# How to Tax Capitalists in the Twenty-First Century?*

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**Abstract**

We study the optimal tax system design in an economy featuring active business owners running closely-held, highly profitable businesses–a.k.a. capitalists in the twenty-first century. In line with the current U.S. law, they choose a legal form of a firm's organization between a pass-through entity and a C corporation, which determines how their business income is taxed. The model captures a critical trade-off between these forms. C corporations face double taxation of profits but have easier access to external equity and can insure themselves better against investment risk relative to pass-through entities. Through endogenous selection, our model generates the predominant position of the pass-through business owners in line with the U.S. data. We compute the optimal fiscal policy under two revenue-neutral scenarios. Under the current U.S. legal restrictions scenario, we find that the reform maximizing the social welfare of the population eliminates corporate income tax and increases mildly the progressivity of the personal income tax code. This implies a sizeable switch of economic activity towards C corporations, which improves capital allocation in the economy, insurance provision and resource redistribution toward workers. Under the uniform business profit tax scenario, we find that the progressivity of the labor income tax-transfer code should more than double, and business income tax should be set to 31 percent. This optimal policy *strictly dominates* in terms of welfare, the optimal policy computed under the current legal framework. Separation of labor income taxation from business profit taxation allows the Ramsey planner to separate distortions of the labor supply margin from distortions on the accumulation of the productive capital and the choice of the legal form of business organization margins.

**Keywords:** Income Inequality; Business Taxation; Legal forms of organization; Redistribution

**JEL Codes:** E62; H21; H32; L2

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# 1 Introduction

How to design business taxes efficiently? What is the optimal tax system that considers the particular characteristics of business income in the twenty-first century? In this paper, we tackle these questions in the context of the United States. The difficulty in addressing them stems from at least three features of the existing U.S. tax system, which are also prevalent in many developed economies. First, the personal income tax code applies to wages and salaries, interest income, dividends, and some business income, which implies labor income and some part of the capital income are subject to the same tax schedule. Second, business owners can choose their legal form of organization, which has implications for whether their business income is taxed according to the corporate income tax code (C corporations) or personal income tax code (pass-through businesses).[1] Third, there is multidimensional heterogeneity among workers and business owners, which interacts with the tax code and complicates the design of an optimal tax system.

In this paper, we confront these challenges by studying an optimal design of a business income tax code in a quantitative, general equilibrium model, which incorporates heterogeneous workers and entrepreneurs, an *endogenous choice of a legal form* of business organization and a realistic representation of the U.S. tax system. The endogenous choice of a legal form is a critical, novel feature of the model applied to the optimal policy analysis. As we document in Dyrda and Pugsley (2021), past tax reforms induced U.S. businesses to adjust their organizational form to take advantage of the tax code. Following the 1986 and 2001 reforms, which reduced personal income taxes at the top of the income distribution, many U.S. firms organized as C corporations switched to the pass-through form.[2] Our model stylizes the trade-off entrepreneurs face between running the two organizational forms, which emerges from the existing legal framework in the United States. Profits of pass-through businesses are entirely channeled to the owners and taxed according to the personal income tax code. Owners of pass-through entities finance, using only their equity, a capital investment of the firm, and face uninsurable investment risk. In contrast, profits of the C corporation are taxed first at the entity level based on the corporate income tax code. Further, the owners pay the dividend

[1] Recently, Smith, Yagan, Zidar, and Zwick (2019) document the rising importance of the pass-through business owners in the U.S. economy post-1999 labeling them as capitalists in the 21 century. Also, using LBD data Dyrda and Pugsley (2023) document that this trend goes back to 1980.

[2] The main type of pass-through business, i.e., S corporation, must be a domestic corporation with at most 100 individual shareholders (an S corp cannot be a subsidiary of another corporation or partnership) with only one class of stock. Certain types of businesses, such as those in financial services, are also ineligible. In particular pass-through businesses can not be publicly traded companies. See https://www.irs.gov/businesses/small-businesses-self-employed/s-corporation

income tax whenever the dividends are paid out. Unlike pass-through businesses, the owners of the C corporations can fully diversify their investment risk by having access to external equity. This model feature reflects the current legal status, in which pass-through businesses are restricted in raising external equity. Apart from the double taxation of profits, another downside of running a C corporation is an overhead fixed cost. These features generate the economic trade-off between two legal forms: double taxation of profits with overhead costs but access to external equity for C corporations versus single taxation of profits but reliance on self-financing. The resolution of this trade-off in our model generates the selection pattern broadly observed in the data. Conditional on the level of wealth, the higher the profits, the larger the propensity of entrepreneurs to organize as a C corporation. On the other hand, conditional on the profits level, the wealthier the entrepreneur is, the lower her propensity to be organized as a pass-through business. On top of the heterogeneous entrepreneurs, the model incorporates heterogeneity among the workers, who face uninsurable, idiosyncratic labor productivity risk following the standard incomplete markets model. Thus, we capture a broad spectrum of heterogeneity of business owners and workers in our environment.

We discipline the parameters of the model using four significant sets of targets. The model replicates essential macroeconomic relationships between consumption, investment, capital, government expenditure, and debt observed in the NIPA statistics. Second, we discipline the productivity process of the workers and entrepreneurs by income inequality statistics characterizing labor and business incomes in the IRS data. On the entrepreneurial side, we impose on the model the firm size distribution and flows between the legal forms, consistent with the administrative data from the Longitudinal Business Database (LBD). Finally, we replicate the non-linear personal income tax code with a flexible parametrization of the tax-transfer function proposed by Benabou (2002), which has been successfully implemented recently into the quantitative models with heterogeneity[3]. We also test the endogenous selection mechanism by comparing the model-generated propensity to form a pass-through business with the empirical counterparts from the Survey of Consumer Finances (SCF). We conclude that our quantitative theory generates selection patterns into different forms of business organization, which are broadly consistent with the one observed in the U.S. data.

The model disciplined by recent microeconomic data is our departure point for optimal policy analysis. As a policy evaluation metric, we use the social welfare function, which is a weighted average of the social welfare of workers and entrepreneurs. Our optimal policy analysis seeks the policies which maximize welfare gains in terms of lifetime consumption[4]

[3]See Krueger and Ludwig (2016), Heathcote et al. (2017a) or Ferrière and Navarro (2018).

[4]Current results are computed by a comparison of stationary equilibria. Maximizing welfare, including

and is revenue neutral. We employ the Ramsey approach, in which we stick to particular parametric forms of taxes. We start with the experiment in which we restrict the tax system to the Current Legal Framework (CLF), where the personal income tax code applies to both labor income as well as to the business income from running a pass-through firm and the corporate income tax is imposed on profits of C corporations. Next, abandon the current legal framework and separate business profits from labor income taxation, the scenario we call Uniform Business Profit Tax (UBPT).

Under the Current Legal Framework scenario, the optimal system maximizes the weighted average social welfare and calls for reducing the corporate income tax from 19.7 percent to 0.0 percent, effectively eliminating the corporate income tax. The progressivity of the personal income tax code increases by 40 percent (the progressivity parameter in our tax function increases from 0.10 to 0.14). The policy yields an average welfare gain of 2.1 percent. It induces a switch of economic activity towards C corporations and the fraction of businesses organized as pass-throughs fall from 80 percent to 14 percent. As a result, the economy experiences a reallocation of labor and capital towards more prominent and more efficient firms with better access to external funding, positively affecting the macroeconomic aggregates. Reallocation of capital increases wages, which benefits workers and essentially drives the implied welfare gains. The aggregate output increases by 3.3 percent, whereas employment falls by 0.7 percent, primarily due to a reduction in labor supply following more extensive redistribution through the tax-transfer system. To illustrate the welfare trade-off between workers and entrepreneurs, we also analyze the policy maximizing only entrepreneurial welfare. In this case, the optimality unsurprisingly calls for abandoning the corporate income tax and reducing the tax code's progressivity by 70 percent towards almost a flat tax system. Neglecting the interests of workers allows the planner to reduce the intertemporal distortions on the capital accumulation margin for pass-through business owners. Hence, the fraction of pass-throughs falls to 28.1 percent, which is 14.1 percentage points less relative to maximizing the average social welfare case.

Under the Uniform Business Profit Tax scenario, we separate labor income tax from business profit taxation and abandon double taxation of profits for C corporations. Hence, regardless of the legal form of business organization, the entrepreneurs face the same tax rate on profits. Significantly though, in this exercise, we do not change the number of fiscal instruments available to the planner; we redefine their tax bases. Workers' labor income remains

transitional effects in this economy, poses significant numerical challenges, and it is currently a work in progress.

taxed according to the personal income tax code modeled as a nonlinear tax-transfer schedule. The planner, who maximizes the weighted average social welfare, calls for more than doubling the progressivity of this tax-transfer system relative to the current U.S. one. Uniform business profit tax is set at 31.0 percent, which primarily benefits large pass-throughs. As a result, the fraction of pass-through businesses increase to 95.0 percent. Such policy yields an average welfare gain in the population of 3.9 percent. Hence, this scenario *strictly dominates* in terms of welfare, the optimal policy computed under the CLF scenario. At the aggregate level, UBPT implies an increase in aggregate capital due to reduced intertemporal distortions on the capital accumulation margin, especially among large pass-through businesses. A sharp increase in progressivity disincentives labor supply, resulting in employment falling by 3.9 percent and overall output by 1.2 percent. Again, we analyze the policy maximizing just entrepreneurial welfare to illustrate the welfare trade-off between workers and entrepreneurs. In this case, the optimality calls for cutting the progressivity of the labor income tax-transfer system by 40 percent, which in turn enables to set the of uniform business profit tax at 9.0 percent. Such policy further boosts capital accumulation and increases labor supply, leading to an increase in output and employment by 2.2 and 4.6 percent relative to the baseline economy. Unsurprisingly it is detrimental for workers, whose welfare falls by 4.4 percent due to lost benefits of the progressivity of the tax-transfer system.

