The Role of Market Power in Capital Taxation*

Juan Segura†
CEMFI

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Abstract

Taxing wealth and taxing capital income are not equivalent when returns to investment are heterogeneous. Which tax is preferable depends on the source of this heterogeneity. I compare the two taxes in a model where entrepreneurs face collateral constraints and charge heterogeneous markups. I calibrate the model to the US under different levels of market power within the range of reported values. Replacing the capital income tax with a revenue-neutral wealth tax raises welfare when markups are low, but lowers it when they are high. Together with financial frictions, market power matters through two channels. First, entrepreneurs who grow out of their collateral constraints charge higher markups, which limits the efficiency gains from taxing wealth. Second, profits are part of the capital income tax base but not of the wealth tax base. Profits rise with markups, and so does the wealth tax rate that keeps government revenue constant, thus lowering most households' return to saving and capital accumulation. The second channel is more sensitive to aggregate market power and explains most of the differences across economies. Once transitions are accounted for, taxing wealth still raises welfare only when markups are lowest, but only slightly.

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†CEMFI address: Casado del Alisal 5, 28014 Madrid, Spain. Email: juan.segura@cemfi.edu.es.

1 Introduction

Whether capital should be taxed as income or as wealth is back on the political agenda. Large economies like the US debate proposals to introduce a wealth tax, even though the number of OECD countries levying one fell from 12 in 1990 to only four in 2017 (OECD, 2018). In academia, recent evidence on heterogeneity in returns (Bach, Calvet and Sodini, 2020; Fagereng, Guiso, Malacrino and Pistaferri, 2020; Smith, Zidar and Zwick, 2023) has reopened the comparison between the two taxes.

The two taxes are equivalent in many standard models,[1] but this equivalence breaks down when returns to investment are heterogeneous, and the consequences are likely to depend on the source of this heterogeneity. As Guvenen, Kambourov, Kuruscu, Ocampo and Chen (2023) show in a recent influential paper, in economies with financial frictions, taxing capital income weakens the self-financing channel of productive entrepreneurs by reducing their after-tax profits, limiting their financing capacity and increasing aggregate misallocation.[2] By contrast, a wealth tax is also paid by entrepreneurs with low returns, which lowers the burden on productive ones, favoring wealth accumulation of efficient producers and helping them overcome credit limitations. Financial frictions, however, are not the only source of heterogeneity in returns.

I argue that an important source of heterogeneity in returns is product market power, which generates heterogeneous markups across firms. De Loecker, Eeckhout and Unger (2020) document that aggregate markups in the US rose from 21% above marginal cost in 1980 to 61% in 2016.[3] This rise has been uneven across producers: markup dispersion has widened alongside the aggregate level. Consistent with this asymmetry, a growing share of income accrues to pure profits rather than to labor or capital (Barkai, 2020; Eggertsson, Robbins and Wold, 2021), and the fall in the labor share is driven by the reallocation of sales toward large firms with high markups (Autor, Dorn, Katz, Patterson and Van Reenen, 2020). Market power thus differs across firms, and a model of its effects should allow for this heterogeneity, not only for its aggregate level. The large market shares of some firms allow them to charge higher markups and earn rents, which leaves their output below the

[1] Equivalence in this context means it is possible to find a tax rate on wealth such that government revenue and after-tax financial income for all households are the same as under a tax schedule taxing capital income instead of wealth.

[2] In an economy like the one in their paper, heterogeneity in returns is driven by differences in productivity (as more efficient entrepreneurs obtain larger profits, all else equal) and wealth (as the firms of entrepreneurs with low wealth might not reach the size that maximizes their profits).

[3] Recent reevaluations of these estimates by Benkard, Miller and Yurukoglu (2025) show that the reported increase is sensitive to sample restrictions, and that markups rise more modestly once Finance and Insurance firms are excluded. However, estimated markups remain sizable under either sample.

efficient scale. This has implications for resource allocation and welfare, and hence for the taxation of capital.

This paper studies how market power, in combination with financial frictions, affects the comparison between taxing capital income and taxing wealth. I build a model of firm dynamics with both sources and characterize the inefficiencies each creates and how they interact. I then calibrate the model to five economies that differ only in their level of market power, and use them to evaluate revenue-neutral tax reforms, in steady state and along the transition, and to compute the welfare-maximizing combination of the two instruments.

In the model, entrepreneurs face collateral constraints and set markups that increase with their market share. Households derive utility from consumption and leisure, and choose how much labor to supply to a final good producer. Households differ in their labor productivity, which follows a persistent stochastic process. Moreover, a fraction of them possess an entrepreneurial productivity, which also follows a persistent stochastic process and allows them to run their own businesses. Each entrepreneur produces a differentiated intermediate good with a private technology linear in capital. Households can self-insure against risk by saving in a bond market, which entrepreneurs can also use to borrow and invest in their own firm up to a collateral constraint. The different intermediate goods are combined by the final good producer through a Kimball (1995) aggregator, which defines the demand for these varieties. Under this demand structure, entrepreneurs find it optimal to charge a price equal to a markup over their marginal cost, where the markup increases with their quantity market share. Collateral constraints and markups both drive a wedge between the revenue product of capital and its cost, generating dispersion in returns across entrepreneurs. The two are linked: accumulating wealth relaxes the collateral constraint but, by allowing the firm to scale up, raises its markup. The government finances its expenditure through linear taxes on consumption, labor income, capital income and wealth.

I calibrate the model to five economies that differ in the relative strength of the two distortions, everything else equal. Motivated by the lack of consensus on the size of the aggregate markup in the US, I target revenue-weighted markups between 1.2 and 1.6, one for each economy. All other targets are the same across economies: salient features of the US wealth and income distributions and key aggregates.

Market power lowers the gains from taxing wealth instead of capital income, and turns them into losses when markups are high. It does so through two channels. First, taxing wealth instead of capital income helps productive entrepreneurs accumulate wealth and relax their collateral constraints, but as they grow, they charge higher markups, which lowers the efficiency gains. Second, profits are part of the capital income tax base but not of the wealth tax base, and they are larger relative to capital the larger the markup. Replacing

the capital income tax therefore requires a wealth tax rate that rises with the markup, which lowers the return to saving of most households. The second channel dominates: misallocation falls by similar amounts in all economies, while the return to saving falls by more the larger the markup. As a result, the welfare gain from the reform goes from 1% of consumption in the economy with the lowest targeted markup to a loss of 2% in the one with the highest. Accounting for the transition preserves this ranking. However, the economy with the lowest targeted markup is the only one that still gains, and barely so, because the efficiency gains arrive as entrepreneurs accumulate wealth, a slow process, while the fall in the return to saving acts on impact.

The optimal mix of the two taxes shifts toward capital income taxation as market power rises. The capital income tax rate that maximizes steady-state welfare goes from a subsidy of 10% in the economy with the lowest targeted markup to a tax of 29% in the one with the highest, while the optimal wealth tax rate falls to about zero. Moving to the optimal mix raises welfare by about 1% when market power is lowest, and by a negligible amount when it is high, since the benchmark tax system is close to optimal. Once the transition is accounted for, the welfare effects of moving to these rates are small in all economies.

Related work. This work relates to the quantitative literature on optimal capital income taxation (Conesa, Kitao and Krueger, 2009), and in particular to recent studies that compare capital income and wealth taxes when returns are heterogeneous. Guvenen et al. (2023) renewed interest in this comparison with an argument based on financial frictions: taxing wealth instead of capital income helps productive entrepreneurs accumulate wealth and overcome their constraints, which can raise welfare substantially. Boar and Midrigan (2023) study the same comparison in an economy where private firms coexist with corporate firms that face no collateral constraints, and find instead that taxing capital income is preferable. With a large part of production unconstrained, the efficiency gains from taxing wealth are smaller than the redistributive benefits of taxing the profits of richer entrepreneurs. Boar and Knowles (2024) make financial frictions endogenous, so that capital income taxes tighten them, and find low positive optimal taxes on both capital income and wealth. Gaillard and Wangner (2021) show that the effects of a wealth tax depend on whether return heterogeneity reflects investment productivity or rents. Other work moves beyond these two instruments: Macnamara, Pidkuyko and Rossi (2026) find that capital income and wealth should not be taxed when consumption taxes and a progressive labor income tax are available, and Aguiar, Moll and Scheuer (2026) show that realization-based capital gains and cash-flow taxes implement the optimal allocation once asset prices fluctuate. Relative to these papers, I introduce market power alongside financial frictions as a source

of heterogeneity in returns. Through the two channels described above, its level determines which of the two taxes is preferable. Concurrently, Cremonini (2025) shows that a top wealth tax lowers the aggregate markup when entrepreneurs cannot borrow and markups rise with wealth.

