

# Taxation and Legal Form of Organization

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## **Abstract**

I study the aggregate consequences of the differential tax treatments of U.S. businesses focusing on the role of legal forms of organization. I develop an industry equilibrium model in which the organizational form is an endogenous choice. This model incorporates the key trade-off that businesses face when choosing their legal forms: the tax treatment of the business income; the access to external capital, and the potential level and evolution of productivity over time. The model is matched to the firm dynamic features of U.S. businesses and the contributing share of each legal form in total output. Using the model, I study revenue-neutral tax reforms in which legal forms receive the same tax treatments, and I find that the incentives induced by tax structure for organizational form and external finance are both large. Relative to the benchmark economy, unifying the tax code for all legal forms, can lead to 8% increase in the aggregate output.

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# 1 Introduction

The share of pass-through businesses<sup>1</sup> in total number of businesses in the U.S. has increased substantially since 1986. According to IRS data, over the period of 1986 to 2012, the share of pass-through entities in the total number of returns grew from 85.2 percent to 95.1 percent. Also, in terms of business receipts, share of pass-through entities increased from 16.1 percent to 38.8 percent. Focusing on the legal forms of organization providing liability protection, we see that the change is even more drastic. The share of pass-through businesses among legal forms with limited liability in business receipts, increased from 6.2% in 1986 to 31.9% in 2012.

These developments have taken place in response to changes in tax rates, changes in the types of legal entities providing limited liability, and other changes in the economic and legal landscape governing the operation of businesses. Specifically changes of the tax code and shifts in tax regulations since the Tax Reform Act of 1986 (TRA86) made pass-through legal forms more attractive choices for many businesses. However, differences between legal forms of organization extend beyond just the tax treatment. Each legal form of organization brings with it specific rules and limitations on financial structure and availability of external capital for the business which in turn induce changes in the investment decisions, financing decisions and dividend policies. In this paper I argue that choosing a legal form of organization based on tax treatment rather than economic features of an organizational form could create inefficiencies, miss-allocation of capital and has consequences on growth prospect of a business.

In a pass-through business the profit is passes entirely to the owners and taxed according to individual income tax code. In a C corporation, 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 capital gain, the shareholder pays dividend income tax or capital gain tax based on individual income tax code. C corporation are the only legal form of organization that have access to the stock market to generate capital. In other words, the capital of a C corporation can be financed thorough the public capital market. However, capital of pass-through businesses are mainly financed thorough their owners' equity and

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<sup>1</sup>a pass-through is a business that does not pay corporate income tax, instead all income is passed entirely to the owner and it is taxed according to the individual income tax code. This includes entities like sole proprietorships, partnerships, and S-corporations. Detailed definition and a comparison between various legal forms are provided in section 2

they don't have access to the public capital market. These features give rise to a trade-off between two choices (1) having access to the public equity market, but facing double taxation (for C corporations) or (2) having no access to public equity, but facing only single taxation of profits (for pass-through entities). Capturing this trade-off in a model shed light on the mechanisms through which the tax structure influences organizational form and business operations.

Decreasing the individual income tax rate to a level lower than the corporate income tax rate, similar to the tax reform act of 1986, reduces the tax burden on pass-through entities and makes these types of legal forms more attractive compared to C corporations. However, converting the business to a pass-through entity would affect its structure as the firm would face an increase in the cost of capital. The change in the structure of businesses, would lead to changes in the demand for capital which in turn could influence savings and investments. The key contribution of this paper is providing a framework for quantifying the distortionary effects of the current tax structure on the choice of legal form of organization, the subsequent impact on the allocation of capital among businesses, and the associated effects on capital.

In this paper, I develop an industry equilibrium model in which legal form of organization is an endogenous choice for firms. In this model, production takes place in two types of firms: C-type firms which represents C corporations; and P-type firms which represents pass-through entities. These two types are different with respect to their cost of external capital, fixed costs of production, and the potential evolution of their productivity over time. Also, they receive different tax treatments. A C-type firm's profit is being taxed at the entity level and once it distributes the after-tax profit to the shareholders, they pay individual income tax on it. Hence, a C-type is being taxed twice. For a P-type firm, the profit passed to the shareholders is subject to individual income tax.

At each period, firms that are heterogeneous with respect to their productivity, can 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 among a C-type and a P-type. At the beginning of each period, there is an unlimited supply of new firms that can enter the market by paying entry cost. Once they 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 in a setup that can generate firm dynamics.

The model is calibrated to match certain features of U.S. economy such as size distribution of firms, share of C corporations among all U.S. businesses and the output share of C corporations. Using the calibrated model, I proceed to evaluate the effects of taxing all legal forms of organization symmetrically.

I study the aggregate impacts of three modified tax structures, keeping the calibrated parameters fixed and the government tax revenue constant at its level in the benchmark economy. In all the three tax reforms, the *nature* of the tax base is different from the benchmark case, and both types of firms are receiving similar tax treatment. All experiments change the nature of the tax base compared to the benchmark tax system. In all tax structures evaluated here, both types of firms are receiving a uniform tax treatment. Hence, the tax advantages of one type over the other as in the benchmark tax structure vanish.

In the first tax reform experiment, both C-type firms and P-type firms are taxed only at the corporate level while the labor income is being taxed at the same rate as in the benchmark economy. With both types of firms receiving a same tax treatment, the aggregate output of the economy increases by 7% compared to the benchmark economy, which is the result of reallocating capital to the more productive firms. In the second tax reform experiment, similar to the first one, both types of firms are taxed at the corporate level, but there single tax rate levies on both labor income and business income. The tax rate determined by imposing the revenue neutrally which results in a rate which is slightly lower than the labor income tax in the benchmark economy and a relatively higher than the business income tax in the first tax reform. Hence in this experiment, the aggregate output increases by 2%.

In the third experiment, both types of business taxation are eliminated and dividends from both types of firms are taxed at the same rate as labor income. With this tax structure the aggregate output increases by 18%. Here, eliminating the business income taxation results in a this noticeable increase in the output which highlights the distortionary effect of taxing capital income.

