Taxation of Top Incomes and Tax Avoidance*

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October 23, 2024

Abstract

This paper studies the aggregate and distributional effects of raising the top marginal income tax rate in the presence of entrepreneurial tax avoidance. To this end, we develop a quantitative macroeconomic model with heterogeneous agents and occupational choice in which entrepreneurs can avoid taxes in two ways. On the extensive margin, entrepreneurs can choose the legal form of their business organization to reduce their tax burden. On the intensive margin, entrepreneurs can shift their income between different tax bases. In a quantitative application to the US economy, we find that tax avoidance weakens the distortionary effects of higher income taxes at the top but makes them ineffective at lowering inequality. Eliminating tax avoidance by implementing an equal tax treatment of entrepreneurs across all legal forms of business organization substantially increases tax revenue, aggregate output, and welfare.

JEL Classifications: E21, E62, H25, H26, H32.

Keywords: Tax avoidance, top income tax rate, occupational choice, legal form of organization, wealth inequality, incomplete markets, heterogeneous agents.

*We are grateful to Dirk Krueger and the anonymous referees for very useful comments and suggestions. We thank Job Boerma, Dean Corbae, Leo Kaas, Alex Ludwig, Paolo Martellini, Ananth Seshadri and seminar participants at the Free University Berlin, Goethe University Frankfurt, the University of Konstanz, the University of Vienna, the University of Wisconsin-Madison, Queen Mary University of London and conference audiences at the CEF 2021, ASSA 2022, EEA 2022, the First U. Barcelona Macro Workshop, the annual meetings of the German Economic Association 2022, and the SED 2023 for their insightful comments and suggestions. We thank the German Research Foundation (grant No. SCHO 1442/2-1) for financial support. Alessandro Di Nola thanks the AGAUR - Generalitat de Catalunya (project 2021 SGR 00862) and the Spanish Ministry of Science, Innovation and Universities (PID2022-139468NB-I00) for financial support. The views expressed in this paper represent the authors' personal opinions and do not necessarily reflect the views of the Deutsche Bundesbank, the European Central Bank, or the Eurosystem.

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1 Introduction

In the US, increasing top-income shares have stimulated an academic and political debate on how to tax the rich. It is well known that progressive income taxation may induce behavioral responses shaping the trade-off between equity and efficiency. When assessing the economic consequences of taxing top incomes, it is, therefore, crucial to account for the characteristics of rich households and their behavioral responses to marginal tax rates. In this respect, two empirical facts are of key importance. First, there is a high concentration of entrepreneurs with small and medium-sized businesses at the top of the US income distribution (Smith et al., 2019). Second, the estimated response of reported income to marginal tax rates is larger for the top 1% income earners compared to the rest of the population. This difference may be attributed to tax avoidance and suggests that entrepreneurs effectively reduce their tax burden (Mertens and Montiel Olea, 2018; Saez et al., 2012).

These empirical facts highlight the importance of understanding entrepreneurial decisions and tax avoidance when assessing the aggregate and distributional consequences of taxing top incomes. This paper focuses on two main research questions. First, how does tax avoidance by entrepreneurs affect macroeconomic outcomes and welfare? And, second, how does the top marginal income tax rate impact equity and efficiency in the presence of tax avoidance?

To answer these questions, we introduce entrepreneurial tax avoidance in a dynamic general equilibrium model with incomplete markets and occupational choice following Cagetti and De Nardi (2006), Quadrini (2000), and Kitao (2008). Households are heterogeneous in wealth, working ability, and entrepreneurial talent and decide every period whether to be a worker or entrepreneur. Entrepreneurs can avoid taxes in two ways. On the extensive margin, entrepreneurs can choose the legal form of their business organization to reduce their tax burden. On the intensive margin, they can shift their income between different tax bases. Entrepreneurs invest in capital, hire labor, and use a decreasing return to scale production technology to produce the consumption good. Entrepreneurs are credit-constrained in their investment decisions facing a borrowing limit proportional to their net wealth, and the limit depends on the legal form of business organization. The government collects personal income, corporate, and dividend taxes to finance government spending. Moreover, the government raises a social security tax to provide pension benefits to retirees. In addition to the entrepreneurial sector consisting of small and medium-sized businesses, a non-entrepreneurial sector operates under constant returns to scale using capital and labor competitively to produce the consumption good.

We focus on the tax treatment of three main forms of business organization: sole proprietorship, S-corporation, and C-corporation. Sole-proprietorships involve no taxation at the entity level. Instead, business income is passed through to the owners and taxed at

the personal income tax rate. The advantage of this organizational form is its simplicity, but there is little room for tax avoidance. Alternatively, entrepreneurs can decide to incorporate, which generates operating costs. Like sole proprietors, S-corporations are taxed at the individual level rather than the entity level, but their owners have the option to declare part of their income as business income to avoid the social security tax (Smith et al., 2022). C-corporations are complex and run at higher operating costs. However, they benefit from better access to credit because there are fewer legal restrictions that limit their ability to raise external capital (Dyrda and Pugsley, 2022b; Chen et al., 2018; Chen and Qi, 2016). C-corporations are taxed at the entity level and face double taxation: business income is subject to the corporate tax and then taxed again when it is paid to the owners as dividends. Like S-corporations, C-corporations can shift their income between different tax bases.

Our model is calibrated to the US economy in 2013 and replicates important quantitative features in terms of income and wealth, the entrepreneurial sector, the distribution of legal forms of business organization, and the composition of tax revenue. Our quantitative analysis highlights that wealth-poor entrepreneurs choose to be sole proprietors. Despite operating costs, richer entrepreneurs run their businesses as S-corporations to avoid the social security tax by declaring business income rather than wage income. In addition, they circumvent the double taxation of C-corporations. In line with the empirical evidence, our model predicts that S-corporations are more common than C-corporations among small and medium-sized businesses (Smith et al., 2022). Entrepreneurs with high entrepreneurial talent organize as C-corporations to benefit from the relaxed credit constraint, which allows them to invest more.

To understand how entrepreneurial tax avoidance affects macroeconomic outcomes and welfare, we consider a tax reform in which all entrepreneurs are taxed as sole proprietors independent of their legal form of business organization. The equal tax treatment of all entrepreneurs eliminates the benefits from income shifting and tax-motivated choices of legal forms. Consequently, a large share of entrepreneurs run their businesses as C-corporations to improve their access to credit. As a result, entrepreneurial investment and output strongly increase. Since the tax reform removes all channels of tax avoidance and raises aggregate output, the government collects a higher tax revenue that can be redistributed to all households via tax cuts. The tax reform is beneficial for workers and entrepreneurs and generates substantial welfare gains in the aggregate. Our quantitative findings highlight the distortions of tax avoidance generated by the legal form choice: the possibility to avoid taxes increases the entrepreneurs' incentives to run their businesses as S-corporations, despite tighter credit constraints and the associated efficiency loss.

In a policy analysis, we study the aggregate and distributional impact of the top marginal income tax rate and explore how entrepreneurial tax avoidance affects the trade-off between equity and efficiency. Using our benchmark economy, we find that raising

the top marginal tax rate induces entrepreneurs at the top of the income distribution to run their businesses as C-corporations rather than S-corporations because the higher top marginal tax rate reduces the tax advantage of S-corporations relative to C-corporations. Moreover, they engage in income shifting to minimize their tax burden. Due to the improved access to credit experienced by C-corporations, the negative impact of top income taxation on aggregate outcomes is dampened. However, the income share held by the top 1% increases. Our findings highlight that entrepreneurial tax avoidance weakens the distortionary effects of higher taxes at the top but makes them ineffective at lowering inequality. In contrast, in an economy in which equal tax treatment eliminates all channels of entrepreneurial tax avoidance, increasing the top marginal tax rate reduces inequality at the expense of efficiency. The predictions of our model are in line with Cooper et al. (2016), Smith et al. (2022), and Dyrda and Pugsley (2022b, 2024), who report that cutting top marginal income tax rates in the 1980s induced income shifting and a switch from C-corporations to pass-through businesses. Our findings suggest that accounting for entrepreneurial tax avoidance is important when assessing the optimal top marginal tax rate and the welfare effects of income tax reforms.

Related literature. Our paper builds on different strands of the literature. First, our study contributes to the analysis of optimal top marginal tax rates, e.g., Kindermann and Krueger (2022), and Badel et al. (2020). Heathcote and Tsujiyama (2021), Heathcote et al. (2020), Heathcote et al. (2017), Guner et al. (2016), Bakış et al. (2015), Diamond and Saez (2011), and Erosa and Koreshkova (2007) discuss the optimal progressivity of the income tax schedule. All these studies abstract from entrepreneurs, who are concentrated at the top of the income distribution. Quadrini (2000) and Cagetti and De Nardi (2006) show that models incorporating entrepreneurship and financial frictions can better explain macroeconomic patterns such as wealth inequality. Building on this literature, Brüggemann (2021) and Ge (2023) analyze dynamic general equilibrium models with incomplete markets and occupational choice to derive the optimal taxation of top income earners. Brüggemann (2021) reports a welfare-maximizing top marginal tax rate of 60%. In a model with entrepreneurial activity, Imrohoroglu et al. (2023) argue that increasing the progressivity of the income tax schedule is less effective in raising tax revenue than increasing the top marginal tax rate. In a model with occupational choice, Bohacek and Zubricky (2012) report a flat tax reform to be welfare improving for workers as well as entrepreneurs.

All these papers abstract from tax avoidance, which is the focus of our paper.[1] The important role of tax avoidance has been addressed by Piketty et al. (2014), who provide empirical evidence on the decomposition of the total behavioral response of top incomes

[1] A related literature focuses on tax evasion as an illegal way to reduce tax payments, see Slemrod (2007), Maffezzoli (2011), Kotsogiannis and Mateos-Planas (2019), Di Nola et al. (2021), Bhandari et al. (2024), and the references therein. In this paper, we focus on legal strategies to reduce tax liabilities.

to marginal tax rates. Landier and Plantin (2017), Uribe-Teran (2021), and Gorea (2014) account for tax avoidance in dynamic models by assuming that agents have access to a costly tax avoidance technology. We contribute to this literature by modeling the micro-foundations of tax avoidance as we allow entrepreneurs to optimally reduce their tax burden.

Our micro-foundation of tax avoidance builds on the earlier literature that studies the entrepreneurial choice of incorporation and the role of taxation and tax distortions in this context, see, among others, Gordon and Slemrod (1998), Mackie-Mason and Gordon (1997), Gordon and MacKie-Mason (1994). Bilicka and Raei (2023) apply an industry equilibrium model in which the legal form of business organization is an endogenous choice to study how differential tax treatments distort aggregate output. Chen et al. (2018) analyze the impact of the corporate tax on the entrepreneurial choice of business organization and unemployment within a dynamic stochastic occupational choice model.[2] Our paper is most closely related to Dyrda and Pugsley (2022a), who develop a quantitative dynamic general equilibrium model with a fixed share of entrepreneurs choosing whether to run a pass-through business or a C-corporation. They study the optimal design of the labor and business tax and find that the progressivity of the labor tax scheme should rise and that the uniform business income tax should be set to 31%. Dyrda and Pugsley (2022b) explore the effects of tax reforms using a dynamic general equilibrium model with an endogenous choice of legal form. We contribute to this literature by focusing on the different channels of tax avoidance. While Chen et al. (2018) and Dyrda and Pugsley (2022a,b) differentiate between pass-through businesses and C-corporations, we explicitly account for the different tax treatments of sole proprietors, S-corporations, and C-corporations. In addition, we allow for entrepreneurial income shifting between different tax bases as an intensive margin of tax avoidance. Importantly, we focus on how the top marginal tax rate affects the entrepreneurial choice of how to run the business in the presence of tax avoidance.

The rest of the paper is organized as follows. In Section 2, we provide details on legal forms of business organization in the US and discuss evidence on entrepreneurial tax avoidance. Section 3 describes the model. Section 4 explains the calibration procedure. In Section 5, we inspect the mechanisms of entrepreneurial tax avoidance. In Section 6, we perform a policy analysis and discuss how tax avoidance affects aggregate outcomes and welfare. Moreover, we provide a discussion of the limitations of our model. Finally, we analyze the impact of higher top marginal income tax rates on the equity-efficiency trade-off in the presence of entrepreneurial tax avoidance and derive the optimal top marginal tax rate. The last section concludes.

[2]In a related paper, Zeida (2022) evaluates the macroeconomic and distributional impact of the Tax Cuts and Jobs Act and allows for an endogenous entrepreneurial choice of legal form in a robustness analysis presented in an online appendix.

2 Tax Avoidance and Legal Forms of Organization

In the following, we focus on the taxation of three main types of business organizations in the US: sole proprietorships and partnerships, C-corporations, and S-corporations. Sole proprietorships and partnerships are unincorporated businesses and involve no taxation at the entity level.[3] Instead, business income is subject to the individual income tax and the social security tax. C-corporations and S-corporations are incorporated businesses. C-corporations are taxed at the entity level and face double taxation: business income is subject to the corporate tax and then taxed again when it is paid to the owners as dividends. In contrast, for S-corporations, business income is passed through to the owners and taxed at the individual level. Therefore, like sole proprietorships, S-corporations belong to the class of pass-through businesses. In contrast to sole proprietorships, owners of S- and C-corporations can shift their income between the two tax bases: wage income and business income.

Sole proprietors and partnerships are the most common form of organization for business owners. Using the Integrated Business Data (IBD) of the Internal Revenue Service (IRS), in the year 2013, around 82% of all businesses are sole proprietorships and partnerships whereas S-corporations and C-corporations amount to 13% and 5% of all businesses, respectively. However, the aggregate statistics provided by the IRS include publicly held C-corporations. As we are interested in the entrepreneurial choices of privately held businesses, we consider the sample of active business owners in the 2013 Survey of Consumer Finance (SCF) and restrict our sample to households headed by males aged 25 to 64. We find that 67% of the entrepreneurs are sole proprietors, 24% run their business as S-corporations, and 9% choose the C-corporation as their legal form of business organization.

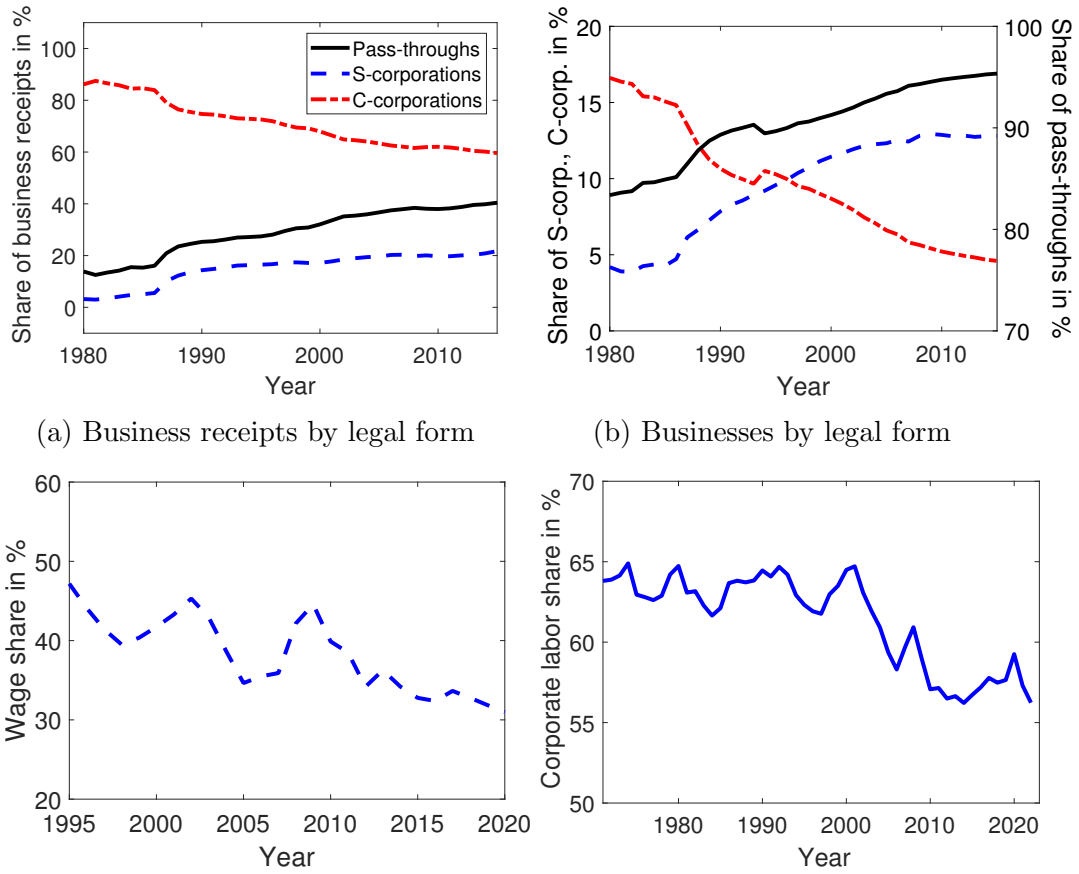
We focus on two distinct channels of entrepreneurial tax avoidance. First, entrepreneurs can reduce their tax burden through the choice of the legal form of business organization. We label this channel the *extensive margin* of tax avoidance. Second, conditional on incorporating their businesses, entrepreneurs can reduce their tax liabilities by shifting income between different tax bases; we label this as the *intensive margin* of tax avoidance.[4]

The extensive margin of tax avoidance. As of 2013, the top marginal income tax in the US was 39.6%. The social security tax amounted to 12.4% for the first $113,700 plus

[3] While a sole proprietorship has one owner, a partnership is owned by two or more persons.

