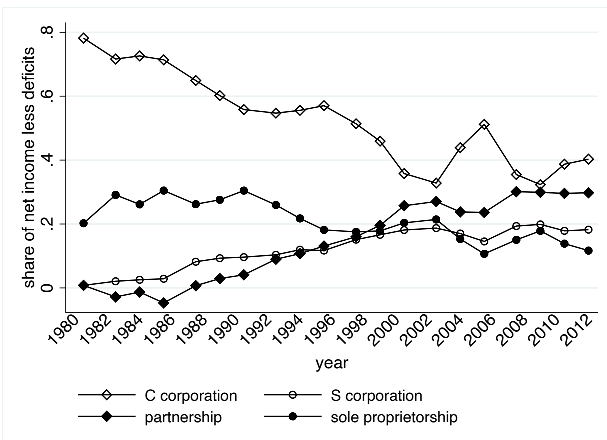
Figure 1: Pass-throughs vs C-corporations: evolution.



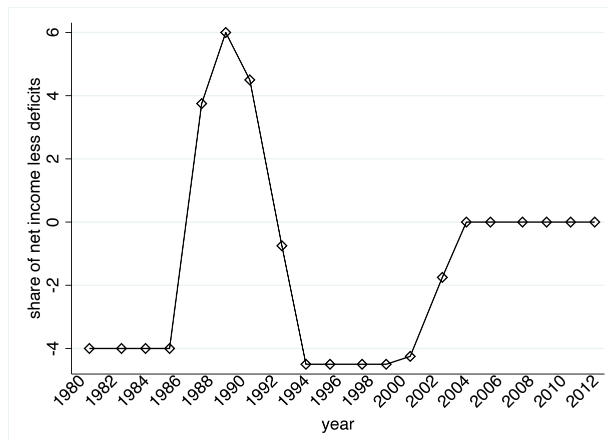

a Share of U.S. Businesses Organized in each of the three Basic Legal Form of Organization. Sole proprietorship excluded.