This paper also connects with three other strands of the literature. First, it relates to work on entrepreneurs who face financial frictions. Itskhoki and Moll (2019) show that policies that raise entrepreneurial profits speed up wealth accumulation and relax borrowing constraints, and a large body of work studies entrepreneurial firms that differ in productivity and face credit limitations, pioneered by Quadrini (2000) and followed by Cagetti and De Nardi (2009), Buera, Kaboski and Shin (2011), Midrigan and Xu (2014) and Moll (2014), among others. This paper shows that, when markups increase with firm size, relaxing these constraints also raises market power, which reduces the resulting efficiency gains. In parallel work, Li, Lian, Ma and Martell (2025) document that less constrained firms charge higher markups and show that, when firms borrow against earnings, the feedback between markups and borrowing constraints lowers the productivity losses from markup dispersion. Second, it relates to work on optimal taxation in environments with entrepreneurs (İmrohoroğlu, Kumru, Lian and Nakornthab, 2023; Brüggemann, 2021). It adds market power as a source of entrepreneurial returns and shows that it matters for the choice between taxing capital income and taxing wealth. Third, it relates to the literature on the aggregate and distributional costs of market power and variable markups, from the seminal studies of Dixit and Stiglitz (1977) and Atkeson and Burstein (2008) to the more recent work of Baqaee and Farhi (2020), Edmond, Midrigan and Xu (2023) and Boar and Midrigan (2025). Within this strand, Eeckhout, Fu, Li and Weng (2026) study optimal profit and labor income taxes in a static environment. This paper adds financial constraints, which make markups respond to capital taxation, and studies the taxation of capital in a dynamic economy.

Outline. The remainder of the paper is organized as follows. Section 2 lays out the model economy. Section 3 elaborates on the inefficiencies caused by financial constraints and markups, and on how they affect the comparison between capital income and wealth taxation. Section 4 describes the calibration procedure. Section 5 evaluates replacing the capital income tax with a wealth tax. Section 6 studies the optimal mix of capital income and wealth taxes. Finally, Section 7 concludes.

2 Model

I present an incomplete-markets model of monopolistic competition with variable markups and financial frictions. All households are endowed with labor productivity and decide how much labor to supply every period. A fraction of them also have entrepreneurial productivity and can run firms that produce varieties of an intermediate good. There is a perfectly competitive final good producer that uses labor and efficiency-adjusted capital as inputs, where the latter is an aggregate of the varieties generated by entrepreneurs. Last, there is a government that finances its spending through linear taxes.

2.1 Final Good Producer

The final good is produced according to a Cobb-Douglas technology:

$$Y = Q^{\alpha} L^{1-\alpha},$$

where L is aggregate labor and Q is an efficiency-adjusted capital stock. The latter combines firm-specific inputs q_i through a Kimball (1995) aggregator implicitly defined by

$$\int_0^{\psi} \Upsilon\Big(\frac{q_i}{Q}\Big) di = 1,$$

where $\Upsilon(1) = 1, \Upsilon' > 0$, $\Upsilon'' < 0$, and $\psi \leq \bar{\psi} \in (0,1]$ is the fraction of households that are endowed with entrepreneurial productivity and choose to run a firm.[4] Anticipating the calibration of the model, I follow Klenow and Willis (2016) and assume an aggregator of the form

$$\Upsilon(x) = 1 + (\sigma - 1)\exp\Big(\frac{1}{\varepsilon}\Big)\varepsilon^{\sigma/\varepsilon - 1}\left(\Gamma_g\Big(\frac{\sigma}{\varepsilon}, \frac{1}{\varepsilon}\Big) - \Gamma_g\Big(\frac{\sigma}{\varepsilon}, \frac{x^{\varepsilon/\sigma}}{\varepsilon}\Big)\right),$$

where $\Gamma_g(u,z)$ is the upper incomplete gamma function, $\Gamma_g(u,z) = \int_z^{\infty} s^{u-1} e^{-s} ds$. Under this specification the price elasticity of demand is given by

$$\epsilon(x) = -\frac{\Upsilon'(x)}{x\Upsilon''(x)} = \sigma x^{-\frac{\varepsilon}{\sigma}}. \tag{1}$$

[4] The subscript in q_i refers to the firm i in the continuum of firms with measure ψ (it is the same continuum as that of households with entrepreneurial productivity endowments that engage in production). As will become clear later, households in the model are distributed across the state space on productivities and wealth, so when convenient, I will identify individuals' choices by a triple (s,z,a) rather than the index i.

Thus, if $\varepsilon > 0$, entrepreneurs with larger quantity market shares $x = q/Q$ face less elastic residual demand curves, allowing them to charge higher markups.

The associated markup, which I show below is the one charged in equilibrium, is

$$\mu(x) = \frac{\epsilon(x)}{\epsilon(x) - 1} = \frac{\sigma}{\sigma - x^{\varepsilon/\sigma}}, \tag{2}$$

increasing in relative size whenever $\varepsilon > 0$, with $\mu(x) \to 1$ as $x \to 0$ and $\mu(1) = \sigma/(\sigma - 1)$. This aggregator also produces a non-zero super-elasticity, the elasticity of the price elasticity with respect to relative size,

$$-\frac{d\epsilon(x)}{dx}\frac{x}{\epsilon(x)} = \frac{\varepsilon}{\sigma}.$$

The Kimball aggregator is often seen as a generalization of the familiar constant elasticity of substitution (CES) aggregator, which is obtained in the limit case where $\varepsilon \to 0$.

Under $\varepsilon > 0$, the Kimball aggregator generates a negative relationship between market shares and demand elasticities, and hence variable markups, as in models of oligopolistic competition (Atkeson and Burstein, 2008).[5]

The final good producer maximizes profits by choosing the optimal combination of intermediate good varieties and labor, subject to the technology that aggregates these varieties,

$$\max_{\{q_i\},L} Q^{\alpha} L^{1-\alpha} - \int_0^{\psi} p_i q_i di - wL \qquad \text{s.t.} \quad \int_0^{\psi} \Upsilon\Big(\frac{q_i}{Q}\Big) di = 1,$$

where p_i is the price of firm i's intermediate good and w is the equilibrium wage. The solution gives the demand functions[6]

$$Q = \alpha \frac{Y}{p_i} \Upsilon'\Big(\frac{q_i}{Q}\Big) D, \qquad L = (1-\alpha)\frac{Y}{w},$$

where $D = \Big[\int_0^{\psi} \Upsilon'\Big(\frac{q_i}{Q}\Big)\frac{q_i}{Q} di\Big]^{-1}$ is an endogenously determined demand index.[7]

[5] With Kimball aggregation, firms are atomistic and take the aggregate indices as given, which simplifies the computation of the equilibrium.

[6] The derivation of demands is standard and can be found in Appendix A.1.

[7] The index D summarizes all relevant information about competing firms.

2.2 Households

The economy is populated by a continuum of households (with measure normalized to one) that derive utility from consumption c of a final good and elastically supply up to one unit of labor h to the final good producer. Households share the same preferences and discount factor β but differ in their labor productivity, $s \in \boldsymbol{S}$, assumed to follow a stochastic Markovian process $G_s(s'|s)$. In addition, a fraction $\bar{\psi}$ of households are also endowed with an entrepreneurial productivity, $z \in \boldsymbol{Z}$, also Markovian, $G_z(z'|z)$.[8] Their optimization problem can be split into its dynamic and static parts.

2.2.1 Dynamic Problem

Each household maximizes its discounted lifetime utility with respect to consumption, labor supply and savings subject to a budget constraint and a no borrowing condition:[9]

$$\begin{aligned} v(s,z,a) &= \max_{c,h,a'} u(c,h) + \beta\,\mathbb{E}\left[v(s',z',a')\right] \\ \text{s.t.} \quad & (1+\tau_c)c + a' = (1-\tau_l)wsh + \omega(z,a;\tau_a,\tau_k) \\ & a' \geq 0, \end{aligned}$$

where r is the return on savings, w is the wage and $\{\tau_c, \tau_l, \tau_a, \tau_k\}$ is the set of flat tax rates on consumption, labor income, wealth and capital income, respectively. The object ω is the after-production and after-tax non-labor income of the household,

$$\omega(z,a;\tau_a,\tau_k) = (1-\tau_a)a + (1-\tau_k)[ra + \pi(z,a)]. \tag{3}$$

The intertemporal solution to this problem is characterized by the Euler equation

$$u_c(c,h) \geq \beta\,\mathbb{E}\left[\omega_a(z',a') \cdot u_c(c',h')\right],$$

and the intratemporal labor supply decision is given by

$$\frac{u_c(c,h)}{(1+\tau_c)} = -\frac{u_h(c,h)}{(1-\tau_l)ws},$$

which together with the budget constraint define the policy functions on savings, consump-

[8] For simplicity, it is assumed that productivity processes are independent.