## 1.1 Related Literature

This paper contributes to several strands of literature. First, the empirical literature of firm dynamics in the US. There are many papers exploited microeconomic data to document various interesting facts on this topic. These papers look at issues such as

dynamics of small and large firms over the business cycle - Chari et al. (2008)Chari et al. (2008), Moscarini and Postel-Vinay(2012)Moscarini and Postel-Vinay (2012) and Kudlyak and Sanchez (2017)Kudlyak and Sanchez (2017); cyclical reallocation of workers across employers depending on the firm size - Haltiwanger et al.(2013)Haltiwanger et al. (2013); or job creation by firms of different size and age - Haltiwanger et al. (2015)Haltiwanger et al. (2015). There are some pure empirical papers that investigate the correlation between the tax system and business legal forms of organizations: Nelson (1991)Nelson (1991), Poterba (1992)Poterba (1992), Gentry (1994)Gentry (1994), and Mackie-Mason et al. (1997)Mackie-Mason et al. (1997). This paper link the changes in tax regulation with dynamic of legal forms of organization of U.S. businesses since 1980s.

Second, This paper contribute to the vast literature of the economic implications of the corporate income tax. Much of the early research focuses on tax incidence issues as exemplified by Harberger (1962)'s seminal paper as well as Feldstein (1978)Feldstein (1978), Feldstein and Slemrod (1980)Feldstein and Slemrod (1980), and Gravelle and Kotlikoff (1989)Gravelle and Kotlikoff (1989). The main focus of these papers is to study the welfare implications of the corporate income tax. Another strand of literature focuses on the effects of the corporate income tax on firm financing decisions. Bradford (1981)Bradford (1981) analyzes the effect of a tax on corporate distributions to equity owners. Auerbach and Hines(2002)Auerbach and Hines (2002) and Jensen (1986)Jensen (1986) examine the implications of corporate tax distortions on investment efficiency.

The usual practice in most papers investigating the distortions created by the corporate tax is to take as exogenous a firm's choice of organizational form, assuming for example that some industries are inherently corporate. There are few exceptions such as Kotlikoff and Miao(2013)Kotlikoff and Miao (2013) who posit that the tax impacts entrepreneurs incorporation decisions by affecting business risk sharing, suggesting that the tax-induced distortion of organizational form could have substantial efficiency costs. Chen et al. (2017)Chen et al. (2017) evaluate how a corporate income tax reduction affects employment thorough affecting the firm's choice of legal form of organization. And finally, Dyrda and Pugsley (2017)Dyrda and Pugsley (2017) which investigates the effects of change in dynamic of legal forms of businesses on the increase in the income inequality. They propose a heterogeneous agent equilibrium model with workers, entrepreneurs and endogenous choice of legal form of organization and quantify the contribution of tax reforms thorough the business reorganization channel on the evolution of income inequality of workers and entrepreneurs.

This paper studies the aggregate outcomes and efficiency consequences of the differential tax treatment of business incomes, and its impact on firm dynamics, focusing on the roles of legal forms of organization. I develop an equilibrium firm dynamic model with endogenous legal form of business. The model features the extensive margin (entry and exit of firms) as well as intensive margin (expansion and contraction of the incumbent firms), i.e. I let the incumbent firms to switch their types throughout their life. This gives the model the capacity to be consistent with the empirical finding on dynamic of business legal forms in the United States. As Dyrda and Pugsley (2017) Dyrda and Pugsley (2017) document, using the U.S. Census micro level firm data, the significant increase in pass-through entities is coming from two sources: first is a secular increase in the share of new businesses which chooses 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, noticeable near tax-reform episodes. Using the model I quantify the distortionary effects of differential tax treatments of business income on capital allocation, exploiting the channel of choosing the legal form of business.

In what follows, I document the empirical trend in the dynamic of business legal forms in the United States over the period of 1986 to 2012. More precisely, I investigate the distribution of business income by organizational form using the IRS tax return data. Also I describe tax reforms and changes in regulations that have taken place over time, and establish the empirical link between changes in tax legislation and the evolution of distribution of business legal forms.

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

During the past thirty years, the most drastic change in legal forms of organization of U.S. businesses is a secular increase in pass-through entities and a decline in the traditional corporations. Different tax treatment is only one of the characteristics of each legal forms of organization that distinguished them from each other. In this section, I provide a brief summary of features of each type of legal forms in the U.S. and then with these definitions in hand, I provide a review on the numerous legal changes that took place since the passage of the Tax Reform Act of 1986 (TRA86) and describe their effect the actual dynamics of business legal forms in the United States using IRS data.

Businesses in the United States, may operate in a variety of organizational forms,

Table 1: Main Features of Legal Forms of Organization

	Number of Owners	Taxing Structure	Liability Protection
<b>Sole Proprietorship</b>	1	Pass-through	No
<b>Partnership:</b>			
<i>General Partnership</i>	1+	Pass-through	No
<i>Limited Partnership</i>	1+	Pass-through	No
<i>Limited Liability Company(LLC)</i>	1+	Pass-through	Yes
<b>S corporation</b>	[1,100]	Pass-through	Yes
<b>C corporation</b>	1+	Corporate tax Dividend/capital gain tax	Yes

*This table compares legal form of organizations available for U.S. businesses, along three dimensions: number of owners, whether they provide limited liability protection and their tax treatment*

ranging from sole-proprietorship to traditional C corporations. The choice of legal form of organization for the business would usually reflect the need for capital, for flexibility and for owners protection from the liabilities that the business takes on, also the legal form of organization determines the federal level tax burden 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. Their main characteristics are illustrated in table 1.

**Sole-proprietorship**, is the simplest legal form of organization, one that has no separate legal existence from its owner. There are no legal requirements to operate a proprietorship. This form does not provide any liability protection for the owner, i.e. the owner is personally responsible for all legal obligations of the firm. Also, the life of a proprietorship is limited by the life of the proprietor. The profits and losses of the business flow through to the owner and taxed at owner income level according to individual tax code.

**General partnership**, is very close to sole-proprietorship with more than one owners.

**Limited liability partnership**, with this form limited liability partners, are not personally liable for the debts of the LLP or any other partner, nor is the partner liable for the malpractice committed by other partners. There must be at least one general partner,

who bears unlimited legal liability for the business's legal obligations. The profits and losses of the business pass through to the partners at a pro rata share.