[4] C-corporations can also retain earnings to invest in their businesses to relax their credit constraints and to postpone the payment of the dividend tax. Clarke and Kopczuk (2017) show that the ratio of the stock of retained earnings to net income has substantially declined since the 1970s. Moreover, for S-corporations retained earnings are substantially lower than for C-corporations, because S-corporations are privately held while most C-corporations are publicly held. Since we focus on entrepreneurs of privately held businesses, we abstract from retained earnings as a channel of tax avoidance. In our model described in Section 3, the owner of a privately held C-corporation can save distributed profits and use them as collateral for investment.

Figure 1: Facts on US Businesses by Legal Form of Business Organization



(a) Business receipts by legal form

(b) Businesses by legal form

(c) Owner wage share, S-corporations

(d) Labor share in corporate sector

Notes: Panels (a) and (b) are based on the Integrated Business Data (IBD) of the IRS Statistics of Income and show the percentage share of business receipts and the share of businesses by legal form. Panel (c) uses data from the Corporation Income Tax Returns Complete Report of the IRS Statistics of Income and shows the owner wage share defined as officer compensation/(net income (less deficit) plus officer compensation) for S-corporations. The corporate labor share shown in panel (d) is defined as the compensation of employees in the corporate sector over gross value added in the corporate sector using Table 1.14 of the National Income and Product Accounts (NIPA) of the Bureau of Economic Analyses.

an additional uncapped 2.9% medicare tax and the 0.9% of Affordable Care Act surcharge. On the other hand, the corporate income tax was 35%, and the top dividend tax rate was 23.8%. Cooper et al. (2016) point out that not only the statutory but also the average effective tax rate on corporate income is larger than the average effective tax rate on pass-through business income. Therefore, entrepreneurs can reduce their tax burden by running their businesses as S-corporations rather than C-corporations.

The predominance of pass-through businesses started after the Tax Reform Act of 1986 (TRA86). The reform reduced the top personal tax rate from 50% to 28%, creating tax incentives for business owners to reorganize from C-corporation to S-corporation. Figure 1a shows that in the early 1980s about 86% of business receipts were generated by C-corporations, including the large publicly held corporations, whereas in 2020 it amounted to about 60%. The share of business receipts of S-corporations increased from 3.2% to 21%. Figure 1b illustrates the significant increase in the share of S-corporations, which is reflected in the overall rise of pass-through businesses.[5] Cooper et al. (2016) argue that if the share of pass-through businesses would have remained at its 1980s level, the average tax rate on total business income would have been 28% rather than 24% and tax revenue would have been substantially higher. Dyrda and Pugsley (2022b) use firm-level administrative data and show that tax reforms are associated with a significant reorganization between the legal forms. In a recent empirical contribution, Dyrda and Pugsley (2024) highlight that the TRA86 explains not only the sharp increase in pass-through businesses but also their continued rise in the 2000s.

The intensive margin of tax avoidance. Incorporated business owners can reduce their tax liabilities by shifting income between wage income and business income. Owners of S-corporations are inclined to declare their income as business income to avoid the social security tax. In contrast, under the fiscal regime in 2013, owners of C-corporations have incentives to pay themselves wage income to avoid the double taxation of business income implied by the corporate and dividend taxes. However, the IRS requires S-corporations and C-corporations to pay a *reasonable compensation* to owner-employees who provide services to the corporations (Internal Revenue Service, 2022).

Gordon and Slemrod (1998) and Slemrod (1996) document empirical evidence of substantial income shifting since 1965. Because labor earnings of corporate owners are not available, we follow Nelson (2016) and use data on officer compensation as a measure of business owner wages. Nelson (2016) argues that for S-corporations this is a good proxy because these businesses are actively managed by their owners who can shift their income between business income and wage income. Figure 1c uses data of the IRS Statistics of Income and shows wage income as percentage share of total net income for S-corporations between 1995 and 2020. As also highlighted by Nelson (2016), the share of owner's wage

[5]Similar numbers are reported by DeBacker and Prisinzano (2015), Nelson (2016), Cooper et al. (2016), Clarke and Kopczuk (2017), Kopczuk and Zwick (2020), and Dyrda and Pugsley (2022b).

income has decreased over time. Smith et al. (2022) deliver empirical evidence of tax-motivated forces behind this pattern. They identify 183,000 firms switching from C- to S-corporation between 2000 and 2012 and find that the estimated reported labor payments decreased in the switching year by 2.29% of sales. Importantly, the estimated reported profits increased by the same amount. These findings suggest a tax-motivated response: by switching from C-corporation to S-corporation, owners shift their income towards the tax-preferred tax base and pay themselves profits rather than wage income to avoid the social security tax. Overall, Smith et al. (2022) provide evidence that 17.7% of the fall in the corporate labor share shown in Figure 1d can be explained by the growth of S-corporations and the associated reporting response of business owners who shifted their income toward business income.

Top incomes and tax avoidance. The extensive and intensive margins of entrepreneurial tax avoidance have important implications for the income distribution. Cooper et al. (2016) argue that pass-through business income is substantially more concentrated at the top. As of 2014, 69% of the top 1% and more than 84% of the top 0.01% of the income distribution earn some pass-through business income (Smith et al., 2019). A substantial part of the rise in the income share held by the top 1% is driven by the organizational shift to pass-through businesses (Kopczuk and Zwick, 2020). Dyrda and Pugsley (2022b) document that the rise of pass-through businesses explains up to 40% of the increase in the share of pre-tax income of the top 1%. Motivated by these facts, we incorporate the choice of the legal form of business organization and income shifting in an incomplete market model with entrepreneurs building on Cagetti and De Nardi (2006), Quadrini (2000), and Kitao (2008) and use it to study how the top marginal income tax rate interacts with entrepreneurial tax avoidance.

3 The Model

3.1 Model Environment

Demographics, occupations, and preferences. Households go through two life stages, young and old. They age stochastically with probability ρ_R. Old households are retired (R) and receive a pension, die with probability ρ_D, and are immediately replaced by newborn young households so that the fraction of young households is held constant at $\frac{\rho_D}{\rho_R+\rho_D}$.

Households are heterogeneous in wealth a, working ability ε, and entrepreneurial talent θ. ε and θ follow an exogenous stochastic process described by the Markov chain $\Gamma(\varepsilon', \theta'|\varepsilon, \theta)$. Young households decide every period whether to be a worker (W) or entrepreneur. Entrepreneurs choose from three legal forms of business organization: EP (sole proprietorship), ES (S-corporation), or EC (C-corporation). We refer to the former two legal forms (EP and ES) as pass-through businesses. The occupation and legal form

is denoted by $o \in \{W, EP, ES, EC\}$.

Preferences are given by

$$U(c, \ell) = \begin{cases} u(c) - v(\ell) & \text{for } o = W, \\ u(c) & \text{for } o \in \{EP, ES, EC\} \text{ and } R, \end{cases}$$

where c denotes consumption and ℓ refers to working hours. We normalize the total time endowment to one so that $\ell \in [0, 1]$. Workers W derive utility from consumption and disutility from their working hours. We assume that entrepreneurs do not receive disutility from managing their businesses.[6]

Switching the occupation or the legal form incurs a utility cost $\xi_{z_-,o}$ where $z_- \in \{W, EP, ES, EC, R\}$ denotes the status in the previous period.[7]

Technology, costs, and financial constraints. The economy consists of two production sectors: an entrepreneurial sector consisting of businesses (EP, ES, and EC) run by entrepreneurial households and a non-entrepreneurial sector.

Entrepreneurs with talent θ produce outputs according to a decreasing returns to scale technology,

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

where $\gamma \in (0, 1)$ is the share of capital in the production function and $v \in (0, 1)$ is the span-of-control parameter. Entrepreneurs invest in capital k and hire labor n (in efficiency units of labor supplied by workers). The operating profit is given by

$$f(\theta, k, n) - (r + \delta)\, k - wn,$$

where δ is the capital depreciation rate, r is the rental rate of capital, w is the wage paid for an efficiency unit of hired labor, and the price of output is normalized to one.

In contrast to being a sole proprietor, running an S-corporation or C-corporation involves operating costs κ^{ES} and κ^{EC}, respectively. Owners of S-corporations (C-corporations) can shift their income between different tax bases and declare a share ϕ^{ES} (ϕ^{EC}) as wage income and the remaining part as business income. For S-corporations, only wage income is subject to social security taxation such that the owner can avoid taxes by declaring income as business income. However, tax avoidance generates a convex cost $C^{ES}\left(1-\phi^{ES}\right)$, reflecting the IRS requirement for reasonable compensation of owner-employees (Internal Revenue Service, 2022). For C-corporations, business income is subject to the corporate tax and the dividend tax. Owners of C-corporations can avoid this double taxation by declaring their income as wage income. However, similar to S-corporations, there is an

[6] This assumption is in line with Hurst and Pugsley (2017) who provide evidence that for a majority of small business owners "being their own boss" was the primary reason for becoming an entrepreneur.

[7] $z_- = R$ indicates a newborn household. We assume that $\xi_{z_-,o} = 0$ for $z_- = o$ or $z_- = R$, and $\xi_{z_-,o} > 0$ otherwise.

increasing and convex cost of tax avoidance $C^{EC}\left(\phi^{EC}\right)$. We assume that the costs κ^{ES}, κ^{EC}, C^{ES}, and C^{EC} are tax-deductible as business expenses.

In the non-entrepreneurial (NE) sector, firms operate competitively with a constant returns to scale technology:[8]

$$F(K^{NE}, N^{NE}) = \left(K^{NE}\right)^{\alpha} \left(N^{NE}\right)^{1-\alpha}, \tag{2}$$

where $0 < \alpha < 1$ is the capital share, and K^{NE} and L^{NE} are capital and labor inputs, respectively.

Given the value of their assets a, households choose their future asset level a' facing a borrowing constraint, $a' \geq 0$. Entrepreneurial households can borrow from a single financial intermediary that behaves competitively and earns zero profit and repay their debt at the end of the period. Due to the partial enforceability of credit contracts, entrepreneurs pledge their private assets as collateral and can borrow up to a factor λ of their current wealth a to invest in capital: $k \leq \lambda a$, where $\lambda \in \{\lambda^{EP}, \lambda^{ES}, \lambda^{EC}\}$ depends on the legal form of business organization. It is well documented that C-corporations have better chances of attracting external capital than pass-through businesses (Chen and Qi, 2016; Dyrda and Pugsley, 2022b). We capture this stylized fact in a parsimonious way by assuming that the collateral requirement is lower for entrepreneurs who run their businesses as C-corporations, $\lambda^{EP} = \lambda^{ES} \leq \lambda^{EC}$.

Government. The government raises personal income, corporate, and dividend taxes to finance public spending G. Pension benefits B are financed via social security taxation. The personal income tax liability after paying social security is given by $T^i(y)$ where y is declared personal income after deductibles. Following Heathcote et al. (2017) and Imrohoroglu et al. (2023), we consider the following tax schedule:

$$T^i(y) = \begin{cases} y - \lambda_i y^{1-\tau_i} & \text{if } y < y_h, \\ \tau_h \left(y - y_h\right) + y_h - \lambda_i y_h^{1-\tau_i} & \text{if } y \geq y_h. \end{cases} \tag{3}$$

The parameter τ_i specifies the progressivity of the income tax schedule whereas the parameter λ_i determines the average income tax level. τ_h is the marginal tax rate for incomes exceeding y_h.

We consider a flat social security tax that is proportional to labor income denoted by y_l up to an income cap $\bar{y}_s$:

$$T^s(y_l) = \tau_s \min\{y_l, \bar{y}_s\}. \tag{4}$$

The marginal social security tax rate is zero for gross labor incomes above this cap. The corporate tax on declared business income y_c is given by $T^c(y_c) = \tau_c y_c$. Corporate profits paid out as dividends d are subject to the dividend tax $T^d(d) = \tau_d d$, which is assumed to be linear following Dyrda and Pugsley (2022a).

[8]The non-entrepreneurial firms correspond to large public C-corporations. In the model, we assume that this sector does not face financial constraints.

3.2 Decisions

At the beginning of each period, given assets a, their previous status z_-, and after observing their idiosyncratic working ability ε and entrepreneurial talent θ, young households choose their occupation and legal form of business organization according to:

$$\mathcal{V}(a, \varepsilon, \theta, z_-) = \max_{o \in \{W, EP, ES, EC\}} \left\{ V^o(a, \varepsilon, \theta) - \xi_{z_-, o} \right\}, \tag{5}$$

where V^o is the value of the occupation/legal form o.[9] $\xi_{z_-,o}$ is the utility cost associated with switching from z_- to o.

Worker. A worker chooses consumption c, labor supply ℓ, and savings a'. The worker's value function is defined as:

$$V^W(a, \varepsilon, \theta) = \max_{c, a', \ell} \left\{ u(c) - v(\ell) + \beta(1 - \rho_R) \mathbb{E}_{\varepsilon', \theta' | \varepsilon, \theta} \left[\mathcal{V}(a', \varepsilon', \theta', W) \right] + \beta \rho_R V^R(a') \right\} \tag{6}$$

subject to

$$y^W = w\varepsilon\ell - T^s(w\varepsilon\ell) + ra, \tag{7}$$

$$c + a' = y^W + a - T^i\left(y^W\right), \tag{8}$$

$$a' \geq 0, \tag{9}$$

$$\ell \in [0, 1].$$

$V^R(a')$ denotes the value of retirement and is defined later in the text. Eq. (7) defines the worker's personal income y^W consisting of wage income $w\varepsilon\ell$ net of social security taxes and income from renting out assets ra. Personal income y^W is subject to the personal income tax, which is reflected in the budget constraint Eq. (8). Eq. (9) states the worker's borrowing constraint.

Sole proprietor. Entrepreneurs choose consumption, savings, and the capital and labor inputs in production, k and n. The value function of a sole proprietor is given as:

$$V^{EP}(a, \varepsilon, \theta) = \max_{c, a', k, n} \left\{ u(c) + \beta(1 - \rho_R) \mathbb{E}_{\varepsilon', \theta' | \varepsilon, \theta} \left[\mathcal{V}(a', \varepsilon', \theta', EP) \right] + \beta \rho_R V^R(a') \right\} \tag{10}$$

subject to

$$\pi^{EP} = f(\theta, k, n) - (r + \delta) k - wn, \tag{11}$$

$$y^{EP} = \pi^{EP} - T^s(\pi^{EP}) + ra, \tag{12}$$

$$c + a' = y^{EP} - T^i\left(y^{EP}\right) + a, \tag{13}$$

$$k \leq \lambda^{EP} a, \;\; a' \geq 0, \tag{14}$$

[9] For numerical stability, we introduce a small i.i.d. preference shock to the occupational choice when solving the model, see Appendix A.1.

Eq. (11) defines business profits as the difference between revenue and input costs. Business profits are passed through to the business owner and are taxed at the social security tax, Eq. (12). Personal income y^{EP} is subject to the income tax as reflected in Eq. (13). Eq. (14) states the credit and borrowing constraints.

S-corporation. Owners of S-corporations face operating costs κ^{ES} but have the option to shift income between different tax bases. Their value function is given as:

$$V^{ES}(a,\varepsilon,\theta) = \max_{c,a',k,n,\phi^{ES}} \left\{ u(c) + \beta(1-\rho_R)\,\mathbb{E}_{\varepsilon',\theta'|\varepsilon,\theta}\left[\mathcal{V}(a',\varepsilon',\theta',ES)\right] + \beta\rho_R V^R(a') \right\}$$

subject to

$$w^{ES} = \phi^{ES}\left[f(\theta,k,n) - (r+\delta)k - wn\right], \tag{15}$$
$$\pi^{ES} = \left(1-\phi^{ES}\right)\left[f(\theta,k,n) - (r+\delta)k - wn\right], \tag{16}$$
$$y^{ES} = \pi^{ES} + w^{ES} - T^s(w^{ES}) + ra, \tag{17}$$
$$c + a' = y^{ES} - C^{ES}\left(1-\phi^{ES}\right) - \kappa^{ES} - T^i\left(y^{ES} - C^{ES}\left(1-\phi^{ES}\right) - \kappa^{ES}\right) + a, \tag{18}$$
$$k \le \lambda^{ES} a,\ a' \ge 0, \tag{19}$$
$$0 \le \phi^{ES} \le 1.$$

The owner of an S-corporation reports the fraction ϕ^{ES} of $f(\theta,k,n)-(r+\delta)k-wn$ as wage income w^{ES} and $\left(1-\phi^{ES}\right)$ as business income π^{ES}. Eq. (17) derives the entrepreneur's taxable income consisting of business income, wage income, and income from renting out assets. Because only wage income is subject to social security taxation, the entrepreneur has incentives to shift her income towards business income to avoid the social security tax. However, tax avoidance generates a convex cost $C^{ES}\left(1-\phi^{ES}\right)$. The entrepreneur's income y^{ES} is subject to the personal income tax. We assume that the operating costs and the costs of tax avoidance are tax-deductible as business expenses (Eq. 18).