b Share of Each Legal Form of Organization in Total U.S. Business Receipts



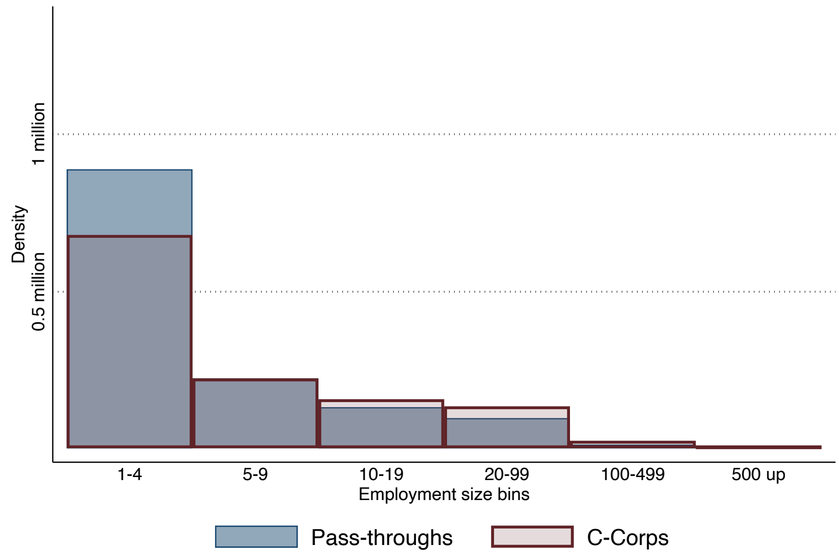

c Share of Legal forms of Organization in Total Net Income Less Deficits



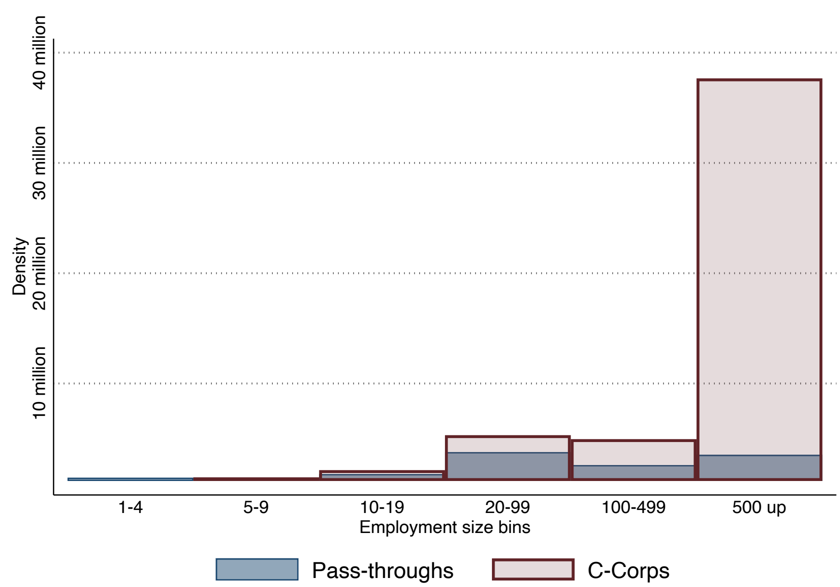

d Difference Between the Top Corporate Tax Rate and the Top Individual Tax Rate

Note: Sources: IRS, SOI Tax Stats CBP Census, and author's calculation. In Panel A we show how the percentage of U.S. businesses organized in each of the three main legal forms of organization has evolved over time. We exclude sole proprietorship for which the share was around 75% throughout the sample period. In Panel B we show the evolution of the share of each legal form of organization in the total U.S. business receipts. In Panel C we show how the total net income less deficits of all U.S. businesses is divided among all organizational forms. In Panel D we show the top corporate income tax rate minus the top individual income tax rate. Hence, for periods in which the corporate tax rate is higher than the individual tax rate the graph shows positive values.

Figure 2: Pass-throughs vs C-corporations: firm distributions.



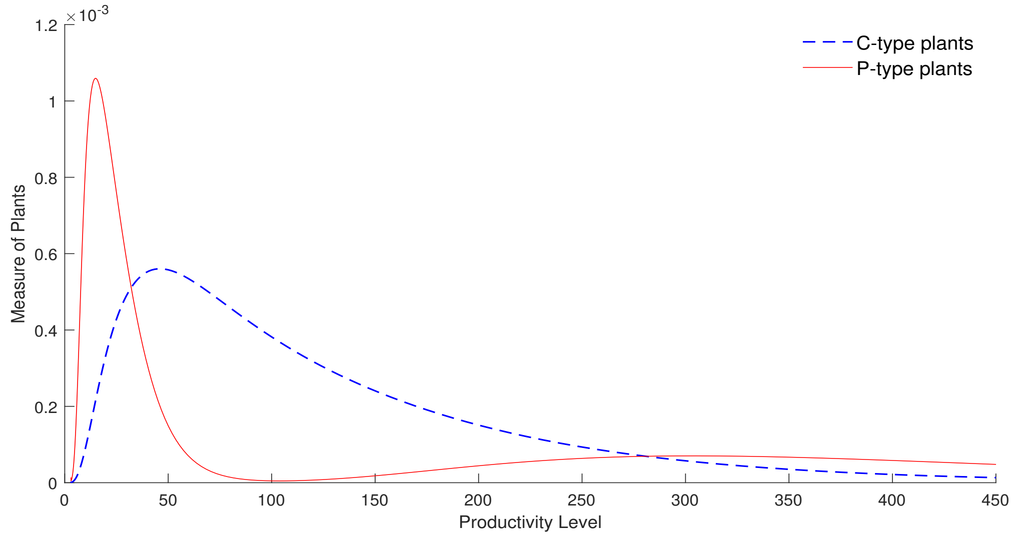

a Distribution of the number of firms by type, 2009 - 2010 average.



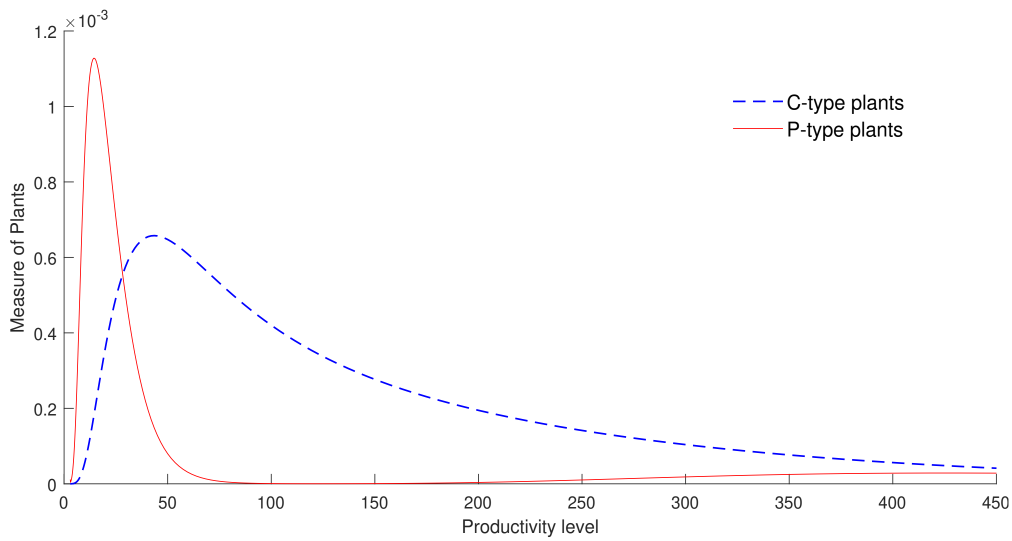

b Distribution of number of employees by type, 2008 - 2010 average.