**Limited liability company,** or LLC is a hybrid between the partnership and the S-corporation. Owners of an LLC enjoy limited liability, ease of transfer of ownership shares, pass-through of income to the owners, and less administrative burden than faced by owners of a corporation. It can be single-owned.

**Corporations** a corporation is a separate legal entity from its owner. All owners of a corporation enjoy limited liability. In sharp contrast to a proprietorship and partnership, a corporation enjoys an unlimited life as well as free transferability of interest and centralized management. The unlimited life ensures that the firm does not automatically dissolve upon the death, bankruptcy, or withdrawal of the owner. Free transferability of interest implies that each owner may sell his or her interest without the permission of the other owners. And the centralized management means that the decision making belongs to the board of directors and not directly to the general owners.

There are two main type of corporation in the U.S.: C corporations and S corporations. **C corporation** are subject to corporate income tax at both federal and state levels, any earnings distributed to shareholders as dividends or capital gains are subject to a second level of taxation at personal income tax rates. In contrast to C corporations, **S corporation** income passes through to its shareholders so that it is subject to a single level of taxation, at the personal level<sup>2</sup>. The S-corporation was created in 1958 to provide tax relief primarily to small privately held firms. However, they are subject to a number of restrictions, including a limit to one class of stock and a limit on the number of shareholders<sup>3</sup>. Also shareholders of an S corporations must be U.S. citizens or residents, and must be physical entities (a person), so corporate shareholders and partnerships are to be excluded.

We can categorize these legal forms of organization according to their tax treatments. As described above, C corporations, face double taxation of their profit; first, they pay corporate income tax on their profit at the entity level and further, whenever the after-

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<sup>2</sup>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.

<sup>3</sup>Originally, the shareholder limit was set at 10, but subsequently was raised to 15 in 1976, to 25 in 1981, to 35 in 1982, to 75 in 1996 and to 100 in 2004.

tax profits are distributed to the shareholders as dividends, or shareholders realize capital gains by selling the corporate shares, they need to pay personal income tax on them. However, C corporation is the only legal forms of organization that is subject to corporate income tax. In fact, S corporation together with all other non-incorporated legal forms pass all profits thorough to their owners, who pay individual income tax on them, hence, they are called pass-thorough entities.

Since 1980, the overall number of tax returns reporting business income has grown from 13 millions to 32.7 millions. The differences in the growth rates among the various return types between 1980 and 2012 are striking. The number of C corporation returns have declined by 25 percent, this is while the total number of corporate returns (C corporation plus S corporations) increased, i.e. the decline in the number of C corporations was offset by an increase in the number of S corporations.

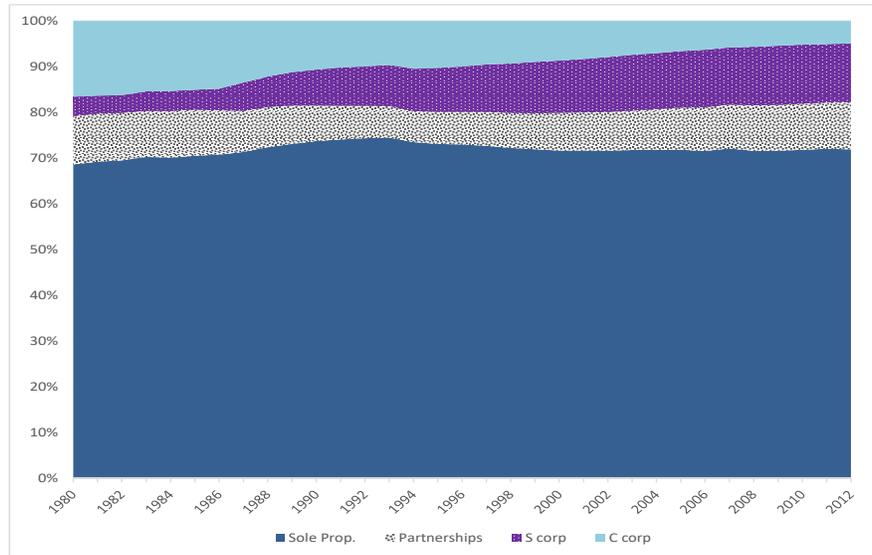
Figure 1 and figure 2 show the significant changes in the distribution of legal form of organizations in the US over the past thirty years. The share of C corporations in total number of entities dropped from 16.6 percent in 1980 to 4.9 percent in 2012, while the share of business receipts of C corporations in total business receipts decreased from 86.2 percent to 61.2 over the same period.

Over the same period, the share of organizational forms that provide liability protection among all U.S. businesses stay almost constant. However, withing these forms, the share of pass-thorough entities increases significantly in term of number of businesses as well as their share of business receipts (see figure ??).

In order to have a better understanding of the size of economic activity taking place in each business form I compare the net income less deficit for all businesses. This is an intermediate measure of taxable income that is calculated prior to taking special deductions (it can be either positive or negative). As figure 3 shows, the dramatic 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 IRS data reports the stock measure for all organizational forms over time. Dyrda and Pugsley (2017) measure both the stock and flows across the legal forms of employer businesses using confidential micro-level Census data. They merge the Longitudinal Business Database (LBD), which provides a complete enumeration of nearly all U.S. private

Figure 1: Share of U.S. Businesses Organized in each of the four Basic Legal Form of Organization



Source: IRS, SOI Tax Stats, and author's calculation.

This figure shows how the percentage of U.S. businesses organized in each of the four main legal forms of organization has evolved over time.