The key takeaway from our analysis is that the separation of labor income taxation from business profit taxation allows the Ramsey planner to separate distortions of the labor supply margin from the distortions of the productive capital accumulation and on a choice of the legal form of business organization margins. The UBPT also enables the planner to alleviate the impact of the borrowing constraints for allocating productive capital across the two legal forms, which can not be achieved under the CLF. Three factors primarily drive the level of the optimal business profit tax: (i) the revenue neutrality requirement imposed on our experiments; (ii) the weight of the workers in the planner's objective function, and (iii) the strength of the market incompleteness. The quantitative importance of these factors determines the macroeconomic effects following the implementation of the optimal policy. We consider several extensions to our benchmark experiment (i) non-linear uniform business profit taxation, (ii) taxation of capital gains, (iii) endogenous interest rate (iv) short-term secured borrowing with collateral constraint. The results of these extensions are still pending.

## 2 Related literature

This paper contributes to the quantitative macro public finance literature. There is a vast and important literature studying the effects and design of the tax systems in heterogeneous agents models with idiosyncratic labor income risk in either Ramsey or Mirrlees tradition—see Golosov et al. (2003), Domeij and Heathcote (2004), Conesa, Kitao, and Krueger (2009), Poschke et al. (2012), Krueger and Ludwig (2016) Heathcote et al. (2017a) or Stantcheva (2017) among many others. At the same time there is also a large body of the literature inspecting the effects of the capital income taxes in the presence of the uninsurable investment risk - see Panousi (2008), Meh and Terajima (2009), Panousi and Reis (2012), Evans (2014). In particular Scheuer (2014) studies optimal taxation of profits and labor income under endogenous firm formation in two cases, when profits and labor income are subject to the same schedule and under the assumption of differential treatment of profits and labor income. Our exercise of separating labor income tax code from uniform business tax is similar in spirit. A number of interesting and important lessons emerge from these studies on the effects of capital income and labor income taxation in an environment with idiosyncratic and uninsurable shocks (be it capital or labor income shocks). Nonetheless, the existing papers abstract from legal forms of organization of businesses and the possibility of reorganization, which directly affects whether the same business activity is taxed as labor, capital or both. We show that incorporating an endogenous choice of business legal form is important to understand the full effects of both business and personal income tax reforms in a quantitative framework. Thus, the main contribution of this paper is to study the optimal design of the tax system in a quantitative model, which incorporates this margin explicitly.

There are few related papers, which model explicitly legal forms of organization. Short and Glover (2019) focus on the incorporation decision of entrepreneurs and quantify the role of the limited liability, which is the dimension of heterogeneity among entrepreneurs we abstract from in the paper. Chen et al. (2014) evaluate the effects of corporate tax cuts on the employment in a model, where the choice of legal form is endogenous. They abstract from the accumulation of capital by entrepreneurs and risk premium, the features which are central to our analysis and relevant for the economic mechanism we propose. Recently, Bhandari and McGrattan (2018) develop a theory of pass-through businesses and estimate an aggregate sweat equity value of 0.65 times GDP, with little cross-sectional dispersion in valuations when compared to business net incomes and large cross-sectional dispersion in rates of return.

Smith, Yagan, Zidar, and Zwick (2019) show that pass-through income of top earners

more closely reflects returns to high human capital embodied in individuals than returns to capital. They attribute a significant fraction of the rise in top incomes to these pass-through business owners. We use their label of "Capitalists in the Twenty-First Century" for pass-through businesses who are predominant in our model.

# 3 Model with endogenous choice of the legal form

In this section we present a model with heterogenous workers and entrepreneurs featuring endogenous choice of the legal form of organization for entrepreneurs, which follows closely the environment developed in Dyrda and Pugsley (2021). The model captures stylized trade-off between the legal forms discussed in Appendix A.1. The income of pass-through entities is taxed once according to the personal income tax code. Owners of the pass-through entities finance capital from their own equity and are subject to the undiversified investment risk. The income of the C corporation is subject double taxation, to the corporate income tax is levied on profits at the entity level and the dividend income tax is levied on the dividend payouts to the owners. Contrary to the pass-through entity, C corporations owners have access to the perfectly elastic supply of external equity and their owners can diversify completely an investment risk. On the top of that running the C corporation is associated with some overhead, fixed costs. These features introduce trade-off between fully diversified risk but double taxation of profits and fixed costs of operation and undiversified investment risk but single taxation of profits. As we illustrate in the quantitative section these properties of our environment allow us to replicate selection patterns into the LFOs observed in the data.

**Demographics.** There is a measure one of individuals in the economy. Each individual is one of the two types: worker or entrepreneur. The lifespan of both types is infinite. We denote a fixed fraction of entrepreneurs in the model by $\mu$. Entrepreneurs have access to the production technology and use it to run a firm and can organize their businesses in two ways: as a pass-through entity or as a C corporation. We denote the fraction of entrepreneurs organized as pass-through entities by $p$. Thus in every period there are $(1-\mu)$ of workers, $\mu p$ of pass-through entrepreneurs and $\mu(1-p)$ of entrepreneurs with firms organized as C corporations in the model economy.

**Preferences.** Households in the economy have standard preferences over consumption $c$ and hours worked $h$ ordered by

$$\mathbb{E}_0 \left[ \sum_{t=0}^{\infty} \beta^t u^i \left( c_t, h_t \right) \right] \qquad i \in \{w, e\}$$

where $\beta \in (0,1)$ is the discount factor, $u$ satisfies standard conditions and expectation operator is with respect to the idiosyncratic shocks and $i$ stands for index for workers, $i = w$, or entrepreneurs, $i = e$. For entrepreneurs we will abstract from the labor supply decision.

**Technology.** Every entrepreneur has an access to a decreasing returns to scale technology $f(z, k, n)$ transforming physical capital $k$ and labor input $n$ into the consumption good. Variable $z$ represents the entrepreneur-specific productivity shock which follows the Markov transition matrix $\Gamma^j$, where $j \in \{P, C\}$ and $P$ stands for pass-through and $C$ stands for C corporation. Hence, the potentially the transition matrix depends on the legal form of business organization, however as we argue in Section 4 we do not impose that dependence on the model but rather derive it. The technology of production is independent on the legal form and is as follows:

$$f(z, k, n) = z^{1-\nu} \left( k^{\alpha} n^{1-\alpha} \right)^{\nu}$$

where the presence of fixed factor $z$ induces decreasing returns to scale. Given the installed capital $k$ and productivity $z$ every firm generates gross profits

$$\pi(k, z) = \max_{n} \left\{ z^{1-\nu} \left( k^{\alpha} n^{1-\alpha} \right)^{\nu} - wn \right\}.$$

For the convenience for further notation notice that gross profits can be expressed as the sum of the return to capital and the return to the entrepreneur's productivity (Ricardian rent) as follows[5]

$$\pi(k, z) = f_k k + f_z z.$$

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

1. The entrepreneur makes a decision about the legal form of organization and about investment into a business.

2. Productivity shock $z, \varepsilon$ are realized.

[5]Given the homogeneity of the technology in $z$, $k$, and $n$ and if labor markets are competitive where each unit of labor $n$ is paid its marginal product and given the technology is homogeneous of degree 1 in all factors, the result follows immediately from Euler's theorem noting with a competitive labor market, $f_n = w$.

3. Labor supply and labor inputs are decided.

4. Production occurs. All agents receive their respective earnings.

5. The government levies taxes on personal, dividend and corporate income, then makes transfers and finances the exogenous government spending.

6. Switching costs shock $c_S$ is realized.

7. Consumption, saving decisions are made.

**Workers.** The individual state of the worker is an asset position $a \in \mathcal{A}$ and idiosyncratic productivity shock $\varepsilon \in \mathcal{E}$, where $\varepsilon$ follows the Markov transition matrix $\Gamma^{\varepsilon}$. Workers choose consumption $c$, labor supply $h$ and next period asset position $a'$ subject to the budget constraint and borrowing constraint. Their income $y$ consists of interest income $ra$ and labor income $wh\varepsilon$. Thus the problem of the worker is

$$\begin{aligned} V^W(a,\varepsilon) &= \max_{c.h,a'} u^w(c,h) + \beta \mathbb{E}\left[V^W(a',\varepsilon')\,|\varepsilon\right] \\ &\quad \text{subject to} \\ &\quad c + a' = a + y - \tau_d ra - T_i(wh\varepsilon) \\ &\quad y = ra + wh\varepsilon \\ &\quad a' \geq \underline{a} \end{aligned} \tag{3.1}$$

where $T_i(\cdot)$ is the personal income tax schedule and $\tau_d$ is the marginal dividend income tax.

**Entrepreneurs: pass-through entity.** The individual state of the pass-through entrepreneur is $a \in \mathcal{A}$ personal asset position, $e \in \mathcal{E}$ equity invested in the business and productivity shock $z \in \mathcal{Z}$, where $z$ follows the Markov transition matrix $\Gamma^j$ for $j = \{P, C\}$, which depends on her next period LFO choice. Entrepreneur chooses consumption $c$ and savings $s$, which further in the next stage are split into safe asset $a'$ and next period equity invested into the business $e'$(the split depends on the choice of the legal form of organization). Her income $y$ consists of the return on the safe asset $ra$ and the profits form running a firm $\pi(e,z)$. Undepreciated value of the capital $(1-\delta)e$ is added to her budget constraint. Income net of the value of depreciated capital is subject to the personal income tax levied according to the tax schedule $T_i(\cdot)$. Pass-through entrepreneur can finance the capital stock only through her own equity and is subject to exogenous borrowing constraint $\underline{a}$. Hence, the

dynamic programming program becomes:

$$\begin{aligned} V^P(a,e,z) &= \max_{s,c} u^e(c,h) + \beta W^P(s,z) \\ &\quad \text{subject to} \\ &\quad c + s = y + a + (1-\delta)e - T_i(\pi(e,z) - \delta e) - \tau_d r a \\ &\quad y = ra + \pi(e,z) \\ &\quad s \geq \underline{a} \end{aligned} \tag{3.2}$$

where $W^P$ is the continuation value that takes into account discrete decision about changing the legal form of organization, which is specified later on.