C-corporation. Owners of C-corporations face operating costs κ^{EC} and double taxation as their business is taxed at the entity level. Their maximization problem is given as:

$$V^{EC}(a,\varepsilon,\theta) = \max_{c,a',k,n,\phi^{EC}} \left\{ u(c) + \beta(1-\rho_R)\,\mathbb{E}_{\varepsilon',\theta'|\varepsilon,\theta}\left[\mathcal{V}(a',\varepsilon',\theta',EC)\right] + \beta\rho_R V^R(a') \right\}$$

subject to

$$w^{EC} = \phi^{EC}\left[f(\theta,k,n) - (r+\delta)k - wn\right], \tag{20}$$
$$\pi^{EC} = \left(1-\phi^{EC}\right)\left[f(\theta,k,n) - (r+\delta)k - wn\right], \tag{21}$$
$$y^{EC} = (1-\tau_c)\,\pi^{EC} + w^{EC} - T^s(w^{EC}) + ra, \tag{22}$$
$$\begin{aligned} c + a' = {} & y^{EC} - \tau_d(1-\tau_c)\,\pi^{EC} - C^{EC}\left(\phi^{EC}\right) - \kappa^{EC}, \\ & - T^i\left(w^{EC} - T^s(w^{EC}) + ra - C^{EC}\left(\phi^{EC}\right) - \kappa^{EC}\right) + a, \end{aligned} \tag{23}$$
$$k \le \lambda^{EC} a,\ a' \ge 0, \tag{24}$$
$$0 \le \phi^{EC} \le 1.$$

The owner of a C-corporation reports a fraction ϕ^{EC} of $f(\theta,k,n)-(r+\delta)k-wn$ as wage income w^{EC}. The remaining fraction $1-\phi^{EC}$ is declared as business income π^{EC}. Eq. (22) highlights that wage income is subject to social security taxation while business income is taxed at the corporate tax rate τ_c. Double taxation occurs because net business income is distributed as dividends to the business owner and then taxed again at the dividend tax rate τ_d, Eq. (23). To avoid double taxation, owners of C-corporations may shift their income towards wage income. However, similarly to S-corporations, there is an increasing and convex cost of tax avoidance $C^{EC}\left(\phi^{EC}\right)$. As for S-corporations, operating costs and tax avoidance costs are tax-deductible. Eq. (24) highlights the collateral constraint of C-corporations.

Retiree. The problem of a retiree amounts to choosing consumption c and savings a' according to the following maximization problem:

$$V^R(a)=\max_{c,a'}\left\{u(c)+\beta(1-\rho_D)V^R(a')+\beta\rho_D\mathbb{E}_{\varepsilon',\theta'}\left[\mathcal{V}(a',\varepsilon',\theta',R)\right]\right\} \tag{25}$$

subject to

$$c+a'=b\bar{y}_l+(1+r)a-T^i(b\bar{y}_l+ra), \tag{26}$$

$$a'\geq 0. \tag{27}$$

The pension income of the retiree is a fraction b of the average wage income of young households $\bar{y}_l$. Incomes from pension and renting out assets are subject to the personal income tax (Eq. (26)). The expectation operator $\mathbb{E}_{\varepsilon',\theta'}$ signifies the expectation over the value function $\mathcal{V}(a',\varepsilon',\theta',R)$ in terms of productivity shocks ε' and θ' drawn from the stationary distribution of the process $\Gamma(\varepsilon',\theta'|\varepsilon,\theta)$ when the retiree is reborn as young.

3.3 Equilibrium

Let $s\equiv(a,\varepsilon,\theta,z,z_-)$ with $z,z_-\in\{W,EP,ES,EC,R\}$. A stationary equilibrium is a list of prices $\{r,w\}$, policy functions $\{c(s),a'(s),\ell(s),k(s),n(s),\phi(s)\}$ and an invariant distribution over the states, $\mu(s)$, such that

1. The policy functions $\{c(s),a'(s),\ell(s),k(s),n(s),\phi(s)\}$ solve the household maximization problem described in Section (3.2) with $z=o(a,\varepsilon,\theta,z_-)$ for young households and $z=R$ for old households.

2. Capital and labor markets clear:

$$K^{NE}+\int\mathcal{I}_E(s)k(s)d\mu(s)=\int ad\mu(s),$$

$$N^{NE}+\int\mathcal{I}_E(s)n(s)d\mu(s)=\int\mathcal{I}_W(s)\ell(s)\varepsilon d\mu(s).$$

where $\mathcal{I}_E(s)=1$ if $z\in\{EP,ES,EC\}$, and $\mathcal{I}_W(s)=1$ if $z=W$.

3. Competitive factor pricing holds:

$$r = \alpha \left(\frac{K^{NE}}{N^{NE}} \right)^{\alpha - 1} - \delta, \qquad w = (1 - \alpha) \left(\frac{K^{NE}}{N^{NE}} \right)^{\alpha}.$$

4. The government budget constraints are satisfied:

$$\int \left[T^i(s) + T^c(s) + T^d(s) \right] d\mu(s) = G,$$

$$\int T^s(s) d\mu(s) = B,$$

where G is government spending and B is total pension expenditure defined as

$$B = b\bar{Y} \int \mathcal{I}_R(s) \, d\mu(s),$$

where b is the replacement rate, $\mathcal{I}_R(s) = 1$ if $z = R$ and $\bar{Y}$ is the average wage income of young households.

5. The invariant distribution satisfies the fixed point equation $\mu = \mathcal{H}(\mu)$, where $\mathcal{H}$ is a one-period-ahead transition operator such that $\mu' = \mathcal{H}(\mu)$.

4 Calibration and Model Fit

We calibrate our model to replicate important empirical features of the US economy, including *(i)* the share of entrepreneurs and the distribution of legal form of business organization, *(ii)* the share of entrepreneurial income declared as wage income, *(iii)* inequality measures such as the share of wealth held by entrepreneurs, and *(iv)* the entrepreneurial employment shares by firm size.

Our main data source is the Survey of Consumer Finance in 2013 (SCF). We restrict our sample to households headed by males aged 25 to 64 and define entrepreneurs as active business owners (ABO). In line with our theoretical model, we consider three categories of business organizations: (1) sole proprietors EP, which include both sole proprietors and partnerships, (2) S-corporations ES, and (3) C-corporations EC, which include C-corporations and other corporations. We use the Business Dynamics Statistics (BDS) data for information on the exit rate from entrepreneurship. To construct data targets related to employment distribution across firm-size bins, we use the Statistics of US Businesses (SUSB).

4.1 Calibration Strategy

We calibrate a subset of parameters externally based on the literature or the US tax code, including those governing demographics, working ability, preferences, corporate production, and taxation (Table 1). The remaining parameters are jointly calibrated by minimizing the distance between a set of data- and model-generated moments (Table 2). While

Table 1: Externally Calibrated Parameters

Parameter	Description	Value	Source
Demographics			
ρ_R	Prob. of retiring	0.022	Brüggemann (2021)
ρ_D	Prob. of dying	0.089	Brüggemann (2021)
Working ability			
ρ_ε	Persistence	0.94	Kitao (2008)
σ_ε^2	Variance	0.02	Kitao (2008)
Preferences			
σ_1	Risk aversion	1.50	Standard value
σ_2	Inverse of Frisch elasticity	1.70	Frisch elasticity 0.59
Production			
α	Capital share in non-corporate sector	0.33	Standard value
δ	Capital depreciation	0.06	Standard value
Taxation			
b	Replacement rate, pensions	0.400	OECD (2013)
τ_c	Corporate tax rate	0.350	US Tax code (2013)
τ_d	Dividend tax rate	0.181	SCF (2013) and TAXSIM
τ_h	Top marginal tax rate	0.396	US Tax code (2013)
$\bar{y}_s/\bar{y}_l$	Social security cap (in terms of average labor income)	2.283	SSA and QCEW

all the parameters affect all targets, in the following, we highlight which data moment is most informative about a certain parameter.

Demographics, endowments, and preferences. We set the probability of retiring at $\rho_R = 0.022$ and the probability of dying in retirement at $\rho_D = 0.089$ following Brüggemann (2021). Working ability ε is defined by an AR(1)-process:

$$\log(\varepsilon_{t+1}) = \rho_\varepsilon \log(\varepsilon_t) + \eta_{\varepsilon,t+1},$$

where $\eta_{\varepsilon,t+1} \sim N(0, \sigma_\varepsilon^2)$ is an i.i.d. innovation term. We take the values for the persistence parameter $\rho_\varepsilon = 0.94$ and the variance of the innovation $\sigma_\varepsilon^2 = 0.02$ from Kitao (2008).

The entrepreneurial talent θ is modeled as an AR(1)-process:

$$\log(\theta_{t+1}) = \mu_\theta + \rho_\theta \log(\theta_t) + \nu_{\theta,t+1},$$

where $\nu_{\theta,t+1} \sim N(0, \sigma_\theta^2)$ is the innovation term. The long-run unconditional mean μ_θ is pinned down by matching the share of entrepreneurs in the data. The persistence ρ_θ and the dispersion σ_θ are calibrated to replicate the exit rate of entrepreneurs and the Gini coefficient of entrepreneurial income. The calibrated values $\rho_\theta = 0.89$ and $\sigma_\theta = 0.175$ are in line with other estimates in the literature. For example, Chen et al. (2018) calibrate the parameters of the AR(1)-process to the fraction of entry firms and the employment fraction of entry firms. Their estimated persistence of 0.821 and standard deviation of 0.245 are similar to what we find. Dyrda and Pugsley (2022b) set the persistence of entrepreneurial

Table 2: Internally Calibrated Parameters

Parameter	**Description**	**Value**
Preferences		
β	Discount factor	0.924
χ	Disutility from working	30.0
Production		
ν	Span of control	0.89
γ	Capital share, entre. sector	0.475
Entrepreneurial ability		
μ_θ	Unconditional mean	-0.0305
ρ_θ	Persistence	0.89
σ_θ	Dispersion	0.175
Switching cost		
ξ	Disutility of occupational/LFO switching	0.195
Financial Frictions		
$\lambda^{EP}, \lambda^{ES}$	Collateral constraint (Pass-through)	1.50
λ^{EC}	Collateral constraint (C-corp.)	2.02
Tax avoidance and corp. costs		
κ^{ES}	Operating cost for S-corp.	0.008
κ^{EC}	Operating cost for C-corp.	0.061
ψ^{ES}	Intercept of $C(\cdot)$ S-corp.	0.131
ψ^{EC}	Intercept of $C(\cdot)$ C-corp.	4.50
Superstar shock		
ϵ^*	Value of the shock	12.20
p_{ϵ^*}	Probability of becoming a superstar	0.85%
$\bar{p}_{\epsilon^*}$	Probability of dropping back	12.0%
Taxation		
λ_i	Income tax, level	0.796
τ_i	Income tax, progressivity	0.127
τ_s	Social security tax	0.133

productivity to 0.9. and the dispersion to 0.315.[10]

Since we study the aggregate and distributional consequences of taxing high income earners, it is important to match the occupational distribution at the top of the income distribution. Although we focus on entrepreneurial responses to tax changes, we also need to match the empirical observation that many top earners are workers. To generate high-income workers in our model, we assume a superstar shock on worker ability following Brüggemann (2021) and Kindermann and Krueger (2022). Specifically, with probability p_{ϵ^*}, an ordinary worker becomes a superstar and her ability becomes ϵ^*, which is significantly higher than the mean ability among ordinary workers. With probability $\bar{p}_{\epsilon^*}$, a superstar worker drops back to a random ordinary state. We calibrate the parameters ϵ^*, p_{ϵ^*}, and $\bar{p}_{\epsilon^*}$ to match the Gini coefficient of income and the share of entrepreneurs at the top 1% of the income and wealth distributions.

Preferences take the following functional forms:

$$\begin{aligned} u(c) &= \frac{c^{1-\sigma_1}}{1-\sigma_1}, \\ v(\ell) &= \chi \frac{\ell^{1+\sigma_2}}{1+\sigma_2}. \end{aligned}$$

The coefficient of relative risk aversion σ_1 is assumed to be 1.5, which is standard in the macroeconomic literature. The parameter σ_2 is set to 1.7 to match a Frisch elasticity of 0.59. The weight of the disutility of labor χ is calibrated internally to match average hours worked. The discount factor β pins down the interest rate in the economy.

We make the parsimonious assumption that $\xi_{z_-,o} = \xi$ for $z_- \neq o$ and $z_- \neq R$. The parameter ξ is calibrated to match the transition rate from C-corporations to pass-through businesses taken from Bhandari and McGrattan (2020).

Technology, costs, and financial constraints. The non-entrepreneurial sector operates with a Cobb-Douglas production function given in Eq. (2). The parameter α represents the capital share and is set to 0.33, and the capital depreciation δ is 6%, which is standard in the macroeconomic literature (Stokey and Rebelo, 1995).

The entrepreneurial sector uses a decreasing return to scale technology specified in Eq. (1). The capital share γ is calibrated to match the capital-to-output (K/Y) ratio. We compute the K/Y ratio as fixed capital and consumer durables relative to GDP based on 2013 data provided by the Federal Reserve St. Louis. The span of control parameter ν influences the size of entrepreneurial businesses. We discipline ν by targeting the employment shares by business size. Specifically, we group firms into four bins and compute the employment share in each bin. Using data from the SUSB, we focus on firms with fewer than 500 employees to capture the characteristics of entrepreneurial businesses. The four

[10] Buera and Shin (2013) assume that entrepreneurs draw a new productivity realization from a Pareto distribution and retain the previous one with probability 0.894.

bins are, respectively, firms with 0-4 employees, 5-9 employees, 10-19 employees, and 20-499 employees. 62.11% of firms belong to the first bin, 17.24% to the second bin, 10.43% to the third bin, and 10.22% to the fourth bin. In the model, we group firms into bins based on the firm size distribution found in the SUSB and use the corresponding employment shares as calibration targets.

S- and C-corporations face operating costs κ^{ES} and κ^{EC} affecting the share of sole-proprietors, S-corporations, and C-corporations among entrepreneurs, which we use as internal calibration targets. We assume quadratic costs of tax-motivated income shifting: $C^{ES}(1-\phi) = \psi^{ES}(1-\phi)^2$ and $C^{EC}(\phi) = \psi^{EC}\phi^2$. The parameters ψ^{ES} and ψ^{EC} are calibrated internally to match the share of income reported as wage income within S- and C-corporations. We rely on tax return tables in 2013 provided by the IRS Statistics of Income and use the data on officer compensation as a proxy for wage income following Nelson (2016). We compute the wage share as the ratio of officers' compensation to net income less deficit.

The collateral constraint faced by entrepreneurs captures the financial frictions in raising external credit. We calibrate $\lambda^{EP} = \lambda^{ES}$ and λ^{EC} internally to match the entrepreneurial share of total wealth and the share of payroll of pass-through businesses. The intuition behind these targets is that a tighter collateral constraint increases the accumulation of wealth by entrepreneurs. Moreover, λ^{ES} and λ^{EC} affect the relative size of C-corporations vs. pass-through businesses; a lower λ^{ES} implies that pass-through businesses are, on average, smaller and, thus, have a smaller share of payroll than C-corporations.[11] The recovered value for pass-through businesses $(\lambda^{EP}, \lambda^{ES})$ is 1.5, which is in line with, e.g., Kitao (2008) and Brüggemann (2021). The value for C-corporations (λ^{EC}) is 2.02, implying better access to credit as documented in the literature.[12]

Tax schedule. The income tax function given in Eq. (3) is non-linear up to the income threshold y_h and linear with slope τ_h for incomes greater than y_h. We calibrate the parameter τ_h to the statutory marginal tax rate for the top income bracket, which equals 0.396 in 2013. The level of the income tax λ_i is internally calibrated to match total tax revenue (excluding social security) as a share of GDP based on the Congressional Budget Office (CBO) 2013 fiscal report. The progressivity parameter τ_i is internally calibrated to replicate the fraction of tax returns reaching the top income bracket taken from IRS data.[13]

[11] Our approach similar to the one of Chen et al. (2018), who use the employment share of C-corporations to identify the collateral constraint.

