Tax Evasion and Capital Taxation

Shahar Rotberg* Joseph B. Steinberg†

January 21, 2021

Abstract

Wealth inequality has prompted calls for higher taxes on capital income and wealth, but also concerns that rich households would evade these taxes by concealing their assets offshore. We develop a general equilibrium model of offshore tax evasion and use it to quantify the consequences of taxing capital more heavily. We find that raising capital income taxes would reduce tax revenue, taxing wealth would reduce welfare, and both policies would increase wealth inequality. In the absence of evasion, however, raising capital income taxes could increase tax revenue substantially, taxing wealth would be optimal, and both policies could reduce inequality.

JEL Classification: E21; E22; E62; H21; H26

Keywords: tax evasion; wealth tax; capital income tax; wealth inequality; redistribution; entrepreneurship; optimal policy

1 Introduction

Wealth inequality has increased dramatically in recent decades (Saez and Zucman, 2016; Piketty et al., 2018), evoking calls for wealth taxes[1] and higher taxes on capital income.[2] These calls have been echoed by concerns that rich households will evade these taxes by concealing their wealth in offshore tax shelters.[3] In this paper, we build a dynamic general equilibrium model of offshore tax evasion and use it to study the consequences of taxing capital more heavily.

We use our model to answer the following questions: how much tax evasion would occur if capital income taxes are increased or a wealth tax is introduced? How would this evasion affect public finances and wealth inequality? How would it affect investment, output, and wages in equilibrium? How would it affect the design of optimal tax systems?

Zucman (2015) estimates that 4% of U.S. wealth is concealed in offshore tax shelters like Switzerland and the Cayman Islands, reducing capital income tax revenue by $35 billion per year. Offshore tax evasion is concentrated among the ultra-rich, but households that engage in this behavior conceal large portions

*University of Toronto.

†University of Toronto. Corresponding author. Contact: joseph.steinberg@utoronto.ca. We thank seminar participants at McMaster University and the Bank of Israel for helpful suggestions.

[1] Elizabeth Warren and Bernie Sanders proposed progressive wealth taxes targeted at "ultra-millionaires" during the 2019 Democratic presidential primary campaign, and the former's proposal garnered the support of leading economists like Saez and Zucman (2019a). We analyze both of these policies in this paper. Support for wealth taxation is rising outside of the United States as well. In Canada, NDP leader Jagmeet Singh has proposed a tax on wealth above $20 million, and Argentina has recently implemented a one-time tax on rich households' wealth to fill the budget gap left by the COVID-19 pandemic.

[2] At the time of this writing, U.S. President Joe Biden has pledged to raise the top tax rate on capital gains by 16p.p. and the corporate income tax rate by 7p.p..

[3] Former Treasury Secretary Larry Summers has estimated that up to 90% of the potential revenues from Elizabeth Warren's proposed wealth tax would be lost (Summers and Sarin, 2019; Saez and Zucman, 2019c).

of their wealth (Guyton et al., 2020; Alstadsæter et al., 2018; Londoño-Vélez and Ávila-Mehcha, 2020b). Our theory of tax evasion provides a micro-founded account of these facts. In our model, households can reduce their reported tax liabilities by concealing their wealth in tax shelters. Maintaining a tax shelter and transferring wealth into it is costly, however, and entrepreneurial households cannot fully leverage their concealed wealth to finance their capital expenditures. Households choose whether to maintain tax shelters and how much wealth to conceal as part of their dynamic optimization problems, and due to these costs only the richest households choose to evade in equilibrium. We calibrate these costs so that under the current U.S. tax code, our model's equilibrium matches the aggregate stock of concealed wealth, the fraction of households that maintain tax shelters, and the extent to which the highest-income households under-report their capital income. Our calibrated model is consistent with several other facts about offshore tax evasion, and because households choose endogenously how much wealth to conceal, it allows us to study how this behavior would respond in equilibrium to changes in the tax system.

We embed our theory of offshore tax evasion into a general equilibrium environment with overlapping generations of heterogeneous households. Households in our model differ exogenously in labor market productivity, entrepreneurial skill, and entrepreneurial opportunity, and they also differ endogenously in reported wealth and concealed wealth. They work in the labor market until retirement and, if they have entrepreneurial opportunities, operate businesses. They save to smooth consumption over their life cycles, insure against idiosyncratic income shocks, and build wealth and collateral to finance entrepreneurial capital. Higher-ability entrepreneurs earn greater returns on their wealth, generating a realistic level of wealth concentration (Quadrini, 2000; Cagetti and De Nardi, 2006; Benhabib et al., 2011, 2015, 2016). We calibrate our model so that its equilibrium matches the share of wealth held by the top 0.1% of households, entrepreneurial leverage, and several other salient features of the U.S. economy in addition to the facts about tax evasion described above.

In our first quantitative experiment, we use our model to study the effects of redistributionary capital income tax reform. We simulate a range of capital income tax increases and decreases, holding other tax instruments fixed and balancing the government's budget using lump-sum transfers. We find that raising capital income taxes would increase tax evasion dramatically: a 10p.p. increase in the capital income tax rate would double concealed wealth and increase lost tax revenues by an order of magnitude. Higher capital income taxes would also reduce investment, which would shrink the economy and reduce labor income and consumption tax revenues. As a result of these two forces, we find that the U.S. economy is effectively at the top of the capital income Laffer curve under the current tax code: either increasing or decreasing capital income taxes would reduce overall tax revenues, requiring the government to levy lump-sum taxes that would disproportionately hurt poor households. Moreover, increasing the capital income tax would appear to reduce wealth inequality, but would actually increase inequality after accounting for concealed wealth. Comparing our model to a counterfactual in which households cannot evade taxes reveals that capital income tax reform would have strikingly different effects in the absence of evasion. Overall tax revenues would be maximized by increasing the capital income tax rate by more than 30p.p., and this would truly reduce wealth inequality. Regardless of the presence of evasion, however, it would be optimal to reduce capital income taxes substantially, although the welfare gains would be smaller in the absence of evasion and would accrue primarily to richer households.

In our second quantitative experiment, we study the effects of introducing a flat wealth tax that applies to all households' wealth. Again, we hold other taxes fixed and distribute the net proceeds in a lump-sum fashion. Similar to capital income taxes, wealth taxes reduce households' incentives to save, which would directly shrink the wealth tax base and also reduce income tax revenue in equilibrium. Additionally, wealth taxes would induce households to conceal substantially more wealth, which would further reduce wealth tax revenue, but would also increase capital income tax evasion even though capital income taxes do not change. In our baseline model, overall tax revenues would be maximized by introducing a wealth tax of 2.7%, but half of the potential wealth tax revenues from this policy would be lost to evasion, and capital income tax evasion would more than triple. As in our first experiment, reported wealth inequality would fall but actual inequality would rise due to the increase in concealed wealth. This policy would generate a lump-sum transfer of about 1.5% of the average household's labor income, which would improve welfare for households in the bottom 20% of the wealth distribution. It would also reduce wages by 10%, however, which would leave almost all other households worse off, although the very richest households in the economy—those that engage in tax evasion—would actually benefit. More broadly, we find that wealth taxes always reduce aggregate welfare, and thus it is not optimal to tax wealth at all. Like capital income tax reform, wealth taxes would have strikingly different effects in the absence of tax evasion. Most notably, the optimal wealth tax in our no-evasion counterfactual is positive. The welfare-maximizing wealth tax rate in this version of the model of 0.5% would generate a lump-sum transfer of about 1% of the average household's labor income and would benefit households in the bottom 80% of the wealth distribution.

In our last quantitative experiment, we analyze progressive wealth taxes that exempt all but the wealthiest households. Here, we begin by using the proposals of Elizabeth Warren and Bernie Sanders as case studies and then analyze the optimal progressive wealth structure. The Warren proposal would tax wealth between \$50 million–\$1 billion at 2% and wealth above \$1 billion at 3%. The Sanders proposal features 8 brackets, starting with a tax of 1% on wealth between \$32–\$50 million and ending with a tax of 8% on wealth above \$10 billion. Despite the fact that fewer than 0.1% of households would be subject to these taxes, they would still have sizeable macroeconomic consequences and would reduce almost all households' welfare. The reason is that they would target precisely the same households that are responsible for virtually all of the offshore tax evasion in the U.S. economy. Under these policies, concealed wealth would increase by 106–120%, more than half of the potential wealth tax revenues would be lost to evasion, and capital income tax evasion would double. Moreover, the decline in these households' saving would have material macroeconomic consequences because the wealth distribution is so concentrated. Output would fall by more than 0.5%, which would reduce wages and further worsen public finances. In fact, the net effect of these policies on the government's budget would be negative: both policies would reduce overall tax revenues, requiring the government to impose lump-sum taxes instead of providing transfers. Consequently, almost all households would lose. And although the Warren and Sanders wealth taxes would reduce actual wealth inequality slightly, they would reduce reported inequality substantially more—most of the apparent reduction in inequality would be illusory. In addition to these case studies, we also conduct a global search for the optimal nonlinear wealth tax and find that no wealth tax, flat or progressive, would raise aggregate welfare. Once again, progressive wealth taxes would have sharply different effects in the absence of evasion. In our no-evasion counterfactual, the Warren and Sanders policies would raise overall tax revenues, would reduce wealth inequality more than in the baseline model, and would increase welfare for households except those at the top of the wealth distribution. Moreover, the optimal progressive wealth tax in the absence of evasion would entail a tax of 4.2% on wealth above $5 million, which is substantially more aggressive than either Senator's proposed policy.

Our calibrated model captures the key micro- and macroeconomic facts about the extent of offshore tax evasion under the current U.S. tax code, and predicts that tax evasion would increase substantially if capital income taxes were increased or wealth taxes were introduced. These predictions are broadly in line with reduced-form estimates from the empirical literature of the elasticity of reported taxable income and wealth to changes in tax rates. Our model's elasticity of reported capital income is similar to Agersnap and Zidar (2020)'s estimate, and its elasticity of reported taxable wealth is in the middle of the range of estimates from other countries (Brulhart et al., 2016; Seim, 2017; Jakobsen et al., 2018; Zoutman, 2018; Londoño-Vélez and Ávila-Mehcha, 2020a; Durán-Cabré et al., 2019). Our results indicate that tax evasion plays a key role in determining these elasticities, especially in the short run, but that real effects driven by declining saving are also important in the long run.

Our experiments, which use increased tax revenues to fund lump-sum transfers, are motivated by growing calls to tax capital more heavily in order to redistribute wealth and fund transfers that would benefit poor households. The quantitative public finance literature often takes a different approach, analyzing the optimal combination of distortionary taxes. To investigate how tax evasion affects this tradeoff, we conduct a second version of each of our experiments in which the government's budget is balanced by changing the labor income tax rate. The results of this set of experiments largely mirror the first. Capital income tax reform would not allow the government to reduce labor income taxes—either increasing or decreasing capital income taxes would require labor income taxes to rise—but in the absence of evasion it could be used to reduce labor income taxes substantially. Wealth taxes would yield small, welfare-diminishing reductions in labor income taxes, but in the absence of evasion they could finance large, welfare-enhancing reductions. Our results are also robust to changes in the parameters that govern the cost of offshore tax evasion. Even if these costs were 50% higher, capital income tax reform could do little to improve public finances, and wealth taxes—even progressive ones like those proposed by Elizabeth Warren and Bernie Sanders—would reduce welfare.

This paper makes both methodological and quantitative contributions to the literature. Our methodological contribution is to develop a dynamic general equilibrium model in which heterogeneous households endogenously evade taxes in equilibrium. Previous theories of tax evasion have restricted attention to static, partial equilibrium, or representative-agent settings (Saez et al., 2012; Piketty, 2013; Piketty et al., 2014), or limited-enforcement environments in which evasion does not occur in equilibrium (Shourideh, 2013; Boar and Knowles, 2020). Our model provides a microfounded account of offshore tax evasion by rich households, predicts how this behavior will respond to tax reforms, and connects these responses to investment, wages, and other macroeconomic outcomes. It can be used to address a wide array of issues beyond the scope of this paper, from cross-country studies of the consequences of offshore tax evasion to the optimal design of estate taxes.

Our quantitative contribution is to show that offshore tax evasion has significant implications for capital income taxes and wealth taxes. Numerous studies have used calibrated general equilibrium models to analyze capital taxation (see, e.g., Cagetti and De Nardi, 2009; Conesa et al., 2009; Trabandt and Uhlig, 2011, 2012; Guvenen et al., 2019; Dyrda and Pedroni, 2020; Rotberg, 2020; Boar and Midrigan, 2020), but all of them have abstracted from tax evasion. Positive analyses of the public-finance implications of capital income tax reform like Trabandt and Uhlig (2011, 2012) typically find that doubling or even tripling capital income tax rates would raise tax revenues substantially. Our analysis confirms that this would be true in the absence of offshore tax evasion, but that raising capital income taxes would actually reduce revenues once evasion is taken into account. Normative studies of optimal wealth taxes like Guvenen et al. (2019) find that using wealth taxes to reduce labor-income tax distortions would significantly increase welfare. Similarly, we find that this would be true in the absence of evasion, but that wealth taxes would actually reduce welfare after evasion is accounted for. Our findings highlight a range of other implications that should interest academic researchers and policymakers alike, from the fact that taxing capital more heavily would appear to reduce wealth inequality but might actually increase it after accounting for concealed wealth, to the fact that wealth taxes would increase capital income tax evasion even if capital income taxes do not change.

2 Model

The model economy features overlapping generations of finitely-lived households, competitive firms, and a government. Households in each cohort are heterogeneous in labor market productivity, entrepreneurial ability, entrepreneurial opportunity, and wealth. They earn income from working, operating their own businesses, and lending capital to other businesses. Households save in order to smooth consumption over their life cycles, insure against idiosyncratic shocks, and finance their businesses' capital expenditures. Firms produce homogeneous final goods using labor and capital supplied directly by households as well as intermediate inputs purchased from households' businesses. The government purchases public goods, provides social security benefits to retired households, and makes lump-sum transfers to all households. It finances these expenditures by levying taxes on income, consumption, and wealth. These features are similar to those found in many other models in the quantitative public finance literature, most notably Guvenen et al. (2019) and Boar and Midrigan (2020).