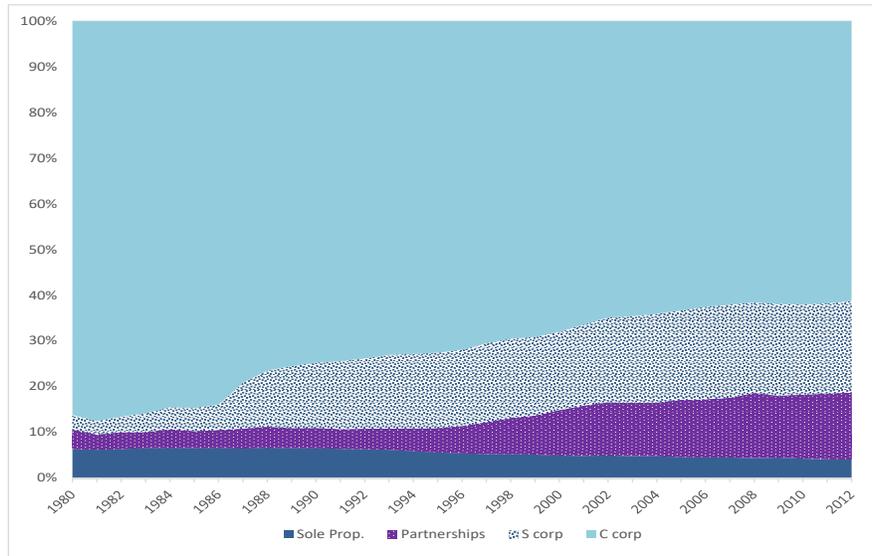
sector **establishments**, with additional raw data from the Business Register. They construct matrices to measure transitions across legal forms for each year from 1980 to 2012, and they estimate them for two cases of equally weighted establishments and weighting by each establishments payroll <sup>4</sup>.

According to their estimates, the conversion rate from C corporations to pass-through entities increases around periods of major tax reforms that reduced personal income tax, in particular the top rates. also, they argue that the surge in business conversions was concentrated in larger firms, because the share of conversions when weighted by payroll is larger (see figure ??).

<sup>4</sup> Dyrda and Pugsley (2017) Dyrda and Pugsley (2017)

...Weighting by each establishment payroll, can be interpreted as an activity weighted measure which assigns more weight to large firms.

Figure 2: Share of Each Legal Form of Organization in Total U.S. Business Receipts



Source: IRS, SOI Tax Stats, and author's calculation.

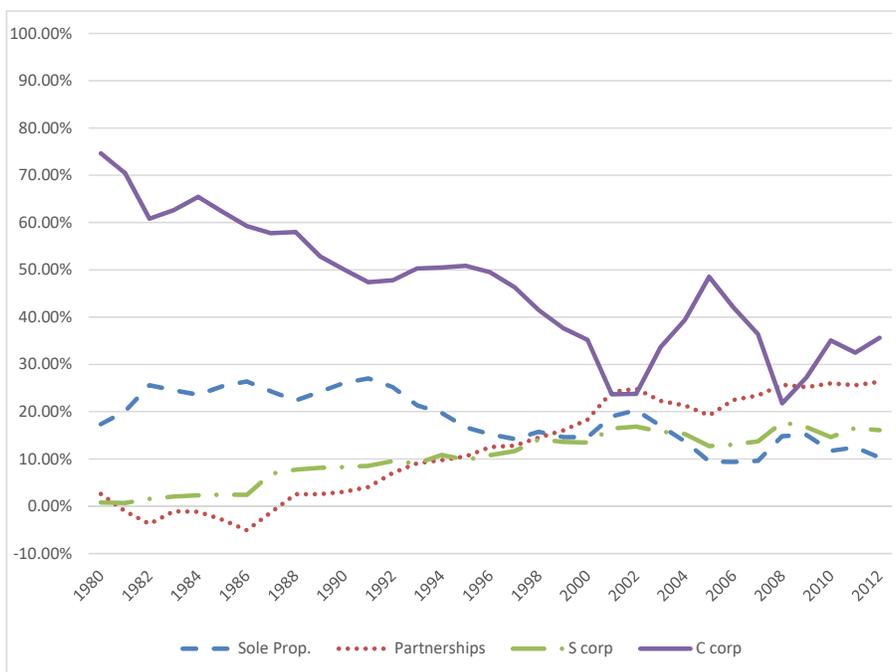
This figure shows the evolution of the share of each legal form of organization in the total U.S. business receipts.

## 2.1 Changes Influencing Business Organizational Form since TRA86

In this part I provide a review of numerous legal changes that took place since Tax Reform Act of 1986 (hereafter TRA86) and describe their effect on organizational form decisions by businesses.

For the first time in the U.S tax history, TRA86 reduced the top individual tax rate below the top corporate tax rate. As it has been shown in figure 4 over a two-year phase-in period, the maximum individual tax rate was reduced from 50 percent to 28 percent while the corporate rate declined from 46 percent to 34 percent. As a result, C corporations, which are subject to corporate income tax, were facing a higher tax rate compared to pass-through entities, even not taking into account the dividend tax or the capital gain tax. This encouraged C corporations to change their legal form to one of the pass-through

Figure 3: Share of Legal forms of Organization in Total Net Income Less Deficits



Source: IRS, SOI Tax Stats, and author's calculation.

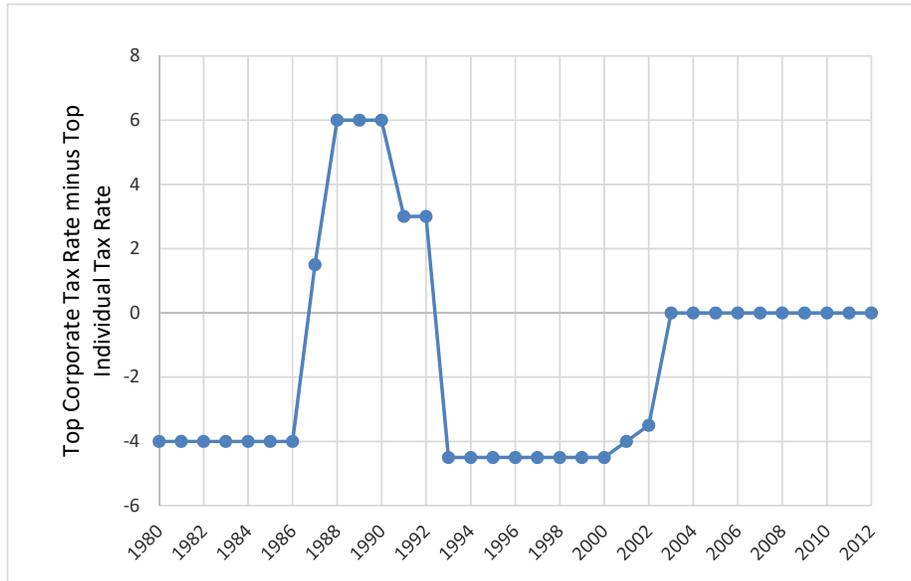
This graph shows how the total net income less deficits of all U.S. businesses is divided among all organizational forms.

entities to avoid the higher tax rate.<sup>5</sup> This is consistent with what Dyrda and Pugsley(2017)Dyrda and Pugsley (2017) found in the micro level data. As they have reported, there is a spike in the conversion rate of C corporations to pass-through entities over the same period as TRA86 took place (see figure ??).