**Entrepreneurs: C corporation.** The individual state of the entrepreneur that enters the period running C corporation consists of $a \in \mathcal{A}$ safe asset position and productivity $z \in \mathcal{Z}$, where $z$ follows Markov transition matrix $\Gamma^j$ for $j = \{P, C\}$, again depending on her next period LFO choice. Entrepreneur chooses consumption $c$ and savings $s$. Her income consists of the return on the individual assets $ra$ and the Ricardian rents (dividend) from running the C corporation $D(z)$, which are net of the corporate income tax $\tau_c$. The tax base for the corporate income tax is reduced by the fixed costs associated with running the C corporation, which are denoted by $c_f$. These dividends are paid out by the mutual funds which runs all the C corporations in the model and which we describe below. Income is subject to the marginal dividend income tax levied on Ricardian rents and returns on assets $\tau_d$. Hence, the dynamic programming problem of the C corporation owner becomes

$$\begin{aligned} V^C(a,z) &= \max_{s,c} u^e(c,h) + \beta W^C(s,z) \\ &\quad \text{subject to} \\ &\quad c + s = y + a - \tau_d(ra + D(z)) \\ &\quad y = ra + D(z) \\ &\quad D(z) = (1-\tau_c)(f_z(k^*)z - c_f) \\ &\quad s \geq \underline{a} \end{aligned} \tag{3.3}$$

where $W^C$ is the continuation value that takes into account discrete decision about changing the legal form of organization, which is specified below.

**Mutual fund.** The owners of the C corporations in the model have access to the infinitely elastic supply of outside equity, through the mutual fund, at the cost of $1 + r$. The mutual fund makes investment decisions for the C corporations and aggregates the idiosyncratic risks faced by their owners and hence by the law of large number it is able to fully diversify it, so that it does not face any uncertainty with respect to the aggregate profits. Thus, the optimal capital stock $k^*(z)$ of the C corporation with productivity $z$ is determined by equalizing the expected marginal return on the capital net of depreciation and corporate income tax with the marginal opportunity cost of investing one more unit of physical capital, i.e.

$$\mathbb{E}^C[(1-\tau_c)\left(\pi_k(k^*;z') - \delta\right)|z] + 1 = 1 + r \tag{3.4}$$

where $\tau_c$ is the corporate income tax and superscript $C$ indicates expectations with respect to the Markov transition matrix of $C$ corporations. The profits of the C corporation $\pi(k^*, z')$ are then split between the owner of the C corporation, who receives $f_z z$ and owners of the mutual funds, i.e. all the savers in the economy, who receive $f_k k^*(z)$.

**Continuation values: converting decision.** At the beginning of every period, before the productivity shock for entrepreneurs is realized, entrepreneur chooses the legal form of organization. The pass-through entrepreneur may continue to operate with current legal form or convert to a C corporation by selling its equity to the mutual fund. The revenue from the transaction adds up to the personal assets. If she chooses to continue as pass-through entrepreneur she makes a portfolio choice and decides how much to invest into the business, i.e. $e'$. Thus, the continuation value for pass-through entrepreneur is

$$W^P(s,z) = \max\left\{\mathbb{E}^C\left[V^C\left(s, k^*(z), z'\right)\middle| z\right] - c_s, \max_{e' \leq s - \bar{a}}\left\{\mathbb{E}^P\left[V^P\left(s - e', e', z'\right)\middle| z\right]\right\}\right\}, \tag{3.5}$$

where $c_s$ is the realization of the stochastic, i.i.d switching cost and the $\mathbb{E}^j$ for $j \in \{C, P\}$ are expectations with respect to LFO-dependent transition probabilities. The owner of the C corporation can convert to the pass-through entity or continue to operate with the current legal form. If she converts, she makes a portfolio choice and decides how much to invest into the business, i.e. $e'$. Therefore, the continuation of the pass-through entrepreneur value becomes

$$W^C(s,z) = \max\left\{\mathbb{E}^C\left[V^C(s, k^*(z), z')\middle| z\right], \max_{e' \leq s - \bar{a}}\left\{\mathbb{E}^P\left[V^P\left(s - e', e', z'\right)\middle| z\right] - c_s\right\}\right\}. \tag{3.6}$$

Denote a probabilistic decision to switch by $d(s,z,j) \in [0,1]$ with $j \in \{P,C\}$, which is the arg max of 3.5 and 3.6 accordingly.

**Aggregation and Market Clearings.** In every period there is a fixed fraction $1-\mu$ of workers and $\mu$ of entrepreneurs in the economy. Let $a \in A = [a_{\min}, \infty]$ and $\varepsilon \in \epsilon$, where $\epsilon$ is the domain of the productivity shock and further let $(A \times \epsilon, \mathcal{B}(A) \times \mathcal{B}(\epsilon))$ be a measurable space of individual assets and workers productivities, where $\mathcal{B}(A)$ and $\mathcal{B}(\epsilon)$ denote the Borel sets. Let $\lambda_w : \mathcal{B}(A) \times \mathcal{B}(\epsilon) \to [0,1]$ be the measure of over the space of individual assets and productivities for workers. It evolves according to

$$\lambda'_w(\mathcal{A}, \vartheta) = \int_{A \times \epsilon} \mathbb{I}\{a'(a,\varepsilon) \in \mathcal{A}\} \Gamma^{\varepsilon}(\varepsilon'|\varepsilon) \, d\lambda_w(a,\varepsilon) \quad \forall \mathcal{A}, \vartheta \in \mathcal{B}(A) \times \mathcal{B}(\epsilon) \tag{3.7}$$

Let $e \in E = [0,\infty]$ and $z \in Z$ where $Z$ is the domain of entrepreneur's productivity shocks. Let $(A \times Z, \mathcal{B}(A) \times \mathcal{B}(Z))$ be a measurable space of individual assets and firm's productivities of the C corporation owners and let $(A \times E \times Z, \mathcal{B}(A) \times \mathcal{B}(E) \times \mathcal{B}(Z))$ be a space of individual assets, capital invested in a firm and firm's productivities of the pass-through owners. Then define $\lambda_C : \mathcal{B}(A) \times \mathcal{B}(Z) \to [0,1]$ to be the measure of C corporation owners over the individual states and $\lambda_P : \mathcal{B}(A) \times \mathcal{B}(E) \times \mathcal{B}(Z) \to [0,1]$ as the measure of pass-through owners over the individual states. They evolve according to the following law for all $\mathcal{A}, \mathcal{E}, \mathcal{Z} \in \mathcal{B}(A) \times \mathcal{B}(E) \times \mathcal{B}(Z)$:

$$\begin{aligned} \lambda'_P(\mathcal{A}, \mathcal{E}, \mathcal{Z}) &= \int_{A \times E \times Z} (1 - d(s,z,P)) \, \mathbb{I}\{s - e' \in \mathcal{A}\} \, \mathbb{I}\{e' \in \mathcal{A}\} \, \Gamma^P(z'|z) \, d\lambda_P(a,e,z) \\ &+ \int_{A \times Z} d(s,z,C) \; \mathbb{I}\{s - e' \in \mathcal{A}\} \, \mathbb{I}\{e' \in \mathcal{A}\} \, \Gamma^P(z'|z) \, d\lambda_C(a,z) \end{aligned} \tag{3.8}$$

where we skip the dependence of the policy functions on the individual states to economize on notation. The law of motion for the measure of C corporation owners is, for all $\mathcal{A}, \mathcal{Z} \in \mathcal{B}(A) \times \mathcal{B}(Z)$, given by

$$\begin{aligned} \lambda'_C(\mathcal{A}, \mathcal{Z}) &= \int_{A \times Z} (1 - d(s,z,C)) \, \mathbb{I}\{s \in \mathcal{A}\} \, \Gamma^C(z'|z) \, d\lambda_C(a,z) \\ &+ \int_{A \times E \times Z} d(s,z,P) \; \mathbb{I}\{s \in \mathcal{A}\} \, \Gamma^C(z'|z) \, d\lambda_P(a,e,z) \end{aligned} \tag{3.9}$$

where we again skip the dependence of the policy functions on the individual states to economize on notation. The number of pass-through owners $p$ is endogenous in the model

and determined by

$$p = \mu\left(\int_{A\times E\times Z} d\lambda_P\left(a,e,z\right)\right) \tag{3.10}$$

and then by construction the fraction of the C corporation owners is $(1-\mu)(1-p)$. Market clearing for labor requires

$$\begin{aligned}\int_{A\times\epsilon} h\left(a,\varepsilon\right) d\lambda_w\left(a,\varepsilon\right) &= \int_{A\times Z} n^*\left(z\right) d\lambda_C\left(a,z\right) \\ &+ \int_{A\times E\times Z} n\left(a,e,z\right) d\lambda_P\left(a,e,z\right)\end{aligned} \tag{3.11}$$

and market clearing for the capital stock requires

$$\begin{aligned}\int_{A\times Z} k^*\left(z\right) d\lambda_C\left(a,z\right) &= \int_{A\times\epsilon} a'\left(a,\varepsilon\right)\ d\lambda_w\left(a,\varepsilon\right) + \int_{A\times Z} a'\left(a,z\right)\ d\lambda_C\left(a,z\right) \\ &+ \int_{A\times E\times Z} a'\left(a,e,z\right)\ d\lambda_P\left(a,e,z\right)\end{aligned} \tag{3.12}$$

where $a' = s - e'$ for the pass-through entrepreneur and $a' = s$ for the C corporation owner.