Our modeling innovation is a novel theory of endogenous tax evasion. Households can evade taxes on capital income and wealth by concealing their wealth in tax shelters. Maintaining a tax shelter requires a fixed administrative cost and transferring wealth into a shelter requires a proportional transaction cost. Additionally, households with entrepreneurial opportunities cannot use their concealed wealth to self-finance their capital expenditures, and can only use a fraction of their concealed wealth as collateral to secure external financing. Households choose optimally whether or not to maintain tax shelters and how much wealth to conceal. In section 3, we discipline the costs of tax evasion using estimates from the literature on the amount of wealth U.S. households conceal offshore and the extent to which this behavior is concentrated among the richest households. To quantify the consequences of tax evasion, we also consider a version of our model in which wealth cannot be concealed, which we refer to as the no-evasion counterfactual.

2.1 Demographics and preferences

Households are born at age $j = 0$ and live for a maximum of J years, but may die earlier due to mortality risk. The parameter ϕ_j represents the probability that a household of age $j < J$ survives to reach age $j + 1$. When a household dies it is replaced by a newborn household; we refer to the latter as the former's child or offspring. We assume without loss of generality that there is a measure one of newborn households each period, so the measure of age-j households is $\Pi_{k=0}^{j-1}\phi_k$.

Households derive utility from consumption and leisure. A household's flow utility is given by

$$u(c, \ell) = \frac{\left[c^{\mu}(1-\ell)^{1-\mu}\right]^{1-\sigma}}{1-\sigma}, \tag{1}$$

where c denotes consumption and ℓ denotes the fraction of time spent working in the labor market. The parameter μ represents the share of consumption in utility, and σ governs risk aversion and the elasticity of intertemporal substitution. Households retire from the labor force at age $j = R$. Before retirement, households choose how much time to spend working ($\ell \in [0, 1]$ for $j < R$). Retired households do not work ($\ell = 0$ for $j \geq R$), but they receive social security payments from the government which we describe in more detail below. Households do not value the consumption or leisure of their offspring.

2.2 Heterogeneity

Households are heterogeneous in labor productivity, entrepreneurial productivity, and wealth. Each of these primary characteristics has two components.

A household's labor productivity consists of a deterministic life-cycle profile, ζ_j, and an idiosyncratic shock, $e \in \mathcal{E} = \mathbb{R}_{++}$. A household of age j that works for ℓ hours supplies $\zeta_j e \ell$ units of labor. During a household's working life, its labor productivity shock follows an AR(1) process $F(e', e)$ with persistence ρ_e and variance σ_e^2. After retirement, its labor productivity shock remains constant until death. Upon death, its labor productivity shock is transmitted stochastically to its child according to an AR(1) process $\tilde{F}(e', e)$ with persistence $\tilde{\rho}_e$ and variance $\tilde{\sigma}_e^2$.

A household's entrepreneurial productivity is determined by its entrepreneurial ability, $z \in \mathcal{Z} = \mathbb{R}_{++}$, and whether or not it has an entrepreneurial opportunity, $\iota \in \mathcal{I} = \{0, 1\}$. We refer to households with entrepreneurial opportunities ($\iota = 1$) as entrepreneurs, and those without opportunities ($\iota = 0$) as workers. A household's entrepreneurial ability is fixed throughout its life. Its entrepreneurial opportunity evolves stochastically over time according to a Markov process with transition matrix

$$\Pi_\iota = \begin{bmatrix} 1 - p_1 & p_1 \\ p_2 & 1 - p_2 \end{bmatrix}, \tag{2}$$

where p_1 is the probability of losing an opportunity and p_2 is the probability of regaining one. At birth, households inherit their entrepreneurial abilities stochastically from their parents according to an AR(1) process $\tilde{G}(z', z)$ with persistence $\tilde{\rho}_z$ and variance $\tilde{\sigma}_z^2$ and receive entrepreneurial opportunities with probability p_0.[4]

In addition to the exogenous characteristics described above, households are also heterogeneous in wealth, which is endogenous. There are two forms of wealth in our model: reported wealth, $a_r \in \mathcal{A}_r = \mathbb{R}_+$, and hidden wealth, $a_h \in \mathcal{A}_h = \mathbb{R}_+$. We discuss the extent to which hidden wealth can be deployed in entrepreneurs' businesses, the costs of concealing wealth, and the optimal choices of saving and concealment in sections 2.4, 2.5, and 2.6, respectively. Newborn households inherit both types of their parents' wealth.[5]

The household's state space is $\mathcal{S} = \mathcal{E} \times \mathcal{Z} \times \mathcal{I} \times \mathcal{A}_r \times \mathcal{A}_h$. We use $\Psi_{j,t}(s)$ to denote the measure of age-j households with state $s \in S$ in period t. Households of the same age and location in the state space make the same decisions, and thus we index households by their ages and state variables throughout the remainder of the paper.

[4] Guvenen et al. (2019) assume that all newborn households have entrepreneurial opportunities, which implies that the entrepreneurship rate declines with age. Boar and Midrigan (2020) assume that entrepreneurial opportunities are assigned randomly at birth and are then fixed over the life cycle. Our approach allows us to capture the fact that entrepreneurship displays a hump shape over the life cycle: the entrepreneurship rate first increases with age and then decreases.

[5] These bequests are accidental because households do not value the utility of their offspring. We leave intentional bequests and the implications of offshore tax evasion for estate taxation for future research. Still, our model matches the fact that bequests account for only 1% of aggregate wealth (Nishiyama, 2000), and this fact implies that whether bequests are intentional or accidental should have little bearing on the effects of the policies we study in this paper.

2.3 Final goods production

A representative firm produces the final good, Y_t, using labor, L_t, corporate capital K_t, and entrepreneurial capital, Q_t, according to the Cobb-Douglas technology,

$$Y_t = K_t^{\gamma} Q_t^{\alpha} L_t^{1-\alpha-\gamma}. \tag{3}$$

Labor and corporate capital are rented directly from households. As in Guvenen et al. (2019), Q_t is a CES bundle of differentiated goods purchased from entrepreneurial households:

$$Q_t = \left(\sum_{j=0}^{J} \int_S q_{j,t}(s)^{\nu} \, \mathrm{d}\Psi_{j,t}(s) \right)^{\frac{1}{\nu}}. \tag{4}$$

The parameter ν governs the elasticity of substitution between these goods. We include corporate capital as well as entrepreneurial capital to account for the fact that public firms may not face the same financial frictions as privately-run businesses (Zetlin-Jones and Shourideh, 2017; Boar and Midrigan, 2020), which means that changes in taxes may have different effects on the allocation of capital among the former as compared to the latter.

Final-goods producers are competitive, choosing factor inputs to maximize profits taking the wage, W_t, the interest rate, r_t, and the price of each intermediate variety, $p_{j,t}$, as given:

$$\max_{L_t, K_t, q_{j,t}(s)} \left\{ Y_t - W_t L_t - (r_t + \delta) K_t - \sum_{j=0}^{J} \int_S p_{j,t}(s) q_{j,t}(s) \, \mathrm{d}\Psi_{j,t}, \right\} \tag{5}$$

where δ is the depreciation rate. The first-order conditions that characterize a final-goods producer's demand for labor, corporate capital, and each variety of entrepreneurial capital are

$$W_t = (1-\alpha-\gamma) K_t^{\gamma} Q_t^{\alpha} L_t^{-\alpha-\gamma}, \tag{6}$$

$$r_t + \delta = \gamma K_t^{\gamma-1} Q_t^{\alpha} L_t^{1-\alpha-\gamma}, \tag{7}$$

$$p_{j,t}(q) = \alpha K_t^{\gamma} Q_t^{\alpha-\nu} L_t^{1-\alpha-\gamma} q^{\nu-1}. \tag{8}$$

2.4 Entrepreneurship

We follow Guvenen et al. (2019)'s model of entrepreneurship in which households with entrepreneurial opportunities use capital to produce differentiated goods and sell them to final-goods producers at a profit. A household with an entrepreneurial opportunity ($\iota = 1$), entrepreneurial ability z, and k units of capital produces $q = zk$ units of her good and sells them at the price $p_{j,t}(q)$ characterized above. Households without entrepreneurial opportunities ($\iota = 0$) produce $q = 0$ units of goods regardless of their abilities.

Entrepreneurs can self-finance their capital expenditures using their reported wealth, a_r, or obtain external financing at the interest rate r_t. Hidden wealth, a_h, cannot be used for self-financing.[6] External financing is limited to a multiple $\lambda(z)$ of a household's collateralizable wealth:

$$k - a_r \leq \lambda(z)(a_r + \chi a_h). \tag{9}$$

Following Buera et al. (2011) we assume $\lambda'(z) > 0$, which captures in a reduced-form way the idea that higher-ability entrepreneurs can credibly repay larger loans. Only a fraction χ of hidden wealth can be collateralized, however, which creates an opportunity cost of evasion: concealing additional wealth today reduces collateral, and thus capital income, tomorrow. Entrepreneurs who self-finance passively invest any excess reported wealth at the interest rate r_t. Hidden wealth also earns interest, but this interest is not included in a household's reported capital income.

Conditional on its current state s, a household chooses how much capital to rent to maximize the sum of its entrepreneurial and interest income. A household's onshore capital income is given by

$$\pi_{j,t}(s) = \max_k \Big\{ \underbrace{\iota \left[p_{j,t}(zk) \times zk - \delta k - r_t \max\left(k - a_r, 0\right)\right]}_{\text{Entrepreneurial income}} + \underbrace{r_t \max\left(a_r - k, 0\right)}_{\text{Interest income}} \Big\} \tag{10}$$

subject to (9). We use $k_{j,t}(s)$ to denote the optimal choice of capital and $q_{j,t}(s)$ to denote the associated output of intermediate goods. In addition to onshore capital income, households also earn interest on the wealth they have concealed offshore. A household's total capital income is equal to $\pi_{j,t}(s) + r_t a_h$, but only the first term is potentially reported to the government and assessed for taxation.

2.5 Taxes and tax evasion

The government raises revenue from proportional taxes τ_k, τ_ℓ, τ_c, and τ_a on capital income, labor income, consumption, and wealth respectively. The government spends its revenue on public consumption, G, lump-sum transfers, T_t, and social security benefits, $B_t(e)$. Public consumption does not provide any benefit to households; its only purpose is to facilitate the calibration of our model under the current U.S. tax code as in Guvenen et al. (2019). Social security benefits depend on retirees' labor productivity shocks and the current average labor income in the economy: $B_t(e) = \kappa(e)\bar{y}_{\ell,t}$. The parameter $\kappa(e)$ captures in a parsimonious way the extent to which a household's lifetime labor income influences its retirement benefits.

Households can evade taxes on wealth and capital income by concealing their wealth in tax shelters. Hidden wealth is not reported to the government, so households pay wealth taxes on reported wealth only; a household with reported wealth a_r pays $\tau_a a_r$ in wealth taxes regardless of how much hidden wealth

[6] If households can use hidden wealth to self-finance there is very little incentive not to evade capital income and wealth taxes. Under this assumption, extremely high concealment costs are required in our calibration to match the amount of concealed wealth observed in the data, and the capital income tax revenues lost to evasion are implausibly large.

it has. Reported onshore capital income is reduced by the amount of wealth a household transfers into its shelter, which is given by $\max(a_h' - a_h, 0)$. To be precise, a household in state s with hidden wealth a_h' at the end of the period reports capital income of $\pi_{j,t}(s) - \max(a_h' - a_h, 0)$ and pays capital income taxes equal to $\tau_k \max\left[\pi_{j,t}(s) - \max(a_h' - a_h, 0), 0\right]$. Note that a household's reported capital income tax liability is bounded from below at zero.

There are two direct costs of concealing wealth in addition to the opportunity cost discussed above. In order to maintain a tax shelter, a household must pay a fixed cost, θ, regardless of how much hidden wealth it has in its shelter. In order to transfer funds into or out of its tax shelter, the household must also pay a proportional transaction cost, η, on the amount of wealth it transfers.[7] The total cost of concealment for a household with hidden wealth a_h at the beginning of the period and end-of-period hidden wealth a_h' is $\mathbb{1}_{\{a_h'>0\}}\theta + \eta|a_h' - a_h|$.

2.6 Dynamic program

Each period, households choose how much to consume, how much to work, how much to save, and how much to conceal. The value function of a working-age household is

$$V_{j,t}(s) = \max_{c,\ell,a_r',a_h'} \left\{ u(c,\ell) + \beta\phi_j \sum_{\iota'\in\mathcal{I}} \Pi_\iota(\iota',\iota) \int_{\mathcal{E}} V_{j+1,t+1}(e',z,\iota',a_r',a_h')\, \mathrm{d}F(e',e) \right\} \tag{11}$$

subject to $c \geq 0$, $\ell \in [0,1]$, $a_r' \geq 0$, $a_h' \geq 0$, and the budget constraint

$$\begin{aligned}(1+\tau_c)c + a_r' + a_h' + \tau_k \max\left[\pi_{j,t}(s) - \max(a_h' - a_h, 0), 0\right] + \tau_a a_r + \mathbb{1}_{\{a_h'>0\}}\theta + \eta|a_h' - a_h| = \\ (1-\tau_\ell)W_t\zeta_j e\ell + \pi_{j,t}(s) + r_t a_h + a_h + a_r + T_t\end{aligned} \tag{12}$$

The left-hand side of the budget constraint includes the household's consumption, saving (both reported and concealed), capital income tax payment, wealth tax payment, and evasion costs. The right-hand side includes net labor income, gross capital income, initial wealth, and the lump-sum transfer from the government. The value function of a retiree is similar, except that its labor supply is set to zero, its labor productivity shock, e, is fixed, and its budget constraint includes social security income, $B_t(e)$, rather than net labor income. We denote the policy functions for consumption, labor supply, reported wealth, and hidden wealth by $c_{j,t}(s)$, $\ell_{j,t}(s)$, $a_{r,j,t}'(s)$, and $a_{h,j,t}'(s)$, respectively.