[9] To ease notation, the problem of the household with no entrepreneurial productivity endowment is not studied separately, but it is captured by the limit case where $z = 0$ at all times.

tion and labor supply, $g_a(s,z,a)$, $g_c(s,z,a)$ and $g_h(s,z,a)$, respectively.

2.2.2 Static Problem

Intermediate goods are produced by entrepreneurs with access to a backyard technology linear in capital $q = zk$. They face a collateral constraint that limits their capital to a multiple $\lambda \geq 1$ of their wealth. The profit maximization problem is

$$\begin{aligned} \pi(z,a) = \max_{p,q,k} \ & \Big\{ p(q;Q,D)q - (r+\delta)k \Big\} \\ \text{s.t.} \quad & q = zk \\ & p = \Upsilon'\Big(\frac{q}{Q}\Big)X, \\ & k \leq \lambda a, \end{aligned}$$

where δ is the depreciation rate, and $X \equiv \alpha \frac{Y}{Q} D$ is a composite aggregate index. The solution is

$$p = \underbrace{\frac{\sigma}{\sigma - (q/Q)^{\varepsilon/\sigma}}}_{\text{Markup}} \Big(\underbrace{\frac{r+\delta+\Lambda}{z}}_{\text{Marginal cost}} \Big) \tag{4}$$

and $\Lambda(k - \lambda a) = 0$, where Λ is the Lagrange multiplier corresponding to the collateral constraint. Entrepreneurs charge a price equal to a markup, increasing in the relative quantity they produce, over a marginal cost that includes the cost of capital and the cost of satisfying the credit constraint. Unconstrained quantities can be found by equating firms' optimality conditions with the final good producer's inverse demand function,

$$\underbrace{\Upsilon'\Big(\frac{q^*}{Q}\Big)X}_{\text{Demand curve}} = \underbrace{\frac{\sigma}{\sigma - (q^*/Q)^{\varepsilon/\sigma}}\Big(\frac{r+\delta}{z}\Big)}_{\text{Supply curve}}, \tag{5}$$

yielding the solution

$$q(z,a) = \min\Big\{q^*(z), z\lambda a\Big\} \iff g_k(z,a) = \min\Big\{q^*(z)/z, \lambda a\Big\},$$

where $g_k(z,a)$ is the optimal capital choice function. The associated maximized profit function is

$$\pi(z,a) = \begin{cases} q^*(z)\left[\Upsilon'\left(\frac{q^*(z)}{Q}\right)X - \frac{(r+\delta)}{z}\right] & \text{if} \quad k(z,a) < \lambda a, \\ z\lambda a\left[\Upsilon'\left(\frac{z\lambda a}{Q}\right)X - \frac{(r+\delta)}{z}\right] & \text{if} \quad k(z,a) = \lambda a. \end{cases} \tag{6}$$

Not all firms decide to engage in production. There is a positive price[10] above which no intermediate goods are demanded: $p(q=0) = \alpha\frac{Y}{Q}\frac{\sigma-1}{\sigma}e^{1/\varepsilon}D$. It follows that only sufficiently efficient entrepreneurs will decide to run firms. This cutoff solves (5) for $q=0$ and is given by

$$\bar{z} = e^{-1/\varepsilon}\frac{\sigma}{\sigma-1}\frac{r+\delta}{X}. \tag{7}$$

Entrepreneurs with $z \leq \bar{z}$ would find it optimal to produce negative quantities, so they do not engage in production. By contrast, those with $z > \bar{z}$ will run their firms and, if credit constrained, will produce as much as possible, which will always be a positive quantity with a price below the choke price defining the cutoff $\bar{z}$.

2.3 Government

The government finances exogenous spending G through taxes on consumption, labor income, wealth and capital income at flat rates $\{\tau_c, \tau_l, \tau_a, \tau_k\}$, respectively. For simplicity, it is assumed government spending provides no utility to households.

2.4 Equilibrium

A steady-state equilibrium is a set of decision rules $\{g_c(s,z,a), g_h(s,z,a), g_a(s,z,a), g_k(s,z,a)\}$, a set of aggregates $\{Q, L, D, K\}$, a set of prices $\{p(x), r, w\}$, a set of taxes $\{\tau_c, \tau_l, \tau_a, \tau_k\}$, and a probability measure of individuals $\Gamma(s,z,a)$ such that

1. The functions $\{g_c(s,z,a), g_h(s,z,a), g_a(s,z,a), g_k(s,z,a)\}$ maximize the discounted utility of households given prices and taxes.

2. The solution to the final good producer's problem sets the pricing of varieties function $p(x)$ and wages w.

[10] Strictly positive if the case where nobody produces is ruled out.

3. Production factors come from aggregation of households' and firms' decisions:

$$\int_{s,z,a} 1\{z > \bar{z}\} \Upsilon\Big(\frac{z \cdot g_k(s,z,a)}{Q}\Big) d\Gamma(s,z,a) = 1,$$
$$D^{-1} = \int_{s,z,a} 1\{z > \bar{z}\} \Upsilon'\Big(\frac{z \cdot g_k(s,z,a)}{Q}\Big) \frac{z \cdot g_k(s,z,a)}{Q} d\Gamma(s,z,a),$$
$$L = \int_{s,z,a} s g_h(s,z,a) \cdot d\Gamma(s,z,a),$$

where $\psi = \int_{s,z,a} 1\{z > \bar{z}\} d\Gamma(s,z,a)$.

4. The capital market clears:

$$K = A, \quad \text{where} \quad A \equiv \int_{s,z,a} a d\Gamma(s,z,a), \quad K \equiv \int_{s,z,a} g_k(s,z,a) d\Gamma(s,z,a).$$

5. The government budget balances:

$$G = \tau_c \int_{s,z,a} g_c(s,z,a) d\Gamma(s,z,a) + \tau_l w L$$
$$+ \tau_k \int_{s,z,a} (ra + \pi(z,a)) d\Gamma(s,z,a) + \tau_a \int_{s,z,a} a \cdot d\Gamma(s,z,a).$$

6. The goods market clears:

$$Y - \delta K - G = \int_{s,z,a} g_c(s,z,a) \cdot d\Gamma(s,z,a).$$

3 Costs and Tax Implications of Financial Constraints and Markups

The benchmark economy is distorted by collateral constraints and by market power. This section shows how these two distortions generate misallocation at the individual level, alter aggregate input choices, decrease aggregate productivity and shape how taxes affect the return to saving.

3.1 Aggregate Losses

Recall that the optimality condition (4) sets the price equal to a markup over a marginal cost that includes the cost of satisfying the collateral constraint. In the spirit of the literature

framing the discussion of misallocation as wedges (Hsieh and Klenow, 2009), I express the multiplier on the collateral constraint as a wedge on the cost of capital,

$$r + \delta + \Lambda = (r + \delta)(1 + \tau^{\mathcal{K}}) \Rightarrow \tau^{\mathcal{K}} = \frac{\Lambda}{r + \delta}, \tag{8}$$

so the optimality condition (4) can be rewritten as

$$p(x(z,a)) = \mu(x(z,a)) \frac{(r + \delta)(1 + \tau^{\mathcal{K}}(z,a))}{z}.$$

Absent financial frictions and variable markups, the average revenue product of capital (ARPK) is equalized across variety producers. The presence of these two terms in the expression for ARPK captures the misallocation they generate

$$\text{ARPK} \equiv \frac{p(x(z,a))q(z,a)}{k(z,a)} = \mu(x(z,a))(1 + \tau^{\mathcal{K}}(z,a))(r + \delta). \tag{9}$$

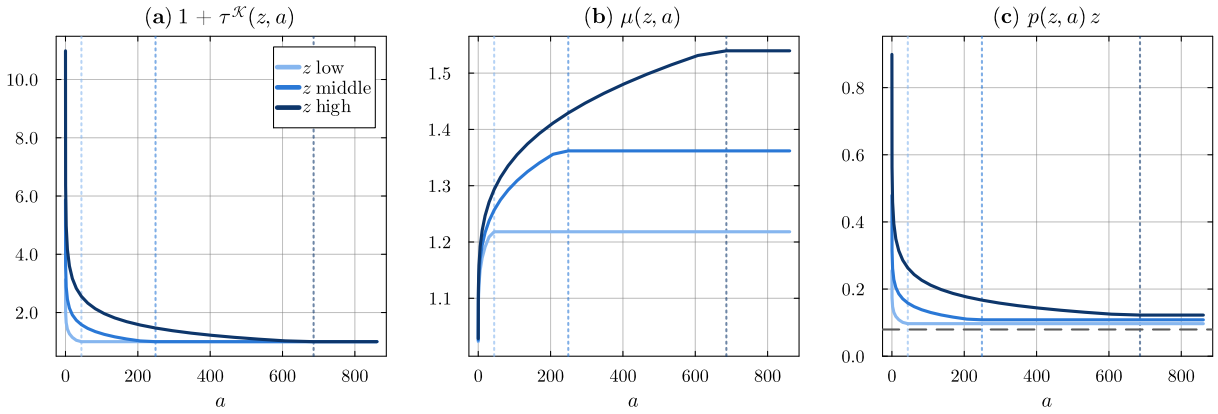
Proposition 1. *Let $z > \bar{z}$ and $\varepsilon > 0$. If the collateral constraint is slack, the markup and the capital wedge do not depend on wealth. If it binds,*

$$\frac{d\mu}{da} > 0 \qquad \textit{and} \qquad \frac{d\tau^{\mathcal{K}}}{da} < 0.$$

Proof: see Appendix A.5.