**Government.** Government in the model finances an exogenous stream of expenditure $G$ using revenues from the corporate income tax $R_c$, dividend income tax $R_c$ and personal income tax $R_i$, government debt, which are defined as follows:

$$\begin{aligned}R_i &= \int_{A\times\epsilon} T_i\left(wh\varepsilon\right)\ d\lambda_w\left(a,\varepsilon\right) + \int_{A\times E\times Z} T_i\left(\pi\left(e,z\right) - \delta e\right)\ d\lambda_P\left(a,e,z\right) \\ R_d &= \int_{A\times Z} \tau_d\left(D(z) + ra\right)\ d\lambda_C\left(a,z\right) + \int_{A\times E\times Z} \tau_d\left(ra\right)\ d\lambda_P\left(a,e,z\right) + \int_{A\times\epsilon} \tau_d\left(ra\right)\ d\lambda_w\left(a,\varepsilon\right) \\ R_c &= \int_{A\times Z} \tau^c\left(\pi(k^*(z);z) - c_f\right)\ d\lambda_C\left(a,z\right)\end{aligned}$$

Hence the intertemporal government budget constraint becomes

$$G + (1+r)\,B = B' + R_i + R_d + R_c \tag{3.13}$$

**Equilibrium.** The general equilibrium is defined as follows.

**Definition 1** *Given government policy* $\{G, T_i, \tau_d, \tau_c\}$, ***a recursive competitive equilibrium*** *is a set of value functions* $\left\{V^W, V^P, V^C\right\}$, *allocations of workers* $X_W = \{a', c, h\}$, *allocations of pass-through entrepreneurs* $X_P = \{s, c, a', e', d\}$, *allocations of C corporation owners* $X_C = \{s, c, a', d\}$, *allocations of labor for pass-through firms and C corporations* $\{n^*, n\}$,

*allocation of capital for $C$ corporations $\{k^*\}$, prices $\{r, w\}$ and measures $\{\lambda_w, \lambda_P, \lambda_C\}$ such that*

1. *Given prices, allocations $X_W, X_P, X_C$ and value functions $\left\{V^W, V^P, V^C\right\}$ solve respectively problems (3.1), (3.2), (3.3) and (3.5), (3.6).*
2. *Given prices, allocations of labor $\{n^*, n\}$ and capital $\{k^*\}$, solve respectively (3) and (3.4).*
3. *The probability measures $\{\lambda_w, \lambda_P, \lambda_C\}$ evolve according to (3.7), (3.8), (3.9).*
4. *Government budget constraint (3.13) is satisfied.*
5. *Market clearing conditions (3.11), (3.12) hold.*

# 4 Calibration

## 4.1 Model parametrization

In this section we describe the functional forms imposed on the model as well as the calibration strategy. The baseline parameter values and targeted moments are summarized in Table 2 and Table 1.

**Preferences.** We impose the following preferences for the workers

$$u(c, 1-h) = \frac{c^{1-\sigma}}{1-\sigma} - \psi \frac{h^{1+\frac{1}{\theta}}}{1+\frac{1}{\theta}} \tag{4.1}$$

We abstract from the labor supply decision of the entrepreneurs. We set the risk aversion parameter $\sigma$ to 1.5. Frisch elasticity of labor supply, $\theta$ is set to 0.85, closely in line with estimates provided by Chetty et al. (2011). To discipline the discount factor $\beta$ we match in the model the capital to output ratio, we take the mean from 2012 to 2016, which is 1.25, where we define capital as the sum of fixed private assets and durable consumption. The parameter governing disutility of labor, $\psi$, is pinned down by targeting the average hours worked at the household level in the CPS data, where we normalize the total available hours to 1. Hence, we end up with the target value being 0.33.

**Demographics and Technology.** The fraction of workers in the model economy, $\mu$ is exogenous and we discipline it by averaging across waves the fractions of workers in the SCF data, which is 87.9 percent, hence our economy consists of 12.1 percent of entrepreneurs. We impose the following production technology for entrepreneurs

$$f(z,k,n) = z^{1-\nu}\left(k^{\alpha}n^{1-\alpha}\right)^{\nu}$$

The span of control parameter $\nu$ and depreciation rate $\delta$ are disciplined by matching the set of targets specified in Table 2. The elasticity of the capital stock $\alpha$ is disciplined by the labor income share of 0.64. To discipline the fixed cost of running C corporation we target the average fraction of the C corporations among businesses in LBD between 2004 and 2012, which is equal to percent 25 percent. In order to discipline the fixed costs associated with changing the legal form of business organization $f_{PC}$ and $f_{CP}$ we exploit the panel dimension of LBD data and our estimates of the transition matrices between these two legal forms.

**Productivity processes.** We assume labor productivity for workers and entrepreneurs follows the AR1 process governed separate parameters. We also allow for the means of these processes to differ across the occupations. These parameters are mostly pinned down by the labor income inequality statistics, the occupational composition of the top income shares and the total income top shares. The specific targets together with the parameter values are presented in Table 2 and Table 1.

**Tax system.** The tax system in the model consists of three instruments: the corporate income tax $\tau_c$, the dividend income tax $\tau_d$ and the schedule for the personal income tax. We assume that both corporate and dividend income taxes are linear. As for the personal income tax schedule we apply the tax and transfer formula introduced into the class of models with heterogenous agents by Benabou (2002) and used also by Heathcote et al. (2017b) and Ferrière and Navarro (2018):

$$T(y) = y - \lambda_y y^{1-\tau_y}$$

The parameter $\tau_y$ determines the degree of progressivity of the tax system and the second parameter, $\lambda_y$, shifts the tax function and determines the average level of taxation in the economy.

In order to discipline the corporate income tax, we compute the time series of the average corporate income tax rate following the method proposed by McGrattan and Prescott (2005). We average the tax rate from 2012 to 2016 and set it to 19.7 percent. We discipline the linear

Table 1: Model Parameters

| Parameter | Symbol | Discipline | Value |
|---|---|---|---|
| **Externally calibrated** | | | |
| Fraction of workers | $\mu$ | SCF data | 0.88 |
| Risk aversion | $\gamma$ | - | 1.50 |
| Frisch elasticity | $\nu$ | - | 0.85 |
| **Internally calibrated** | | | |
| Discount factor | $\beta$ | Targets in Table 2 | 0.99 |
| Depraciation rate | $\delta$ | Targets in Table 2 | 0.14 |
| Labor disutility | $\psi$ | Targets in Table 2 | 2.76 |
| Borr.constraint | $\underline{a}$ | Targets in Table 2 | -0.14 |
| Returns to scale | $\nu$ | Targets in Table 2 | 0.83 |
| Persistance ent. | $\rho_z$ | Targets in Table 2 | 0.91 |
| Std ent. product. | $\sigma_z$ | Targets in Table 2 | 0.41 |
| Mean prod. wor. | $\mu_w$ | Targets in Table 2 | 1.05 |
| Persistance wor. | $\rho_w$ | Targets in Table 2 | 0.88 |
| Std wor. product. | $\sigma_w$ | Targets in Table 2 | 0.36 |
| Fixed cost C corp. | $c_f$ | Targets in Table 2 | 0.05 |
| Mean switching cost | $c_s$ | Targets in Table 2 | 16.62 |
| Extreme value shock std | $\sigma_c$ | Targets in Table 2 | 3.64 |
| Scaling C corp. productivity | $\theta_z$ | Targets in Table 2 | 1.10 |
| Probability shifter for C corp. | $\theta_{f1}$ | Targets in Table 2 | 0.59 |
| Probability power for C corp. | $\theta_{f2}$ | Targets in Table 2 | 1.09 |
| Probability of staying in the top state | $q$ | Targets in Table 2 | 0.18 |

Table 2: Target Statistics and Model Counterpars

| **Statistic** | **Source** | **Model** | **Target** |
|---|---|---|---|
| Capital/Output | NIPA | 1.25 | 1.25 |
| Investment/Output | NIPA | 0.14 | 0.13 |
| Avg Labor Supply | CPS | 0.34 | 0.33 |
| Gini Income | SCF | 0.62 | 0.65 |
| Gini Ent Income | SCF | 0.64 | 0.67 |
| Gini Wor Income | SCF | 0.59 | 0.62 |
| Share ABOs Income Top 10 | SCF | 0.40 | 0.37 |
| Top 1 Wor Inc Share | SCF | 0.15 | 0.19 |
| Top 10 Wor Inc Share | SCF | 0.42 | 0.45 |
| Top 1 Ent Inc Share | SCF | 0.20 | 0.23 |
| Top 10 Ent Inc Share | SCF | 0.49 | 0.53 |
| Fraction of P ent | LBD | 0.80 | 0.81 |
| Emp Share of P ent | LBD | 0.64 | 0.57 |
| Flow CP | LBD | 0.02 | 0.01 |
| Flow PC | LBD | 0.004 | 0.002 |
| Logit CH | SCF | -1.02 | -1.08 |
| Logit Prof. | SCF | -0.87 | -0.93 |
| Logit CH&Prof. | SCF | 0.17 | 0.06 |

dividend income tax by the data on the average marginal dividend income tax computed using TAXSIM. We take the mean of the averages from 2012 to 2012 and set it to 27.7 percent. To estimate the progressivity parameter $\tau_y$ we exploit the data on the average marginal income tax on wages, salaries and entrepreneurial income provided by Mertens and Olea (2018) as well as the data from the IRS. We average the progressivity measure from 2012 to 2016 and set $\tau_y$ to 0.095. Finally, the $\lambda_y$, which controls the average level of personal income taxes, is pinned down by the average tax revenues to GDP in NIPA between 2012 and 2016, which were equal 21.0 percent.