[7]Note that these costs implicitly capture the penalty for misreporting and the probability of getting caught as in Allingham and Sandmo (1972), as well as the actual monetary costs of concealing wealth offshore. We have also experimented with a convex transaction cost that increases with the amount of wealth a household transfers as in Piketty et al. (2014). In this alternative setup, households at the very top of the income distribution conceal smaller fractions of their wealth and evade smaller fractions of their capital income than households in the next-highest income bracket, which is inconsistent with the data.

2.7 Aggregation

There are two factor market clearing conditions:

$$\sum_{j=0}^{R-1} \int_S \ell_{j,t}(s)\ \Psi_{j,t}(s) = L_t, \tag{13}$$

$$\sum_{j=0}^{J} \int_S (a_h + a_r)\ \mathrm{d}\Psi_{j,t}(s) = K_t + \sum_{j=0}^{J} \int_S k_{j,t}(s)\ \mathrm{d}\Psi_{j,t}(s). \tag{14}$$

The labor market clearing condition (13) states that the final-good producer's labor demand must equal working-age households' total supply of effective labor hours. The capital market clearing condition (14) states that the supply of wealth must equal firms' demand for corporate capital plus households' demand for entrepreneurial capital. Note that all wealth, both hidden and reported, is included in the supply of capital.[8]

The government's budget constraint states that total expenditures must equal total tax revenues:

$$G + \sum_{j=0}^{J} \int_{\mathcal{S}} \left[T_t + \mathbb{1}_{\{j \geq R\}} B_t(e)\right]\ \mathrm{d}\Psi_{j,t}(s) = \tag{15}$$
$$\sum_{j=0}^{J} \int_{\mathcal{S}} \left\{\tau_\ell W_t \zeta_j e \ell_{j,t}(s) + \tau_c c_{j,t}(s) + \tau_k \max\left[\pi_{j,t}(s) - \max\left(a'_{h,j,t}(s) - a_h, 0\right), 0\right] + \tau_a a_r\right\}\ \mathrm{d}\Psi_{j,t}(s)$$

In our calibration, we set the lump-sum transfer to zero and set the level of public consumption so that the government's budget constraint is satisfied under the current U.S. tax code. Increasing the capital income tax rate or introducing a wealth tax may generate additional revenues that can be distributed lump-sum, but these revenues will be reduced if households respond by endogenously transferring more wealth offshore. Moreover, if output declines in equilibrium—and it does in many of our experiments—income and consumption tax revenues will fall, further offsetting the potential increase in revenue from heavier capital taxation.

The distributions of surviving households evolve according to the law of motion,

$$\Psi_{j+1,t+1}(E \times Z \times \{\iota'\} \times A_r \times A_h) = \tag{16}$$
$$\phi_j \int_{\mathcal{S}} \left[\Pi_\iota(\iota'|\iota) \int_E \mathrm{d}F(e', e)\right] \mathbb{1}_{\left\{a'_{r,j,t}(s) \in A_r \wedge a'_{h,j,t}(s) \in A_h\right\}} \mathbb{1}_{\{z \in Z\}} \mathrm{d}\Psi_{j,t}(s),\ j < J$$

where E, Z, A_r, and A_h are typical subsets of $\mathcal{E}$, $\mathcal{Z}$, $\mathcal{A}_r$, and $\mathcal{A}_h$, respectively. The distribution of newborn

[8] The assumption that hidden wealth is supplied to the domestic capital market is internally consistent with our assumption that hidden wealth earns the equilibrium interest rate. It is also externally consistent with the findings of Zucman (2015), who documents that U.S. households' offshore hidden wealth is often ultimately invested in U.S. assets. Alternatively, one could model the U.S. as a small open economy that faces a fixed world interest rate and assume that hidden wealth is not supplied to the domestic capital market. This setup yields similar results in most of our experiments.

households evolves according to

$$\Psi_{0,t+1}(E \times Z \times \{\iota'\} \times A_r \times A_h) = \tag{17}$$
$$\left[\mathbb{1}_{\{\iota'=1\}} p_0 + \mathbb{1}_{\{\iota'=0\}}(1-p_0)\right] \sum_{j=0}^{J}(1-\phi_j)\int_{\mathcal{S}}\left[\int_{E\times Z} \mathrm{d}\tilde{F}(e',e)\mathrm{d}\tilde{G}(z',z)\right]\mathbb{1}_{\left\{a'_{r,j,t}(s)\in A_r \wedge a'_{h,j,t}(s)\in A_h\right\}}\mathrm{d}\Psi_{j,t}(s).$$

2.8 Equilibrium

An equilibrium is a sequence of aggregate prices and quantities, $\{W_t, r_t, K_t, L_t, Q_t, Y_t\}_{t=0}^{\infty}$, a sequence of value and policy functions, $\left\{\left(V_{j,t}(\cdot), k_{j,t}(\cdot), q_{j,t}(\cdot), c_{j,t}(\cdot), \ell_{j,t}(\cdot), a'_{r,j,t}(\cdot), a'_{h,j,t}(\cdot)\right)_{j=0}^{J}\right\}_{t=0}^{\infty}$, and a sequence of distributions, $\left\{\left(\Psi_{j,t}(\cdot)\right)_{j=0}^{J}\right\}_{t=0}^{\infty}$, that

1. solve the household's static and dynamic problems (10)–(11);
2. satisfy the representative firm's first-order conditions (6)–(8);
3. satisfy the market clearing conditions (13)–(14);
4. satisfy the government's budget constraint (15);
5. and satisfy the laws of motion for the distributions of households (16)–(17).

In the long run, an equilibrium always converges to a stationary equilibrium in which the objects listed above are constant over time, and each set of parameter values is associated with a unique stationary equilibrium.

3 Calibration

We calibrate our model so that its stationary equilibrium under the current U.S. tax code replicates a set of facts about wealth inequality, offshore tax evasion, and other salient features of the U.S. economy. We first assign standard values to common parameters like the capital share and apply estimates from other studies for parameters that have clear empirical counterparts. We then jointly calibrate the remaining parameters so that the model matches the share of wealth held by the richest households; the aggregate amount of wealth held in offshore tax shelters; the fraction of households with accounts in these shelters; taxes evaded through the use these shelters by households at the top of the distribution; and several additional statistics about the distribution and dynamics of entrepreneurship. The calibrated equilibrium matches a number of additional non-targeted facts about the wealth distribution and offshore tax evasion.

3.1 Externally assigned parameters

Table 1 lists the assigned parameter values, which we break into several groups.

3.1.1 Demographics and preferences

Households are born at age 25, retire at age 66, and can reach a maximum age of 85, which implies $R = 41$ and $J = 60$. We set the survival probabilities, ϕ_j, using the 2010 United States Life Tables (Arias, 2014). We set the relative risk aversion coefficient, σ, to 4 as in Conesa et al. (2009). The discount factor, β, and the share of consumption, μ, are determined in the second stage of our calibration procedure.

3.1.2 Endowments

We use the same labor productivity process as Guvenen et al. (2019). The deterministic life-cycle profile is set to $\log \zeta_j = -j^2/1800 - j/30$. The intra-generational AR(1) parameters are set to $\rho_e = 0.937$ and $\sigma_e = 0.201$, and the inter-generational parameters are set to $\tilde{\rho}_e = 0.568$ and $\tilde{\sigma}_e = 0.184$.[9]

We set the inter-generational persistence of entrepreneurial ability, $\tilde{\rho}_z$, to 10% based on Fagereng et al. (2018). The standard deviation, $\tilde{\sigma}_z$, is determined in the second stage of our calibration. The probability of receiving an entrepreneurial opportunity at birth, p_0, is set to 8.74% to match the fraction of 25-year olds with business income in the 2016 Survey of Consumer Finances (SCF). The probability of losing an entrepreneurial opportunity, p_1, is set to to 8.1% as estimated by Clementi and Palazzo (2016). Given these two choices, the probability of regaining an entrepreneurial opportunity, p_2, is set to 2.26% so that 19.45% of all households have business income as in the 2016 SCF wave.

3.1.3 Production

We set the corporate capital share, γ, to 7.1%, which is the average ratio of corporate income to GDP in the 2010–2019 NIPA tables. We then set α so that the aggregate capital share, $\alpha + \gamma$, is 40%. We set the depreciation rate, δ, to the standard value of 5%. We use Guvenen et al. (2019)'s value of 0.9 for ν, which governs the elasticity of substitution between varieties of entrepreneurial capital.

3.1.4 Taxes

We set the consumption tax, τ_c, the labor income tax, τ_ℓ, and the capital income tax, τ_k, to McDaniel (2007)'s estimates of 7.5%. 22.4%, and 25% respectively. We set the wealth tax, τ_a, to zero since the goal of the calibration exercise is to construct a stationary equilibrium that represents the U.S. economy under the current tax code, which does not feature a wealth tax. We set $\kappa(e)$, which governs the extent to which a household's idiosyncratic labor productivity affects its retirement benefits, using the same approach as in Guvenen et al. (2019).

[9] Guvenen et al. (2019) use a labor productivity process that includes two components: a fixed effect that is constant over a household's life and correlated across generations; and a transitory component that follows an AR(1) process over a household's life but is not correlated across generations. Our model's additional endogenous state variable—hidden wealth—makes it substantially more difficult to solve numerically, and thus, for the sake of tractability we have adopted a more parsimonious labor productivity process with only one idiosyncratic component. We have chosen the parameters of our labor productivity process to match the coefficients from intra- and inter-generational AR(1) regressions estimated using simulated data from Guvenen et al. (2019)'s process.

3.2 Internally calibrated parameters

We jointly calibrate the remaining parameters so that the model matches a set of facts about the U.S. economy. There are seven parameters determined at this stage: entrepreneurial ability dispersion, $\tilde{\sigma}_z$; the discount factor, β; the consumption share, μ; the collateral constraint, λ;[10] the fixed cost of maintaining an offshore account, θ; the proportional cost of transferring funds into and out of an offshore account, η; and the fraction of hidden wealth that is collateralizable, χ.

We choose the values of these parameters so that the model's stationary equilibrium replicates the following seven statistics:

- the share of reported wealth held by the top 0.1% of households is 20% (Saez and Zucman, 2019a);
- aggregate reported wealth is three times GDP (Guvenen et al., 2019);
- households spend 40% of their time working on average (Guvenen et al., 2019);
- entrepreneurial debt is 1.29 times GDP (Guvenen et al., 2019)
- 0.05% of households have tax shelters (Guyton et al., 2020);
- hidden wealth accounts for 4% of total wealth (Zucman, 2015);
- and households in the top 0.01% of the income distribution evade 6% of their taxes on average (Guyton et al., 2020).

We use Saez and Zucman (2019a)'s estimate of the share of wealth held by the top 0.1% of the wealth distribution, which is computed by manually adding the Forbes 400 into the SCF, to ensure an accurate capital tax base that includes the assets of the ultra-wealthy. We compute this share using reported wealth, rather than total wealth, so that our model is consistent with the fact that true wealth inequality is higher than reported wealth inequality (Alstadsæter et al., 2018). Our measure of the fraction of households with concealed wealth comes from Guyton et al. (2020), who analyze IRS data on Foreign Bank Account Reports and the Offshore Voluntary Disclosure Program and find that about 0.05% of U.S. taxpayers hold offshore assets for the purposes of evading taxes. This figure is similar to the 0.11% estimated by Alstadsæter et al. (2018) for Scandinavia. Our measure of the total amount of concealed wealth comes from Zucman (2015), who estimates that 4% of total U.S. wealth is held in offshore tax shelters like Switzerland, Bermuda, and the Cayman Islands. Finally, the average tax evasion rate of households in the top 0.01% of the income distribution also comes from Guyton et al. (2020). Note that this figure includes only tax evasion that is related to wealth held in offshore accounts; as mentioned above, we abstract from other forms of tax evasion (e.g. misreporting cash income) in this study. Finally, in the no-evasion counterfactual we calibrate the first four parameters in this section to the first four target statistics; we ignore the evasion-related parameters and targets in this version of our model.

The internally calibrated parameters are not individually identified, but each target moment influences the identification of one of these parameters more than the others. Entrepreneurial ability dispersion, $\tilde{\sigma}_z$,

[10] We discretize the entrepreneurial ability distribution and parameterize the collateral constraint as $\lambda(z_n) = 1 + \lambda \frac{z_n - 1}{N-1}$, $z_n \in \{z_1, z_2, \ldots, z_N\}$ following Guvenen et al. (2019).

is primarily identified by the the level of wealth inequality. The higher this dispersion, the more wealth is concentrated among households at the top of the distribution. The discount factor, β, is determined largely by the ratio of aggregate wealth to GDP. The higher this ratio, the more patient households must be to generate the required level of saving. The share of consumption in utility, μ, is governed by the average time spent working. The more households work on average, the less they care about leisure. The collateral constraint, λ, is identified by the ratio of entrepreneurial debt to GDP. The higher this ratio, the more external financing entrepreneurs can access. The fixed evasion cost, θ, determines the fraction of households with offshore tax shelters. The higher this cost, the larger the number of households for whom the cost of offshore shelters exceed their benefit. The proportional evasion cost, η, governs the aggregate amount of concealed wealth. The higher this cost, the less wealth households with tax shelters conceal. Finally, the fraction of concealed wealth that is collateralizable, χ, is identified by the amount of taxes evaded by households at the top of the income distribution. Most of these households are entrepreneurs, and when the opportunity cost of concealing wealth is higher, they will evade a smaller share of their taxes.