This inverted rate structure lasted until 1993 when the Omnibus Budget Reconciliation Act of 1993 increased the maximum individual rate to 36 percent with a 10 percent surtax on income in excess of \$250,000 (married filing jointly), and thus created a new maximum

<sup>5</sup>There were other provisions of TRA86 that created additional disincentives to remaining a C corporation, such as introducing a new corporate Alternative Minimum Tax or repealing the *General Utilities* doctrine, under which a C corporation that sold its assets to another corporation was able to distribute the proceeds of the sale to shareholders without having to pay a corporate level tax.

Figure 4: difference Between the Top Corporate Tax Rate and the Top Individual Tax Rate



*This graph plots 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.*

individual marginal tax rate of 39.6 percent. In addition, a new corporate tax rate of 35 percent was introduced on taxable income in excess of \$10 million.

The 2001 Economic Growth and Tax Relief Reconciliation Act, along with the Jobs and Growth Tax Relief Reconciliation Act of 2003, reduced the top individual rate to 35 percent, the same as the top corporate rate, beginning in 2003, and those two equal maximum rates persisted through the end of 2012. In addition to changes in tax structure, there have been other changes that encouraged the expansion of pass-through entities since 1986: the number of shareholders allowed in an S corporation rose from 35 to 100, and changes in state laws facilitated the growth of limited liability companies(LLCs).

### 3 Model

The empirical facts discussed in previous section are useful for understanding the link between tax reforms and changes in regulations with changes in the distribution of legal forms of organization. However they don't highlight a clear role for the choice of legal forms for businesses as a mechanism thorough which changes in the tax legislation distort the capital allocation and aggregate output in the economy. Also it is not clear how the distribution of legal forms of organization would evolve facing a fundamental tax reform. So I need a model to address these issues. In this section, I develop a model of firm dynamics featuring endogenous choice of legal forms of organization.

Time is discrete and infinite. The economy consists of a representative household, a unit measure of heterogeneous firms, and a government. The paper focuses on a steady-state analysis of the model. Next,I describe decisions of each type of agent in the model, and then I define the stationary equilibrium

#### 3.1 Preferences

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

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

where  $c_t$  is the consumption in period  $t$  and  $0 < \beta < 1$  is the time discount factor. Households are endowed with one unit of time in each period which they supply to the market inelastically.

#### 3.2 Technology

In this economy production can take place in two types of firm, one type is a C corporation, denoted by C-type, and the other type is a pass-through firm, denoted by P-type. Both types use capital and labor as inputs and use the same production technology to produce a homogeneous output,

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

where  $k$  is capital,  $n$  is labor, and  $s$  is the productivity shock. Both types of firm are subject to an idiosyncratic productivity shock at each period.

A C-type firm pays tax at the corporate level. Any distribution of the after-tax profit among shareholders is also subject to an individual level tax. Therefore it pays tax twice while a P-type firm passes any profits or losses to the owners and they pay income tax.

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

- Fixed cost of production,

Another difference is with respect to the fixed cost of production. A C-type firm faces a higher fixed cost of production compared to a P-type firm.<sup>6</sup>

- Rental rate of capital,

As I discussed before, while C corporation has access to the public equity market which is basically an elastic supply of external equity, a pass-through entity can only rely on its owners personal fund to use either as equity or as a collateral for issuing debt. This feature is captured in the model by introducing a wedge over 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,

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

here  $\zeta$  is the wedge that pass-through entities face. This can be think of as an abstract way of capturing 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 are with respect to their productivity paths. Productivity evolves according to an exogenous  $AR(1)$  process with an innovation that is independent across firms. The standard deviation for the innovation process is bigger for C-type relative to P-type firms. C corporation is the only legal form that has access to the public equity market, this makes them more eager to pursue projects and investments assessed with higher level of risk, mainly because they have better opportunities to diversify the risk compared to pass-through entities. This feature is captured through the higher standard deviation for the innovation in the shock process of C-type.

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<sup>6</sup>The overhead cost in C-corporations are higher than other types, this can be interpreted as cost of using an specific accounting system, keeping records of the all the board meetings, tax preparation,...

### 3.3 Government

In this model government collects revenue by taxing labor income, dividend income, taxing C-type firms at the corporate level, and taxing P-type firm at their owners income level.

### 3.4 Timing

The timing of the events within a period is as follows:

**Incumbent Firms,** at the beginning of each period, an incumbent firm pays the fixed cost of production  $C^F$ , then the productivity shock for the period,  $s_t$  is realized and the firm decides on its current period capital and labor demands. At the end of the period the firm decides between exiting the market and staying for the next period. If the firm exits, it disappears from the model and receives profit zero in all future period. If it stays, the firm can choose its type for the next period; it can choose to continue to the next period with the same type or it can switch the type and start the next period with the new type.

**New Entrants,** at each period there is a continuum of ex-ante identical potential entrants. new firms have to pay a one-time entry cost of  $C_e$ . Once this cost has been paid, the new entrant draws a productivity shock  $s_t$  from a distribution  $\eta$ . These draws are independently and identically distributed across entering firms. Given  $s_t$ , an entrant chooses its type and its problem is equivalent to an incumbent firm with the same type that has the productivity shock  $s_t$ .

**Households,** at the beginning of each period, households rent their labor endowments and capital stocks to the firms. It has been assumed that households own equal shares in all firms and at the end of each period they receive the labor income, capital income and profit of firms. They choose their consumption and saving at the end of the period.