## 4.2 Selection into the legal forms: model vs. data

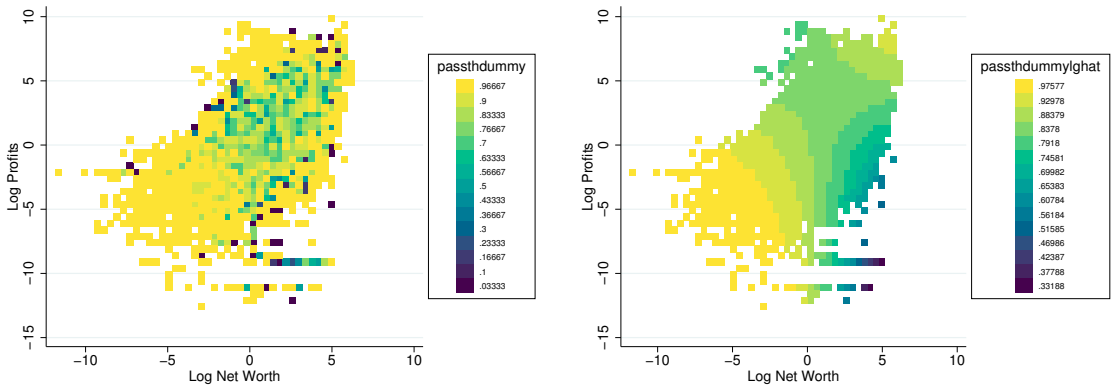
Figure 1 presents the selection into the legal form of organization in the SCF data and the quantitative model. We present two statistics informative about the selection. The left panels in both figures illustrate the empirical distributions of pass-through businesses over profits and wealth. The right panels present the results of the logit regression, which links pass-

through form to profits and wealth. To run the logit regression we split the SCF population into workers and Active Business Owners (ABO) and attach the legal form of organization to each ABO. Next, we run for the ABOs the following logistic regression:

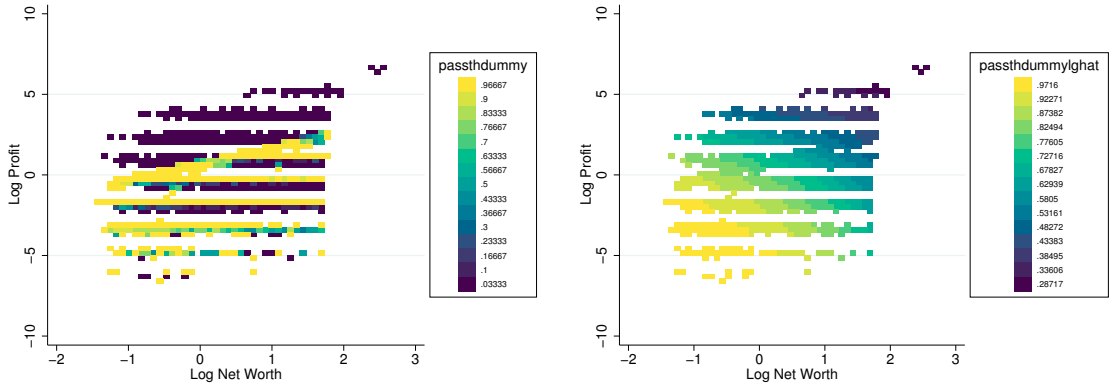
$$\Pr\left(D_{it}=1\right)=F\left(\mu_t+\gamma_1\log\Pi_{it}+\gamma_2\log X_{it}+\gamma_3\log\Pi_{it}\times\log X_{it}\right)$$

where $D_{it}$ is the pass-through dummy, $\mu_t$ is the year fixed effect, $\Pi_{it}$ are profits, $X_{it}$ is the net worth and $F\left(x\right)=\frac{e^x}{1+e^x}$. We use the following SCF waves $t\in\{2004,2007,2010,2013,2016\}$. Under both measures it is clear, that the model replicates increasing number of C corporation as profits are rising, i.e. larger and more profitable businesses are organized as C corporations. However, the model falls short of replicating precisely falling number of pass-through businesses along wealth dimension for a given profit level.

Figure 1: Conditional Probability of observing the pass-through - empirical distribution (left panel), logit regression (right panel). Data (top panel) vs. data (bottom panel)




Notes: SCF waves 2004-2016, the variables are deviations from annual average




Notes: The variables are deviations from average

# 5 Optimal Policy Experiments

## 5.1 Social Welfare Function

In order to evaluate tax policies we use the concept of the average social welfare function. We define it separately for workers and entrepreneurs. For workers we have

$$SWF_w(\mathcal{T}) = \int_{A\times Z} V_1^W(a,\varepsilon;\mathcal{T})\, d\lambda_0(a,\varepsilon) \tag{5.1}$$

where $V_1^W(a,\varepsilon;\mathcal{T})$ is the value function in the first period of the transition induced by new tax system $\mathcal{T}$ and $\lambda_0(a,\varepsilon)$ is the initial distribution of workers in the stationary equilibrium under the status quo policy. For the entrepreneurs we first transform the problems 3.3 and 3.2, using cash on hand, $x$, that entrepreneur has after the production took place and before consumption, savings and investment decisions have been made. The details of this procedure are described in the Appendix. Next, we define the welfare function for entrepreneurs as

$$SWF_e(\mathcal{T}) = \int_{X\times Z} pV_1^P(x,z;\mathcal{T})\, d\lambda_{0P}(x,z) + (1-p)\, V_1^C(x,z;\mathcal{T})\, d\lambda_{0C}(x,z) \tag{5.2}$$

where $V_1^P(x,z;\mathcal{T})$ and $V_1^C(x,z;\mathcal{T})$ are the value functions in the first period of the transition induced by new tax system $\mathcal{T}$ and $\lambda_{0P}(x,z)$, $\lambda_{0P}(x,z)$ are the initial distributions of pass-through businesses and C corporations respectively in the stationary equilibrium under the status quo policy. With the two welfare measures defined by 5.1 and 5.2 we define the social welfare function for the whole population as the weighted sum of the two, i.e.

$$SWF(\mathcal{T}) = \mu\, SWF_w(\mathcal{T}) + (1-\mu)\, SWF_e(\mathcal{T}) \tag{5.3}$$

where $\mu$ is the fraction of workers in the population.

## 5.2 Optimal Tax System

In our optimal policy analysis we seek for the levels of corporate income tax and progressive tax schedule, which maximize the social welfare function defined in 5.3. Therefore, given initial conditions $(K_0, B_0)$, initial fiscal policy $\{\tau_{c,0}, \tau_{y,0}, \lambda_{y,0}\}$ and cross-section of agents determined by a stationary equilibrium, the optimal tax reform is defined as the sequence $\mathcal{T}^* = \{\tau_{c,t}, \tau_{y,t}, \lambda_{y,t}\}_{t=0}^{\infty}$ that maximizes the social welfare function, i.e., that solves, i.e. we

aim to solve the following problem:

$$\mathcal{T}^* \in \arg\max_{\mathcal{T}\in\Gamma} SWF(\mathcal{T})$$

Here $\Gamma$ is the set of policies for which an associated competitive equilibrium exists. Unfortunately, the set $\Gamma$ is too large a policy space to optimize over in our model.[6] Therefore, our objective here is to characterize the optimal one-time policy reform, by restricting the sequences that are being optimized over to:

$$\tau_{c,t} = \tau_{c,1}$$
$$\tau_{y,t} = \tau_{y,1}$$

for all $t \geq 1$. To make sure that the budget constraint is satisfied we adjust $\lambda_{y,t}$ so that the tax revenues to GDP stay at the initial stationary equilibrium level, thus all our reform scenarios are *revenue neutral*. Also all admissible policies defined by $\{\tau_{c,0}, \tau_{y,0}, \lambda_{y,0}\}$ have to lie in $\Gamma$, from the definition of equilibrium there must be an associated sequence of $B$ such that the government budget constraint is satisfied in every period. This imposes further restrictions on the set of possible triples $\{\tau_{c,0}, \tau_{y,0}, \lambda_{y,0}\}$ over which the optimization of the social welfare function is carried out, i.e., the path of government debt has to be consistent with initial conditions and a long-run stationary equilibrium.

## 5.3 The Optimal Tax System - current U.S. legal framework

In this section we describe the optimal tax under current U.S. legal framework with the join tax schedule for workers and pass-through entrepreneurs. We relax this restriction in the following section. Table 3 presents the results from the experiment. We start by maximizing the social welfare defined in 5.3, which is labeled as Optimal Tax System in Tables 3 and 4. The optimal tax system calls for the increase in the progressivity from 0.10 to 0.14. At the same time the corporate income tax is drastically reduced from 19.7 percent to 0.0 percent. The fiscal closure parameter, which controls the level of the average tax rises from 0.24 to 0.30. The policy yields significant average welfare gain for entrepreneurs equal to 7.01 percent of lifetime consumption and average welfare gain for workers is 1.37 percent of lifetime consumption. As a result the average welfare gain for the population is 2.05 percent of lifetime consumption. Alternatively, we look for the policies, which maximize

[6] Dyrda and Pedroni (2022) solve a full-blown Ramsey problem with time-varying policy in the standard incomplete markets model.