Table 1 lists the internally calibrated parameter values. The values of the first four parameters are similar in the baseline model and no-evasion counterfactual, reflecting the fact that tax evasion has relatively small macroeconomic effects under the current tax system. There are two differences, however: entrepreneurial abilities are more widely dispersed in the baseline model because true wealth inequality is higher than reported wealth inequality; and the discount factor is higher because the actual wealth/GDP ratio is higher than the reported ratio. The last three parameters, which represent the costs of tax evasion, are specific to the baseline model. We find that all of these costs are substantial. The fixed cost of maintaining a tax shelter is 103% of the average labor income, the proportional cost of transferring funds into a shelter is 10.6%, and only 32% of hidden wealth is collateralizable.

3.3 Validation

In addition to replicating the facts targeted in our calibration, our model matches a number of additional facts about offshore tax evasion as well as other moments of the wealth distribution. Panel (a) of table 3 compares the reported wealth distribution in our model to the data. Although we target only the share of wealth held by the top 0.1% of households in our calibration, both the baseline model and no-evasion counterfactual match the wealth shares of other groups of households reasonably well. The share of wealth that is transferred across generations in our model is also consistent with the data. Note, again, that in our baseline model the distribution of total wealth (which includes both reported and concealed wealth) is more skewed than the distribution of reported wealth, as it is in the data (Alstadsæter et al., 2018).

Panel (b) shows our baseline model's predictions for non-targeted moments related to tax evasion and wealth concealment. Zucman (2015) estimates that $35 billion in capital income tax revenues were lost to offshore tax evasion in 2014, or about 0.2% of GDP. In comparison, lost capital income tax revenues are 0.27% of GDP in our model. In addition to generating a realistic level of aggregate tax evasion, our model is also consistent with non-targeted statistics about the distribution of evasion across households. Guyton et al. (2020) estimate that the highest-earning U.S. taxpayers are the most likely to evade taxes by concealing wealth offshore. Our model captures this fact on both the extensive (the fraction of households with tax shelters) and intensive (the fraction of taxes that households evade) margins, although they are more skewed towards the highest-earning households in our model than in the data. Alstadsæter et al. (2018) document that Scandinavian households that evade taxes by concealing wealth offshore conceal about a third of their wealth regardless of their position in the wealth distribution, and Londoño-Vélez and Ávila-Mehcha (2020b) report similar findings for Colombia.[11] Our model matches this fact quite closely as well, albeit with households at the very top hiding slightly more and other households hiding slightly less.

4 Quantitative experiments

We use our calibrated model to analyze three kinds of tax reforms: changing the capital income tax; introducing flat wealth taxes that apply to all households; and introducing progressive wealth taxes that apply only to rich households. For each kind of reform, we compare the benchmark equilibrium calibrated under the current U.S. tax code to a range of steady-states[12] with different tax rates while holding all other aspects of the tax code fixed. The government's budget is balanced using lump-sum transfers, so reforms that increase overall tax revenues generate positive transfers, while reforms that reduce revenues require lump-sum taxes.[13] After conducting these analyses, we compare our results to empirical estimates of the sensitivity of reported taxable income and wealth to changes in tax rates.

4.1 Capital income tax reform

In our first quantitative exercise, we use our calibrated model to study the effects of changing the capital income tax rate. Figure 1 illustrates how changing the capital income tax rate would affect the macroeconomy, government finances, inequality, tax evasion, and welfare. Table 4 provides additional details about the revenue- and welfare-maximizing capital income tax reforms, and table 5 illustrates how the welfare consequences of these policies would be distributed across households.

Panel (a) of figure 1 shows our model's Laffer curve for capital income taxes. In the baseline model,

[11] To our knowledge, there are no such estimates available for the United States.

[12] Our analysis is in the spirit of "dynamic scoring" as described by Mankiw and Weinzierl (2006). We omit transition dynamics, both for the sake of tractability and because including them does not yield much additional insight. We included transitions in a previous version of this paper that focused on the Warren and Sanders wealth tax proposals and found that comparing steady states was sufficient to convey all of the important results. We can solve for transitions in our current model, but doing so is computationally burdensome due to the additional state variable required to keep track of hidden wealth. We can provide results for specific transitions (e.g. for a specific capital income tax or wealth tax rate) upon request.

[13] In a previous version of the paper, we assumed that increased tax revenues are spent on public consumption instead of lump-sum transfers and that households derive utility from both public and private consumption. In this setup, the macroeconomic effects of the policies we analyze are virtually identical to our current results, but the distribution of welfare gains and losses hinges on the value households place on public consumption as well as its substitutability with private consumption. We believe that our current approach is more transparent and better captures the spirit of redistributionary tax reforms. For example, if preferences are separable in public and private consumption as in Heathcote et al. (2017), rich households benefit more from an increase in public consumption than poor households because the former have a lower marginal utility of private consumption than the latter.

the initial benchmark equilibrium is almost exactly at the peak of this curve: either raising or lowering the capital income tax rate would reduce overall tax revenues.[14] In the absence of evasion, however, raising capital income taxes could increase tax revenues substantially. The revenue-maximizing capital income tax rate in the no-evasion counterfactual is 32p.p. higher than in the benchmark—similar to the estimates obtained by Trabandt and Uhlig (2011, 2012) using neoclassical models without tax evasion—and would generate a lump-sum transfer of almost 2.5% of the average household's labor income.

Panels (f) and (g) of figure 1 illustrate the reason for this stark result: raising capital income taxes would dramatically increase tax evasion. For example, a 10p.p. increase in the capital income tax rate would double the amount of hidden wealth and increase lost tax revenues by an order of magnitude (from 0.27% of GDP in the benchmark equilibrium to about 2%). Conversely, lowering the capital income tax rate would have similar effects in both versions of the model because tax evasion would rapidly diminish; a 10p.p. decrease in the capital income tax rate would almost completely eliminate evasion.[15]

Panels (c)–(e) of figure 1 show that regardless of the presence of tax evasion, raising capital income taxes would have adverse macroeconomic consequences. Households would save less, reducing the aggregate capital stock, which would in turn reduce output and wages. We are certainly not the first to make this point, but what is novel in our analysis is that these effects would be smaller in the presence of evasion. For example, a 15p.p. increase in the capital income tax rate would reduce GDP by about 7% in the baseline model and 10% in the counterfactual. As a result, increasing capital income taxes would have less effect on labor income and consumption tax revenues in the former than in the latter. Note that this implies that the peak of the Laffer curve in the baseline model would be even further to the left if the macroeconomic effects of capital income taxes were as strong as in the counterfactual.

Panels (h) and (i) of figure 1 show that tax evasion would prevent capital income tax reform from reducing wealth inequality in addition to preventing it from improving public finances. In the no-evasion counterfactual, raising the capital income tax rate by 15p.p. would reduce the share of wealth held by the top 0.1% of households by about 2.5p.p. (or about 13%). In the baseline model, this reform would reduce these households' share of reported wealth by more than in the counterfactual, but would actually increase their share of total wealth (both reported and hidden). In other words, increasing capital income taxes would appear to reduce wealth inequality, but would in fact increase it once concealed wealth is taken into account.

Finally, panel (b) of figure 1 shows that raising capital income taxes would reduce welfare even in the absence of evasion.[16] Cutting capital income taxes would raise welfare in both versions of our model despite requiring lump-sum taxes. The optimal capital income tax rate is 11.7p.p. lower than the benchmark rate in the baseline model and 7.5p.p. lower in the no-evasion counterfactual. Although the optimal capital income

[14] Technically, reducing the capital income tax very slightly would raise revenue, but the maximum lump-sum transfer that could be raised is less than one thousandth of a percent of the average household's labor income.

[15] Note that there would be precisely zero evasion once the capital income tax rate falls below the cost of transferring wealth into a tax shelter, θ, which is equal to 10.6% in our calibration.

[16] We measure welfare using the same utilitarian consumption-equivalent criterion as Guvenen et al. (2019) and Conesa et al. (2009) that weights all newborn households equally.

tax cut is larger in the former, the lump-sum tax required by this policy would be about the same as in the latter. This is because the larger tax cut would trigger a larger economic expansion, but also because tax evasion would be almost completely eliminated. Table 5 shows that although cutting capital income taxes would increase aggregate welfare, the gains would be unequally distributed. In fact, optimal capital income tax reform would hurt poor households because the required lump-sum taxes would exceed the income boost from higher wages.

To sum up, raising capital income taxes would reduce overall tax revenue and would actually increase wealth inequality. Comparing our baseline model to a counterfactual with no tax evasion shows that evasion drives both of these results: but for tax evasion, raising capital income taxes could increase revenue substantially and would reduce wealth inequality. However, it would be optimal to reduce the capital income tax rate even in the absence of evasion, although this would benefit rich households at the expense of poor ones.

4.2 Flat wealth taxes

In our second quantitative exercise, we use our calibrated model to study the effects of introducing flat taxes on all households' reported wealth. Figure 2 illustrates the effects of introducing a wealth tax on the macroeconomy, public finances, tax evasion, inequality, and welfare. Table 6 provides additional details about the revenue- and welfare-maximizing wealth taxes, and table 7 shows the distribution of welfare gains and losses associated with these policies.

Panel (a) of figure 2 shows the Laffer curve for wealth taxes. Taxing wealth could improve public finances regardless of the presence of evasion but would generate substantially more revenue in its absence. In the baseline model, the revenue-maximizing wealth tax rate is 2.67%, which would generate a modest lump-sum transfer of about 1.5% of the average household's labor income. In the no-evasion counterfactual, the revenue-maximizing wealth tax rate is significantly higher, at 6.3%, and would generate a large transfer of 4.5% of the average labor income. Note that sufficiently high wealth taxes would actually reduce overall tax revenue in the baseline model.

Panels (c)–(e) of figure 2 show the macroeconomic effects of wealth taxation. Even a small wealth tax would reduce saving substantially, albeit less so in the presence of evasion. For example, a 2% wealth tax would reduce the total stock of wealth by about 20% in the baseline model and 30% in the no-evasion counterfactual. This "behavioral effect", as it is often referred to in the public finance literature, would shrink the wealth tax base directly, and would also indirectly reduce overall tax revenues by causing the economy to contract. Continuing the example, a 2% wealth tax would reduce GDP and wages by about 7% in the baseline model and 10% in the no-evasion counterfactual. Note that as in the previous exercise, the smaller macroeconomic effects in the baseline model shift the peak of the wealth tax Laffer curve to the right; if wealth taxes had the same macroeconomic effects regardless of the presence of evasion, the peak in the baseline model would be located even further to the left.

Panels (f) and (g) of figure 2 show that taxing wealth would increase evasion dramatically, however. A 2%

wealth tax would have about the same effect on concealed wealth and lost tax revenues as a 15p.p. increase in the capital income tax rate. Note that even though the capital income tax rate does not change in this exercise, households would also endogenously evade more capital income taxes as they shelter additional wealth to evade a wealth tax. Under the revenue-maximizing wealth tax in our baseline model, lost capital income tax revenues would almost quadruple, from 0.27% of GDP in the benchmark equilibrium to 0.92%, and would account for just under a third of the total amount of lost tax revenues. This is an important point for policymakers to recognize, and it highlights the value of analyzing wealth taxes using a structural model with endogenous evasion. Most reduced-form estimates of the impact of wealth taxes on public finances that assume an exogenous rate of wealth tax evasion—like Saez and Zucman (2019a)'s analysis of Elizabeth Warren's proposed plan—omit this channel and therefore overestimate the revenues that a wealth tax could raise. One exception is Londoño-Vélez and Ávila-Mehcha (2020b), who document that wealth tax reforms in Colombia that reduced wealth tax evasion also increased reported capital income.

Panels (h) and (i) show that introducing a wealth tax would have similar effects on wealth inequality as raising the capital income tax rate in our baseline model. The share of reported wealth held by the top 0.1% of households would fall (except for very high wealth tax rates), but these households' share of total wealth would actually rise. Thus, a wealth tax would appear to ameliorate wealth inequality, but it would actually exacerbate it. Note, though, that a wealth tax would also increase wealth inequality in our no-evasion counterfactual. As Guvenen et al. (2019) point out, flat wealth taxes actually increase wealth concentration because they erode unproductive entrepreneurs' wealth more rapidly than productive entrepreneurs' wealth.

Panel (b) of figure 2 shows that introducing even a small wealth tax would reduce welfare in our baseline model: the optimal wealth tax rate in the presence of evasion is zero. Table 7, which reports the welfare consequences of the revenue-maximizing wealth tax for households in different parts of the wealth distribution, shows that wealth taxes would hurt all households except the very poor and the ultra-rich. For most households, the decline in wages would outweigh the lump-sum transfer, but the reverse would be true for poor households with low enough incomes. The ultra-rich would benefit because they can afford tax shelters and because the decline in saving would increase interest rates. In the no-evasion counterfactual, on the other hand, small wealth taxes would actually raise welfare, albeit only slightly. The welfare-maximizing wealth tax rate in this version of the model is 0.5%. This policy would benefit households in the bottom 80% of the wealth distribution, particularly those at the bottom, and hurt rich households.

To sum up, flat wealth taxes could increase tax revenue but would also increase wealth inequality and reduce welfare. As with capital income taxes, tax evasion plays an important role in driving these results: but for tax evasion, wealth taxes would raise substantially more revenue and could improve welfare, although they would still increase wealth inequality. Importantly, although a substantial portion of potential wealth tax revenues would be lost to evasion, our theory also reveals that taxing wealth would cause households to evade a larger portion of their capital income taxes even if capital income taxes do not change.

4.3 Progressive wealth taxes

In our third quantitative exercise, we use our calibrated model to study the effects of progressive wealth taxes that target only households at the top of the wealth distribution. Here, we use the proposals by Senators Elizabeth Warren and Bernie Sanders during the 2020 Democratic presidential primary campaign as case studies to illustrate how the effects of progressive wealth taxes would differ from the effects of flat wealth taxes. The Warren proposal would tax wealth between $50 million–$1 billion at 2% and wealth above $1 billion at 3%.[17] The Sanders proposal is more progressive, with tax rates of 1% on wealth between $32 million–$50 million; 2% from $50 million–$250 million; 3% from $250 million–$500 million; 4% from $500 million–$1 billion; 5% from $1 billion–$2.5 billion; 6% from $2.5 billion–$5 billion; 7% from $5 billion–$10 billion; and 8% on wealth above $10 billion.[18] We also solve for optimal progressive wealth taxes, choosing the tax rate and an amount of wealth that is exempt from taxation to maximize aggregate welfare. Table 8 lists the main results of these analyses, and table 9 shows the distribution of welfare gains and losses across households.