A constrained entrepreneur who becomes wealthier can use more capital, moving her firm closer to its unconstrained size and lowering the wedge created by the collateral constraint. Because markups rise with relative size, this expansion increases the markup she charges. Thus, relaxing the financial friction raises market power. Figure 1 numerically illustrates this interaction between the two wedges in the economy targeting a markup of 1.4, calibrated in Section 4. As is common in standard models with collateral constraints, the capital wedge in Panel (a) is decreasing in the net worth of the entrepreneur. More productive firms display larger wedges while constrained because their unconstrained scale is greater and, at any given level of net worth, they remain further from it. Panel (b) illustrates the opposing move of wedges: while constrained, net worth accumulation allows the firm to raise scale and charge larger markups. Under CES demand the three markup profiles would be horizontal even in the presence of financial frictions, as they are here once firms become unconstrained. Last, Panel (c) combines both wedges into the ARPK. At low levels of net worth firms are overall far from their unconstrained size, so the capital wedge is much larger than the markup, and the ARPK closely tracks the former. However,

Figure 1: Wedges and net worth



Notes: Panel (a) plots one plus the firm-level capital wedges defined in equation (8) as a function of net worth a for three different entrepreneurial productivity levels; Panel (b) plots the firm-level markup defined in equation (4); Panel (c) plots the firm-level ARPK given by equation (9). The horizontal dashed line in Panel (c) is set at the unit price of capital $r+\delta$. Vertical dotted lines mark the net worth above which the collateral constraint stops binding for each productivity level. Curves are generated under the parameter values calibrated to match an economy with a revenue-weighted markup of 1.4 described in Table 1.

as firms accumulate net worth, the direct effect of the collateral constraint vanishes and the markup reaches its unconstrained level, remaining as the only source of distortion. This explains why, even when unconstrained, firms have an ARPK above the unit price of capital $r+\delta$.

Motivated by expression (9), let $\mathcal{M}$ denote the aggregate markup of the economy and $1+\mathcal{T}^{\mathcal{K}}$ the aggregate capital wedge, implicitly defined by

$$\frac{P_Q Q}{K} = \mathcal{M}(1+\mathcal{T}^{\mathcal{K}})(r+\delta), \tag{10}$$

where P_Q is the price of efficiency-adjusted capital Q.[11,12] Similarly to the expression for an individual firm, aggregate ARPK shows how the aggregate markup and capital wedge lead to an underaccumulation of capital.

3.2 Dispersion and Productivity

Dispersion in markups and wedges leads to differences in ARPK and reduces aggregate productivity. To see this, consider the problem of a social planner that aims to maximize aggregate output Y subject to a technology defined by the Kimball aggregator and a resource

[11] It follows $P_Q Q = \int_{s,z,a} p(z,a)q(z,a)d\Gamma(s,z,a)$.

[12] See Appendix A.3 for a derivation of the aggregate markup and the aggregate capital wedge.

constraint holding aggregate capital K and labor L at their equilibrium values:

$$\begin{aligned}
&\max_{q,Q} Y \\
\text{s.t.} \quad & Y = Q^{\alpha} L^{1-\alpha} \\
& \int_{s,z,a} \Upsilon\Big(\frac{q(s,z,a)}{Q}\Big) d\Gamma(s,z,a) = 1 \\
& \int_{s,z,a} \underbrace{\frac{q(s,z,a)}{z}}_{k(z,a)} d\Gamma(s,z,a) = K.
\end{aligned}$$

The first order conditions are

$$\begin{aligned}
&\alpha \frac{Y^{\text{eff}}}{Q^{\text{eff}}} = v \int_{s,z,a} \Upsilon'\Big(\frac{q^{\text{eff}}(s,z,a)}{Q^{\text{eff}}}\Big) \frac{q^{\text{eff}}(s,z,a)}{(Q^{\text{eff}})^2} d\Gamma(s,z,a) \Rightarrow v = \alpha Y^{\text{eff}} D^{\text{eff}}, \\
&v\Upsilon'\Big(\frac{q^{\text{eff}}(s,z,a)}{Q^{\text{eff}}}\Big) \frac{1}{Q^{\text{eff}}} - \frac{\nu}{z} = 0,
\end{aligned}$$

where v and ν are the multipliers coming from the technology and resource constraints, respectively. Combining the two conditions, I obtain the relationship defining the efficient allocation of resources across entrepreneurs and the efficient productivity cutoff:

$$\Upsilon'\Big(\underbrace{\frac{q^{\text{eff}}(z)}{Q^{\text{eff}}}}_{x^{\text{eff}}(z)}\Big) X^{\text{eff}} = \frac{\nu}{z}, \quad \bar{z}^{\text{eff}} = e^{-1/\varepsilon} \frac{\sigma}{\sigma - 1} \frac{\nu}{X^{\text{eff}}}. \tag{11}$$

The former only depends on the productivity level of entrepreneurs and not their wealth level.[13] The efficient allocation states the familiar optimality condition that prices must equal the social marginal costs. By contrast, entrepreneurs seek profit maximization and are subject to credit constraints, so they equate prices to a markup over a marginal cost potentially inflated by credit limitations:

$$\Upsilon'(x(z,a))X = \mu(x(z,a)) \frac{(1 + \tau^{\mathcal{K}}(z,a))(r + \delta)}{z}.$$

[13] Trivially, this follows from the absence of a collateral constraint in the planner's problem. Solving the planner's problem with a credit constraint gives $\Upsilon'\Big(\frac{q}{Q}\Big)X = \frac{\nu + \Lambda}{z}$. Although not including financial constraints may seem an unfair comparison to the laissez-faire solution, the goal of this section is to exhibit the inefficiencies caused by both markups and financial constraints.

Moreover, the efficient entrepreneurial productivity cutoff includes the planner's shadow cost of capital instead of its market price as in equation (7). These two discrepancies capture how variable markups and capital wedges distort optimal production quantities through both intensive and extensive margins, and decrease aggregate productivity. To measure this loss, let Z denote the aggregate productivity of the efficiency-adjusted capital sector, defined by $Q = ZK$, and Z^{eff} its value under the efficient allocation. Misallocation is defined as the productivity loss $\Omega = 1 - Z/Z^{\text{eff}}$. Appendix A.4 derives both productivity levels.

3.3 Revenue Neutrality and the Return to Saving

Because the focus of this paper is the comparison between capital income and wealth taxation, I study how the two distortions affect a revenue-neutral shift from the capital income tax to the wealth tax.

Proposition 2. *Consider a reduction in the capital income tax rate, compensated by an increase in the wealth tax rate that keeps government revenue constant, holding prices, quantities and the distribution of households fixed.*

(i) The required increase in the wealth tax rate is

$$\Delta\tau_a = -\left(r + \frac{\Pi}{K}\right)\Delta\tau_k, \quad \textit{where} \quad \frac{\Pi}{K} = (r+\delta)\left[\mathcal{M}\left(1+\mathcal{T}^{\mathcal{K}}\right) - 1\right].$$

(ii) The marginal return to saving changes by

$$\Delta\omega_a(z,a) = \left[\frac{r + \pi_a(z,a)}{r + \Pi/K} - 1\right]\Delta\tau_a,$$

where $\omega_a(z,a) = \partial\omega(z,a)/\partial a$ *and* $\pi_a(z,a) = \partial\pi(z,a)/\partial a$.

Proof: see Appendix A.6.