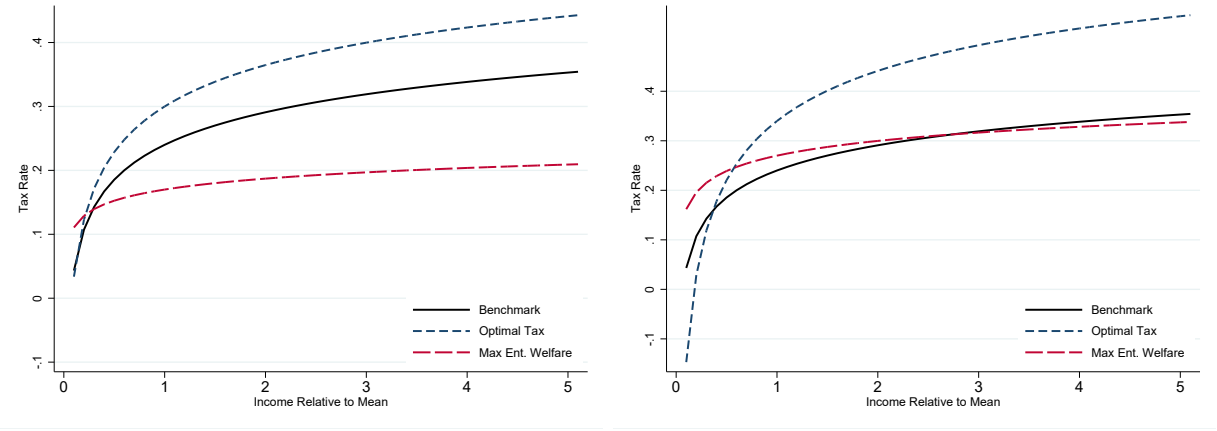
Table 3: Current Legal Framework: The Optimal Tax Schedules

| | **Baseline Economy** | **Optimal Tax System** | **Max. Entr. Welfare** |
|---|---|---|---|
| Progressivity, $\tau_y$ | 0.10 | 0.14 | 0.03 |
| Corporate Income Tax, $\tau_c$ | 0.20 | 0.00 | 0.00 |
| Fiscal closure, $1 - \lambda_y$ | 0.24 | 0.30 | 0.17 |
| Debt to GDP | 1.02 | 1.02 | 1.02 |
| Revenues to GDP | 0.21 | 0.21 | 0.21 |
| $\Delta SWF_w(\%)$ | - | 1.37 | -1.09 |
| $\Delta SWF_e(\%)$ | - | 7.01 | 8.84 |
| $\Delta SWF(\%)$ | - | 2.05 | 0.12 |
| % of Pass-Throughs | 80.4 | 14.0 | 28.1 |

entrepreneurial welfare. Unsurprisingly, maximizing welfare of entrepreneurs calls for further reduction of tax-transfer schedule progressivity with progressivity parameter equal to 0.03 and the corporate income tax rate still set at 0.0 percent. The average tax rate of labor and pass-through income is reduced, with the fiscal closure parameter equal to 0.17. Such policy is welfare detrimental for workers who loose -1.09 percent of lifetime consumption, whereas the entrepreneurs gain as much as 8.84 percent of lifetime consumption, which averages to the societal welfare gain of 0.12 percent. The optimal tax-transfer schedules are presented in Figure 2. The optimal tax schedule increases the average taxes for almost all of the income's levels while increasing mildly the progressivity of the system. The opposite is true for the schedule which maximizes the entrepreneurial welfare.

**Macroeconomic effects of the tax reform.** Macroeconomic effects of the optimal policy are presented in Table 4. Optimal tax system induces business owners to massively switch towards C corporations, the fraction of pass-through businesses falls to 14.0 percent. As a result the economy experiences the reallocation labor and capital towards larger and more efficient firms, which has consequences for the macroeconomic aggregates. The aggregate output increases by 3.3 percent, the aggregate capital by 17.7 percent, whereas the employment falls by 0.7 percent. Reallocation of capital leads to increase of wages, which is beneficial for workers and drives welfare gains for them up. As an alternative we solve for the optimal policy, which maximizes the welfare of entrepreneurs. This experiment is much closer in spirit to finding the policy, which maximizes the efficiency of allocation in the model economy. The

Figure 2: The Optimal Tax-transfer Schedules: Current US legal framework (left panel) and uniform business tax (right panel)




aggregate picture of the outcomes are even better relative to the baseline economy. Steep reduction in the progressivity of the tax system pushes labor supply up, which is reflected in the increase of employment by 1.7 percent. Both output and capital increase by 4.9 and 17.9 percent accordingly. The policy also leads to a decline, relative to the baseline economy, in the fraction of pass-through businesses to 28.1 percent. However, relative to maximizing population welfare the policy doubles the fraction of pass-throughs, which results from lowering overall tax burden for this legal form.

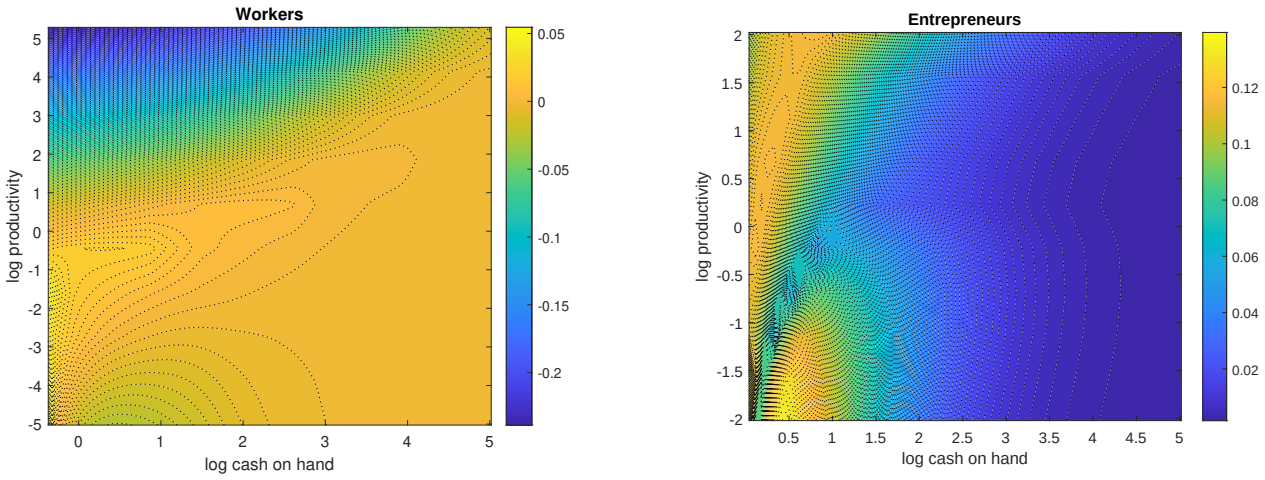
**Conditional welfare changes.** Figures 3-4 present the conditional welfare measures associated with the two reform experiments we conduct. They are presented in the cash-on-hand and productivity space for both workers and entrepreneurs, hence every individual state variables pair in the initial equilibrium has a separate welfare measure. Rich and productive workers loose following the optimal tax reform, as it increases the progressivity of the tax-transfer system. On the other hand, unproductive entrepreneurs are among the beneficiaries of the tax reform, as they change their legal form of organization to C corporations. Quite the opposite is true for the maximization of entrepreneurs welfare. The wealthies and most productive workers benefit from flattering the tax-transfer schedule and from reducing the overall tax burden. Almost all entrepreneurs on the other hand benefit from the reform.

Table 4: Current Legal Framework: Macro Aggregates

| | **Baseline Economy** | **Optimal Tax System** | **Max. Entr. Welfare** |
|---|---|---|---|
| Employment | 0.49 | 0.48 | 0.49 |
| Output | 0.38 | 0.39 | 0.40 |
| Capital | 0.40 | 0.47 | 0.47 |
| Wage | 0.50 | 0.52 | 0.52 |
| Employment C | 0.12 | 0.44 | 0.38 |
| Employment P | 0.37 | 0.04 | 0.11 |
| Output C | 0.09 | 0.36 | 0.31 |
| Output P | 0.29 | 0.03 | 0.09 |
| % of Pass-Throughs | 80.4 | 14.0 | 28.1 |

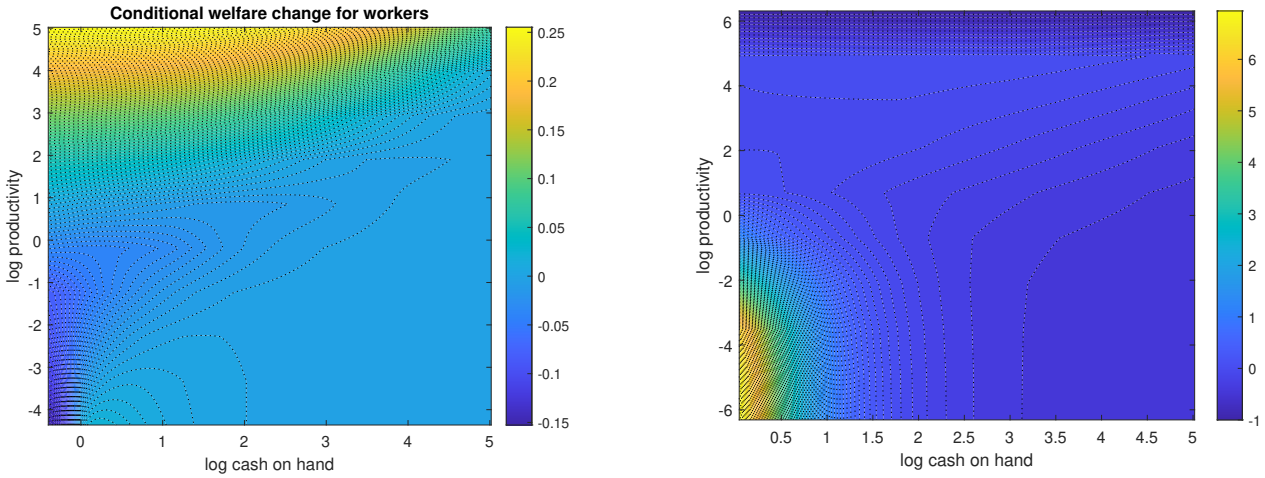
**Distributional effects of the reform.** The optimal tax reform under the current legal framework leads to mild changes in distribution of income in the economy, which are summarized in Table 5. Gini coefficient falls under both welfare criterions. The inequality at the very top of the income distribution (Top 1 Percent Share) rises by about 1 percentage points, whereas the share of income of the top 10 percent falls. The optimal tax reform changes the dispersion of income among entrepreneurs. The Gini coefficient rises from 0.64 to 0.71 in maximizing the overall welfare case and to 0.788 in case of maximizing the entrepreneurial welfare. Finally, the composition of distribution of income at the top changes, with fraction of active business owners falling under both welfare criterions.