The Warren and Sanders wealth taxes would affect fewer than 0.1% of households but would still have noticeable macroeconomic consequences because these households own a large share of aggregate wealth. As in our previous exercises, these consequences would be smaller in our baseline model than in our no-evasion counterfactual, but the differences would be particularly pronounced because these households are also responsible for the vast majority of tax evasion. In our baseline model, the two Senators' policies would reduce aggregate wealth by 1.2–1.5% and GDP by 0.6–0.7%, whereas wealth would fall by 2.8–3.4% and GDP by 1.3–1.6% in the counterfactual.

Because many of the households that would be subject to these policies already maintain tax shelters to evade capital income taxes, tax evasion would increase dramatically: concealed wealth would more than double; more than half of the potential wealth tax revenues from these policies would be lost; and capital income tax evasion would also increase substantially. After adding these effects to the drop in income taxes caused by the macroeconomic losses, the Warren and Sanders proposals would actually reduce overall tax revenue, requiring lump-sum taxes of 0.13–0.15% of the average household's labor income to re-establish fiscal balance. As a result, virtually all households' welfare would fall, with the more-aggressive Sanders plan generating larger losses.[19] The public-finance and welfare consequences of these policies would be strikingly different in the absence of evasion. In our no-evasion counterfactual, these policies would raise about 50% more wealth tax revenue than in the baseline model and would provide lump-sum transfers of 0.33-0.39% of the average labor income. As a result, welfare would rise for all households except those at

[17] https://elizabethwarren.com/plans/ultra-millionaire-tax

[18] https://berniesanders.com/issues/tax-extreme-wealth

[19] One might wonder whether the welfare consequences of these policies would differ once transition dynamics are taken into account. Unlike flat wealth taxes, which would be borne by all households, progressive wealth taxes would not have any direct effects on most households in partial equilibrium, and the general equilibrium effects would occur gradually over time as the capital stock shrinks. We have analyzed the transition dynamics that would follow implementation of these policies and found that welfare would fall even in the short run. These results are available upon request.

the top of the wealth distribution.

In contrast to flat wealth taxes, which would increase wealth inequality, we find that progressive wealth taxes would indeed reduce wealth inequality even in the presence of tax evasion. The share of wealth held by the top 0.1% of households would fall by 1.3p.p. under the Warren policy in our baseline model and by 1.6p.p. under the Sanders policy. Note, though, that reported wealth inequality would fall more than actual wealth inequality due to the increase in concealed wealth. In other words, much of the apparent reduction in inequality would be illusory.

The Warren and Sanders proposals would be clear policy failures due to their deleterious effects on public finances and welfare, but they are just two examples of a wide range of progressive wealth taxes that could be implemented. Could a progressive wealth tax with a different tax rate or exemption threshold generate better outcomes? To answer this question, we consider alternative policies characterized by a tax rate, τ_a, and a threshold, $\underline{a}$, below which wealth is not subject to taxation. We use a global optimization algorithm to search over $(\tau_a, \underline{a})$ space for the welfare-maximizing policy and find that the answer is no: there exists no welfare-enhancing wealth tax, either flat or progressive, in our baseline model. In the no-evasion counterfactual, on the other hand, progressive wealth taxes can generate far better outcomes than the Warren and Sanders policies. The optimal progressive wealth tax in this version of the model features a threshold of about $5 million and a tax rate of 4.2%. This policy would generate large welfare gains for almost all households, although it would have more severe macroeconomic consequences.

To sum up, progressive wealth taxes like those proposed by Elizabeth Warren and Bernie Sanders would reduce wealth inequality, but they would also shrink the economy and increase tax evasion dramatically, ultimately worsening public finances and harming most households. Tax evasion plays a particularly important role in driving these results: but for tax evasion, progressive wealth taxes would yield far better outcomes than flat wealth taxes, improving public finances and benefiting virtually all households.

4.4 Elasticities of reported taxable income

We have calibrated our model to match facts about offshore tax evasion under the current U.S. tax code and we have used it to demonstrate that evasion plays a crucial role in shaping the effects of capital income tax reform and wealth taxes. Here, we ask: how does the increase in evasion caused by these policy changes in our model compare to estimates from the literature?

In empirical studies, the elasticity of taxable income with respect to the tax rate, often abbreviated ETI, is used to capture changes in tax revenue caused by households' behavioral responses to tax reforms (Saez et al., 2012). These responses include evasion that reduces reported income, but also changes in labor supply, saving, and other activities that affect actual income, especially when estimated over a long time frame. ETIs are typically estimated as the ratio of the log change in reported taxable income, Y, to the log change in the net-of-tax rate, $1-\tau$:

$$\varepsilon = \frac{\Delta \log Y}{\Delta \log(1-\tau)} \tag{18}$$

For wealth taxes, the numerator is the log change in reported taxable wealth. We use this formula to calculate two elasticities for each of our quantitative analyses: short-run elasticities, which are driven purely by evasion; and long-run elasticities, which also include other micro- and macroeconomic drivers.[20] We also compute long-run elasticities in our no-evasion counterfactual, but short-run elasticities in this version of the model are zero because evasion is the only channel through which households can reduce reported capital income or wealth immediately after a tax reform.

Panel (a) of figure 3 shows our ETIs for capital income tax reform. In our baseline model, reported capital income is more elastic to small reforms than large ones, with ETIs ranging from 1-3 near the benchmark tax rate, and more elastic in the short run than in the long run. In our no-evasion counterfactual, on the other hand, reported capital income barely responds at all to changes in the capital income tax rate even in the long run. This indicates that tax evasion is the primary reason that reported capital income falls when the capital income tax rate rises. Our baseline capital income tax ETIs are slightly lower than recent estimates of Agersnap and Zidar (2020), who report capital gains ETIs of 3.6 and 2.6 for the short run and long run, respectively.[21] There are a few other studies that estimate capital income ETIs—most studies in this literature lump labor income and capital income together—but those that do often report somewhat lower estimates (Kleven and Schultz, 2014).

Panel (b) of figure 3 shows our elasticities of taxable wealth (ETWs) for flat wealth taxes. They range from 5–10 in the short run to 20–30 in the long run in our baseline model. Table 10 reports our ETWs for progressive wealth taxes. They are similar to ETWs for flat wealth taxes in the long run but substantially higher in the short run. This is because progressive wealth taxes that target rich households induce more evasion but also have smaller macroeconomic consequences than flat wealth taxes that apply to all households. In contrast to our capital income ETIs, long-run ETWs are quite high even in our no-evasion counterfactual, reflecting the fact that wealth taxes would reduce saving—and thus the relevant tax base—substantially regardless of the presence of evasion.

Comparing our ETWs with empirical estimates is more difficult because the United States has never had a wealth tax. Moreover, estimates of ETWs from other countries vary widely, from less than one in Sweden and Denmark (Seim, 2017; Jakobsen et al., 2018) to as high as 35 in Switzerland (Brulhart et al., 2016). Most of these studies use microdata to estimate ETWs by analyzing how many individuals "bunch" below exemption thresholds or tax brackets immediately following wealth tax reforms. This approach captures

[20] We compute short-run elasticities by using the policy functions associated with the new tax system to compute the change in reported capital income/wealth while holding fixed prices and the wealth distribution from the benchmark equilibrium. Long-run elasticities are computed using prices and the wealth distribution from the stationary equilibrium associated with the new tax system.

[21] Why, then, do Agersnap and Zidar (2020) estimate that the revenue-maximizing capital gains tax rate is substantially higher than the current rate, while our results indicate that raising capital income taxes would not generate any additional revenue? The answer is that ours is a general equilibrium analysis, while theirs is a reduced-form partial equilibrium analysis. Specifically, our Laffer curve reflects total changes in tax revenues, not just revenues from capital income taxation, and revenues from other sources fall when the capital income tax rises due to the decline in output and wages.

short-run evasion responses but not long-run changes in actual wealth (Londoño-Vélez and Ávila-Mehcha, 2020a), and so these estimates should be compared with our model's short-run ETWs, which are driven solely by evasion. Our results lie between Londoño-Vélez and Ávila-Mehcha (2020a)'s estimate of 2 for Colombia, Zoutman (2018)'s estimate of 11.6 for the Netherlands, and Durán-Cabré et al. (2019)'s estimate of 15.6 for Catalunya.[22] Note that while our ETWs for progressive wealth taxes are toward the higher end of this range, the policies we have analyzed feature substantially higher exemption thresholds than other countries' policies. For example, the Swedish, Colombian, and Catalonian wealth taxes exempt about $100,000, $500,000, and $600,000, respectively, making them more comparable to flat taxes than the "ultra-millionaires" taxes proposed by Elizabeth Warren and Bernie Sanders. Our long-run ETWs are similar to Brulhart et al. (2016)'s estimate for Switzerland. This study analyzes differences in aggregate reported wealth and tax rates across regions using microdata, making it a better point of comparison for our long-run results than other studies, although the particularities of the Swiss banking system may raise questions about the relevance of their estimate for other contexts.

To sum up, the results of all of our quantitative experiments are in line with empirical estimates of how reported income and wealth change in response to tax reforms, and our no-evasion counterfactual reveals that tax evasion plays an important role in driving these responses. Moreover, our results illustrate several advantages to measuring the effects of tax reforms on reported income and wealth in dynamic general equilibrium. For one, our approach allows us to measure short-run and long-run effects. We find that wealth tax ETWs are higher in the long run than in the short run, which indicates that conventional short-run estimates overstate the revenues that wealth taxes could raise. For another, our approach accounts for the fact that tax reforms that change households' incentives to conceal wealth offshore will affect both capital income and wealth tax evasion. Our finding that wealth taxes would increase capital income tax evasion has important policy implications and highlights a new mechanism that has not been explored in the empirical literature. Additionally, our findings indicate that the experiences of other countries that have implemented relatively flat wealth taxes may be poor predictors of how highly progressive wealth taxes that exempt tens of millions of dollars would play out in the United States.

5 Sensitivity analysis

Our quantitative experiments demonstrate that offshore tax evasion has significant implications for capital income tax reform and wealth taxation, and we have found that these results are robust to a wide range of alternative assumptions and parameterizations. Here, we present two sensitivity analyses that help place our results in the literature and provide additional guidance for policymakers. In the first, we explore using the revenues from heavier capital taxation to reduce other distortionary taxes. In the second, we study a version of our model with higher evasion costs.

[22] Zoutman (2018) and Durán-Cabré et al. (2019) also document that ETWs increase over time following wealth tax reforms, consistent with our results, although their analyses consider relatively short time horizons.

5.1 Redistribution vs. reducing distortions

We have assumed that changes in government revenues from capital income tax reform and wealth taxation are distributed lump-sum to households. Our analysis is intended to highlight the consequences of tax evasion in a transparent way that captures the spirit of recent calls for increased redistribution. An alternative approach in the quantitative public finance literature is to use the revenues generated by tax reforms to reduce distortionary taxes. Here, we repeat our analyses of capital income tax reform and flat wealth taxation from sections 4.1–4.2, but clear the government's budget by changing the labor income tax rate as in Guvenen et al. (2019) and Conesa et al. (2009) instead of with lump-sum transfers.

Figure 4 shows how capital income tax reform would affect the economy if the government's budget is balanced by labor income taxes. In our baseline model, either increasing or decreasing the capital income tax rate would require the government to raise labor income taxes, whereas in the no-evasion counterfactual increasing capital income taxes would allow labor income taxes to be reduced. This confirms that the current tax code is at the top of the capital income Laffer curve: capital income tax reform would lower overall revenues regardless of whether the proceeds are redistributed or offset by changes in other distortionary taxes. The effects of capital income tax reform on wealth inequality are also similar in both versions of this experiment. As before, raising capital income taxes would reduce reported inequality but increase actual inequality in our baseline model, whereas actual inequality would fall in the no-evasion counterfactual. Here, though, the macroeconomic consequences of tax evasion would be more severe. In this version of the experiment, capital income tax reform would have about the same effects on aggregate wealth, GDP, and wages in the baseline model as in the no-evasion counterfactual, whereas in the redistributionary version these effects are smaller in the baseline model. This is because raising the capital income tax rate generates more revenue in the no-evasion counterfactual than the baseline model, and in this version of the experiment this allows for a larger reduction in labor-market distortions in the former than in the latter. In turn, the larger reduction in distortions generates a larger macroeconomic boost to offset the adverse effects caused by the decline in saving.

Capital income tax reform would also have similar welfare consequences in this version of the experiment: cutting capital income taxes would increase welfare regardless of the source of financing. In the baseline model, the optimal policy in this version of the experiment entails reducing the capital income tax rate by 17.8p.p. and increasing the labor income tax rate by 4.1p.p. In the no-evasion counterfactual, the optimal policy would increase labor income taxes by the same amount, but reduce capital income taxes by only 14.3p.p. This is because reducing capital income taxes generates more revenue in the baseline model than in the counterfactual because of the additional gains from eliminating evasion. Note that the optimal capital income tax cut in this version of the experiment is smaller than that reported by Guvenen et al. (2019), who find that a large subsidy to capital income would be optimal. Although our model's structure is similar to theirs—aside for our theory of tax evasion—there are several differences that push the optimal capital income tax rate upwards. Financial frictions have less bite in our model because it features unconstrained corporations as well as credit-constrained entrepreneurs and our calibrated constraints are looser.[23] Our model also features a different entrepreneurial opportunity process which we have calibrated to match the life-cycle profile of entrepreneurship in the SCF. Boar and Midrigan (2020), who analyze a similar model that abstracts from life-cycle dynamics and stochastic entrepreneurship, find even higher optimal capital income tax rates than we do. Although the optimal capital income tax rate may be sensitive to these modeling assumptions, our results show that the consequences of tax evasion for capital income tax reform are robust.