Holding prices, quantities and the distribution of households fixed, the increase in the wealth tax rate needed per unit of reduction in the capital income tax rate equals the average return to wealth in the economy, which includes the interest rate and the ratio of aggregate profits to capital. This ratio is increasing in the aggregate markup and the aggregate capital wedge, so larger aggregate wedges require larger adjustments in the wealth tax rate. This is because profits are part of the capital income tax base but not of the wealth tax base. At the household level, a government-revenue-neutral increase in

the wealth tax rate decreases the marginal return to saving of all households except for sufficiently constrained entrepreneurs, those with $\pi_a(z,a) > \Pi/K$. Market power matters through this ratio: everything else equal, a larger aggregate markup lowers $\Delta\omega_a(z,a)$ for every household.

Propositions 1 and 2 identify two channels through which market power affects the comparison between both taxes before prices and the distribution adjust. First, a revenue-neutral increase in the wealth tax rate raises the return to saving of sufficiently constrained entrepreneurs. As they accumulate wealth, their constraints relax and their markups rise, which lowers the efficiency gains. Second, a larger aggregate markup requires a larger increase in the wealth tax rate per unit of reduction in the capital income tax rate. This lowers the change in the return to saving of every household: sufficiently constrained entrepreneurs gain less and all others lose more, which can reduce aggregate capital accumulation.[14]

4 Quantification

The parameterization strategy acknowledges the lack of a single reliable figure on the aggregate level of market power in the US. A subset of parameters is set to conventional values. The remaining ones are calibrated to match salient features of the US wealth and income distributions, as well as the aggregate level of market power. I take the model to different economies that vary in their targeted revenue-weighted markup, while keeping the other targets the same. For a given calibrated economy, all parameters except the tax rates are kept constant through the quantitative exercises.

4.1 Assigned Parameters

One time period represents one year. The model assumes an isoelastic utility function over a Cobb-Douglas bundle of consumption and leisure, $u(c,h) = ((c^{\zeta}(1-h)^{1-\zeta})^{1-\gamma} - 1)/(1-\gamma)$ with $\gamma = 2$. The depreciation rate of capital is set to $\delta = 0.06$. The elasticity of efficiency-adjusted capital is set to $\alpha = 0.3$ to match an aggregate labor share of 0.7. The super-elasticity of demand equals $\varepsilon/\sigma = 0.162$ as estimated for US manufacturing firms by Edmond et al. (2023). The US tax schedule is represented by a triplet of flat tax rates

[14] This second channel is specific to market power. In Proposition 2, the capital wedge enters both the household's own return to wealth, through π_a, and the average return to wealth in the economy, through Π/K, whereas the aggregate markup enters only the latter. Larger capital wedges thus shift saving incentives toward constrained entrepreneurs, while larger aggregate markups lower them for every household.

Table 1: Parameterization

	Panel A. Assigned parameters					
γ	Relative risk aversion	2				
α	Capital elasticity	0.3				
δ	Capital depreciation rate	0.06				
ε/σ	Super-elasticity of demand	0.162				
τ_c	Consumption tax rate	7.5%				
τ_l	Labor income tax rate	22.4%				
τ_k	Capital income tax rate	25.0%				
τ_a	Wealth tax rate	0.0%				
	Panel B. Calibrated parameters					
		Revenue-weighted markup				
		1.2	1.3	1.4	1.5	1.6
β	Discount factor	0.913	0.918	0.919	0.919	0.913
ζ	Consumption preference	0.37	0.37	0.37	0.38	0.37
λ	Collateral strength	2.68	2.77	2.89	3.13	3.49
σ	Demand elasticity at $x = 1$	14.97	13.32	10.22	8.58	7.90
ρ_z	Persistence for entrepreneurial productivity	0.98	0.99	0.99	0.99	0.98
θ_z	Volatility of entrepreneurial productivity innovations	0.15	0.15	0.18	0.24	0.30
ρ_s	Persistence for labor endowment	0.89	0.90	0.89	0.90	0.89
θ_s	Volatility of labor endowment innovations	0.37	0.36	0.35	0.34	0.36
$\bar{\psi}$	Fraction of households with entrepreneurial productivity	0.24	0.36	0.35	0.37	0.36

Notes: Panel A parameters are common to all economies. Flat tax rates are obtained from Guvenen et al. (2023) and the super-elasticity of demand from Edmond et al. (2023); the rest take standard values. Panel B parameters are jointly calibrated within each economy to the moments in Table 2. Each column corresponds to an economy targeting a different revenue-weighted markup.

(τ_c, τ_l, τ_k). Following Guvenen et al. (2023), I set $\tau_c = 7.5\%$, $\tau_l = 22.4\%$, $\tau_k = 25.0\%$. The tax rate on wealth is zero. Panel A of Table 1 summarizes these choices.

4.2 Calibrated Parameters

Individual labor endowments are assumed to follow an AR(1) process in logs with persistence ρ_s and innovations with standard deviation θ_s. Similarly, individual entrepreneurial productivity is assumed to follow an AR(1) process in logs with persistence ρ_z and standard deviation θ_z. Both processes are assumed to be independent of each other.

The fraction of households with a strictly positive entrepreneurial productivity draw, the

discount factor, the Cobb-Douglas consumption share in the utility bundle, the strength of the collateral constraint, the parameters governing labor endowment and entrepreneurial productivity, and the demand elasticity at unit relative size are selected to target the moments reported in Table 2. The selected statistics are the fraction of entrepreneurs in the economy and their wealth and income shares reported by Boar and Midrigan (2023), an interest rate of 2%, an average 1/3 share of available time devoted to work, the business-debt-to-GDP ratio reported by Guvenen et al. (2023), Gini indices and various percentiles from the wealth and income distributions computed by Kuhn and Ríos-Rull (2020), and a revenue-weighted markup ranging from 1.2 to 1.6 (De Loecker et al., 2020).[15]

As reported in Table 2, the model does a good job reproducing the targeted moments across the five calibrated economies. The average percentage deviation between targets and model-generated moments across the five economies is 4.43%, and 9 parameters are used to target 15 moments.[16] The "Model" column in the middle shows the range of values across the five economies. The fraction of entrepreneurs in the economy, the interest rate and the share of hours devoted to work closely match the values reported in the literature. The business-debt-to-GDP ratio is slightly below its data counterpart of 1.29 across the five economies, and the revenue-weighted markup is aligned with targeted values. The wealth and income distributions are also successfully matched overall. High levels of wealth concentration at the top are driven by the profits of entrepreneurs and their increased precautionary savings motive due to the presence of financial frictions.

Panel B of Table 1 reports the calibrated parameters. The fraction of households with strictly positive entrepreneurial productivity goes from 0.24 to 0.37.[17] The discount factor β is bounded between 0.91 and 0.92, arguably low relative to estimates in the literature, which is a structural consequence of economies with heterogeneous markups increasing in relative size.[18] The consumption preference parameter ζ is between 0.37 and 0.38 across all economies, and the maximum leverage ratio λ lies between 2.68 and 3.49. The persistence of the labor endowment ρ_s is between 0.89 and 0.90, while the standard deviation of its innovations θ_s hovers between 0.34 and 0.37. The entrepreneurial productivity process is more persistent and less volatile, with persistence ρ_z between 0.98 and 0.99, and standard deviation of innovations θ_z taking values between 0.15 and 0.30. The range for the demand

[15] This is not the same object as the aggregate markup $\mathcal{M}$ defined in Section 3, but as Table 3 shows, the two are very close. I target the revenue-weighted markup because there is evidence on its value.

[16] Table B.1 in the Appendix shows the fit for each target and each calibrated economy separately. All economies present fits with similar losses, with the largest mean absolute percentage deviation being 4.73%.

[17] This number does not necessarily have to match the fraction of entrepreneurs in the economy due to the presence of the choke price defined in Section 2.2.2.

[18] The largest firms charge the highest markups, which depresses their capital demand with respect to the perfect competition scenario, and so requires high future discounting for market clearing.

Table 2: Targeted moments

Target	US Data	Model	Source
		Aggregates	
Fraction of entrepreneurs	0.117	[0.115, 0.121]	Boar and Midrigan (2023)
Interest rate (%)	2.00	[1.96, 1.99]	Standard
Hours worked	0.33	[0.324, 0.332]	Standard
Business debt / GDP	1.29	[1.200, 1.243]	Guvenen et al. (2023)
Revenue-weighted markup	[1.2, 1.6]	[−0.014, 0.020]	De Loecker et al. (2020)
		Inequality	
Gini wealth	0.85	[0.832, 0.836]	Kuhn and Ríos-Rull (2020)
Top 50% wealth share	0.985	[0.995, 0.996]	Kuhn and Ríos-Rull (2020)
Top 10% wealth share	0.764	[0.690, 0.713]	Kuhn and Ríos-Rull (2020)
Top 1% wealth share	0.372	[0.377, 0.401]	Kuhn and Ríos-Rull (2020)
Gini income	0.57	[0.589, 0.600]	Kuhn and Ríos-Rull (2020)
Top 50% income share	0.855	[0.877, 0.884]	Kuhn and Ríos-Rull (2020)
Top 10% income share	0.467	[0.472, 0.483]	Kuhn and Ríos-Rull (2020)
Top 1% income share	0.192	[0.161, 0.173]	Kuhn and Ríos-Rull (2020)
Wealth share of entrepreneurs	0.46	[0.465, 0.479]	Boar and Midrigan (2023)
Income share of entrepreneurs	0.31	[0.254, 0.264]	Boar and Midrigan (2023)

Notes: The model column reports the range across the five calibrated economies; Table B.1 in the Appendix reports each economy separately. The revenue-weighted markup is targeted at a different value in each economy and its range is expressed as absolute deviations from the target.

elasticity of a firm with relative size $x = 1$, given by σ, goes from 7.90 in the economy targeting the highest markup to 14.97 in the one targeting the lowest.