[12] There are only a few papers considering collateral constraints across different legal forms of business organization. Chen et al. (2018) assume that, with an exogenous probability, the firm receives an external finance offer and can raise as much capital as needed. Their calibration implies that C-corporations have a 1.5 higher probability of obtaining external finance than pass-through businesses. For comparison, our calibrated λ^{EC} is 1.35 higher than λ^{ES}.

[13] Our calibrated progressivity τ_i of 0.127 falls within the broad range in the literature. For example,

To determine y_h, we use the following condition that guarantees continuity in the marginal income tax rate (see Ge, 2023):

$$\tau_h = 1 - \lambda_i (1 - \tau_i) y_h^{-\tau_i}.$$

The corporate tax rate τ_c is set to the statutory level in 2013 of 35%. We set the linear dividend tax rate τ_d to the average marginal dividend income tax computed using TAXSIM based on SCF data. Following Barro and Redlick (2011) and Bhandari and McGrattan (2020), we compute the average marginal dividend tax as follows. Let τ_{di} be the marginal dividend tax of household i, and let $d_i / \sum_i d_i$ be the dividend earnings of household i as a fraction of total dividend earnings. The average marginal dividend tax is $\tau_d = \sum_i \tau_{di} d_i / \sum_i d_i$. Since only owners of C-corporations earn dividends in our model, we restrict the sample accordingly in computing the average marginal dividend tax and find τ_d to be 0.181.[14]

The social security income cap $\bar{y}_s$ is set based on average labor income. According to the Social Security Agency (SSA), the income cap in 2013 is \$113,700. The average annual pay of US workers in 2013 is \$49,808 based on data from the Quarterly Census of Employment and Wages (QCEW). The ratio between the two numbers is 2.283. The social security tax rate τ_s is an equilibrium object that balances the government's pension budget. We get a value of 13.3%, which corresponds well with the US social security tax of 12.4% plus the 2.9% medicare tax.

The pension benefit replacement rate b is set to 40%, which is the average replacement rate in the US in 2013 (OECD, 2013).

4.2 Model Fit

Table 3 shows the values of the targeted moments, revealing that our model successfully replicates important empirical features of the US economy in 2013. The share of entrepreneurs in the working population and at the top of the income and wealth distribution, the share of entrepreneurs by legal form, and the transition rate from C-corporation to pass-through businesses are matched very well. Importantly, our model generates shares of income declared as wage income for S- and C-corporations that closely replicate their data counterparts. Moreover, the model provides a good fit of the distribution of employment shares by firm size and matches the size of pass-through businesses relative to C-corporations in terms of payroll. The model also replicates the empirical distributional characteristics within and across occupations. Specifically, it matches the share of taxpayers in the top income tax bracket and inequality moments including the Gini coefficient of

Bakış et al. (2015) find τ_i to be 0.17, and Guner et al. (2014) estimate it at 0.053.

[14] We use the same method as Bhandari and McGrattan (2020), who consider data from 2007 and report $\tau_d = 0.133$. Our value is slightly higher because the statutory dividend tax rate was larger in 2013 than in 2007.

income in the entire population and among entrepreneurs, the share of wealth owned by entrepreneurs, and the occupations at the top of the income and wealth distribution.

As a validation, Figure 2 and Table 4 show that the model replicates moments of the US economy that are not targeted in our calibration procedure. Figures 2a and 2b display the equilibrium distribution of occupations by quintiles of income and wealth. The model predicts that the share of entrepreneurs is increasing in income and wealth, which is in line with the data. Overall, the model provides a good match of the occupations across income quintiles, despite overestimating the share of entrepreneurs in the fifth quintile. A similar pattern appears across quintiles of wealth. Here, the model underestimates the share of entrepreneurs in the lower quintiles. Figures 2c and 2d focus on the top quintile of income and wealth and report sole proprietors, S-corporations, and C-corporations as shares of entrepreneurs. The empirical pattern of the legal form of business organization is very well matched.

Table 4 reveals that our model provides a decent fit of the share of employment in the entrepreneurial sector and replicates pass-through output as a share of aggregate output and the average business income of pass-through businesses relative to C-corporations. Importantly, our model delivers a good match of the (untargeted) transition rates from sole proprietorships to C-corporations and from S-corporations to C-corporations as documented in Bhandari and McGrattan (2020) and Dyrda and Pugsley (2024).

Regarding inequality, the model provides a good fit of the ratio of entrepreneurial to worker income. It matches the observed Gini coefficient of wealth and the income and wealth shares over the entire distribution despite underestimating the share of wealth held by the top 1%. The model does a good job in replicating tax revenue coming from different tax sources, however, it overstates the share of income tax revenue and understates the share of dividend tax revenue. We also calculate the average income tax rate across income groups, including the personal income tax and the dividend tax. Overall, the model provides a good fit of the empirical average income tax rate.[15] In particular, it replicates the decreasing pattern at the very top because the very rich exploit the tax avoidance opportunities in their corporations. Saez and Zucman (2020) provides a discussion of the regressivity of the US tax system at the very top. Note, however, that our numbers are not comparable to their empirical estimates of average tax rates because Saez and Zucman (2020) include all taxes at all levels, including consumption and sales taxes, which are not part of our model. Moreover, they calculate the average tax as a share of pre-tax national income to take into account that a sizeable fraction of the true pre-tax income of the wealthy is not subject to income taxation such as unrealized capital gains.

[15]The empirical average income tax rates are comparable to those reported by Guner et al. (2014), who consider the IRS public use tax file from 2000.

Table 3: Targeted Moments

	Data	**Model**	**Data Source**
Aggregates			
Interest rate (%)	1.90	2.12	FRED (1990-2020)
Average hours worked	0.33	0.33	SCF (2013)
K/Y ratio	3.33	3.06	FRED (2013)
Tax revenue (excl. social security) to GDP (%)	16.70	16.60	CBO report (2013)
Entrepreneurial sector			
Share of entrepreneurs (%)	15.16	15.47	SCF (2013)
Sole-prop. as share of entre. (%)	67.36	67.48	SCF (2013)
S-corp. as share of entre. (%)	23.63	24.18	SCF (2013)
C-corp. as share of entre. (%)	9.01	8.34	SCF (2013)
Exit rate from entrepreneurship (%)	9.18	9.51	BDS (2013)
Transition rate from C-corp. to pass-through (%)	2.40	2.64	Bhandari and McGrattan (2021)
Share of payroll in pass-throughs (%)	38.00	35.31	SUSB (2013)
Share of entrepreneurial income declared as wage			
S-corp. (%)	36.27	34.07	IRS (2013)
C-corp. (%)	19.88	20.55	IRS (2013)
Employment share by firm size bins (%)			
Bin 1 (smallest)	10.43	17.85	SUSB (2013)
Bin 2	11.48	13.99	SUSB (2013)
Bin 3	14.18	15.51	SUSB (2013)
Bin 4 (largest)	63.91	52.64	SUSB (2013)
Inequality			
Gini income	0.54	0.57	SCF (2013)
Gini income, entrepreneurs	0.62	0.64	SCF (2013)
Share of entre. in top 10% income (%)	37.71	38.10	SCF (2013)
Share of entre. in top 10% wealth (%)	46.88	52.68	SCF (2013)
Wealth share entre. (%)	53.55	55.81	SCF (2013)
Share of taxpayers in the top income bracket (%)	2.87	2.84	IRS (2013)

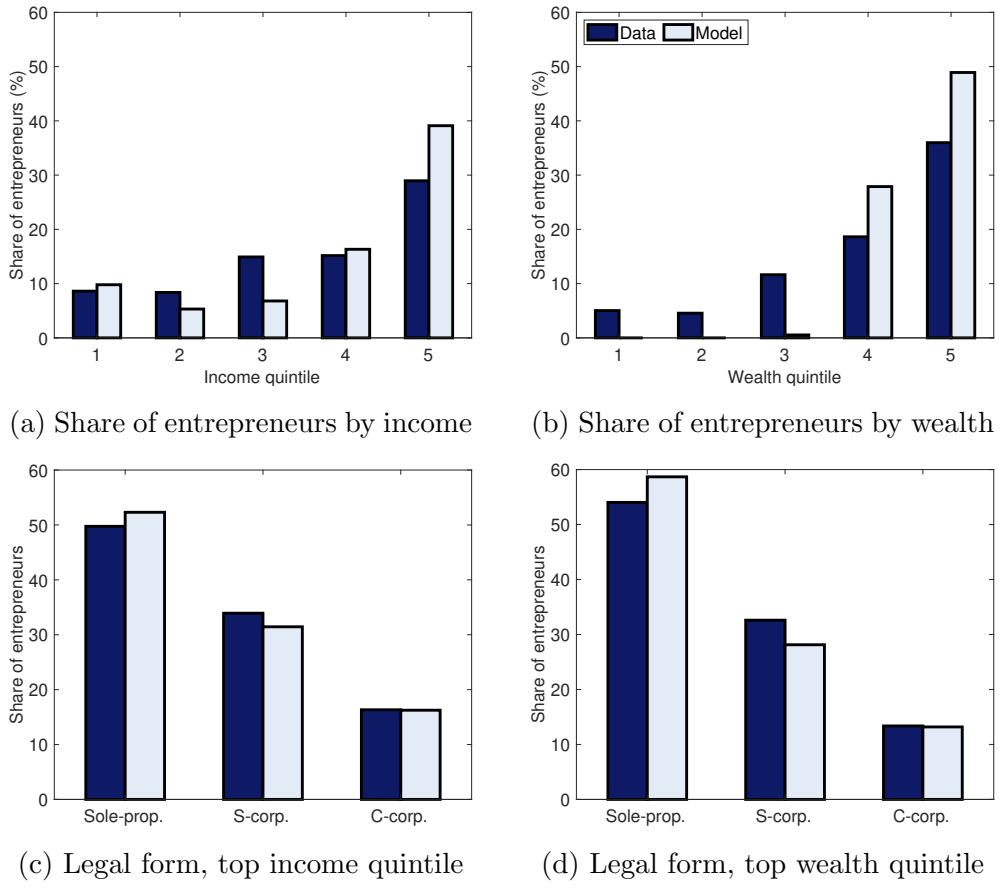
Notes: Model outcomes are based on the benchmark calibration.

Table 4: Untargeted Moments

	Data	Model	Data source
Entrepreneurial sector			
Share of employment in entrepreneurial sector (%)	71.4	62.98	Davis et al. (2007)
Pass-through output as share of aggregate output (%)	39.55	39.76	SOI IBD (2013)
Transition rate from sole prop. to C-corp. (%)	0.9	2.1	Bhandari and McGrattan (2020)
Transition rate from S-corp. to C-corp. (%)	2.7	2.7	Bhandari and McGrattan (2020)
Average business income, pass-through to C-corp.	0.20	0.18	Dyrda and Pugsley (2022b)
Inequality			
Gini wealth	0.84	0.82	SCF 2013
Average income ratio: entre. to worker	2.60	2.50	SCF (2013)
Median income rate: entre. to worker	1.56	1.74	SCF (2013)
Income shares (%)			
Top 1%	19.05	14.27	SCF (2013)
Top 10%	44.89	55.30	SCF (2013)
Top 20%	58.71	65.69	SCF (2013)
Bottom 40%	11.08	12.52	SCF (2013)
Wealth shares (%)			
Top 1%	33.45	19.76	SCF (2013)
Top 10%	73.60	64.92	SCF (2013)
Top 20%	86.20	87.52	SCF (2013)
Bottom 40%	0.10	0.00	SCF (2013)
Tax revenue			
Total tax revenue (incl. social security) to GDP (%)	24.07	22.47	OECD (2012)
Income tax share of revenue (%)	47.44	56.44	CBO (2013)
Social security tax share of revenue (%)	34.17	26.13	CBO (2013)
Corporate tax share of revenue (%)	9.88	13.05	CBO (2013)
Dividend tax share of revenue (%)	8.51	4.38	CBO (2013)
Average tax rate by taxable income (%)			
Top 0.1%	27.46	27.17	SCF and TAXSIM (2013)
P99-P99.9	30.63	27.41	SCF and TAXSIM (2013)
P90-P99	25.30	27.87	SCF and TAXSIM (2013)
P50-P90	16.03	8.27	SCF and TAXSIM (2013)
Bottom 50%	6.39	1.12	SCF and TAXSIM (2013)

Notes: Model outcomes are based on the benchmark calibration. For the empirical moments we use the following data: Average business income of pass-through businesses relative to C-corporations and the share of employment in the entrepreneurial sector are taken from Dyrda and Pugsley (2022b) and Davis et al. (2007), respectively. Transition rates are taken from Bhandari and McGrattan (2020). Business receipts of pass-through businesses as a share of aggregate business receipts in 2013 are taken from the IBD. Total tax revenue as a share of GDP is based on OECD data in 2012. Empirical tax revenue shares by tax type are taken from a report by Congressional Budget Office (2013). Average income tax rates include the personal income tax and the dividend tax and are computed using SCF (2013) and TAXSIM. All other data moments are based on SCF (2013).

Figure 2: Occupation and Legal Form by Income and Wealth



(a) Share of entrepreneurs by income

(b) Share of entrepreneurs by wealth

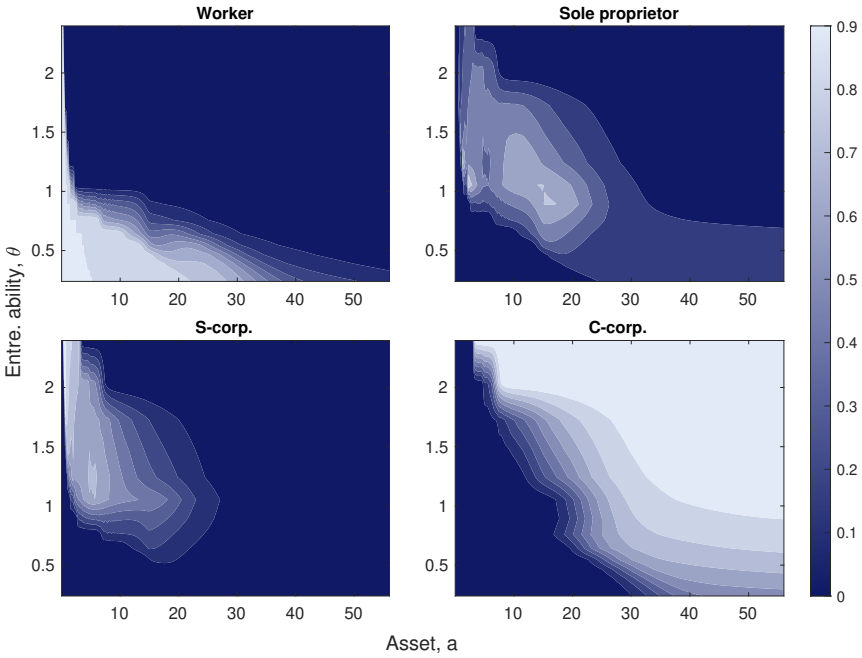
(c) Legal form, top income quintile

(d) Legal form, top wealth quintile

Notes: Shares of entrepreneurs by income and wealth, and sole proprietors, S-corporations, and C-corporations as shares of entrepreneurs are based on SCF (2013). Model outcomes are based on the benchmark calibration.

5 Inspecting the Mechanism: Entrepreneurial Decisions and Tax Avoidance

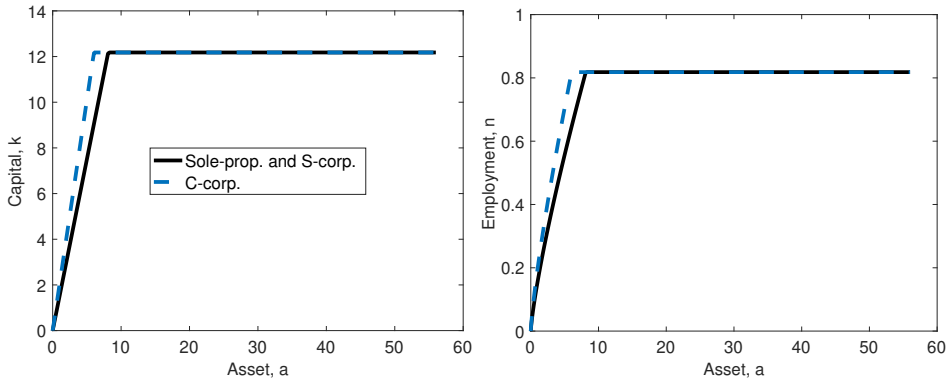
Figure 3: Occupation and Legal Form of Business Organization



Notes: The figure shows the probability distribution of the occupation and legal form of business organization for each level of asset a and entrepreneurial ability θ. We fix the working ability ε at the mean and integrate $o(a, \varepsilon, \theta, z_{-})$ over the previous state z_{-}.