Figure 5 shows how wealth taxes would affect the economy if the revenues were used to reduce labor income taxes. The results of this analysis confirm that tax evasion would substantially reduce these revenues regardless of whether they are distributed lump-sum or used to reduce labor-market distortions. For example, a wealth tax rate of 3% would reduce labor income taxes by less than 4p.p. in our baseline model versus about 10p.p. in the no-evasion counterfactual. Wealth taxes would have similar effects on inequality in both versions of this experiment: actual wealth inequality would increase in both the baseline model and the no-evasion counterfactual, but reported inequality would fall in the former. As with capital income tax reform, tax evasion would have larger macroeconomic implications for wealth taxes when the revenues are used to reduce labor income taxes. In this version of the experiment, wealth taxes would have about the same effects on macroeconomic variables regardless of the presence of tax evasion, whereas in the redistributionary version these effects are smaller in the baseline model than in the no-evasion counterfactual. Again, this is because wealth taxes would allow for larger reductions in labor-market distortions in the absence of evasion, which would mitigate more of the macroeconomic effects caused by the decline in saving. Finally, wealth taxes would also have similar welfare consequences in this version of the experiment: they would still reduce welfare in the baseline model, and the optimal wealth tax in the no-evasion counterfactual is about the same as in the redistributionary version.

To sum up, the implications of tax evasion for capital taxation do not depend on whether the proceeds are redistributed or used to reduce distortions from other taxes. In either case, raising capital income taxes would not generate additional revenue, wealth taxes would harm the economy, and both policies would reduce reported inequality but increase actual wealth inequality.

5.2 Higher evasion costs

We have calibrated the costs of offshore tax evasion in our model to match estimates of the extensive and intensive margins of this behavior under the current U.S. tax code, but the obfuscatory nature of tax evasion makes the precision of these estimates difficult to ascertain. Here, we explore the sensitivity of our results to these key parameters by analyzing the effects of capital income tax reform and wealth taxes in two alternative calibrations with higher evasion costs. In the first alternative, the fixed evasion cost, θ, and the

[23] These two differences go hand in hand. Constrained entrepreneurs account for a smaller fraction of aggregate production in our model, so looser collateral constraints are required to generate the amount of entrepreneurial debt observed in the data.

proportional evasion cost, η, are 25% higher than in the baseline calibration, respectively, and the fraction of wealth that can be collateralized, χ, is 25% lower. In the second alternative, the first two parameters are 50% higher and the second is 50% lower. For brevity's sake, we focus our discussion in this section on public-finance and welfare consequences, as the effects on inequality and the macroeconomy are similar to the baseline results in all three alternatives.

Figure 6 shows the effects of capital income tax reform with higher evasion costs. With 25% higher costs, raising the capital income tax rate slightly would generate a small increase in tax revenues, but raising it further it would have similar effects as in the baseline calibration. With 50% higher costs, small increases in capital income taxes would generate somewhat larger revenue gains, but the peak of the Laffer curve is again close to the baseline peak. Note that particularly large increases in capital income taxes would actually reduce tax revenues more in the two alternative calibrations than in the baseline. This is because these calibrations feature less concealed wealth in the benchmark equilibrium, and so sufficiently high capital income tax rates actually induce larger increases in evasion when measured in percentage terms. Regardless of the cost of evasion, it would be optimal to reduce capital income taxes, which is perhaps not surprising since this is also true regardless of whether evasion occurs at all. The welfare-maximizing capital income tax rates in both alternative calibrations are closer to the no-evasion optimum than the baseline optimum. This is also due to the fact that the alternatives have less evasion in the benchmark equilibrium; reducing capital income taxes has less effect on evasion when there is less of it to begin with.

Figure 7 shows the effects of wealth taxes with higher evasion costs. In both alternative calibrations, introducing a wealth tax would have quantitatively similar effects on public finances and welfare as in the baseline calibration. The revenue-maximizing wealth tax would be around 3% in both alternatives, and would generate slightly larger lump-sum transfers of about 2% of the average household's labor income. Regardless of the cost of evasion, wealth taxes always reduce welfare in the alternative calibrations, just as in the baseline. This is even true for progressive wealth taxes like those proposed by Elizabeth Warren and Bernie Sanders. In fact, the effects of these policies are even less sensitive to the costs of evasion than flat wealth taxes because these policies target households for whom the benefit of evasion greatly exceeds the fixed cost. We have also conducted global searches for optimal progressive wealth taxes in the alternative calibrations and found that there exists no such taxes that raise welfare, just as in the baseline.

To sum up, if the cost of offshore tax evasion was substantially higher, neither capital income tax reform nor wealth taxes could generate substantial increases in tax revenue, and wealth taxes—no matter how progressive—would still reduce welfare. In addition to demonstrating that our main results are robust to changes in the cost of evasion, this sensitivity analysis also has important implications for policymakers. It indicates that even large increases in enforcement of may not be sufficient for taxes on capital income and wealth to be useful in reducing wealth inequality and improving public finances. Proposals to tax capital more heavily, such as the progressive wealth taxes advocated by Elizabeth Warren and Bernie Sanders, often include provisions for increasing the budget of the IRS' enforcement arm, but these provisions may not be enough to make these policies successful.

6 Conclusion

Rising wealth inequality has spurred calls to tax capital income more heavily and introduce new taxes on wealth, but rich households could evade these tax increases by concealing their assets offshore. We have developed a model of offshore tax evasion, disciplined it with data on the extent of this evasion under the current U.S. tax system, and used it to study the implications of this evasion for taxing capital more heavily. We have found that these implications are significant.

In the absence of offshore tax evasion, raising capital income taxes could improve public finances, flat wealth taxes could increase aggregate welfare, and progressive wealth taxes targeted at "ultra-rich" households like those proposed by Elizabeth Warren and Bernie Sanders would benefit almost all households. Once evasion has been taken into account, however, higher capital income tax rates would reduce overall tax revenue, flat wealth taxes would reduce welfare, and progressive wealth taxes would harm virtually all households. Moreover, although taxing capital more heavily would appear to reduce wealth inequality, it would actually increase inequality once offshore concealed wealth is taken into account.

Our analysis is limited to a specific form of tax evasion: the use of offshore tax shelters by rich households. Other forms of tax evasion, such as under-reporting of cash income, are prevalent across the wealth distribution (Johns and Slemrod, 2010) and have larger effects on public finances under the current tax code.[24] However, wealth and capital income are concentrated among rich households, and we show that these households would engage in far more offshore evasion if capital is taxed more heavily.

Our results are in line with reduced-form estimates of how tax reforms affect reported taxable income—or wealth, in the case of wealth taxes—and they show that offshore tax evasion is a key driver of these responses. Of course, the effects of changes in tax policy on the broader economy also depend on how investment, wages, and other macroeconomic variables respond in equilibrium in the long run. Our study provides a framework for analyzing how tax evasion and the real economy interact, providing important insights for policymakers and opening the door to a range of new avenues of research.

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[24] The most recent IRS report on tax compliance estimates that lost revenues from all forms of evasion exceed $400 billion per year. See `https://www.irs.gov/pub/irs-pdf/p1415.pdf`.

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Table 1: Assigned parameters

Parameter	Description	Value	Target or source
(a) Demographics and preferences			
J	Lifespan	60	Max. lifespan of 85 years
R	Retirement age	41	Retirement at age 66
ϕ_j	Survival prob.	Varies	Arias (2014)
σ	Risk aversion	4	Conesa et al. (2009)
(b) Endowments			
$\log \zeta_j$	Life-cycle labor productivity	$-\frac{j^2}{1800} - \frac{j}{30}$	Guvenen et al. (2019)
σ_e	Intra-gen. labor prod. variance	0.201	Guvenen et al. (2019)
ρ_e	Intra-gen. labor prod. persistence	0.937	Guvenen et al. (2019)
$\tilde{\sigma}_e$	Inter-gen. labor prod. variance	0.568	Guvenen et al. (2019)
$\tilde{\rho}_e$	Inter-gen. labor prod. persistence	0.184	Guvenen et al. (2019)
$\tilde{\rho}_z$	Entrepreneurial ability persistence	0.1	Fagereng et al. (2018)
p_0	Prob. of opportunity at birth	0.0874	SCF (2016)
p_1	Prob. of losing opportunity	0.081	Clementi and Palazzo (2016)
p_2	Prob. of regaining opportunity	0.0226	SCF (2016)
(c) Production			
γ	Corporate capital share	0.071	NIPA
α	Entr. capital share	0.329	Standard
δ	Depreciation rate	0.05	Standard
ν	Elasticity of subst. between varieties	0.9	Guvenen et al. (2019)
(d) Taxes			
τ_c	Consumption tax	0.075	McDaniel (2007)
τ_ℓ	Labor income tax	0.224	McDaniel (2007)
τ_k	Capital ioncome tax	0.25	McDaniel (2007)
$\kappa(e)$	Retirement benefits	Varies	Guvenen et al. (2019)

Table 2: Calibrated parameters

Parameter	Description	Baseline	No evasion	Target	Source
$\tilde{\sigma}_z$	Entr. ability variance	0.445	0.397	Top 0.1% share = 20%	Saez and Zucman (2019b)
β	Discount factor	0.975	0.968	Reported wealth/GDP = 3	Guvenen et al. (2019)
μ	Consumption share	0.432	0.436	Avg. labor supply = 40%	Guvenen et al. (2019)
λ	Collateral constraint	2.116	2.093	Debt/GDP = 1.29	Guvenen et al. (2019)
θ	Fixed evasion cost ($\times$ avg. labor inc.)	1.027	–	Pct. with tax shelter = 0.05%	Guyton et al. (2020)
η	Proportional evasion cost	0.106	–	Hidden/total wealth = 4%	Zucman (2015)
χ	Fraction of a_h collateralizable	0.320	–	Tax evasion by top 0.01% = 6%	Guyton et al. (2020)

Table 3: Non-targeted moments

Statistic	Baseline	No evasion	Data	Source
(a) Reported wealth distribution				
Top 1% share	35	35	39	SCF (2016)
Top 10% share	65	66	77	SCF (2016)
Top 20% share	80	80	88	SCF (2016)
Bottom 50% share	3	3	1	SCF (2016)
Gini coefficient	0.78	0.79	0.86	SCF (2016)
Bequests (% reported wealth)	1.0	1.0	1.2	Nishiyama (2000)
(b) Tax evasion				
Aggregate tax evasion (% GDP)	0.27	–	0.2	Zucman (2015)
Pct. evaders by income group				
90%–95%	0.00	–	0.2	Guyton et al. (2020)
95%–99%	0.03	–	0.4	Guyton et al. (2020)
99%–99.5%	0.05	–	1.0	Guyton et al. (2020)
99.5%–99.9%	6.25	–	1.5	Guyton et al. (2020)
99.9%–99.99%	17.14	–	3.0	Guyton et al. (2020)
Top 0.01%	18.82	–	7.0	Guyton et al. (2020)
Tax evasion by income group (% taxes owed)				
90%–95%	0.00	–	0.2	Guyton et al. (2020)
95%–99%	0.01	–	0.4	Guyton et al. (2020)
99%–99.5%	0.01	–	0.9	Guyton et al. (2020)
99.5%–99.9%	5.39	–	1.7	Guyton et al. (2020)
99.9%–99.99%	7.96	–	3.2	Guyton et al. (2020)
Concealment by wealth group (% evaders' wealth)				
99%–99.5%	23.7	–	31.0–42.3	Alstadsæter et al. (2018)
99.5%–99.9%	22.8	–	30.9–46.5	Alstadsæter et al. (2018)
99.9%–99.95%	18.0	–	31.3–36.2	Alstadsæter et al. (2018)
99.95%–99.99%	23.4	–	32.8–36.6	Alstadsæter et al. (2018)
Top 0.01%	47.6	–	26.3–38.6	Alstadsæter et al. (2018)

Table 4: Effects of revenue- and welfare-maximizing capital income taxes

	Revenue-maximizing		Welfare-maximizing	
Variable	Baseline	No evasion	Baseline	No evasion
Capital income tax rate (p.p. chg.)	–	32.14	-11.67	-7.50
(a) Macro variables				
GDP (% chg.)	–	-24.05	7.54	5.04
Employment (% chg.)	–	-2.33	1.03	0.82
Entrepreneurial capital (% chg.)	–	-49.04	19.09	12.11
Corporate capital (% chg.)	–	-42.38	13.54	9.84
Wage (% chg.)	–	-22.24	6.44	4.19
Interest rate (p.p. chg.)	–	2.62	-0.40	-0.36
(b) Aggregate wealth				
Total (% chg.)	–	-45.62	16.28	10.93
Reported (% chg.)	–	-45.62	21.07	10.93
Concealed (% chg.)	–	–	-98.93	–
(c) Wealth inequality				
Top 0.1% share, actual (p.p. chg.)	–	-4.58	0.80	0.61
Top 0.1% share, reported (p.p. chg.)	–	-4.58	3.84	0.61
Bottom 90% share, actual (p.p. chg.)	–	0.00	0.00	0.00
Bottom 90% share, reported (p.p. chg.)	–	0.00	-0.01	0.00
(d) Public finances				
Capital income tax revenue (% chg.)	–	113.50	-42.26	-31.69
Capital income tax evasion (% GDP)	–	–	0.00	–
Lump-sum transfer (% avg. labor income)	–	2.46	-1.25	-1.10
(e) Welfare				
Aggregate, all households (% CE)	–	-12.03	1.37	0.07
Aggregate, newborns (% CE)	–	-14.58	2.15	0.50
Approval rate, all households (%)	–	32.68	55.22	44.61
Approval rate, newborns (%)	–	3.19	85.71	73.39

Table 5: Welfare effects of revenue- and welfare-maximizing capital income taxes by wealth percentile