Although the parameters are calibrated jointly, some are more tightly linked to certain targets. Intuitively, the discount factor is pinned down by the interest rate, the weight of consumption in the utility bundle by the share of hours devoted to work, the mass of households with entrepreneurial productivity by the share of entrepreneurs in the economy, and the maximum leverage ratio by the aggregate level of business debt. The moments from the wealth and income distributions help to pin down the parameters governing the labor and entrepreneurial productivity processes. Last, the demand elasticity at unit relative size from the Kimball aggregator helps pin down the revenue-weighted markup. However, productivity parameters also have large effects on the targets linked to market power, and vice versa.

Table 3 presents the implications of the benchmark calibrations for the two distortions. The aggregate markup $\mathcal{M}$ closely tracks the revenue-weighted markup targeted in each

Table 3: Equilibrium objects

		Revenue-weighted markup				
		1.2	1.3	1.4	1.5	1.6
$\mathcal{M}$	Aggregate markup	1.213	1.276	1.380	1.477	1.544
$1+\mathcal{T}^{\mathcal{K}}$	Aggregate capital wedge	1.494	1.436	1.389	1.323	1.294
$\text{sd}(\log \mu)$	Dispersion of markups	0.042	0.051	0.072	0.091	0.104
$\text{sd}(\log(1+\tau^{\mathcal{K}}))$	Dispersion of capital wedges	0.319	0.294	0.303	0.334	0.363
$\text{corr}(\log \mu, \log(1+\tau^{\mathcal{K}}))$	Correlation between distortions	0.253	0.332	0.334	0.273	0.239
Ω	Misallocation	0.266	0.211	0.174	0.177	0.190

Notes: $\mathcal{M}$ is the aggregate markup implied by the model, defined in Section 3, and differs from the revenue-weighted markup targeted in each economy. Ω is the misallocation measure defined in Section 3.2 and derived in Appendix A.4. The mean absolute percentage deviation from targets is 4.71, 4.73, 4.10, 4.31 and 4.28% for the economies targeting revenue-weighted markups of 1.2 to 1.6, respectively; Table B.1 in the Appendix reports the fit for each target separately.

calibration. The implied aggregate capital wedge spans values from 1.29 to 1.49, and it decreases with the targeted markup. The next three rows look at the dispersion in log markups and log capital wedges, and their correlation, which according to equation (9) capture the variance in firm-level log ARPK.[19] Despite the sensitivity of markups to firm size being mostly driven by the super-elasticity of demand, the dispersion in markups also increases with the aggregate markup. The dispersion of individual capital wedges is not monotone across calibrations: it is relatively flat for the economies targeting the three lowest markups, and increasing thereafter. The correlation between the two log-wedges spans from 0.24 to 0.33 and shows no clear pattern. The last row displays the level of misallocation with respect to the social-planner solution described in Section 3.2.[20] The model predicts significant levels of misallocation across all economies, with aggregate TFP 17 to 27% lower than under the efficient allocation. Economies targeting lower markups present higher misallocation overall.

5 Tax Reform

This section compares the benchmark economy to a counterfactual where wealth is taxed instead of capital income. First, I define the concept of neutrality that ensures comparability across tax systems and a measure of welfare. Second, I present and discuss the main result

[19] Dispersion in revenue products of inputs is associated with higher degrees of misallocation (Hsieh and Klenow, 2009).

[20] Appendix A.4 derives the aggregate productivity and misallocation measures.

of this section: the welfare gain from taxing wealth instead of capital income decreases with the targeted revenue-weighted markup. Last, because these comparisons are between steady states, I evaluate whether this result survives once transition paths are accounted for.

5.1 Comparing Tax Systems

In order to compare economies with different tax systems, it is necessary to take a stand on the concept of neutrality. In this paper, I focus on government-revenue neutrality to guarantee comparability across steady states: for a given capital income tax rate, the tax rate on wealth is pinned down by making government revenue in the new steady state the same as in the benchmark economy.

Before discussing the results, I define the measure of welfare used throughout the paper. I take a Benthamite stand to quantify the welfare consequences of different tax rate combinations. Formally, let $v_b(s,z,a,\Delta)$ be the equilibrium value function before a tax change of a household in state (s,z,a), whose consumption allocation is changed by a percentage Δ in the current and all future periods,

$$v_b(s,z,a,\Delta) = u\big(c_b(s,z,a)(1+\Delta),\, h_b(s,z,a)\big) + \beta\, \mathbb{E}\left[v_b(s',z',a',\Delta)\right],$$

where $c_b(s,z,a)$ and $h_b(s,z,a)$ are the consumption and hours policy functions before the tax change evaluated at (s,z,a). The welfare gain or loss from the tax change is defined as the percentage of additional consumption Δ_{tr} that should be given to all households in the benchmark economy so that aggregate welfare is the same as in the new economy. Formally, Δ_{tr} solves

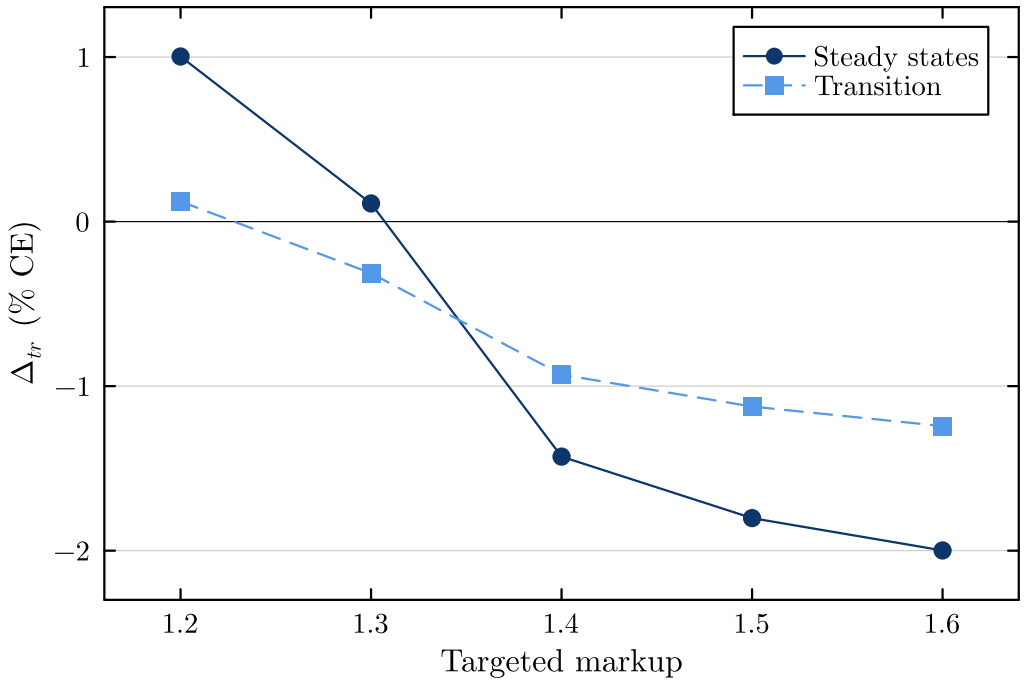
$$\int_{s,z,a} v_b(s,z,a,\Delta_{tr}) d\Gamma_b(s,z,a) = \int_{s,z,a} v_n(s,z,a,0) d\Gamma_n(s,z,a),$$

where $v_n(s,z,a,\Delta)$ is the value function in the new economy, and $\Gamma_b(s,z,a)$ and $\Gamma_n(s,z,a)$ are the equilibrium distributions of households before and after the tax change, respectively.