In this section, we analyze the economic mechanisms of entrepreneurial tax avoidance using our calibrated model and start with a discussion of the policy functions. Figure 3 shows the probability that a household with entrepreneurial talent θ and wealth a (given average working ability) chooses to be a worker or an entrepreneur of a sole proprietorship, S-corporation, or C-corporation. For a given level of entrepreneurial talent, households become entrepreneurs only if they hold sufficient wealth. Talented but wealth-poor agents choose to be workers because they are credit-constrained and cannot generate sufficient income from running a business. Among entrepreneurs, only the very talented and wealthy households run their businesses as C-corporations despite higher operating costs and double taxation to take advantage of the relaxed credit constraint, which allows them to invest more (Figure 4a) and to employ more workers (Figure 4b). Compared to owners of C-corporations, entrepreneurs of S-corporations have less wealth; they operate their businesses as S-corporations because they can circumvent double taxation and report a fraction of their income as business income to avoid the social security tax. The least talented entrepreneurs are sole proprietors as they cannot afford to pay the operating costs associated with S-corporations.

Figure 4: Policy Functions - Capital and Employment

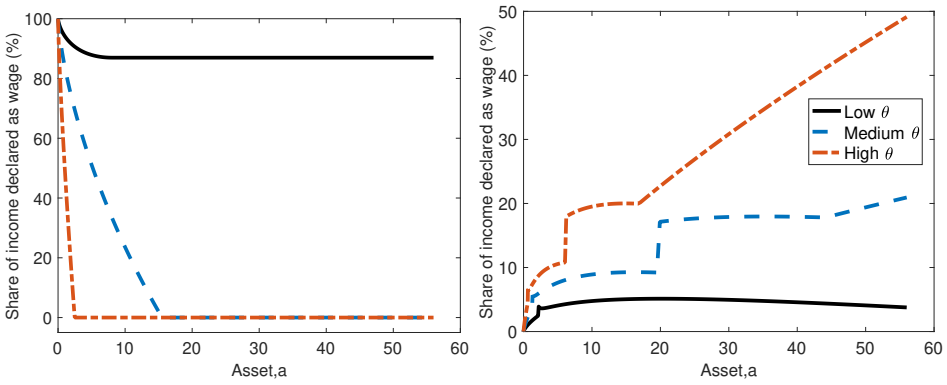


(a) Capital (b) Employment

Notes: Entrepreneurial talent θ is fixed at the mean.

Figure 5 shows how S-corporations (left panel) and C-corporations (right panel) use the intensive margin of tax avoidance. We plot the share of total income declared as wage income as a function of wealth for three different realizations of entrepreneurial ability θ. Owners of S-corporations have an incentive to report their income as business income to avoid the social security tax. However, shifting income between tax bases is costly. Consequently, less talented and less wealthy owners of S-corporations report a larger share of their income as wage income. In contrast, wealthy and talented owners of S-corporations declare all of their income as business income. Owners of C-corporations have incentives to declare their income as wage income to avoid double taxation. However, because income shifting is costly, the talented and wealthy owners of C-corporations declare large shares as wage income. Since wealth-poor C-corporations cannot afford the tax avoidance cost, they report a negligible share of their income as wage income. The capped social security tax and the top marginal tax rate become visible in the income shifting of C-corporations. With increasing assets, income rises, and once it is beyond the cap $\overline{y}_s$ (see Eq. (4)), the declared share of wage income exhibits a jump increase. It is flat afterward because the owner of the C-corporation avoids the highest top marginal tax rate. Once the top marginal tax rate applies, the wage share monotonically increases with assets.

Figure 5: Policy Functions - Income Shifting



(a) S-corporation (b) C-corporation

Notes: The figures display the policy functions for the share of income declared as wage income by asset level. Low-, medium-, and high-θ correspond to entrepreneurial talent values $\{\bar{\theta} - 0.5\sigma_\theta, \bar{\theta}, \bar{\theta} + 0.5\sigma_\theta\}$ where $\bar{\theta}$ is the mean θ conditional on the legal form (S- or C-corp.).

6 Policy Analysis

6.1 Eliminating Tax Avoidance

In this section, we highlight the macroeconomic effects of entrepreneurial tax avoidance. To this end, we consider a tax reform that imposes equal tax treatment of workers and entrepreneurs so that all channels of tax avoidance are eliminated. Specifically, we assume that all entrepreneurs are taxed as sole proprietors, but the differences between legal forms in operating costs and access to credit persist. That is, all entrepreneurs solve the maximization problem (10) subject to Eq. (11) to (14) but S- and C-corporations face operating costs κ^{ES} and κ^{EC}, respectively, and differ in their borrowing limits, $\lambda^{ES} < \lambda^{EC}$. Note that with equal tax treatment, there are no incentives to run a business as an S-corporation because it involves operating costs but faces the same collateral constraint as a sole proprietor.

In our policy experiment, the social security tax τ_s adjusts such that social security contributions equal total pension expenses. We keep the pension replacement rate b fixed such that the level of pensions varies with the average wage income in the economy. We view this specification as the one that occurs most likely in practice. In a robustness check, we implement an alternative specification in which total pension expenditures B are fixed and the replacement rate b adjusts. The results are robust to this alternative specification and are reported in Appendix A.5.

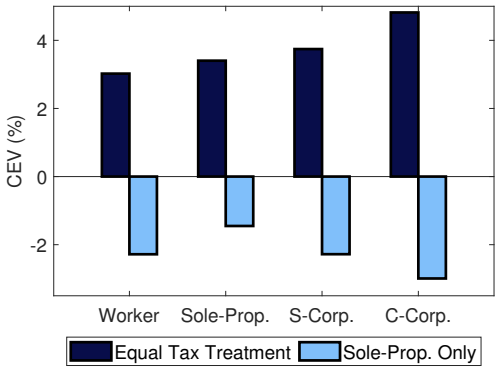
Column (1) in Table 5 summarizes the long-run effects of the tax reform relative to the benchmark economy. The equal tax treatment of all entrepreneurs eliminates the tax-motivated legal form choice and, consequently, a large share of entrepreneurs chooses

Table 5: The Macroeconomic Effects of Eliminating Tax Avoidance

	Equal Tax Treatment (1)	Sole Prop. Only (2)
Impact on prices		
Interest rate (p.p.)	-0.54	0.10
Wage (%)	3.47	-0.58
Impact on aggregates		
Aggregate output (%)	7.26	-2.91
Aggregate capital (%)	10.07	-2.27
Ave. entrepreneurial capital (%)	39.77	-13.94
Entre. share of output (p.p)	11.34	-5.04
Impact on taxes		
Total revenue (excl. soc. sec. %)	6.23	-9.53
Social security contributions (%)	3.47	-0.58
Social security tax rate (p.p.)	-0.85	-0.67
Impact on entrepreneurial sector		
Share of entrepreneurs (p.p.)	-0.51	0.42
Sole prop. as share of entre. (p.p.)	-35.24	32.52
S-corp. as share of entre. (p.p.)	-24.18	-24.18
C-corp. as share of entre. (p.p.)	59.41	-8.34

Notes: Column (1) shows the long-run outcomes of a tax reform in which all entrepreneurs are taxed as sole proprietors but legal forms of business organization differ in their borrowing limits, $\lambda^{EP} = \lambda^{ES} < \lambda^{EC}$, and in their operating costs $\kappa^{ES} < \kappa^{EC}$. Column (2) shows the long-run outcomes of a counterfactual economy in which all entrepreneurs are taxed as sole proprietors and face the same borrowing limit, $\lambda^{EC} = \lambda^{ES} = \lambda^{EP}$. In this counterfactual economy all entrepreneurs choose to be sole proprietors. Statistics are based on steady state equilibria and are given relative to the benchmark economy either in % or in p.p. The social security tax τ_s adjusts such that social security contributions equal total pension expenses while the pension replacement rate b is fixed. All other model and tax parameters are at their benchmark values. To highlight the effects of eliminating tax avoidance on tax revenue, we do not adjust the income tax parameter λ_i to balance the government budget constraint. Assuming fiscal neutrality does not change the qualitative results except total tax revenue.

Figure 6: The Welfare Effects of Eliminating Tax Avoidance



Notes: The figure shows the welfare effects of eliminating tax avoidance relative to the benchmark economy. 'Equal Tax Treatment' refers to a tax reform in which all entrepreneurs are taxed as sole proprietors but legal forms of business organization differ in their borrowing limits, $\lambda^{EP} = \lambda^{ES} < \lambda^{EC}$, and in their operating costs $\kappa^{ES} < \kappa^{EC}$. 'Sole Prop. Only' refers to the counterfactual economy in which all entrepreneurs are taxed as sole proprietors and face the same borrowing limit, $\lambda^{EC} = \lambda^{ES} = \lambda^{EP}$. Fiscal neutrality is imposed by adjusting the tax parameter λ_i in the counterfactual economy. The social security tax τ_s adjusts such that social security contributions equal total pension expenses while the pension replacement rate b is fixed. All other model and tax parameters except λ_i are at their benchmark values. Occupations are defined as occupations in the benchmark economy.

to pay the operating costs and runs their businesses as C-corporations to improve their access to credit. As a result, entrepreneurial capital and output strongly increase. Since the tax reform removes all channels of tax avoidance and raises aggregate output, the government collects more tax revenue and social security contributions. Consequently, the social security tax drops as an equilibrium outcome.

Figure 6 highlights the welfare effects of the tax reform imposing fiscal neutrality and allowing for transitional dynamics.[16] Eliminating tax avoidance generates large welfare gains driven by the substantial increase in aggregate output and tax revenue, which can be redistributed to the households. Workers benefit from higher wages and the reduction of the social security tax. Entrepreneurs gain from the equal tax treatment that induces them to run their businesses as C-corporations, which are less financially constrained.

The legal form choice of entrepreneurs is a distinctive feature of our model, setting us apart from standard occupational choice models in the literature, e.g., Cagetti and De Nardi (2006), Quadrini (2000), and Brüggemann (2021). In our benchmark economy, legal forms of business organization do not only differ in their tax treatment but also in their access to external credit. To highlight the role of differential credit constraints across legal forms, we run a second counterfactual in which we assume that all entrepreneurs are taxed as sole proprietors and face the same borrowing limit, $\lambda^{EC} = \lambda^{ES} = \lambda^{EP}$. Because there are no tax avoidance opportunities to exploit and legal forms do not differ in their access

[16]The transitional dynamics are shown in Figure A1 in Appendix A.4.

to credit, the operating costs of S- and C-corporations induce all entrepreneurs to be sole proprietors. The resulting economy is similar to the one studied by Brüggemann (2021).

Column (2) in Table 5 presents the findings relative to the benchmark economy in which legal forms differ in their tax treatment and financial restrictions. Since all entrepreneurs are sole proprietors, the entrepreneurial sector is more credit-constrained than in the benchmark economy and entrepreneurial investment decreases substantially with adverse effects on aggregate output. Stronger financial constraints generate welfare losses not only for entrepreneurs but also for workers who suffer from lower wages (Figure 6).

Our analysis highlights how the interaction between tax avoidance opportunities and credit constraints distorts macroeconomic outcomes: the possibility to reduce their tax burden induces entrepreneurs to run their businesses as S-corporations despite tighter credit constraints, depressing investment and output. In Section 6.4, we study the implications of this interaction on the optimal design of the top marginal income tax rate.

Table 6: TRA86 - The Impact of the Top Marginal Tax Rate

	$\tau_h = 0.5$	$\tau_h = 0.28$
C-corp. as share of entre. (%)	10.15	0.46
S-corp. as share of entre. (%)	23.50	38.0
Sole-prop. as share of entre. (%)	66.34	61.52
S-corp. output as share of aggregate output (%)	12.49	30.56
Share of S-corp. income declared as wage (%)	37.67	18.18
Labor share of S-corp. (%)	58.28	52.55

Notes: Statistics are based on the steady state equilibrium in which all parameters are kept at their benchmark calibration. The social security tax τ_s adjusts such that social security contributions equal total pension expenses while the pension replacement rate b is fixed. Fiscal neutrality is imposed by adjusting the tax parameter λ_i.

6.2 The Tax Reform Act of 1986

We employ our benchmark model to explore how a reduction of the top marginal tax rate affects the structure of the entrepreneurial sector. This exercise is motivated by the Tax Reform Act of 1986 (TRA86), which reduced the top income tax rate from 50% to 28%. Table 6 compares the steady state of the theoretical economy for $\tau_h = 0.5$ and $\tau_h = 0.28$.[17]

The substantial reduction of the top marginal tax rate induces entrepreneurs of C-corporations to reorganize and to run their businesses as S-corporations. Our model predicts that the share of entrepreneurial C-corporations drops from 10.15% to 0.46% while

[17] We assume that government spending is the same as in the benchmark economy with $\tau_h = 0.396$. For $\tau_h \geq \tau_h^{bench}$, we hold the threshold for the top bracket constant at $y_h = y_h^{bench}$. For $\tau_h < \tau_h^{bench}$ we shift

the share of S-corporations increases from 23.5% to 38% in the long run. The share of sole proprietors decreases from 66.34% to 61.52%. Thus, the share of pass-through businesses increases by 9.68 p.p. in the long run. The owners of S-corporations declare a smaller share of their income as wage income such that the S-corporate labor share decreases by 5.7 p.p. Note, however, that our analysis is limited by the fact that TRA86 included a variety of tax changes that we do not cover. Instead, we focus on the impact of the top marginal tax rate only. Still, the model predictions are qualitatively in line with the empirical trends described in Section 2 and illustrated in Figure 1. Dyrda and Pugsley (2022b) employ a quantitative general equilibrium model with pass-through businesses and C-corporations to evaluate TRA86 and come to similar conclusions. They report that TRA86 is associated with a rise of the share of pass-through businesses of 11.9 p.p. compared to 16.3 p.p. in the data.

6.3 Discussion

Our theoretical framework captures in a stylized way the tax treatment of different forms of business organization to focus on an important trade-off: while pass-through businesses may be advantageous for tax purposes, their legal restrictions limit the access to external credit, constraining capital investment. There are, however, other important factors affecting the entrepreneurial choice of the legal form of business organization, which we incorporate in reduced form in our model. First, we assume the operating costs of C-corporations to be higher than those of S-corporations, and second, switching legal forms generates an additional one-time utility cost. In the quantitative analysis, we discipline these costs by targeting the empirical shares of sole proprietors, S-corporations, and C-corporations, and the flows across legal forms. In line with the data, the model generates low transition rates between different business organizations, reflecting that the legal form choice is rather persistent (Bhandari and McGrattan, 2020). However, at the time of tax reform, substantial switches take place in the model. Dyrda and Pugsley (2024) provide empirical evidence that after the TRA86, the reorganization of C-corporations to pass-through businesses indeed spiked. They also show that while the spike is short-lived, the reform explains the continued rise of pass-through businesses in the 2000s. Comparing the empirical evidence with the predictions of our theoretical framework, we find that in response to tax reforms, our model generates a fast transition (see Figure A.4 in Appendix A.2), overestimating the short-run changes in legal forms with quantitative implications for macroeconomic outcomes during the transition. Therefore, throughout the quantita-

the threshold y_h below y_h^{bench} to ensure that the marginal income tax rate is monotonically increasing:

$$y_h = \left(\frac{\lambda_i(1-\tau_i)}{1-\tau_h} \right)^{1/\tau_i}.$$

tive analysis, we focus on the long-run impact of tax reforms. Note, however, that our welfare analysis accounts for the transitional dynamics such that welfare gains might be overstated.

There are several reasons why our model has difficulties in quantitatively replicating the short-run effects of tax reforms on business organization. First, switching the legal form of organization for tax purposes involves additional legal regulations. By default, a corporation is taxed as a C-corporation but it can choose to be taxed as an S-corporation.[18] However, to qualify for the S-corporation status, a corporation must be domestic with at most 100 shareholders who may not be corporations, partnerships or non-resident foreign shareholders. Moreover, the corporation is allowed to have only one class of stock. These legal requirements limit the corporation's ability to attract external capital (Chen et al., 2018), which we capture in our model in a stylized way by assuming that the collateral requirement is stricter for S-corporations than for C-corporations. This modeling choice implies that an entrepreneur who decides to switch the tax classification from S-corporation to C-corporation immediately gains better access to credit, facilitating a strong increase in entrepreneurial investment in the short run. Therefore, our model potentially overstates the short-run increase in investment as it abstracts from the fact that, in reality, it takes time for businesses to attract additional shareholders and to improve credit conditions.