	Revenue-maximizing		Welfare-maximizing	
Percentile	Baseline	No evasion	Baseline	No evasion
0–20	–	-2.513	-1.668	-2.052
20–40	–	-5.899	+0.014	-0.688
40–60	–	-6.144	+0.421	-0.255
60–80	–	-5.767	+0.664	+0.055
80–90	–	-5.193	+0.812	+0.227
90–95	–	-4.215	+0.626	+0.131
95–99	–	-3.284	+0.474	+0.058
99–99.9	–	-1.397	+0.213	-0.191
99.9–99.99	–	-1.221	-0.118	-0.131
99.99–100	–	-1.518	-2.297	-0.031

Table 6: Effects of revenue- and welfare-maximizing flat wealth taxes

	Revenue-maximizing		Welfare-maximizing	
Variable	Baseline	No evasion	Baseline	No evasion
Wealth tax rate (%)	2.67	6.32	–	0.50
(a) Macro variables				
GDP (% chg.)	-9.57	-25.15	–	-3.12
Employment (% chg.)	0.70	-2.05	–	-0.45
Entrepreneurial capital (% chg.)	-22.57	-47.62	–	-6.46
Corporate capital (% chg.)	-25.21	-59.73	–	-9.36
Wage (% chg.)	-10.20	-23.59	–	-2.68
Interest rate (p.p. chg.)	1.59	7.07	–	0.57
(b) Aggregate wealth				
Total (% chg.)	-25.29	-53.92	–	-7.86
Reported (% chg.)	-47.15	-53.92	–	-7.86
Concealed (% chg.)	500.01	–	–	–
(c) Wealth inequality				
Top 0.1% share, actual (p.p. chg.)	10.92	8.52	–	0.89
Top 0.1% share, reported (p.p. chg.)	-4.23	8.52	–	0.89
Bottom 90% share, actual (p.p. chg.)	-0.12	-0.11	–	-0.01
Bottom 90% share, reported (p.p. chg.)	-0.04	-0.11	–	-0.01
(d) Public finances				
Capital income tax revenue (% chg.)	-21.32	-7.88	–	-0.26
Capital income tax evasion (% GDP)	0.92	–	–	–
Wealth tax revenue (% GDP)	4.68	11.67	–	1.43
Wealth tax evasion (% GDP)	2.21	–	–	–
Lump-sum transfer (% avg. labor income)	1.52	4.50	–	1.00
(e) Welfare				
Aggregate, all households (% CE)	-7.97	-9.88	–	0.30
Aggregate, newborns (% CE)	-7.72	-10.69	–	0.34
Approval rate, all households (%)	26.31	34.46	–	59.83
Approval rate, newborns (%)	1.33	4.07	–	56.00

Table 7: Welfare effects of revenue- and welfare-maximizing wealth taxes by wealth percentile

	Revenue-maximizing		Welfare-maximizing	
Percentile	Baseline	No evasion	Baseline	No evasion
0–20	+0.531	+4.775	–	+2.439
20–40	-2.157	-1.612	–	+1.160
40–60	-3.231	-3.697	–	+0.641
60–80	-4.944	-5.990	–	+0.100
80–90	-6.827	-7.902	–	-0.335
90–95	-8.132	-9.204	–	-0.521
95–99	-9.993	-10.461	–	-0.728
99–99.9	-10.008	-12.204	–	-0.846
99.9–99.99	+6.276	-13.055	–	-1.027
99.99–100	+11.824	-13.671	–	-1.072

Table 8: Effects of progressive wealth taxes

	Warren		Sanders		Optimal	
Variable	Baseline	No evasion	Baseline	No evasion	Baseline	No evasion
Base wealth tax rate (%)	2.00	2.00	1.00	1.00	–	4.21
Wealth tax threshold ($M)	50	50	32	32	–	5.1
(a) Macro variables						
GDP (% chg.)	-0.58	-1.34	-0.71	-1.63	–	-5.10
Employment (% chg.)	0.00	-0.52	-0.00	-0.62	–	-1.86
Entrepreneurial capital (% chg.)	-1.81	-2.41	-2.19	-2.95	–	-9.47
Corporate capital (% chg.)	0.19	-3.21	0.21	-3.86	–	-11.16
Wage (% chg.)	-0.59	-0.82	-0.71	-1.01	–	-3.30
Interest rate (p.p. chg.)	-0.06	0.16	-0.07	0.19	–	0.56
(b) Aggregate wealth						
Total (% chg.)	-1.22	-2.81	-1.46	-3.42	–	-10.36
Reported (% chg.)	-5.67	-2.81	-6.50	-3.42	–	-10.36
Concealed (% chg.)	105.76	–	119.65	–	–	–
(c) Wealth inequality						
Top 0.1% share, actual (p.p. chg.)	-1.32	-2.74	-1.57	-3.29	–	-5.41
Top 0.1% share, reported (p.p. chg.)	-5.20	-2.74	-6.01	-3.29	–	-5.41
Bottom 90% share, actual (p.p. chg.)	0.00	0.01	0.00	0.01	–	0.05
Bottom 90% share, reported (p.p. chg.)	0.02	0.01	0.02	0.01	–	0.05
(d) Public finances						
Capital income tax revenue (% chg.)	-6.10	-0.45	-7.23	-0.55	–	-1.94
Capital income tax evasion (% GDP)	0.54	–	0.59	–	–	–
Wealth tax revenue (% GDP)	0.38	0.55	0.46	0.66	–	2.09
Wealth tax evasion (% GDP)	0.44	–	0.56	–	–	–
Lump-sum transfer (% avg. labor income)	-0.13	0.33	-0.15	0.39	–	1.14
(e) Welfare						
Aggregate, all households (% CE)	-0.87	0.83	-1.03	0.96	–	2.64
Aggregate, newborns (% CE)	-1.01	0.62	-1.20	0.70	–	1.77
Approval rate, all households (%)	6.30	98.30	6.37	97.63	–	95.05
Approval rate, newborns (%)	0.64	84.39	0.65	83.37	–	81.70

Table 9: Welfare effects of progressive wealth taxes by wealth percentile

	Warren		Sanders		Optimal	
Percentile	Baseline	No evasion	Baseline	No evasion	Baseline	No evasion
0–20	-0.783	+0.867	-0.922	+1.001	–	+2.798
20–40	-0.627	+0.526	-0.740	+0.601	–	+1.578
40–60	-0.522	+0.442	-0.617	+0.506	–	+1.368
60–80	-0.395	+0.459	-0.467	+0.534	–	+1.529
80–90	-0.320	+0.495	-0.379	+0.583	–	+1.713
90–95	-0.207	+0.627	-0.242	+0.749	–	+2.276
95–99	-0.151	+0.772	-0.176	+0.927	–	+2.731
99–99.9	+0.089	+1.151	+0.102	+1.382	–	-4.286
99.9–99.99	-2.722	-1.721	-4.017	-3.005	–	-25.224
99.99–100	-6.428	-13.779	-7.483	-15.975	–	-32.467

Table 10: Elasticities of reported taxable wealth with respect to progressive wealth taxes

	Warren		Sanders		Optimal	
ETW	Baseline	No evasion	Baseline	No evasion	Baseline	No evasion
Long run	29.2	14.5	24.8	13.14	–	12.02
Short run	12.6	–	11.6	–	–	–