Figure 3: Consumption equivalence of optimal tax rates under CLF (Optimal Tax System)




(a) Workers (b) Entrepreneurs

Figure 4: Consumption equivalence of optimal tax rates under CLF (Max. Entreprenurs Welfare)




(a) Workers (b) Entrepreneurs

## 5.4 Uniform taxation of business profits

In this section we relax the assumption imposed in the current US law and allow for the uniform taxation of business income independent on the legal form of business organization. At the same time we abandon the double taxation of profits for C corporations. Thus, under this scenario the profits of the C corporations and pass-throughs are subject to the same tax rate, hence the name of the scenario - uniform taxation of business income. The budget constraints for C corporation in problem 3.3 and for the pass-through entity in problem 3.2

Table 5: Current Legal Framework: Inequality Statistics

| | **Baseline Economy** | **Optimal Tax System** | **Max. Entr. Welfare** |
|---|---|---|---|
| Gini Population | 0.62 | 0.58 | 0.60 |
| Top 1% Share (%) | 15.2 | 16.3 | 16.2 |
| Top 10% Share (%) | 45.1 | 43.5 | 44.0 |
| Gini Workers | 0.59 | 0.60 | 0.61 |
| Gini Entrepreneurs | 0.64 | 0.71 | 0.78 |
| % of ABOs in Top 10% | 40.0 | 25.6 | 33.1 |
| % of Pass-Throughs | 80.4 | 14.0 | 28.1 |

become accordingly:

$$\begin{aligned} c+s &= a+(1-\tau_d)ra+(1-\tau_b)(f_z(k^*;n^*;z')z'-c_f) \\ c+s &= a+y+e-(1-\tau_d)ra+(1-\tau_b)\left(\pi-\delta e\right) \end{aligned}$$

where $\tau_b$ is the uniform, linear tax rate imposed on all the business income. The safe asset income remains taxed according to the dividend income tax code for all agents in the economy. Importantly under this scenario we do not change the number of instruments available to the planner, it still can set optimally three taxes. We do however reshuffle the tax base, which as we argue below is sufficient to generate higher welfare relative to the reform conducted under the current legal framework.

We again start by maximizing the social welfare defined in 5.3, which is labeled as Optimal Tax System in Tables 6 and 7. The optimal tax system calls for an significant increase in the progressivity parameters, which rises from 0.095 to 0.24. This drives up the welfare gains for the workers. At the same time the business profit tax is set to 31 percent. This level of the business profit tax should be compared, for C corproations, with the sum of the dividend income tax and corporate profits tax in the baseline economy, which was 48 percent. The fiscal closure parameter, which controls the level of the average tax increases from 0.24 to 0.34. The policy yields significant average welfare gain for entrepreneurs equal to 12.7 percent of lifetime consumption and average welfare gain for workers is 2.6 percent of lifetime consumption. As a result the average welfare gain for the population is 3.9 percent of lifetime consumption. This number *strictly dominates* the welfare gains obtained under the existing restrictions of the current US tax system. Alternatively, we also look for the

Table 6: Uniform Business Profit Tax: The Optimal Tax Schedules

| | **Baseline Economy** | **Optimal Tax System** | **Max. Entr. Welfare** |
|---|---|---|---|
| Progressivity, $\tau_y$ | 0.10 | 0.24 | 0.06 |
| Uniform Business Tax, $\tau_b$ | 0.20* | 0.31 | 0.09 |
| Fiscal closure, $1-\lambda_y$ | 0.24 | 0.34 | 0.27 |
| Debt to GDP | 1.02 | 1.02 | 1.02 |
| Revenues to GDP | 0.21 | 0.21 | 0.21 |
| $\Delta SWF_w(\%)$ | - | 2.63 | -4.38 |
| $\Delta SWF_e(\%)$ | - | 12.72 | 29.11 |
| $\Delta SWF(\%)$ | - | 3.85 | -0.32 |

Notes: 0.20 is a corporate income tax, which should be added to 0.28 of dividend tax.

policies, which maximize entrepreneurial welfare and report them in the last columns of Tables 6 and 7. Again, this experiment illustrates sharp contrast between the interests of workers and entrepreneurs. Maximizing welfare of entrepreneurs calls for a decline in the progressivity of the tax-transfer schedule to 0.06 and for the business profits tax at rate of 9 percent. Such policy is welfare detrimental for workers who loose 4.4 percent of lifetime consumption, whereas the entrepreneurs gain as much as 29.1 percent of lifetime consumption, which averages to the societal welfare loss of 0.3 percent. The optimal tax-transfer schedules are presented in Figure 2. The contrast between the policy, which maximizes workers and entrepreneurs welfare is very sharp, high business profit tax under the optimal tax system finances the transfers towards the workers who dominate the welfare function.

**Macroeconomic effects of the tax reform.** Macroeconomic effects of the tax reform are illustrated in Table 7. Optimal Tax System policy induces business owners to switch towards pass-through businesses, the fraction of pass-throughs increases from 80.4 to 95.4 percent. Elimination of tax progressivity for the pass-thorugh business owners dominates the elimination of double taxation of profits for the C corporation owners, who also face fixed cost of operation, and as a result the share of pass-throughs rises following the reform. Even though this policy induces reallocation of economic activity towards pass-through businesses the allocation of capital improves in the economy, following lower distortions on the capital accumulation margin and the capital stock increases by 5.2 percent. Strongly progressive tax-transfer system reduces labor supply in the economy and as a result employment falls by

Table 7: Uniform Business Profit Tax: Macro Aggregates

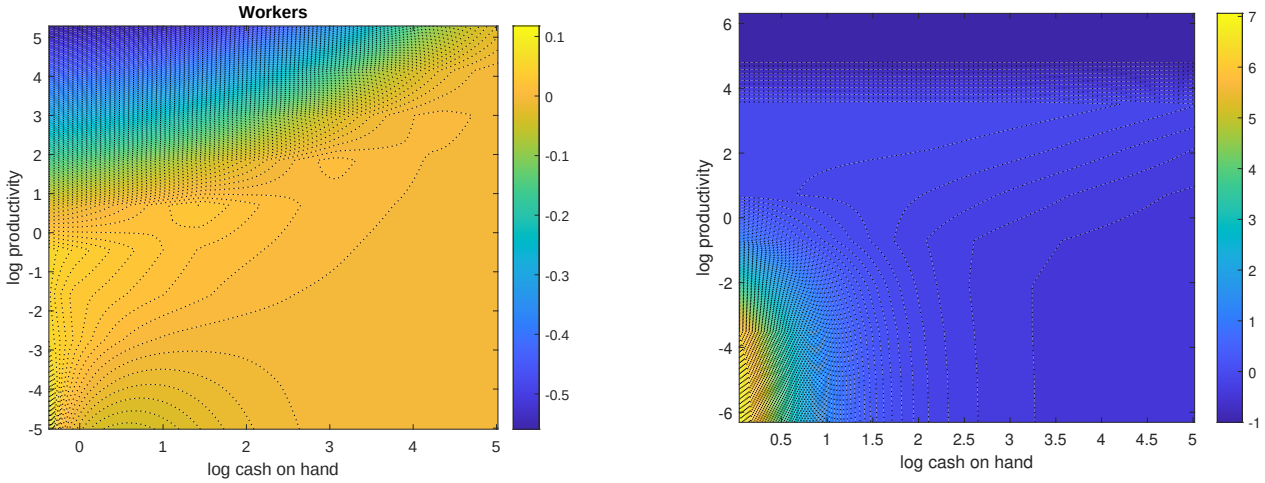
| | **Baseline Economy** | **Optimal Tax System** | **Max. Entr. Welfare** |
|---|---|---|---|
| Employment | 0.49 | 0.47 | 0.50 |
| Output | 0.38 | 0.37 | 0.40 |
| Capital | 0.40 | 0.42 | 0.46 |
| Wage | 0.50 | 0.51 | 0.51 |
| Employment C | 0.12 | 0.02 | 0.28 |
| Employment P | 0.37 | 0.44 | 0.22 |
| Output C | 0.09 | 0.02 | 0.22 |
| Output P | 0.29 | 0.35 | 0.17 |
| % of Pass-Throughs | 80.4 | 95.0 | 48.7 |

3.9 percent and output declines by 1.2 percent. In case we maximize entrepreneurial welfare a very steep reduction in the business profit tax to 9 percent togethere with abolishing of the double profit taxation makes C corporations attractive and economic activity is realloated largely to this sector. The fraction of pass-throughs falls by 32 percentage points. Lower distortions on the capital accumulation margin imply the rise of the capital stock by 15.5 percent. Less insurance and redistribution provided to workers due to decrease productivity together with increased demand for labor boosts employment by 2.2 percent. As a result aggregate output rises by 4.6 percent.

**Conditional welfare changes.** Figures 6-7 present the conditional welfare measures associated with the two reform experiments we conduct. Qualitative patterns among workers are similar to the ones in the reform under the current legal framework. A sharp increase in progressivity of the tax-transfer system benefits mostly less productive, poorer households. As for the entrepreneurs, those with the lowest productivity and lowest cash on hand benefit the most from the tax reform, under both welfare criteria.