Second, switching the tax status from S-corporation to C-corporation or vice versa needs adjustments in accounting, which generate additional costs as Dyrda and Pugsley (2024) emphasize. For example, if an S-corporation converts into a C-corporation, all retained earnings accumulated as an S-corporation are kept in an Accumulated Adjustment Account. Unless distributed within a certain transition period, the shareholders lose the tax benefits of these previously accumulated earnings. If a C-corporation converts into an S-corporation, the retained earnings accumulated as a C-corporation must be tracked in an additional Earning and Profits Account, which are taxed as C-corporation distributions when allocated to the shareholders. In sum, the additional accounting generates costs for several periods after changing the legal form. While our model incorporates a one-time switching cost and different operating costs across legal forms, it abstracts from additional costs during a transition period from one legal form to another. The omission of these costs implies that our model potentially overestimates the short-run elasticity of the legal form choice to tax reforms.

Third, the entry of new firms and their legal form choice is an important force in the increase in pass-through businesses in the US. In an empirical decomposition, Dyrda and Pugsley (2024) show that between 1982 and 1990, the reorganization of incumbent businesses was the major driver behind the increase in pass-through businesses. However,

[18] Dyrda and Pugsley (2024) differentiate between "actual legal form of organization" and the "taxable legal form of organization". For example, the actual legal form refers to corporation whereas the taxable legal form corresponds to S-corporation and C-corporation.

between 1990 and 2015, the legal form choice of businesses entering the market became the key factor for the rise of pass-through businesses. Our model captures the entries and exits of businesses because agents choose their occupation and the legal form of business organization every period. However, the increase in S-corporations in the short and medium run is mainly driven by a reorganization of incumbent C-corporations as S-corporations.

Fourth, running a business as corporation rather than in sole proprietorship is advantageous because owners of a corporation benefit from limited liability. Although this may be an important determinant of business organization, we abstract from it to focus purely on the differential tax treatment and credit access of different legal forms. Introducing limited liability for corporations would increase the incentives to incorporate either as an S-corporation or a C-corporation, as both types of corporations feature limited liability.

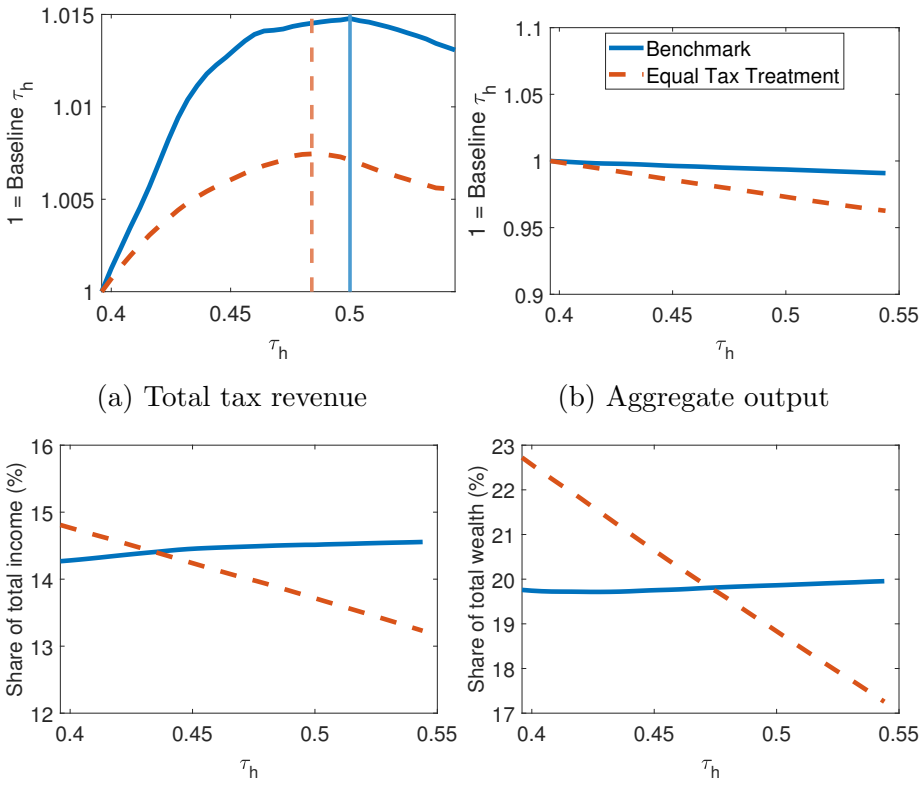
6.4 Optimal Top Income Taxation

In this section, we explore the aggregate and distributional effects of raising the top marginal income tax rate. We explore how tax avoidance affects the equity-efficiency trade-off and the optimal top marginal tax rate.

Laffer curve. In the following, we derive the top marginal income tax rate that maximizes total tax revenue. To assess how tax avoidance affects the revenue-maximizing top marginal tax rate, we compare the benchmark economy with the economy in which all entrepreneurs are taxed as sole proprietors so that all channels of tax avoidance are eliminated. Note, however, that the legal forms differ in their access to credit and operating costs. To make the two economies comparable, we re-calibrate selected parameters of the economy with equal tax treatment to reflect similar economic conditions as the benchmark economy (see Appendix A.4). In both economies, we vary τ_h and display the steady states of tax revenue, aggregate output, and the top 1% income and wealth shares in Figure 7. The solid (dashed) vertical line refers to the tax rate that maximizes tax revenue in the benchmark economy (counterfactual economy with equal tax treatment). Table 7 presents the impact of implementing the tax-revenue maximizing top marginal income tax rate relative to the benchmark $\tau_h = 0.396$.

Let us first analyze the impact of increasing the marginal top tax rate in the counterfactual economy in which equal tax treatment eliminates all channels of tax avoidance. Figures 7a and 7b highlight the well-known finding that a larger top marginal tax rate reduces aggregate output and may erode the tax base with adverse effects on total tax revenue. Total tax revenue follows a Laffer curve, and the revenue-maximizing top marginal tax rate amounts to 48.4%. A higher top marginal tax rate substantially decreases the income and wealth shares held by the top 1% (Figure 7c and 7d). These findings reflect the trade-off between equity and efficiency. Table 7 shows that implementing the revenue-maximizing tax rate substantially reduces capital and output in the entrepreneurial sector

Figure 7: Tax Avoidance and the Equity-Efficiency Trade-Off



(a) Total tax revenue

(b) Aggregate output

(c) Top 1% income share

(d) Top 1% wealth share

Notes: The figure shows selected outcomes for different values of the top marginal tax rate τ_h. With equal tax treatment, all entrepreneurs are taxed as sole proprietors, but operating costs and borrowing limits differ across legal forms. The economy with equal tax treatment is re-calibrated to reflect similar economic conditions as the benchmark economy. Total tax revenue and aggregate output are normalized to 1 at $\tau_h = 0.396$.

Table 7: The Long-Run Effects of the Revenue-Maximizing Top Marginal Tax Rate

	Benchmark	Equal Tax Treatment
Revenue-maximizing τ_h	0.500	0.484
Impact on prices		
Wage (%)	-0.39	-1.28
Interest rate (p.p.)	0.07	0.21
Impact on aggregates		
Aggregate output (%)	-0.64	-2.28
Aggregate capital (%)	-1.73	-4.98
Impact on entrepreneurial sector		
Share of entrepreneurs (p.p.)	-0.03	0.37
Entrepreneurial capital (%)	0.04	-6.84
Entrepreneurial output (%)	0.65	-3.45
Share of sole prop. (p.p.)	-1.25	0.81
Share of S-corporations (p.p.)	-0.89	0.00
Share of C-corporations (p.p.)	2.13	-0.81
Share of wage income, S-corporations (p.p)	4.11	-
Share of wage income, C-corporations (p.p)	-10.32	-
Impact on inequality		
Income Gini (p.p.)	-0.09	-0.60
Wealth Gini (p.p.)	0.07	-1.26
Top 1% income share (p.p.)	0.25	-0.92
Top 1% wealth share (p.p.)	0.10	-3.31
Top 10% income share (p.p.)	-0.10	-0.73
Top 10% wealth share (p.p.)	0.37	-2.30

Notes: The table shows the impact of implementing the tax revenue-maximizing τ_h relative to $\tau_h = 0.396$ in the benchmark economy and the counterfactual economy with equal tax treatment in % or p.p. With equal tax treatment, all entrepreneurs are taxed as sole proprietors, but operating costs and borrowing limits differ across legal forms. The economy with equal tax treatment is re-calibrated to reflect similar economic conditions as the benchmark economy.

and in the aggregate such that the interest rate increases while the wage falls. The lower wage makes it less attractive for households to become workers such that the share of entrepreneurs in the population slightly increases.[19]

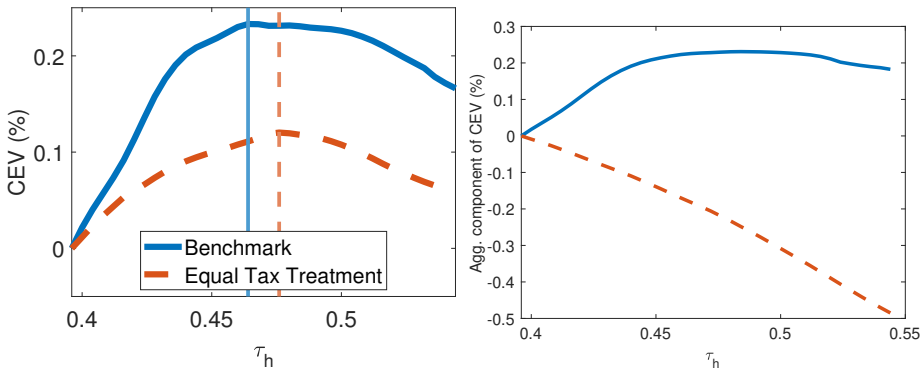
In the benchmark economy, entrepreneurs can minimize their tax burden by choosing the legal form of their businesses and by shifting income between different tax bases. Table 7 reveals that in response to the higher revenue-maximizing marginal tax rate, entrepreneurs switch from S-corporations to C-corporations because the tax advantage of S-corporations relative to C-corporations decreases for high-income earners. Consequently, entrepreneurs of C-corporations declare a smaller share of income as wage income. Since entrepreneurs avoid taxes, the distortionary effects on aggregate capital and output are less pronounced compared to the counterfactual economy with equal tax treatment. Moreover, C-corporations benefit from improved access to credit such that aggregate output is less adversely affected by the higher top marginal tax rate (Figure 7b). Given the weaker aggregate effects, the wage and the interest rate react less strongly. In sum, the interaction of tax avoidance and credit constraints weakens the tax distortions of raising the top marginal tax rate and generates a larger increase in tax revenue compared to the counterfactual economy with equal tax treatment. Entrepreneurial tax avoidance affects the peak of the Laffer curve: the revenue-maximizing top marginal tax rate amounts to 50%, which is 1.6 p.p. higher compared to the counterfactual economy with equal tax treatment (Figure 7a). In the presence of tax avoidance, the impact of the top marginal tax rate on the Gini coefficients of income and wealth is quantitatively much smaller. Notably, as shown in Figure 7c and 7d, the top 1% income and wealth shares increase rather than decrease in response to a tax hike. These findings suggest that tax avoidance reduces the effectiveness of the top marginal tax rate at lowering inequality.

Welfare-maximizing top marginal tax rate. In the following, we derive the optimal top marginal tax rate τ_h that maximizes welfare in the benchmark economy and in the re-calibrated counterfactual economy in which equal tax treatment eliminates all channels of tax avoidance. Figure 8 displays the welfare gains and their components. Figure 8a highlights that entrepreneurial tax avoidance weakens the tax distortions of raising the top marginal tax rate such that welfare increases more in the benchmark economy than in the counterfactual economy with equal tax treatment. The optimal top marginal tax rate equals 46.4% in the benchmark economy, which is 6.8 p.p. higher than the one implemented in the US tax code. Moreover, the economy with equal tax treatment is characterized by an optimal top marginal tax rate of 47.6%, which is 1.2 p.p. higher compared to the benchmark economy.

Following Domeij and Heathcote (2004), we decompose the welfare gain into an aggre-

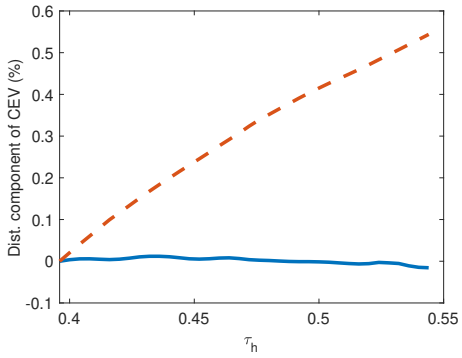
[19] Quantitatively, the change in the share of entrepreneurs is minor, which is in line with Bohacek and Zubricky (2012) who also report quantitatively small responses of the share of entrepreneurs to a flat tax reform.

Figure 8: Welfare-Maximizing Top Marginal Tax Rate

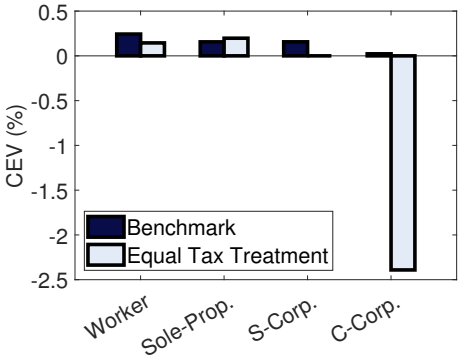


(a) Aggregate CEV

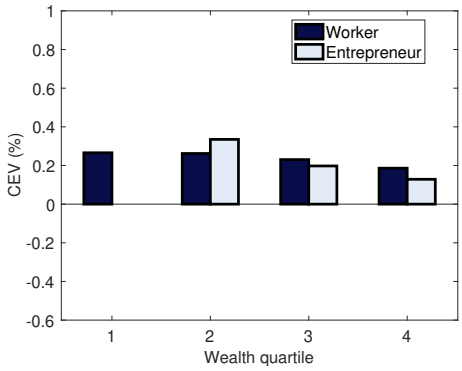
(b) Aggregate component of CEV



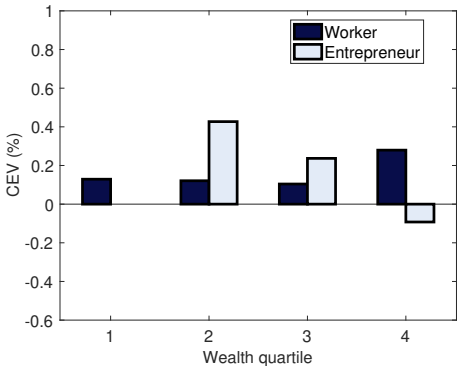
(c) Distrib. component of CEV



(d) CEV by occupation & legal form



(e) CEV, benchmark



(f) CEV, equal tax treatment

Notes: Panels (a), (b), and (c) show the welfare effects of varying the optimal top marginal tax rate τ_h compared to the benchmark value. The aggregate and distributional components are calculated using Eq. (28). Panels (d), (e), and (f) show the welfare effects of implementing the welfare-maximizing $\tau_h = 0.464$ and $\tau_h = 0.476$ in the benchmark economy and in the counterfactual economy with equal tax treatment, respectively. With equal tax treatment, all entrepreneurs are taxed as sole proprietors, but operating costs and borrowing limits differ across legal forms. The economy with equal tax treatment is re-calibrated to reflect similar economic conditions as the benchmark economy. The social security tax τ_s adjusts such that social security contributions equal total pension expenses while the pension replacement rate b is fixed. Fiscal neutrality is imposed by adjusting the tax parameter λ_i. Occupations are defined as occupations in the benchmark economy.

gate component and a distributional component. For each state s, we have

$$1 + \omega(s;\tau) = [1 + \hat{\omega}(s;\tau)]\,[1 + \tilde{\omega}(s;\tau)]\,, \tag{28}$$

where $\hat{\omega}(s;\tau)$ is the increase in consumption such that an agent with state s is indifferent between the benchmark economy (with policy τ_b) and the counterfactual economy (with policy τ) provided that the agent's share of consumption and labor supply in the counterfactual economy are the same as those in the benchmark economy. In other words, $\hat{\omega}(s;\tau)$ is the aggregate component and $\tilde{\omega}(s;\tau)$ the distributional component of the welfare gain (see Appendix A.3 for further details).

Figure 8b and 8c highlight the equity-efficiency trade-off in the counterfactual economy in which equal tax treatment eliminates tax avoidance: while the aggregate component of the welfare gain is decreasing in τ_h, the distributional component is increasing. In contrast, in the benchmark economy, the aggregate component is hump-shaped because entrepreneurs engage in tax-motivated switches of legal forms, thereby benefiting from better access to credit and dampening the loss in efficiency. At the same time, equity is hardly affected.