### 3.5 Decision Problems

This section describes decision problems for both types of firms an the household.

### 3.5.1 Firms' Decision Problem

The state of each firm at any period, can be described by a pair  $(\Delta, s)$ , where  $\Delta$  is the type of firm in that period,  $\Delta \in \{C, P\}$  and  $s$  is the corresponding period productivity shock. While productivity evolves exogenously, firms choose their type endogenously. At the end of each period, after observing current productivity,  $s$ , a firm decides on its type for the next period, upon staying in the economy. In this model value of each firm is determined by the present value of the stream of after-tax profits of the firm that are collected by owners.

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

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

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 firm with state  $(C, s)$  is denoted by  $V(C, s)$  which is given by

$$V(C, s) = \left[ \Pi(C, s) + \beta \max_{C, P, exit} \left\{ \int V(C, s') Q^C(s, ds'), \int V(P, s') Q^P(s, ds') - wC_S^C, G \right\} \right] \quad (4)$$

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  $s^P$ .  $G$  is the exit value.  $C_S^C$  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.

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

following way:

$$\Pi(P, s) = \max_{k, n} \left[ (f(s, k, n) - wn - wC_F^P - \delta k)(1 - \tau^i) - R^P k \right] \quad (5)$$

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

$$V(P, s) = \left[ \Pi(P, s) + \beta \max_{C, P, exit} \left\{ \int V(P, s') Q^P(s, ds'), \int V(C, s') Q^C(s, ds') - wC_S^P, G \right\} \right] \quad (6)$$

Here,  $C_S^P$  is the switching cost for a pass-thorough entity.

**An Entrant Firm,** the value of entering gross of entry cost can be computed by

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

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

The firms decision problem 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).

### 3.5.2 Households' Decision problem

In this economy households rent the labor and capital to the firms. They are also the owners of the firms and receive their profits. The state of households can be described with the capital  $K$  and the firm ownership given by a measure  $x$  over firm types. The

decision problem of a household with state  $(K, x)$  be written as

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

s.t.

$$c + M C_e + K' \leq w(1 - \tau^i) + \quad (9)$$

$$\begin{aligned} & (1 + R) \left( \int k(C, s) x(C, ds) + \int_{\bar{s}} k(C, s) \eta(ds) + \right. \\ & \left. \int k(P, s) x(P, ds) + \int_{\bar{s}} k(P, s) \eta(ds) \right) + \\ & \int \Pi(P, s) x(P, ds) + \int_{\bar{s}} \Pi(P, s) \eta(ds) + \\ & \int \Pi(C, s) x(C, ds) + \int_{\bar{s}} \Pi(C, s) \eta(ds) + Tr \end{aligned}$$

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

$$\begin{aligned} x'(P, \mathcal{S}) &= \int (1 - \mathbb{1}_{switch}(P, s))(1 - \mathbb{1}_{exit}(P, s)) Q^P(s, \mathcal{S}) x(P, ds) \quad (11) \\ & + \int \mathbb{1}_{switch}(C, s)(1 - \mathbb{1}_{exit}(C, z)) Q^P(s, \mathcal{S}) x(C, ds) \\ & + M \int_{\bar{s}} (1 - \mathbb{1}_{switch}(P, s))(1 - \mathbb{1}_{exit}(P, s)) Q^P(s, \mathcal{S}) \eta(ds) \\ & + M \int_{\bar{s}} \mathbb{1}_{switch}(C, s)(1 - \mathbb{1}_{exit}(C, z)) Q^P(s, \mathcal{S}) \eta(ds) \end{aligned}$$

where  $Tr$  is the transfer to the household.<sup>7</sup> Equation (10) and (11) gives the next period ownership of firms  $x'$ . The first integral in equation (10), represents the incumbent

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<sup>7</sup>In the equilibrium, the transfer  $Tr$  is equal to

firms of type  $C$ , who stayed and did not switch type in period  $t$ , the second integral represents the incumbent firms of type  $P$ , who stayed but switched to other type 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 type  $P$  in the current period but decide to switch to  $C$ -type for the next period. Equation (11) can be interpreted in the similar way.

Given the model specified above, a stationary equilibrium is defined in the following way.

### 3.6 Equilibrium

At steady state equilibrium, the aggregate state of the economy  $(K^*, x^*)$  and equilibrium prices  $w^*$  and  $R^*$  are constant over time. Firms solve their problem taking equilibrium prices as given and generate decision rules  $n^*(\Delta, s)$ ,  $k^*(\Delta, s)$ ,  $\mathbb{1}_{exit}(\Delta, s)$  and  $\mathbb{1}_{switch}(\Delta, s)$ . Households solve their decision problem, taking firms' decision rules, equilibrium prices and transfers as given, and choose  $K' = K^*$  and  $x' = x^*$  for the next period. Market clears for good, capital and labor services and government budget constraint holds.

The definition of a recursive equilibrium for this economy is by nowadays standard. Appendix C provides a formal definition of the equilibrium, and appendix D outlines the algorithm for solving the model.

## 4 Calibration

This part describes the calibration process of the model, including the choice of calibration targets and discussion of the implication of calibration results.

Parameters are chosen such that the model be consistent with certain features of U.S. economy over period 1980 to 1985.

The model period is set to be one year. Households' period utility function has the log utility form,  $u(c) = \log(c)$ .

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$$Tr = (R^p - R) \left( \int k(P, s) x(P, ds) + \int^{\bar{s}} k(P, s) \eta(ds) \right) \quad (12)$$

Table 2: Parameters Calibrated Independently

Parameter	Description	Value
$\delta$	Depreciation rate	0.07
$\theta$	Importance of capital	0.406
$\gamma$	Return to scale	0.802
$\tau^c$	Corporate tax rate	0.46
$\tau^d$	Dividend tax rate	0.2
$\tau^i$	Individual income tax rate	0.5

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

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

I used the method developed in Tauchen (1986) to approximate the  $AR(1)$  process through a first-order Markov process.