5.2 Taxing Wealth Instead of Capital Income

Figure 2 plots the welfare gain from taxing wealth instead of capital income, measured by the consumption-equivalent variation Δ_{tr}. The gain is decreasing in the targeted revenue-weighted markup. Households in the economy targeting a markup of 1.2 would need a 1% increase in consumption to be as well off as under the wealth tax. The gain is still positive for a markup of 1.3, at 0.11%, and turns negative at -1.43% for a markup of 1.4. The

Figure 2: Welfare gains from the tax reform



Notes: The figure plots the consumption-equivalent welfare change Δ_{tr}, in percent, from replacing the capital income tax ($\tau_k = 25\%$) with a government-revenue-neutral wealth tax ($\tau_k = 0$). The solid line compares the benchmark and the new steady state without debt, using the measure defined in Section 5.1. The dashed line accounts for the transition from the benchmark steady state, described in Section 5.3. Economies are labeled by their targeted revenue-weighted markup.

decline is monotonic across the five economies. Households in the economy targeting a markup of 1.6 would give up 2% of their consumption to remain in the benchmark rather than jump to a steady state that taxes wealth.

Table 4 investigates the causes behind this pattern. Taxing wealth instead of capital income lowers the aggregate capital wedge and raises the aggregate markup. The first effect is a consequence of the strengthening of the self-financing channel documented by Guvenen et al. (2023). Wealth-poor productive entrepreneurs rely on capital income to escape financial constraints, so taxing it weakens this channel, whereas a wealth tax falls mostly on those who already hold wealth. The drop in the wedge is large in all economies, from 0.14 in the low-markup economies to 0.10 in the economy targeting the largest markup. The rise in markups is Proposition 1 at the aggregate level: the firms that escape the constraint take advantage of their larger size to charge higher markups. Aggregate markups rise by between 0.010 and 0.012 in all economies.[21] Misallocation falls by 4.83 percentage points

[21] Under the assigned super-elasticity of demand $\varepsilon/\sigma = 0.162$, the changes in aggregate markups are an order of magnitude smaller than the changes in aggregate capital wedges.

Table 4: Effects of the tax reform

	Efficiency			Return to saving		Aggregates			
Markup	$\Delta\mathcal{M}$ (level)	$\Delta(1+\mathcal{T}^{\mathcal{K}})$ (level)	$\Delta\Omega$ (pp)	τ_a (%)	Δ net return (pp)	ΔK (%)	ΔY (%)	Δ Gini c (points)	Δ_{tr} (% CE)
1.2	0.012	−0.142	−4.83	1.73	−0.30	2.54	3.13	1.34	1.00
1.3	0.012	−0.137	−4.80	1.89	−0.39	0.19	2.29	1.30	0.11
1.4	0.012	−0.143	−4.38	2.27	−0.59	−3.52	0.96	1.36	−1.43
1.5	0.012	−0.123	−4.31	2.34	−0.79	−3.55	1.03	1.44	−1.80
1.6	0.010	−0.103	−4.27	2.39	−0.92	−2.88	1.32	1.58	−2.00

Notes: Each row reports the effects of replacing the capital income tax ($\tau_k = 25\%$) with a government-revenue-neutral wealth tax ($\tau_k = 0$) in the economy targeting the corresponding revenue-weighted markup. Changes are relative to the benchmark economy. The net return to saving is the asset-weighted average of ω_a across all households. Δ_{tr} is the consumption-equivalent welfare change.

in the economy targeting the lowest markup and by 4.27 in the one targeting the largest, a pattern in line with the welfare results but too small to explain them on their own.

The second channel is the return to saving. The wealth tax rate that keeps government revenue constant increases with aggregate market power, following Proposition 2: in economies with larger aggregate wedges, a larger share of capital income comes from profits rather than interest payments, so each point of capital income tax raises more revenue relative to the wealth base.[22] The net return to saving falls accordingly, by 0.3 percentage points in the economy targeting the lowest markup and by three times as much in the one targeting the highest.

Changes in efficiency and saving incentives explain the change in aggregate output under wealth taxation. Capital accumulation increases in the economies with the lowest targeted markups, where misallocation falls the most and the return to saving falls the least. The picture reverses for economies targeting larger markups, for the opposite reasons. Output is larger under the wealth tax in all economies, but the pattern is not monotone mainly because the capital response is not either.[23] At a targeted markup of 1.2, output is 3.13% larger under a tax on wealth; this number falls to 0.96% for a markup of 1.4 and rises slightly to 1.32% for a markup of 1.6. Last, consumption inequality increases

[22]The interest rate is targeted in all economies and the capital income tax rate is the same, so differences across economies in the wealth tax rate implied by Proposition 2 come only from the ratio of aggregate profits to capital.

[23]The reversal at a targeted markup of 1.6 comes from the capital response; efficiency gains are monotone across economies. The calibrations differ in more than the level of market power, most visibly in the volatility of entrepreneurial productivity and the collateral parameter (Table 1). Holding all other parameters fixed, the effect of market power on Δ_{tr} is monotone in all but three entries, as the next paragraph discusses.

under wealth taxation in all five economies, and most in the economies with the highest targeted markups. Less binding financial constraints and higher market power favor the accumulation of wealth by entrepreneurs, which partially passes to consumption, while the higher wealth tax lowers the return to saving of the rest. Smaller output gains and larger increases in consumption inequality as the targeted markup rises explain the decreasing welfare pattern.

As Table 3 shows, the calibrated economies differ not only in the level of markups but also in the extent of misallocation and in the relative contribution of each wedge, since the remaining calibrated parameters differ as well (see Table 1). To isolate the role of market power, Table B.2 in the Appendix reports how Δ_{tr} changes when, starting from each calibrated economy, only the demand parameters are varied, with all other parameters held at their calibrated values: σ, which governs the level of markups, and ε/σ, which governs how steeply markups rise with firm size. The pattern is the same in all five economies: the gains from taxing wealth instead of capital income are smaller when demand is less elastic (lower σ) and when markups rise more steeply with size (higher ε/σ). Raising ε/σ from 0.132 to 0.192 lowers Δ_{tr} by 1.0 percentage points in the economy targeting a markup of 1.2 and by 1.9 points in that targeting 1.6. Raising σ from one unit below to one unit above its calibrated value increases it by 0.3 to 1.5 points. Both the level of market power and its heterogeneity across firms reduce the gains from taxing wealth, and the effect of heterogeneity is larger in the economies with more market power.

5.3 Accounting for Transitions

The results so far compare steady states. However, after a tax reform capital and the distribution of wealth adjust slowly, and the welfare effects of the reform depend on their paths. To account for them, I study the transition that follows the unexpected and permanent introduction of the reform of Table 4 in the benchmark steady state. Since the tax bases also move slowly, the revenue-neutral wealth tax rate keeps revenue constant in the new steady state but not along the transition. To keep government spending at its benchmark value in every period, the government finances the gap between spending and revenue with debt. I assume that, in order to balance the budget in the new steady state, the labor income tax rate changes at the same time as the reform.

Table 5 reports three consumption-equivalent welfare measures for the five economies, all relative to their benchmark steady state. They are the steady-state comparison of Table 4, the comparison with the terminal steady state of the transition, and the comparison accounting for the whole path. With transitions, the welfare gain still decreases with the

Table 5: Welfare effects of the tax reform with transitions

	Welfare change, Δ_{tr}			End of transition	
Markup	Steady states (% CE)	New steady state (% CE)	Transition (% CE)	τ_l (%)	B/Y (%)
1.2	1.00	0.59	0.12	22.78	5.74
1.3	0.11	−0.17	−0.31	22.67	4.08
1.4	−1.43	−1.51	−0.93	22.49	1.27
1.5	−1.80	−1.97	−1.12	22.53	1.95
1.6	−2.00	−2.29	−1.24	22.59	2.76

Notes: Each row reports the effects of replacing the capital income tax ($\tau_k = 25\%$) with a government-revenue-neutral wealth tax ($\tau_k = 0$) in the economy targeting the corresponding revenue-weighted markup. Welfare changes are relative to the benchmark economy. The *Steady states* column compares the benchmark and the new steady state without debt, as in Table 4. The *New steady state* column compares the benchmark with the terminal steady state of the transition, which carries government debt. The *Transition* column uses households' valuations at the time of the reform. τ_l is the labor income tax rate and B/Y the ratio of government debt to output at the end of the transition.

targeted markup (dashed line in Figure 2), but its range narrows. Only the economy targeting a markup of 1.2 now gains, and just by 0.12% of consumption, while the losses in the economies targeting the highest markups shrink. Part of the difference comes from where the economy ends up. The terminal steady state carries government debt of 1.27 to 5.74% of output and a labor income tax rate up to 0.38 percentage points above its benchmark value, which lowers welfare by 0.1 to 0.4 points. The rest comes from the path itself, which lowers welfare by a further 0.5 and 0.1 points in the economies targeting markups of 1.2 and 1.3, and raises it by 0.6 to 1.0 points in the other three.