Figure 8d compares the welfare gains of the benchmark economy and the counterfactual economy across occupations. In the economy with equal tax treatment, owners of C-corporations suffer from substantial welfare losses if the current top marginal tax rate is replaced with the optimal one. In contrast, these entrepreneurs exhibit only small welfare effects in the benchmark economy. Workers enjoy welfare gains as the government collects additional tax revenue, which is redistributed to the households via an income tax cut. Figures 8e and 8f display the welfare gains of implementing the optimal tax rate across the wealth distribution in the benchmark and the counterfactual economies, respectively. In the benchmark economy, implementing the optimal marginal tax rate at the top benefits workers and entrepreneurs across the wealth distribution. In contrast, in the counterfactual economy where entrepreneurs cannot minimize their tax burden, the wealthy entrepreneurs lose. Overall, our findings highlight the importance of accounting for entrepreneurial tax avoidance when studying the aggregate and distributional effects of increasing the top marginal income tax.

7 Conclusions

This paper has aimed to improve our understanding of the macroeconomic and distributional impact of entrepreneurial tax avoidance and to explore how tax avoidance affects the equity-efficiency trade-off of taxing high incomes.

To this end, we have developed a dynamic general equilibrium model with incomplete markets and occupational choice in which entrepreneurs can avoid taxes in two ways. On

the extensive margin, entrepreneurs can choose the legal form of business organization. On the intensive margin, entrepreneurs can shift their income between different tax bases.

In a quantitative application to the US economy, we have argued that eliminating tax avoidance by an equal tax treatment of all entrepreneurs across legal forms of business organization substantially increases tax revenue, aggregate output, and welfare in the long run. Our findings suggest that tax avoidance weakens the distortionary effects of higher taxes at the top but makes them ineffective at lowering inequality. Our analysis has indicated that entrepreneurial tax avoidance affects the optimal top marginal income tax rate with direct implications for applied policy.

In our analysis, we have incorporated in a stylized way the tax treatment of different forms of business organization to focus on an important trade-off: while pass-through businesses may be advantageous for tax purposes, their legal restrictions limit the access to external credit, constraining capital investment. There are, however, other determinants of the entrepreneurial choice of business organization, which we have addressed only in reduced form. While we have focused on the long-run effects of tax reforms, the complexity of reorganizing a business may generate heterogeneous costs across firms, affecting the short-run responses to tax reforms. Moreover, it seems to be particularly interesting to consider further benefits of incorporation, such as limited liability. Another promising avenue for future research is to derive the optimal combination of income, corporate, and dividend taxation accounting for entrepreneurial tax avoidance.

References

Badel, A., Huggett, M., and Luo, W. (2020). Taxing Top Earners: A Human Capital Perspective. *The Economic Journal*, 130(629):1200–1225.

Bakış, O., Kaymak, B., and Poschke, M. (2015). Transitional Dynamics and the Optimal Progressivity of Income Redistribution. *Review of Economic Dynamics*, 18(3):679–693.

Barro, R. and Redlick, C. J. (2011). Macroeconomic Effects From Government Purchases and Taxes. *The Quarterly Journal of Economics*, 126(1):51–102.

Bhandari, A., Evans, D., and McGrattan, E. R. (2024). Business Income Underreporting and Public Finance. *working paper, University of Minnesota*.

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

Bilicka, K. and Raei, S. (2023). Output Distortions and the Choice of Legal Form of Organization. *Economic Modelling*, 119:106159.

Bohacek, R. and Zubricky, J. (2012). A Flat Tax Reform in an Economy with Occupational Choice and Financial Frictions. *The Economic Journal*, 122(565):1313–1345.

Brüggemann, B. (2021). Higher Taxes at the Top: The Role of Entrepreneurs. *American Economic Journal: Macroeconomics*, 13(3):1–36.

Buera, F. J. and Shin, Y. (2013). Financial Frictions and the Persistence of History: A Quantitative Exploration. *Journal of Political Economy*, 121(2):221–272.

Cagetti, M. and De Nardi, M. (2006). Entrepreneurship, Frictions, and Wealth. *Journal of Political Economy*, 114(5):835–870.

Chen, D. and Qi, S. (2016). The Importance of Legal Form of Organization on Small Corporation External Financing. *Economic Inquiry*, 54(3):1607–1620.

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

Clarke, C. and Kopczuk, W. (2017). Business Income and Business Taxation in the United States since the 1950s. *Tax Policy and the Economy*, 31(1):121–159.

Congressional Budget Office (2013). Monthly Budget Review Summary for Fiscal Year 2013. Technical report.

Cooper, M., McClelland, J., Pearce, J., Prisinzano, R., Sullivan, J., Yagan, D., Zidar, O., and Zwick, E. (2016). Business in the United States: Who Owns It, and How Much Tax Do They Pay? In *Tax Policy and the Economy, Volume 30*, NBER Chapters, pages 91–128. National Bureau of Economic Research, Inc.

Davis, S., Haltiwanger, J., Jarmin, R., and Miranda, J. (2007). Volatility and Dispersion in Business Growth Rates: Publicly Traded versus Privately Held Firms. In *NBER Macroeconomics Annual 2006, Volume 21*, pages 107–180. National Bureau of Economic Research, Inc.

DeBacker, J. M. and Prisinzano, R. (2015). The Rise of Partnerships. *Tax Notes*, 147(13):1563–1575.

Di Nola, A., Kocharkov, G., Scholl, A., and Tkhir, A.-M. (2021). The Aggregate Consequences of Tax Evasion. *Review of Economic Dynamics*, 40:198–227.

Diamond, P. and Saez, E. (2011). The Case for a Progressive Tax: From Basic Research to Policy Recommendations. *Journal of Economic Perspectives*, 25(4):165–90.

Domeij, D. and Heathcote, J. (2004). On the Distributional Effects of Reducing Capital Taxes. *International Economic Review*, 45(2):523–554.

Dyrda, S. and Pugsley, B. (2022a). How to Tax Capitalists in the Twenty-First Century? *working paper, University of Toronto*.

Dyrda, S. and Pugsley, B. (2022b). The Rise of Pass-Throughs: A Quantitative Exploration. *working paper, University of Toronto*.

Dyrda, S. and Pugsley, B. (2024). The Rise of Pass-Throughs: An Empirical Investigation. *The Economic Journal*, ueae062:1–17.

Erosa, A. and Koreshkova, T. (2007). Progressive Taxation in a Dynastic Model of Human Capital. *Journal of Monetary Economics*, 54(3):667–685.

Ge, Z. (2023). Entrepreneurship, Frictions, and Top Marginal Tax Rates. *Available at SSRN 3636212*.

Gordon, R. H. and MacKie-Mason, J. K. (1994). Tax Distortions to the Choice of Organizational Form. *Journal of Public Economics*, 55(2):279–306.

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

Gorea, D. (2014). Tax Avoidance: Aggregate and Distributional Consequences. *working paper, European University Institute*.

Guner, N., Kaygusuz, R., and Ventura, G. (2014). Income Taxation of U.S. Households: Facts and Parametric Estimates. *Review of Economic Dynamics*, 17(4):559–581.

Guner, N., Lopez-Daneri, M., and Ventura, G. (2016). Heterogeneity and Government Revenues: Higher Taxes at the Top? *Journal of Monetary Economics*, 80(C):69–85.

Heathcote, J., Storesletten, K., and Violante, G. L. (2017). Optimal Tax Progressivity: An Analytical Framework. *The Quarterly Journal of Economics*, 132(4):1693–1754.

Heathcote, J., Storesletten, K., and Violante, G. L. (2020). Optimal Progressivity with Age-dependent Taxation. *Journal of Public Economics*, 189:104074.

Heathcote, J. and Tsujiyama, H. (2021). Optimal Income Taxation: Mirrlees meets Ramsey. *Journal of Political Economy*, 129(11):3141–3184.

Hurst, E. and Pugsley, B. W. (2017). Wealth, Tastes, and Entrepreneurial Choice. In *Measuring Entrepreneurial Businesses: Current Knowledge and Challenges*. University of Chicago Press.

Imrohoroglu, A., Kumru, C. S., and Nakornthab, A. (2023). Revisiting Taxes on High Incomes. *Review of Economic Dynamics*, 51:1159–1184.

Internal Revenue Service (2022). S Corporation Employees, Shareholders and Corporate Officers. IRS Website, https://www.irs.gov/businesses/small-businesses-self-employed/s-corporation-employees-shareholders-and-corporate-officers.

Kindermann, F. and Krueger, D. (2022). High Marginal Tax Rates on the Top 1%? Lessons from a Life Cycle Model with Idiosyncratic Income Risk. *American Economic Journal: Macroeconomics*, 14(2):319–366.

Kitao, S. (2008). Entrepreneurship, Taxation and Capital Investment. *Review of Economic Dynamics*, 11(1):44–69.

Kopczuk, W. and Zwick, E. (2020). Business Incomes at the Top. *Journal of Economic Perspectives*, 34(4):27–51.

Kotsogiannis, C. and Mateos-Planas, X. (2019). Tax Evasion as Contingent Debt. Discussion Papers 1903, Centre for Macroeconomics (CFM).

Landier, A. and Plantin, G. (2017). Taxing the Rich. *Review of Economic Studies*, 84:1186–1209.

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

Maffezzoli, M. (2011). Tax Evasion under Market Incompleteness. Working Paper 378, Innocenzo Gasparini Institute for Economic Research, Bocconi University.

Mertens, K. and Montiel Olea, J. L. (2018). Marginal Tax Rates and Income: New Time Series Evidence. *The Quarterly Journal of Economics*, 133(4):1803–1884.

Nelson, S. C. (2016). Paying Themselves: S Corporation Owners and Trends in C Corporation Income, 1980 - 2013. *Office of Tax Analysis Working Paper*, 107.

Piketty, T., Saez, E., and Stantcheva, S. (2014). Optimal Taxation of Top Labor Incomes: A Tale of Three Elasticities. *American Economic Journal: Economic Policy*, 6(1):230–271.

Quadrini, V. (2000). Entrepreneurship, Saving and Social Mobility. *Review of Economic Dynamics*, 3(1):1–40.

Saez, E., Slemrod, J., and Giertz, S. H. (2012). The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review. *Journal of Economic Literature*, 50(1):3–50.

Saez, E. and Zucman, G. (2020). The Rise of Income and Wealth Inequality in America: Evidence from Distributional Macroeconomic Accounts. *Journal of Economic Perspectives*, 34(4):3–26.

Slemrod, J. (1996). High-Income Families and the Tax Changes of the 1980s: The Anatomy of Behavioral Response. In Feldstein, M. and Poterba, J., editors, *Empirical Foundations of Household Taxation*, pages 169–192. University of Chicago Press.

Slemrod, J. (2007). Cheating Ourselves: The Economics of Tax Evasion. *Journal of Economic Perspectives*, 21(1):25–48.

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

Smith, M., Yagan, D., Zidar, O., and Zwick, E. (2022). The Rise of Pass-Throughs and the Decline of the Labor Share. *American Economic Review: Insights*, 88(11):2283–2299.

Stokey, N. L. and Rebelo, S. (1995). Growth Effects of Flat-Rate Taxes. *Journal of Political Economy*, 103(3):519–550.

Uribe-Teran, C. (2021). Higher Taxes at the Top? The Role of Tax Avoidance. *Journal of Economic Dynamics and Control*, 129:104187.

Zeida, T. (2022). The Tax Cuts and Jobs Act (TCJA): A Quantitative Evaluation of Key Provisions. *Review of Economic Dynamics*, 46:74–97.

A Appendix

A.1 Preference Shock

To smooth out the kinks in the value function caused by the discrete occupational choice, we introduce an i.i.d. preference shock. We extend the model described in Section 3 by assuming that in each period young agents draw $\epsilon = \{\epsilon_W, \epsilon_{EP}, \epsilon_{ES}, \epsilon_{EC}\}$, where ϵ follows a type-I extreme value distribution with scale parameter σ_ϵ. The occupational and legal form choice problem in Eq. 5 becomes

$$\mathcal{V}(a, \varepsilon, \theta, z_-, \epsilon) = \max_{o \in \{W,EP,ES,EC\}} \left\{ V^o(a, \varepsilon, \theta) - \xi_{z_-,o} + \sigma_\epsilon \epsilon_o \right\}.$$

The probability of choosing occupation o is given by

$$P^o(a, \varepsilon, \theta, z_-) = \frac{\exp\{[V^o(a, \varepsilon, \theta) - \xi_{z_-,o}]/\sigma_\epsilon\}}{\sum_{j \in \{W,EP,ES,EC\}} \exp\{[V^j(a, \varepsilon, \theta) - \xi_{z_-,j}]/\sigma_\epsilon\}},$$

where the occupational value functions $V^o(a, \varepsilon, \theta)$ described in Section 3 need to be modified such that the expectation $\mathbb{E}$ also operates on the next period's ϵ. For example, in the case of a sole proprietor, the value function becomes

$$V^{EP}(a, \varepsilon, \theta) = \max_{c,a',k,n} \left\{ u(c) + \beta(1 - \rho_R) \mathbb{E}_{\varepsilon', \theta' | \varepsilon, \theta} \left[\mathbb{E}_{\epsilon'} \mathcal{V}(a', \varepsilon', \theta', EP, \epsilon') \right] + \beta \rho_R V^R(a') \right\}$$

subject to constraints in Eq. (11) to (14), where

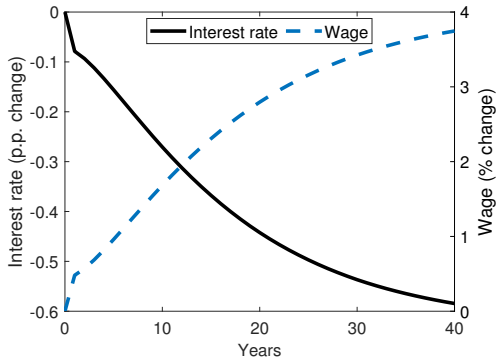
$$\mathbb{E}_\epsilon \mathcal{V}(a, \varepsilon, \theta, z_-, \epsilon) = \sigma_\epsilon \log \left(\sum_{o \in \{W,EP,ES,EC\}} \exp \left\{ \frac{V^o(a, \varepsilon, \theta) - \xi_{z_-,o}}{\sigma_\epsilon} \right\} \right)$$

The scale parameter σ_ϵ should be small enough that it does not affect the results of the model. In our quantitative work, we set it to $\sigma_\epsilon = 0.01$. As a reference, the switching cost ξ, which has the same unit (utils) as σ_ϵ, is estimated to be 0.195.

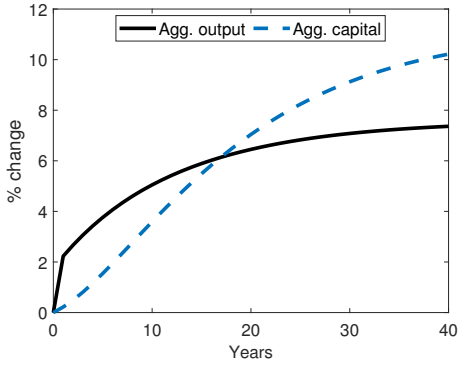
A.2 Transitional Dynamics

We assume that in year 0 the economy is in the steady state of the benchmark economy. In year 1, a permanent tax reform takes place and all entrepreneurs are taxed as sole proprietors. The differences between legal forms in operating costs and access to credit persist. Figure A1 shows the transition from to the new steady state.

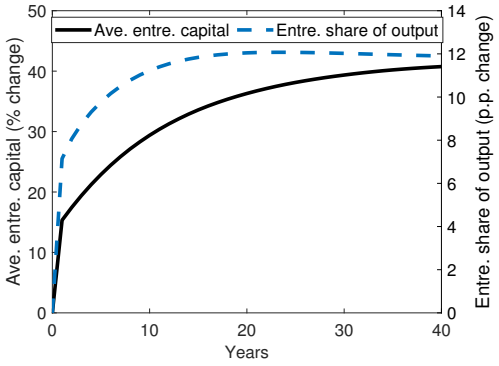
Figure A1: Transition from the Benchmark Economy to the Counterfactual Economy with Equal Tax Treatment



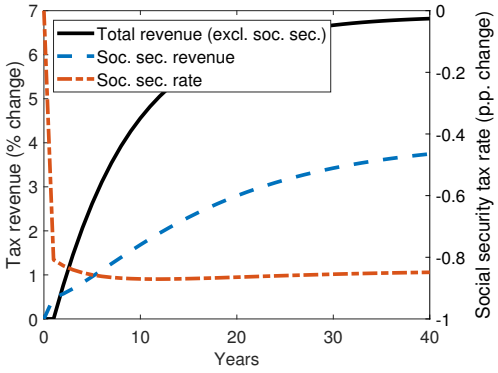
(a) Interest rate and wage



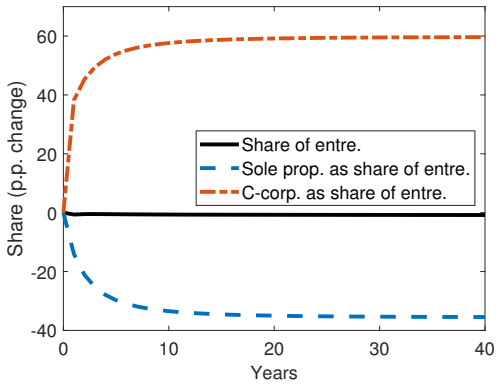
(b) Aggregate output and capital



(c) Ave. entre. k and share of output



(d) Tax revenue and tax rate



(e) Share of entre. and legal forms

Notes: The economy is in the benchmark steady state in year 0. In year 1, a tax reform is implemented imposing equal tax treatment, i.e., all entrepreneurs are taxed as sole proprietors, but legal forms of business organization differ in their borrowing limits, $\lambda^{EP} = \lambda^{ES} < \lambda^{EC}$, and in their operating costs $\kappa^{ES} < \kappa^{EC}$. The figure plots transitional dynamics (in % or p.p. change from the benchmark economy) following the tax reform introduced in year 1. The social security tax τ_s adjusts such that social security contributions equal total pension expenses while the pension replacement rate b is fixed. Fiscal neutrality along the transition path is imposed by adjusting the tax parameter λ_i.