Distribution of productivity shock for new firms,  $\eta(s)$ , is a composite lognormal-Pareto distribution which takes a log-normal density up to a threshold and a Pareto density thereafter. A detailed description of driving this composite distribution is provided in appendix E.

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). The estimated annual depreciation rate is 7.1 percent. Values for parameters  $\theta$  and  $\gamma$  that are controlling the return to scale and capital share are set such that the model is consistent with the capital share of output in the data.

Tax rates are set to their statutory values over period 1980 to 1985. Before Tax Reform Act of 1986, the statutory corporate tax rate was 46%, the dividend tax rate was 20% and the top marginal income tax rate for individuals was 50%. For this iteration I use

Table 3: Parameters Calibrated Jointly

Parameter	Description	Value
$\beta$	Discount rate	0.946
$\rho$	Persistency of productivity shock	0.969
$\sigma_C$	Std. deviation of productivity shock for C-type	0.554
$\sigma_P$	Std. deviation of productivity shock for P-type	0.413
$C_F^C$	Fixed cost of production, C-type *	0.136
$C_F^P$	Fixed cost of production, P-type *	0.023
$C_e$	Fixed entry cost *	0.176
$\zeta$	Markup on capital rent for P-type	0.175
$C_{switch}^C$	Cost of switching from C-type to P-type *	0.117
$\theta_{eta}$	Threshold parameter for entrant's productivity dist. $\eta$	9.89
$\alpha_\eta$	Tail parameter for $\eta$	0.96
$\sigma_\eta$	Std. deviation for $\eta$	1.3

\*, these cost are in wage unit

the statutory tax rates. Table 2 reports parameters that are set independently.

The remaining parameters are calibrated jointly in the model. Table 3 provides a summary of these parameters. A set of empirical moments are used to pin down the value of these parameters. Table 4 provides a description of these data moments and compares them with moments generated in the model.

Calibrated model fits the data well. Specially, it is able to match the firm-size distribution of firms and the output share of C-corporation. As expected, we see that firms with higher productivity are choosing C-type and firms with lower productivity are choosing P-type. Distribution of both types of firms over productivity levels are shown in figure 5.

## 5 Tax Reform Experiments

In this section, I 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.

Table 4: Data and Model Moments

Statistic	Data	Model
Capital output ratio	1.8	1.79
Fraction of C corporation	0.16	0.179
Output share of C corporations	0.84	0.79
Fraction of entry firms	0.12	0.11
Employment share of entry firms	0.04	0.039
Fraction of switching C corporations	0.015	0.013
Firms exiting rate	0.08	0.11
Employment share of top 2% of firms	0.42	0.48
Employment share of bottom 56% of firms	0.062	0.064
Employment share of top 2% of entrants	0.28	0.66
Employment share of bottom 85% of entrants	0.38	0.14

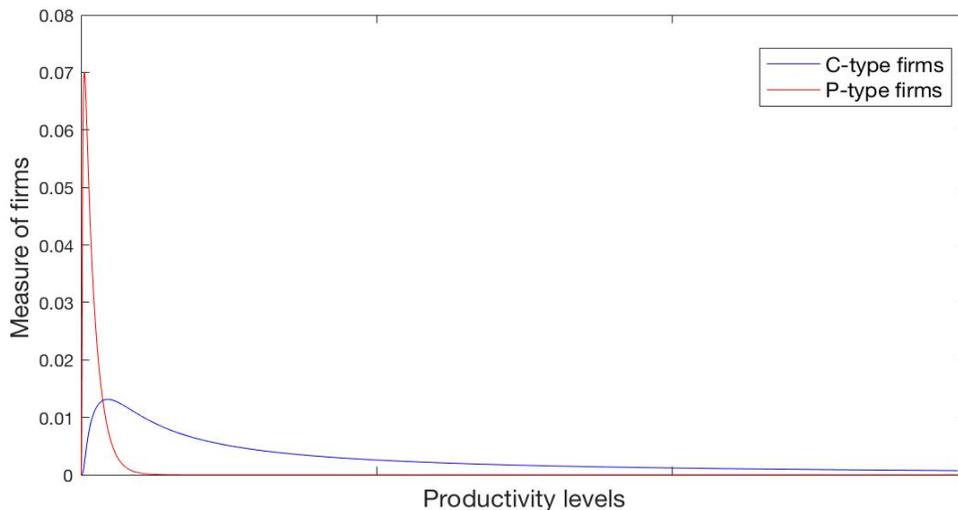
All experiments change the nature of the tax base compared to the benchmark tax system. In all tax structures evaluated here, both types of firms are receiving a uniform tax treatment. Hence, the tax advantages of one type over the other as in the benchmark tax structure are vanished. In what follows I provide detailed description of each tax structure and discuss their impact on the economy.

## 5.1 Tax Reform 1: Uniform Business Income Taxation

In this experiment, the benchmark tax structure is replaced with a tax system in which both C-type firms and P-type firms receive the same tax treatment. More precisely, the dividend tax for C-type firms is abolished and the both types pay business income tax at the entity level, at the same rate  $\tau_1$ . Also, labor income is taxed at the same rate as in the benchmark economy. The business tax rate,  $\tau_1$ , is chosen such that the tax revenue stays constant as in the benchmark economy.

Third column of table 5 reports the aggregate variable under this tax system. As it can be seen in the table 5 replacing the benchmark tax system with the tax structure described above increases the total output by around 8 percent. Fraction of C-type firms is smaller and P-types firms are relatively bigger. The employment share of lower 56% of firms increases by 15% which is mainly coming from the increase in the number of new firms entering the market each period, that are relatively smaller.

Figure 5: Distribution of both types of firms over productivity levels



*This figure shows the measure of each type of firms with different productivity. Higher productivity firms are C-type and lower productivity firms are mostly P-type.*

The calculated tax rate  $\tau_1$  is 0.41, which is lower than the tax rate levied on P-type in the benchmark economy (0.5). It is also below the benchmark's corporate tax rate (0.46) which is levied on C-type. Therefore, with this tax code, there is an expansion of P-type sector relative to the benchmark economy. Part of this expansion is due to lower exit rate. As we saw in previous section, lower productivity firms are mostly of type P. Facing a lower tax burden increases the present value of a P-type firm at each productivity level and this in turn pushes down the productivity threshold below which a firm decides to exit the market.