Figure 1: Effects of capital income tax reform

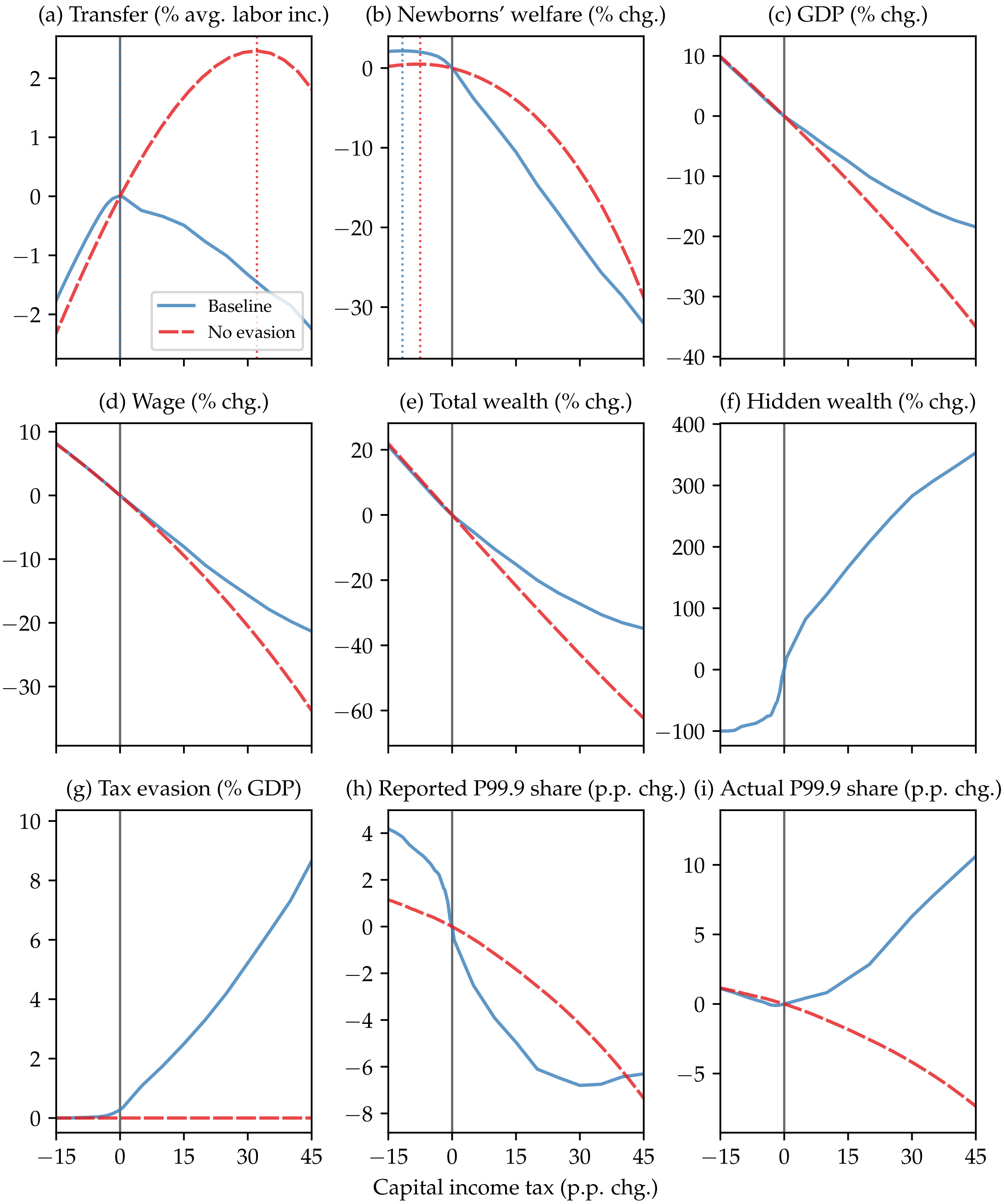

Figure 2: Effects of flat wealth taxes

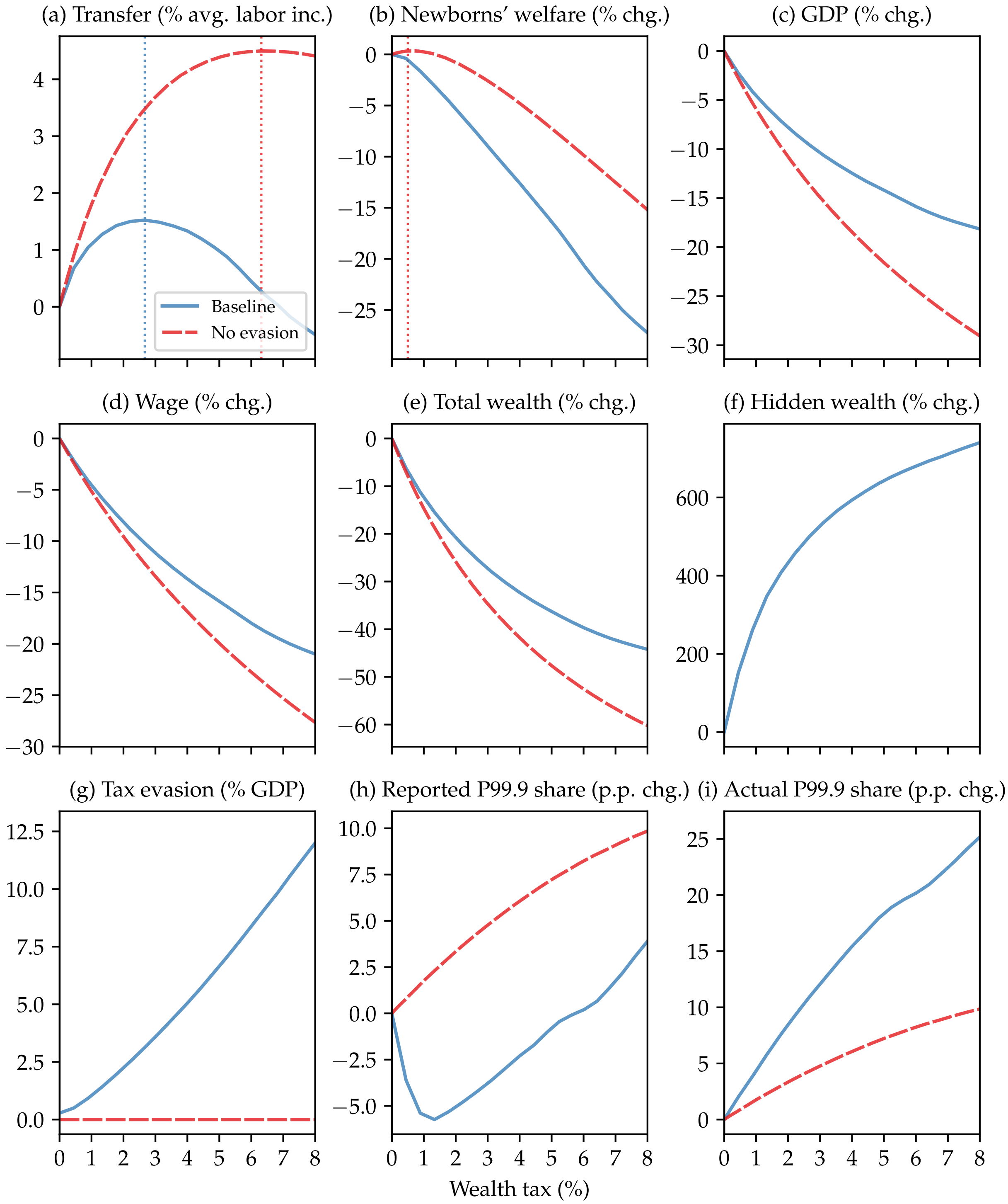

Figure 3: Elasticites of reported taxable income and wealth

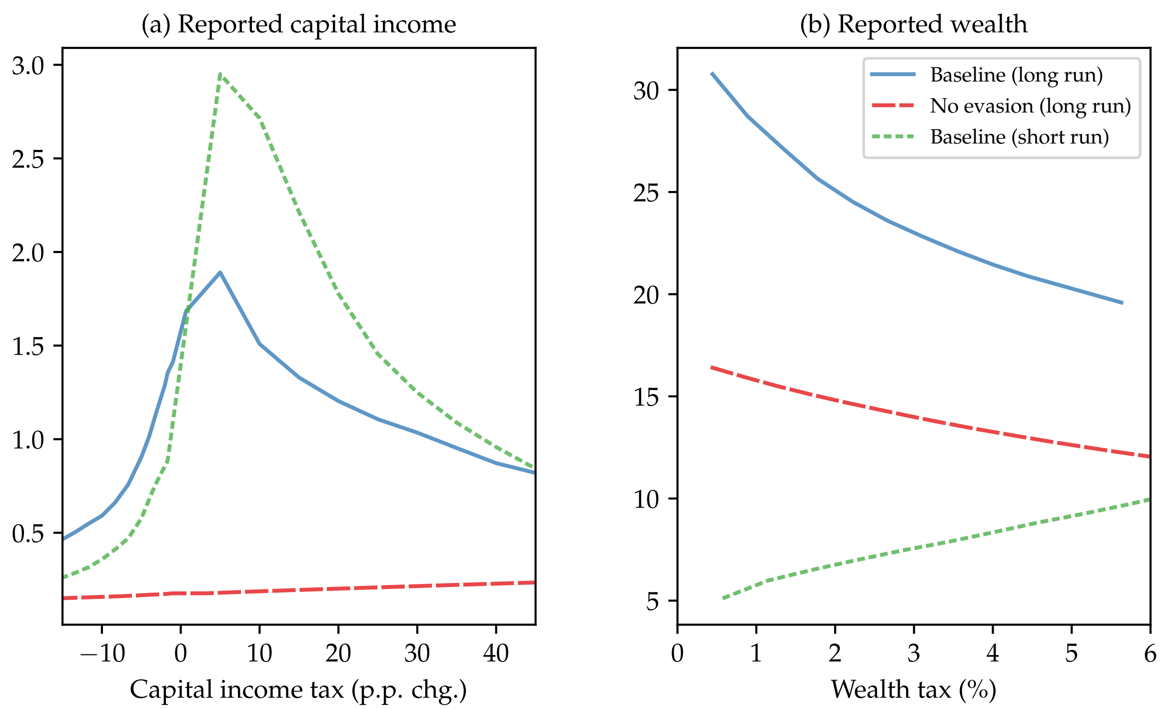

Figure 4: Effects of capital income tax reform financed by changing the labor income tax rate

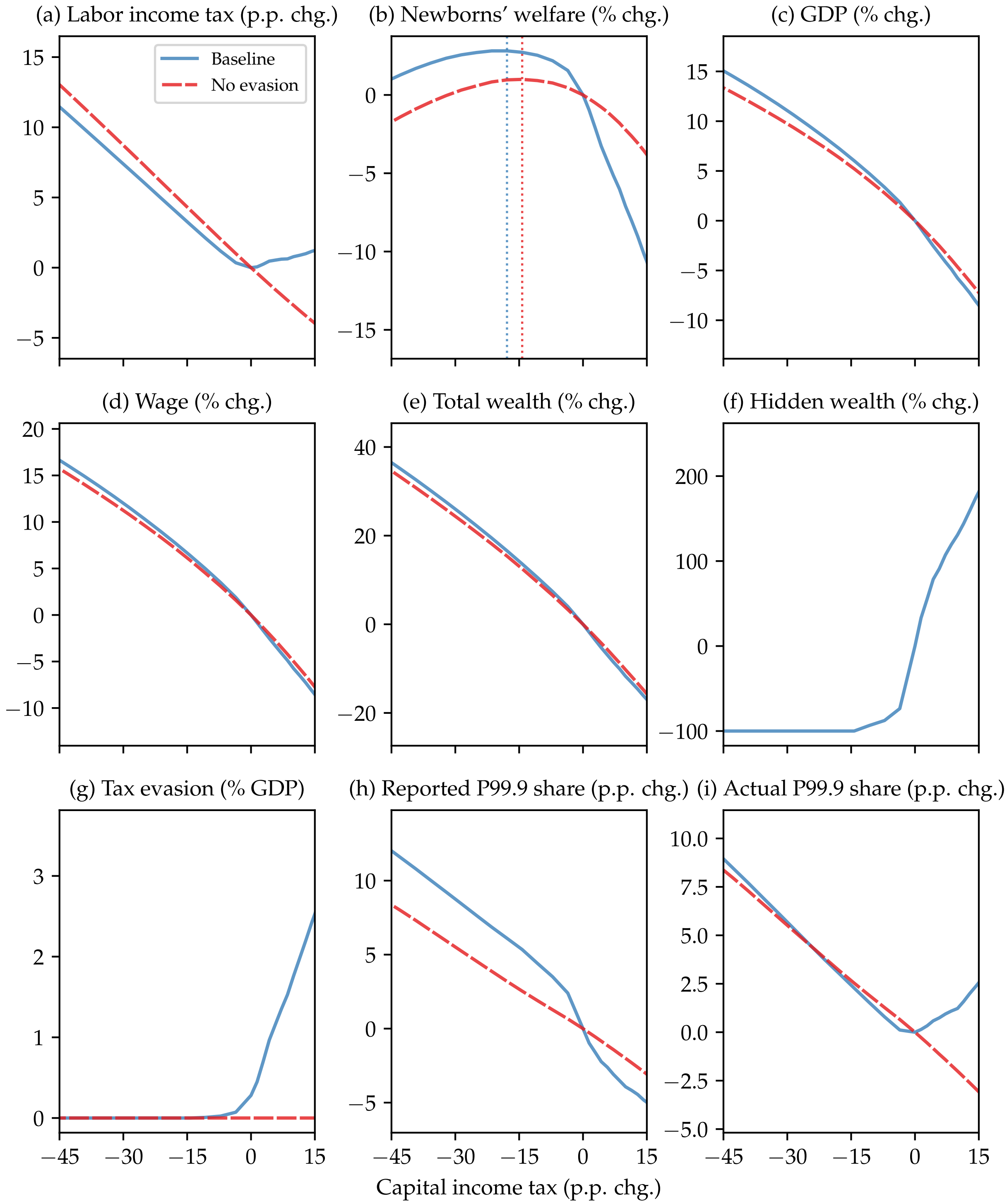

Figure 5: Effects of flat wealth taxes used to finance labor income tax reductions

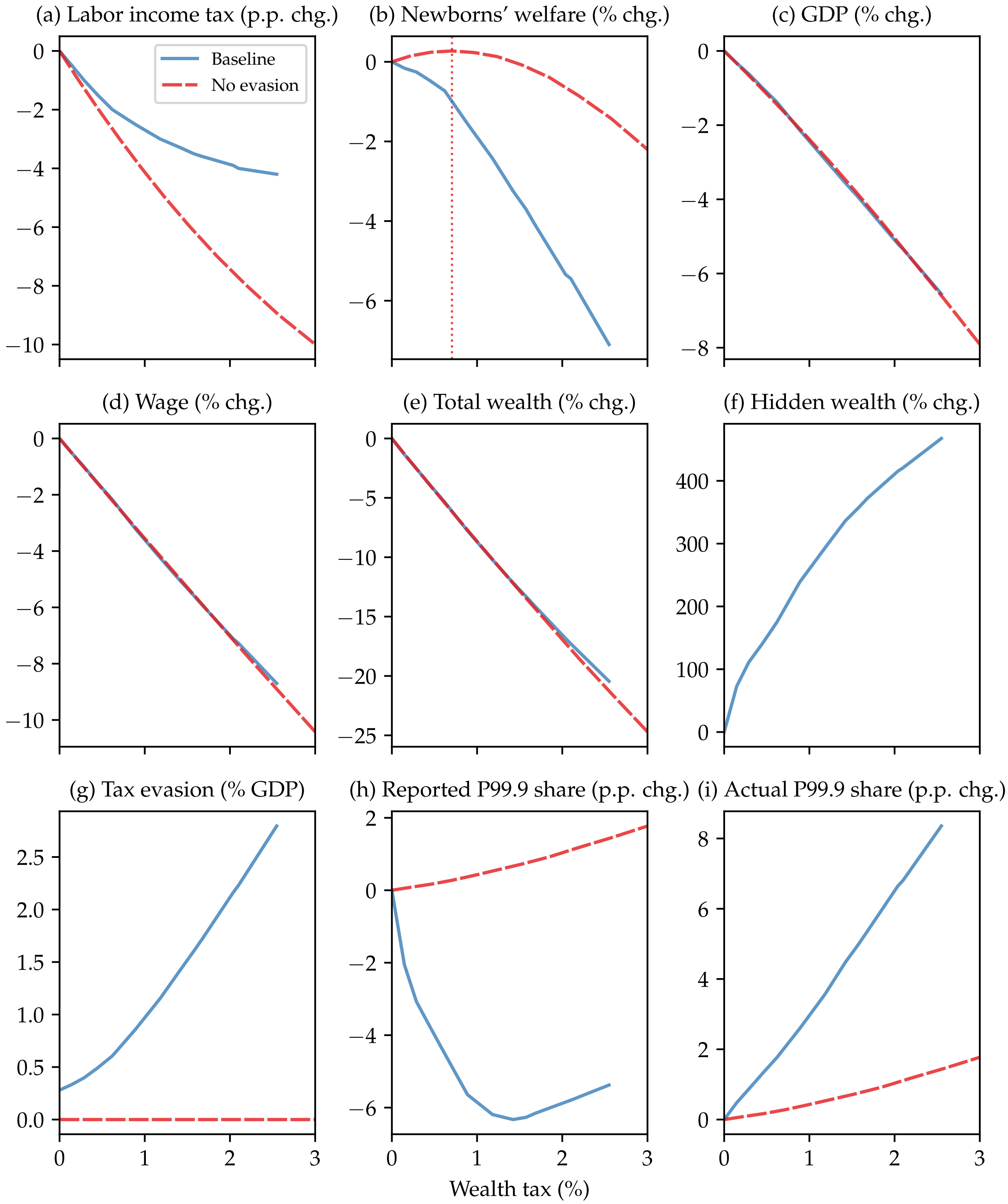

Figure 6: Effects of capital income tax reform with higher evasion costs

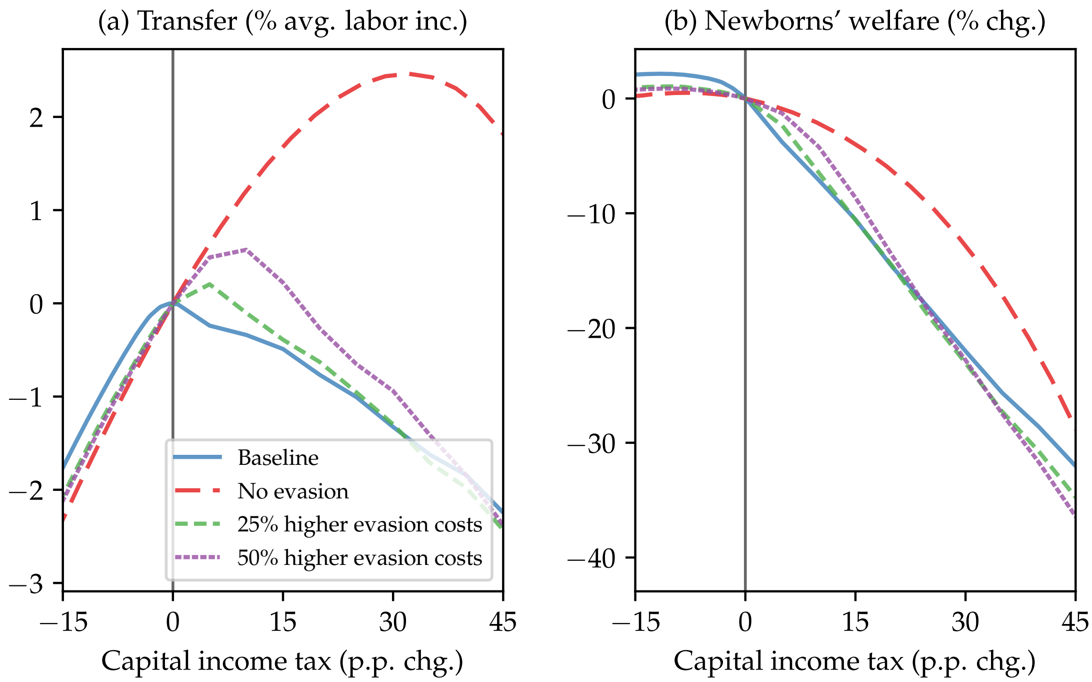

Figure 7: Effects of flat wealth taxes with higher evasion costs