A.3 Welfare

Consumption equivalent variations. We use the conditional consumption equivalent variation (CEV) $\omega(s;\tau)$ to measure the welfare effect of implementing policy τ on an agent in state s. We consider the effects both on the transition path and in the new steady state.

Suppose the economy is originally in a steady state with benchmark policy τ_b. In period $t=0$, policy τ is implemented. The agent's value conditional on s in period $t=0$ is given by

$$V_0(s;\tau) = \mathbb{E}_0\left[\sum_{t=0}^{\infty}\beta^t u\left(c_t(s_t;\tau),\ell_t(s_t;\tau)\right)|s_0=s;\tau\right],$$

which can be re-written as

$$V_0(s;\tau) = V_0^c(s;\tau) - V_0^\ell(s;\tau), \tag{29}$$

where

$$\begin{aligned} V_0^c(s;\tau) &= \mathbb{E}_0\left[\textstyle\sum_{t=0}^{\infty}\beta^t\frac{c_t(s_t;\tau)^{1-\sigma_1}}{1-\sigma_1}|s_0=s;\tau\right], \\ V_0^\ell(s;\tau) &= \mathbb{E}_0\left[\textstyle\sum_{t=0}^{\infty}\beta^t\chi\frac{\ell_t(s_t;\tau)^{1+\sigma_2}}{1+\sigma_2}|s_0=s;\tau\right]. \end{aligned}$$

The conditional CEV $\omega(s;\tau)$ is defined such that

$$\mathbb{E}_0\left[\sum_{t=0}^{\infty}\beta^t u\left((1+\omega(s;\tau))c_t(s_t;\tau_b),\ell_t(s_t;\tau_b)\right)|s_0=s;\tau_b\right] = V_0(s;\tau),$$

Using Eq. (29), we can solve the above equation for $\omega(s;\tau)$ as follows:

$$\omega(s;\tau) = \left[\frac{V_0(s;\tau)-V_0(s;\tau_b)}{V_0^c(s;\tau_b)}+1\right]^{\frac{1}{1-\sigma_1}} - 1.$$

Welfare decomposition. Following Domeij and Heathcote (2004), the welfare gain can be decomposed into an aggregate component and a distributional component:

$$1+\omega(s;\tau) = \left[1+\hat{\omega}(s;\tau)\right]\left[1+\tilde{\omega}(s;\tau)\right],$$

where $\hat{\omega}(s;\tau)$ is the change in consumption such that an agent in state s is indifferent between the benchmark economy (with policy τ_b) and the tax reform economy (with policy τ) provided that the agent's share of consumption and labor supply in the tax reform economy are the same as those in the benchmark economy. In other words, $\hat{\omega}(s;\tau)$ is the aggregate component and $\tilde{\omega}(s;\tau)$ the distributional component of the CEV.

Let $C(\tau_b)$ and $L(\tau_b)$ be aggregate consumption and labor supply in the benchmark economy, and let $C_t(\tau)$ and $L_t(\tau)$ be the counterparts in the tax reform economy. For each

agent in state s, we construct a sequence of hypothetical consumption and working hours such that

$$\begin{aligned}\hat{c}_t(s;\tau) &= \frac{c_t(s;\tau_b)}{C(\tau_b)}C_t(\tau)\\ \hat{\ell}_t(s;\tau) &= \frac{\ell_t(s;\tau_b)}{L(\tau_b)}L_t(\tau).\end{aligned}$$

The value at $t=0$ from this hypothetical sequence is

$$\hat{V}_0(s;\tau) = \mathbb{E}_0\left[\sum_{t=0}^{\infty}\beta^t u\left(\hat{c}_t(s_t;\tau),\hat{\ell}_t(s_t;\tau)\right)|s_0 = s;\tau\right].$$

The aggregate component of the CEV is defined as

$$\hat{\omega}(s;\tau) = \left[\frac{\hat{V}_0(s;\tau) - V_0(s;\tau_b)}{V_0^c(s;\tau_b)} + 1\right]^{\frac{1}{1-\sigma_1}} - 1,$$

and distributional component $\tilde{\omega}(s;\tau)$ is the residual

$$\tilde{\omega}(s;\tau) = \frac{\omega(s;\tau) - \hat{\omega}(s;\tau)}{1+\hat{\omega}(s;\tau)}.$$

A.4 Equal Tax Treatment - Re-Calibration

Table A1 shows the re-calibrated parameters in the counterfactual economy in which equal tax treatment eliminates all channels of tax avoidance but operational costs and access to credit differ across legal forms. We re-calibrate five parameters such that the share of entrepreneurs, the share of C-corporations among entrepreneurs, the Gini coefficient of income, the share of households in the top income bracket, and the ratio between total tax revenue (excl. social security taxes) and GDP are similar to those in the benchmark economy. The rest of the parameters take the same values as in the benchmark model. Table A2 compares the moments of the steady states of the two economies.

Table A1: Re-Calibrated Parameters

Parameter	Description	Value
μ_θ	Unconditional mean	-0.03
κ^{EC}	Operating cost for C-corp.	0.55
ϵ^*	Value of the superstar shock	11.20
λ_i	Income tax, level	0.79
τ_i	Income tax, progressivity	0.12

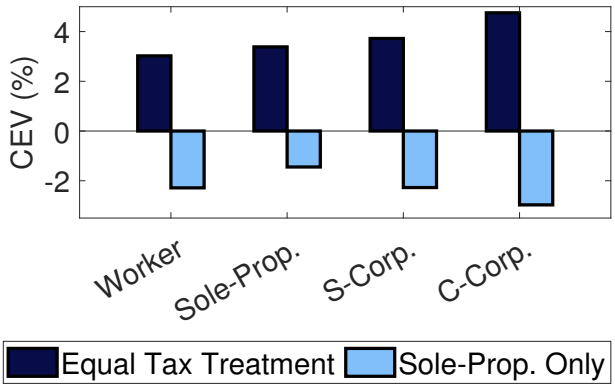
The re-calibrated parameter values are similar to those in the benchmark model except for the value of κ^{EC}, which is much higher than the benchmark model. This is because C-corporations no longer face corporate and dividend taxes in the counterfactual economy, making it a very attractive legal form for entrepreneurs. Thus, to keep the share of C-corporations among the entrepreneurs the same as in the benchmark model, we need to impose a significantly higher operating cost.

Table A2: Moments - Equal Tax Treatment vs. Benchmark

	Benchmark	Equal Tax Treatment
Aggregates		
Interest rate (%)	2.12	2.06
Average hours worked	0.33	0.33
K/Y ratio	3.06	3.05
Tax revenue (excl. soc. security) to GDP (%)	16.60	16.60
Entrepreneurial sector		
Share of entrepreneurs (%)	15.47	15.16
Share of sole-prop. (%)	67.48	91.71
Share of S-corp. (%)	24.18	-
Share of C-corp. (%)	8.34	8.29
Exit rate from entrepreneurship (%)	9.51	9.38
Transition rate from C-corp. to pass-through (%)	2.64	7.15
Share of payroll in pass-throughs (%)	35.31	33.50
Share of entrepreneurial income declared as wage		
S-corp. (%)	34.07	-
C-corp. (%)	20.55	-
Employment share by firm size bins (%)		
Bin 1 (smallest)	17.85	16.85
Bin 2	13.99	13.40
Bin 3	15.51	15.07
Bin 4 (largest)	52.64	54.68
Inequality		
Gini income	0.57	0.56
Gini income, entrepreneurs	0.64	0.64
Share of entre. in top 10% income (%)	38.10	38.14
Share of entre. in top 10% wealth (%)	52.68	55.31
Wealth share entre. (%)	55.81	58.46
Share of taxpayers in the top income bracket (%)	2.84	2.79

A.5 Robustness Check: Fixing Total Pension Benefits in Policy Experiments

Figure A2: The Welfare Effects of Eliminating Tax Avoidance - Robustness Check



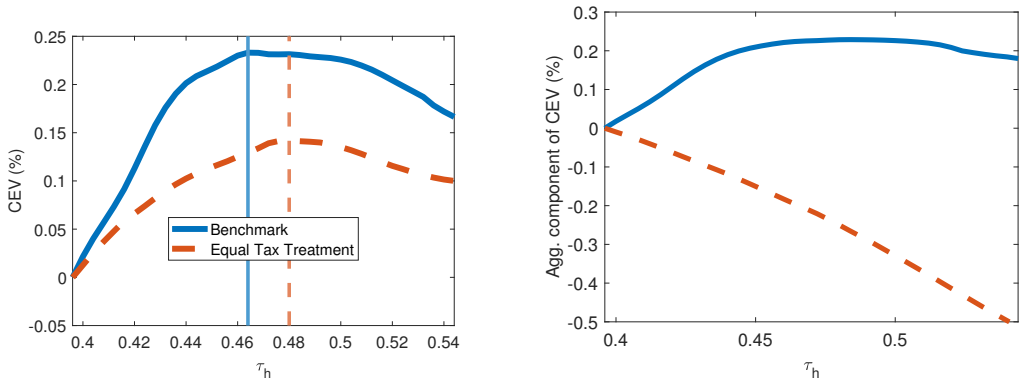
Notes: In this robustness check, total pensions expenditures B are fixed and the replacement rate b adjusts. The figure shows the welfare effects of eliminating tax avoidance relative to the benchmark economy. 'Equal Tax Treatment' refers to a tax reform in which all entrepreneurs are taxed as sole proprietors, but legal forms of business organization differ in their borrowing limits, $\lambda^{EP} = \lambda^{ES} < \lambda^{EC}$, and in their operating costs $\kappa^{ES} < \kappa^{EC}$. 'Sole Prop. Only' refers to the counterfactual economy in which all entrepreneurs are taxed as sole proprietors and face the same borrowing limit, $\lambda^{EC} = \lambda^{ES} = \lambda^{EP}$. Fiscal neutrality is imposed by adjusting the tax parameter λ_i in the counterfactual economy. All other model and tax parameters except λ_i are at their benchmark values. Occupations are defined as occupations in the benchmark economy.

Table A3: The Macroeconomic Effects of Eliminating Tax Avoidance - Robustness Check

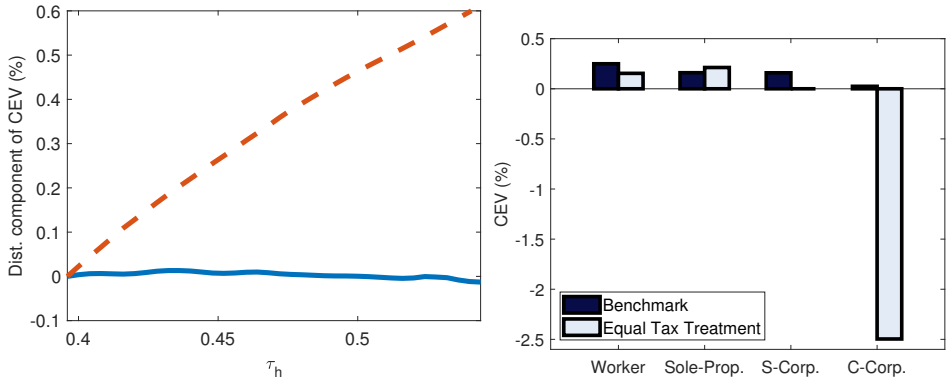
	Equal Tax Treatment (1)	Sole Prop. Only (2)
Impact on prices		
Interest rate (p.p.)	-0.57	0.10
Wage (%)	3.65	-0.61
Impact on aggregates		
Aggregate output (%)	7.41	-2.93
Aggregate capital (%)	10.39	-2.32
Ave. entrepreneurial capital (%)	39.94	-13.96
Entre. Share of output (p.p.)	11.49	-5.06
Impact on taxes		
Total revenue (excl. soc. sec., %)	6.52	-9.57
Social security contributions (%)	0.00	0.00
Social security tax rate (p.p.)	-1.30	-0.60
Impact on entrepreneurial sector		
Share of entrepreneurs (p.p.)	-0.45	0.42
Sole prop. As share of entre. (p.p.)	-35.55	32.52
S-corp. as share of entre. (p.p.)	-24.18	-24.18
C-corp. as share of entre. (p.p.)	59.72	-8.34

Notes: In this robustness check, total pensions expenditures B are fixed and the replacement rate b adjusts. Column (1) shows the long-run outcomes of a tax reform in which all entrepreneurs are taxed as sole proprietors, but legal forms of business organization differ in their borrowing limits, $\lambda^{EP} = \lambda^{ES} < \lambda^{EC}$, and in their operating costs $\kappa^{ES} < \kappa^{EC}$. Column (2) shows the long-run outcomes of a counterfactual economy in which all entrepreneurs are taxed as sole proprietors and face the same borrowing limit, $\lambda^{EC} = \lambda^{ES} = \lambda^{EP}$. In this counterfactual economy all entrepreneurs choose to be sole proprietors. Statistics are based on steady state equilibria and are given relative to the benchmark economy either in % or in p.p. The social security tax τ_s adjusts such that social security contributions equal total pension expenses. All other model and tax parameters are at their benchmark values. To highlight the effects of eliminating tax avoidance on tax revenue, we do not adjust the income tax parameter λ_i to balance the government budget constraint. Assuming fiscal neutrality does not change the qualitative results except for total tax revenue.

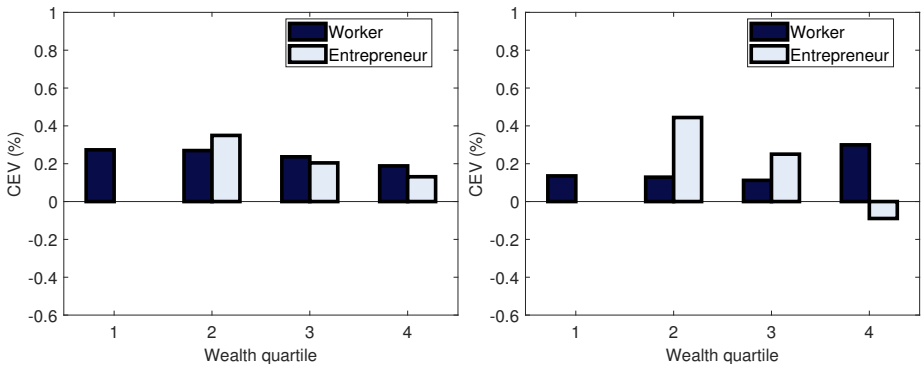
Figure A3: Welfare-Maximizing Top Marginal Tax Rate (Robustness Check)



(a) Aggregate CEV (b) Aggregate component of CEV



(c) Distrib. component of CEV (d) CEV by occupation & legal form



(e) CEV, benchmark (f) CEV, equal tax treatment

Notes: In this robustness check, total pensions expenditures B are fixed and the replacement rate b adjusts. Panels (a), (b), and (c) show the welfare effects of varying the optimal top marginal tax rate τ_h compared to the benchmark value. The aggregate and distributional components are calculated using Eq. (28). Panels (d), (e), and (f) show the welfare effects of implementing the welfare-maximizing $\tau_h = 0.464$ and $\tau_h = 0.480$ in the benchmark economy and in the counterfactual economy with equal tax treatment, respectively. With equal tax treatment, all entrepreneurs are taxed as sole proprietors, but operating costs and borrowing limits differ across legal forms. The economy with equal tax treatment is re-calibrated to reflect similar economic conditions as the benchmark economy. The social security tax τ_s adjusts such that social security contributions equal total pension expenses. Fiscal neutrality is imposed by adjusting the tax parameter λ_i. Occupations are defined as occupations in the benchmark economy.