**Distributional effects of the reform.** The inequality effects of the optimal tax reform under the uniform business profit Tax scenario are presented in Table 8. Relative to the reform under the current legal framework, this reform induces small changes in the inequality. The the Optimal Tax System we observe that Gini coefficients and top income shares barely move. Also the composition of the top income shares stays relatively unchange, with fraction of active business owners increasing by 2.5 percentage points in the top 10 percent of income

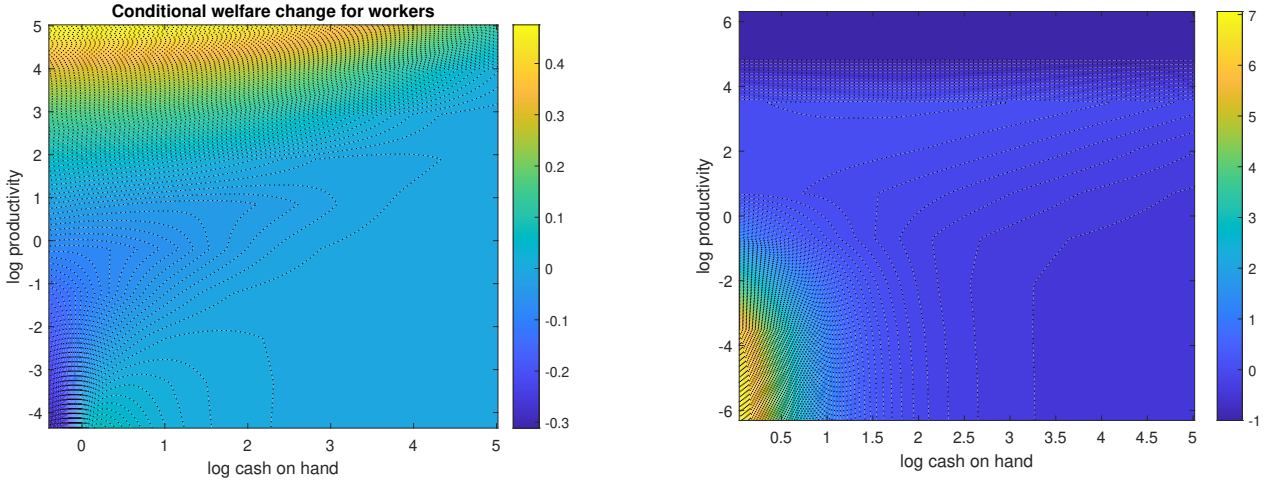
Figure 6: Consumption equivalence of optimal tax rates under CLF (Optimal Tax System)




(a) Workers

(b) Entrepreneurs

Figure 7: Consumption equivalence of optimal tax rates (Max. Entreprenurs Welfare)




(a) Workers

(b) Entrepreneurs

Table 8: Uniform Business Profit Tax: Inequality Statistics

| | **Baseline Economy** | **Optimal Tax System** | **Max. Entr. Welfare** |
|---|---|---|---|
| Gini Population | 0.62 | 0.63 | 0.60 |
| Top 1% Share (%) | 15.2 | 16.3 | 16.9 |
| Top 10% Share (%) | 45.1 | 47.3 | 44.8 |
| Gini Workers | 0.59 | 0.57 | 0.61 |
| Gini Entrepreneurs | 0.64 | 0.62 | 0.73 |
| % of ABOs in Top 10% | 40.0 | 42.5 | 38.2 |
| % of Pass-Throughs | 80.4 | 95.0 | 48.7 |

distribution. The optimal policy under maximizing entreprenurial welfare case has the largest impact on the conditional distribution of income among entrepreneurs. Gini for entrepreneurs rises from 0.62 to 0.73. Also, the composition of the right tail of income distribution changes, there are less entrepreneurs at the top.

# 6 Conclusions

We study a design of the optimal tax system in an economy featuring active business owners running closely held, highly profitable businesses–a.k.a. capitalists in the twenty-first century. In line with the current U.S. law, they choose a legal form of firm's organization between a pass-through entity and a C corporation, which determines the way their business income is taxed. Our key finding is that the optimal policy under the uniform business taxation scenario *strictly dominates* in terms of welfare the optimal policy computed under the current legal framework. Separation of labor income taxation from business income taxation enables the Ramsey planner to separate distortions on the labor supply margin from the distortions on the productive capital accumulation and the choice of the legal form of business organization margins.

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# A Appendix

## A.1 Overview of the legal forms of business organizations in the United States

Table 9: Main Characteristics of Legal Forms of Businesses Organizations

| | Number of Owners | Liability Protection | Taxation of Profits |
|---|---|---|---|
| Sole Properietorship | 1 | No | Pass-through |
| General Partnership | More than 1 | No | Pass-through |
| Limited Partnership | 1+ | No for partners<br>Yes for limited part. | Pass-through |
| LLC* | 1+ | Yes | Pass-through |
| S Corporation | $1-100$ | Yes | Pass-through |
| C Corporation | 1+ | Yes | Entity level |

Notes: LLC - Limited Liability Company.

Business owners in the United States may organize their enterprises in a variety of ways, subject to the applicable laws of their state. The choice would usually reflect their needs for capital, as for flexibility, and to limit their personal liability for any business debts by their business equity. The choice of the organizational form also determines how a business will be taxed at the federal level. An early and fundamental decision the owner must make is whether to incorporate. Corporations may have an unrestricted number and type of owners, and the typically have four characteristics: (i) limited liability (ii) centralized management (iii) free transferability of interest (iv) continuity of life. Limited liability implies that each owner's liability for the debts of the firm is limited to the amount of his or her investment. The centralized management means that the decision making belongs to the board of directors and not directly to the general owners. Free transferability of interest implies that each owner may sell his or her interest without the permission of the other owners. The continuity of life ensures that the firm does not automatically dissolve upon the death, bankruptcy, or withdrawal of the owner. These capabilities of an incorporated business are desirable, if not essential, for a growing business with significant need for outside equity. However, for a smaller scale business the flexibility of a corporate organizational form may be unnecessary.

The decision about incorporation affects how a business is taxed, but it is not the only one. All the unincorporated businesses are taxed in the same way but not all the corporations

are taxed identically. The main legal forms of organization in the United States are: (i) sole proprietorship (ii) general partnership (iii) limited partnership (iv) limited liability company (iv) S corporation (v) C corporation. Their main characteristics are illustrated in Table 9. In terms of limited liability the owners of sole properietorship and general partnership are not protected from the debts of the firm, whereas other unincorporated businesses (limited partnership, LLCs) offer some or full protection. In terms of the taxation, C corporation pay the corporate income tax on their profits at the entity level. Then, whenever the after-tax profits are distributed to the shareholders in forms of the dividends, shareholders pay dividend income tax. Also, shareholders pay tax on any capital gains they realize when they sell shares of stock in the corporation. The profits of an S corporation "pass through" to its owners income taxes according to each owners equity stake in the business. The cost of this simplicity is rigid rules on the type and number of S corporation shareholders.[7] S corporations, along with the other unincorporated legal forms do not pay corporate income tax on profits. Instead, all profits pass through to their owners, who pay individual income tax on them, independently on whether the profits were actually distributed or not. Hence, the common names for these businesses - "pass-through" entities.

## A.2 Numerical algorithms

To economize on the individual state variables we rewrite problems in terms of cash on hand. Let $x$ to be cash on hand that entrepreneur has after the production took place and before consumption, savings and investment decisions have been made. Then, the continuation value depends on the legal form of organization and denote $x'_C$ and $x'_P$ to be respectively the continuation value in case entrepreneur chooses to run C corporation and continuation value in case entrepreneur chooses to run pass-through entity. Thus, we have for the C corporation

$$\begin{aligned} x'_C &= y'_C(z') + a' - T_i(ra') - T_d\left(f_z\left(k^*(z)\right)z'\right) + T - c_f \qquad \forall z' \\ y'_C(z') &= ra' + f_z\left(k^*(z)\right)z' \qquad \forall z' \end{aligned}$$

[7] S corporations must be a domestic corporation with at most 100 individual share holders (an S corp cannot be a subsidiary of another corporation or partnership) with only one class of stock. Certain types of businesses such as those in financial services are also ineligible. See https://www.irs.gov/businesses/small-businesses-self-employed/s-corporation

and for the pass-through entrepreneurs we have

$$\begin{aligned} x'_P &= y'_P(z') + a' + (1-\delta)e' - T_i\left(y'_P(z') - \delta e'\right) + T \quad \forall z' \\ y'_P(z') &= ra' + \pi(e', z') \quad \forall z' \end{aligned}$$

With these continuation values at hand one can rewrite the problem of C corporation entrepreneur as

$$\begin{aligned} V(x,z,C) &= \max_{c,a',d_C} u(c) + \beta\mathbb{E}\left[d_C V\left(x'_C(z'), z', C\right) + (1-d_C)\mathbf{1}_{\{a'\geq k^*(z)\}} V\left(x'_P(z'), z', P\right)\right] \\ &\quad \text{subject to} \qquad (A.1) \\ x'_C &= y'_C(z') + a' - T_i(ra') - T_d\left(f_z(k^*(z))z'\right) + T - c_f \quad \forall z' \\ x'_P &= y'_P(z') + a' + (1-\delta)k^*(z) - T_i\left(y'_P(z') - \delta k^*(z)\right) + T \quad \forall z' \\ y'_C(z') &= ra' + f_z(k^*(z))z' \quad \forall z' \\ y'_P(z') &= ra' + \pi(k^*(z), z') \quad \forall z' \\ x &= a' + c \\ a' &\geq \underline{a} \end{aligned}$$

and the problem of the pass-through entrepreneur as

$$\begin{aligned} V(x,z,P) &= \max_{c,a',d_P} u(c) + \beta\mathbb{E}\left[d_P V\left(x'_P(z'), z', P\right) + (1-d_P)V\left(x'_C(z'), z', C\right)\right] \\ &\quad \text{subject to} \qquad (A.2) \\ x'_C &= y'_C(z') + a' + e' - T_i\left(r(a'+e')\right) - T_d\left(f_z(k^*(z))z'\right) + T - c_f \quad \forall z' \\ x'_P &= y'_P(z') + a' + (1-\delta)e' - T_i\left(y'_P(z') - \delta e'\right) + T \quad \forall z' \\ y'_C(z') &= r(a'+e') + f_z(k^*(z))z' \quad \forall z' \\ y'_P(z') &= ra' + \pi(e', z') \quad \forall z' \\ x &= a' + e' + c \\ a' &\geq \underline{a} \end{aligned}$$