Note: Source: Statistics of U.S. Businesses (SUSB), and author's calculation. In Panel A, we show the distribution of the number of firms by firm employment size bins; in Panel B, the distribution of the number of employees.

Figure 3: Productivity distributions




a Benchmark distributions




b Uniform business tax distributions.

Note: In this figure we plot the distributions of firms across productivity levels generated by the model. C-type firms are represented by the blue dashed line and P-type firms are represented by the red solid line. In Panel A we plot the distributions for the benchmark case and in Panel B we plot the distributions for the uniform business tax case.

Table 3: Effects of Changing the Tax Structure

| | (1) Benchmark | (2) Uniform Business Tax | (3) Uniform Tax | (4) Consumption Tax | (5) TCJA |
|---|---|---|---|---|---|
| Calculated Tax Rate, $\tau$ | . | 0.36 | 0.355 | 0.42 | . |
| Capital | 2.86 | 2.91 | 2.94 | 3.76 | 3.46 |
| | | (+1.8%) | (+2.8%) | (+31.5%) | (+20.9%) |
| Output | 1.21 | 1.23 | 1.27 | 1.32 | 1.31 |
| | | (+1.7%) | (+2.5%) | (+9.0%) | (+8.3%) |
| employment share of C-type | 60.2% | 73.9% | 74.3% | 69.9% | 94.7% |
| % change in average size of C-type relative to benchmark | | 10.1 | 8.5 | 13.1 | -20.9 |
| % change in average size of P-type relative to benchmark | | -27.8 | -27.5 | -21.8 | -62.5 |

Note: This table reports how the aggregate variables change with changes in the tax structure. Uniform Business Tax is a system in which both types of firms are taxed symmetrically at the entity level, there is no dividend tax and the labor income is taxed at the same rate as in the benchmark economy. Uniform Tax is a uniform business income and labor income tax system. Compared to the uniform business tax, the only difference is that both labor income and business income are taxed at the same rate. Consumption tax is a uniform dividend and labor income tax system, where both types of business taxation are abolished and the dividend from both types is taxed at the same rate as the labor income. Note that the first three reforms are revenue neutral, so the calculated tax rate reported in the first row of the table, is the one required to keep the government revenue constant. TCJA is a reform similar to ”Tax Cut and Jobs Act” reform of 2017 in which the corporate tax rate is 21% and the top income tax rate and dividend tax rates are the same as in the benchmark. Note that this reform is not revenue neutral and leads to 8.1% drop in tax revenues.

# Appendices

## A Algorithm for solving the model with endogenous labor supply

1. Set $R = \frac{1}{\beta} - 1$ and $R^P = (1+\zeta)R$
2. Guess $w$
3. Taking Prices ($r$ $R^P$, $w$) as given,
   (a) Solve firms' problems: $k(\Delta, s)$ , $n(\Delta, s)$ , $\Pi(\Delta, s)\, V(\Delta, s)$ , $\mathbb{1}_{exit}(\Delta, s)$ , $\mathbb{1}_{switch}(\Delta, 1)$
   (b) Calculate $V^e$ using $V(\Delta, s)$
   (c) Check the free entry condition: $V^e = c_e$ , and update the $w$ accordingly and start over from step 2 until the free entry condition is satisfied.
4. Guess a value for $M$, which the mass of entrants
5. Solve for stationary distribution of firms $x_0$, using $\mathbb{1}_{exit}(\Delta, s)$ , $\mathbb{1}_{switch}(\Delta, s)$, and then calculate the aggregate profit and cost of entering for all entrants (these are part of household budget constraint).
6. Solve the household problem and find the aggregate labor supply
5. Use market clearing condition for labor:

$$\underbrace{L^S(M)}_{Labor\,supply} = M \ . \qquad \underbrace{L_d}_{Labor\,demand\,from\,aggregating\,n(\Delta,s)}$$

   to update the guess for $M$ and find the equilibrium level of $M$ that clears the labor market.
7. Set $x(\Delta, s) = M.x_0(\Delta, s)$
8. Use the feasibility condition and Government revenue $G$ to find $C$ , $Y$ and $K$

$$Y = \int f(s, k(\Delta, s), n(\Delta, s))dx + \int f(s, k(\Delta, s), n(\Delta, s))\eta(ds)$$

$$C + I + M.c_e + G + \bar{C}_f = Y$$

where $\bar{C}_f$ is total fixed costs and $I$ is the investment ($I = \delta K$ in steady state)