Notice that here both types of firms are subject to the business income tax. Hence we still have the notion of distortion on capital accumulation as in the benchmark tax system. However, in contrast to the benchmark case, the tax structure is not in favor of any type. Therefore, the increase in the output is the effect of reallocation of capital across types. Unifying the tax treatment across all firms affects firms' choice of legal form of organization, for which the trade-off is between the fixed cost of production and the cost of capital.

Table 5: Effects of Changing the Tax Structure

	Benchmark	Tax Reform 1	Tax Reform 2	Tax Reform 3
Calculated Tax Rate, $\tau$	.	0.41	0.49	0.56
Capital Output Ratio	1.79	1.89	1.74	2.51
Output	5.1	5.5	5.2	5.9
		(+7.8%)	(+2%)	(+16%)
Output share of C-type	78.6	74.9	74.1	76.4
Fraction of C-type	0.18	0.12	0.14	0.13
Empl. Share of Bottom 56%	6.4	7.4	7.2	7.5
Empl. Share of new Firms	3.9	4.5	4.1	3.8

*This table reports how the aggregate variables changes with the change in the tax structure. Tax reform 1 is a uniform business income taxation 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 as in the benchmark economy. Tax reform 2 is a uniform business income and labor income tax system. compared to tax reform 1, the only difference of tax structure is that here both labor income and business income are taxed at the same rate. And finally, tax reform 3 is a uniform dividend and labor income tax system. In this case, both types of business taxation is abolished and the dividend from both types is taxed at the same rate as the labor income. Note that all tax reform 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.*

## 5.2 Tax Reform 2: Uniform Business and Labor Income Taxation

The tax structure in this experiment is close to the one in tax reform 1. The only difference is that both labor income and business income are taxed at the same rate  $\tau_2$ , which is picked to generate the same tax revenue as in the benchmark economy. In other word, this is a tax code in which all sources of income are taxed at the same rate  $\tau_2$ .

The forth column of table 5 reports the values of aggregate variables in this tax structure. Here the calculated tax rate  $\tau_2$  is 0.49, which is higher compared to the calculated tax rate in tax reform 1 ( $\tau_1 = 0.41$ ). Hence in the business income is subject to a higher tax rate. However, the tax rate on labor income, which is  $\tau_2$  is slightly lower that the labor income tax in the benchmark economy (0.5). So we decreases the tax rate on labor income at the cost of increasing the tax rate of business income, which justifies the smaller

increase in the total output relative to tax reform 1. As it can be seen in table 5, this tax code affects the economy in the same way as tax reform 1 but in lower magnitude. The fraction of firms choosing to be a C-type is lower compared to the benchmark economy and more new firms enter the market each period.

### **5.3 Tax Reform 3: Uniform Dividend and Labor Income Taxation**

In the final tax reform experiment, there is no business taxation. In this tax system, the tax base is comprised dividend from both types of firms ,and labor income. In other word, this tax structure abolishes both types of business taxation, and dividends from both types of firms are taxed at the same rate as labor income,  $\tau_3$ , which is set to keep tax revenue constant. Notice that this tax code is effectively a consumption tax system.

The most noticeable change of variables in this tax reform is the increase in the aggregate output. As it is reported in the last column of table 5, replacing the benchmark tax system with this uniform dividend and labor income tax code, increases the output by 16%. Number of firms of both types increase relative to the benchmark case, but the increase in the number of P-type firms is bigger. Fraction of businesses organized as a C-type shrinks.

Comparing this tax reform with previous reforms highlights the impact of capital income taxation on capital accumulation. More precisely, the big rise in the output is the result of two channels working here: capital accumulation, and capital reallocation. Abolishing the capital income taxation removes the distortion on capital accumulation while equalizing the tax treatment of both types of firms removes distortion on capital allocation. Although the calculated tax rate in this experiment is higher among the three reforms, the increase in the output is almost twice as big, showing the important of distortionary effect of taxing capital income.

## **6 Conclusion**

Since the passage of the Tax Reform Act of 1986 the significance that various types of organizational forms have played in business activity has changed dramatically. The share of businesses organized as pass-through entities (e.g. S-corporations, who are not subject to corporate income tax), in total U.S. business receipts increased from 16.1% in 1986 to

38.8% in 2012, while the share of traditional C-corporations in total number of firms, declined from 16% to 4.9%. A series of tax reforms and changes in legislation over this period made pass-through legal forms of organization more attractive choices for many businesses and played significant roles in creating this dramatic alteration of distribution of legal forms of businesses over time. The question is to what extent changes in legislation that affect the choice of legal form have impact on real activities.

In this paper I argue that choosing a legal form of organization based on the tax treatment of businesses distorts the capital allocation and affects the size of aggregate output. I 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. I calibrate the model to be consistent with the firm dynamic characteristics of the U.S. businesses as well as the contributing share of each legal form in total output. Using the calibrated model and taking into consideration the general equilibrium effect under the assumption of revenue neutrality, I find that unifying the tax treatment across all legal form of businesses increases aggregate output by 8 percentage points in the long run. The key for this finding is that removing the tax distortions affecting the choice of legal form of organization reallocates capital towards more productive firms and improves the aggregate output.

A significant contribution of this paper is to highlight the necessity of taking into account the choice of legal form of organization for businesses when evaluating any potential tax reforms. Additionally, choice of legal form of organization could have implication on other issues that can be explored in future research. The current model can be extended to have elastic labor supply, which assumed to be inelastic in the current version. As I show in previous parts, the choice of legal form of organization has implication on capital allocation which in turn affect the aggregate labor demand. Hence, modeling an inelastic labor supply, provides an additional margin and can qualitatively improve the result. Also, as I discussed before, each legal form of organization has its own rules and restriction for generating external capital which entails restriction on debt as well as equity. Therefore, choice of legal form of organization has implications on determining the financial structure of a business, which in turn affects the business's decisions in terms of R&D investment, taking on risky projects, the probability of default or bankruptcy,... . Of course, the main challenge is to model firms' ownership of capital within a framework in which a firm could potentially change its organizational form at each period.

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