The efficiency and saving channels operate at different speeds. Figure C.1 in the Appendix plots the paths of the main variables along the transition in the five economies. The efficiency gains require productive entrepreneurs to accumulate wealth and relax their collateral constraints, which takes time: misallocation falls over more than a decade. In the economies targeting markups of 1.2 and 1.3, where these gains raise consumption in the long run, consumption reaches its new level only as entrepreneurial wealth builds up. Households discount these late gains, so the path lowers welfare. The fall in the return to saving acts faster. On impact, before the interest rate rises, the net return to saving of households without marginal profits falls by $\tau_a - \tau_k r$, between 1.2 and 1.9 percentage points. Households bring consumption forward and work less, and since capital is fixed, output falls with hours. In the economies targeting markups of 1.4 to 1.6, where capital drops by about 4% within roughly ten years, consumption starts above its new steady-state level, so the path raises welfare.

Revenue neutrality fails along the transition, so the government accumulates debt. The capital income tax revenue disappears on impact, while the revenue-neutral wealth tax rate balances the budget only once wealth and labor income reach their new steady-state levels. In the economies targeting markups of 1.2 and 1.3, output and labor income grow the most during the transition. Revenue therefore falls short of spending early on, and debt is largest. In the economies targeting markups of 1.4 to 1.6, capital is higher at the start of the transition than in the new steady state, so the wealth tax raises relatively more revenue early on and less debt accumulates. In the new steady state, the debt absorbs savings that would otherwise finance capital, and servicing it requires a higher labor income tax rate. Both effects make welfare in the terminal steady state lower than in the steady state of Table 4, in every economy.

6 Optimal Capital Taxation

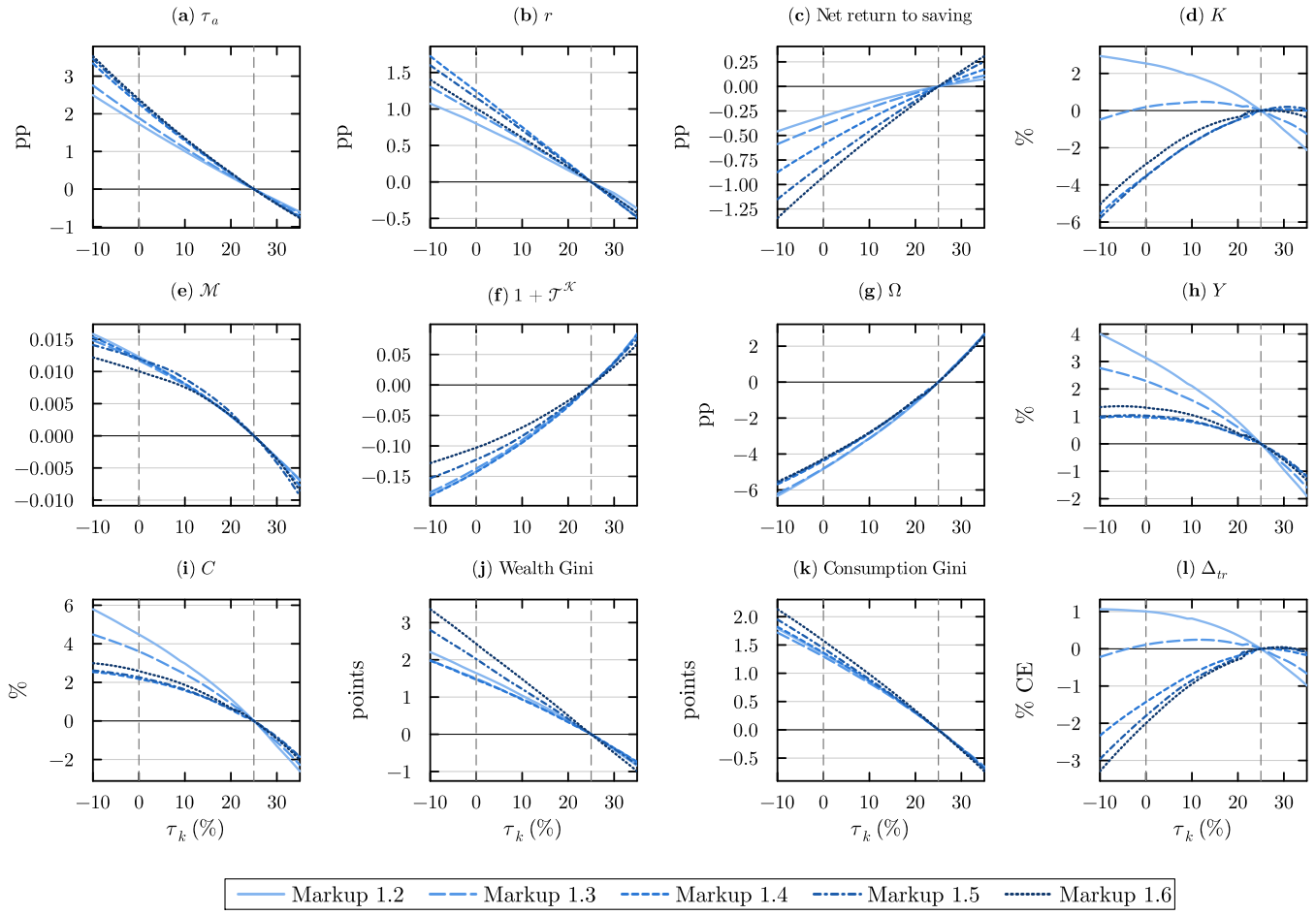
This section extends the analysis to all combinations of capital income and wealth tax rates that keep government revenue constant, and finds the one that maximizes welfare in each economy. First, I describe how the economy changes as the capital income tax rate varies along the government-revenue-neutral locus. Second, I show that the optimal capital income tax rate increases with the targeted revenue-weighted markup.

6.1 Capital Taxation Mixes

Figure 3 presents the changes with respect to the benchmark economy along the government-revenue-neutral locus, for capital income tax rates between -10% and 35%. The pattern documented in Table 4 holds for every tax mix, not only for the reform that eliminates capital income taxation. Panel (a) shows that the wealth tax rate needed to keep revenue constant is decreasing in the capital income tax rate, and that this relationship is steeper the larger the market power. The interest rate in Panel (b) rises in general equilibrium as capital income taxation falls, by 0.7 to 1.2 percentage points at $\tau_k = 0$. The net return to saving in Panel (c) combines the wealth tax rate in Panel (a) and the interest rate in Panel (b) with the marginal profit of constrained entrepreneurs: it is increasing in the capital income tax rate, and this relationship is steeper the larger the targeted markup.

Panels (e)–(g) show that the aggregate markup, the aggregate capital wedge and misallocation follow similar paths in the five economies, with misallocation tracking the capital wedge throughout, so the efficiency gains differ little across economies at any point of the locus. Aggregate capital in Panel (d) increases as capital income taxation falls only in

Figure 3: Tax rate mixes and the macroeconomy



Notes: Each panel plots the change in an object relative to the benchmark economy as the capital income tax rate varies along the government-revenue-neutral locus. τ_a, r and the net return to saving are in percentage points; K, Y and C are percent deviations; $\mathcal{M}$ and $1+\mathcal{T}^{\mathcal{K}}$ are in levels; Ω is in percentage points and the Gini indices in points; Δ_{tr} is the consumption-equivalent welfare change in percent. The net return to saving is the asset-weighted average of ω_a across all households. Vertical dashed lines mark the benchmark economy and the reform that eliminates capital income taxation ($\tau_k = 0$). Economies are labeled by their targeted revenue-weighted markup.

the economies with the lowest targeted markups, where misallocation falls the most and the return to saving the least. As the targeted markup increases, capital peaks within a few points of the benchmark and falls on both sides. Output in Panel (h) is larger under a tax on wealth in all economies because of the efficiency gains, but the fall in capital makes the increase much smaller where market power is high; consumption in Panel (i) closely follows output.

Wealth inequality rises under a tax on wealth, most in the economies targeting the largest markups, since a reinforced self-financing channel favors the accumulation of resources by entrepreneurs; part of it translates into consumption inequality, as Panels (j)–(k) illustrate. Last, Panel (l) shows the trade-off between output and inequality: welfare is higher under a tax on wealth only when the economy grows enough to compensate for the rise in consumption inequality, which happens for sufficiently low targeted markups.

6.2 The Optimal Mix

Table 6 reports the capital income and wealth tax rates that maximize steady-state welfare along the government-revenue-neutral locus, together with the changes they imply relative to the benchmark economy. These rates correspond to the peaks of the welfare curves in Panel (l) of Figure 3.[24] The optimal capital income tax rate increases with the targeted markup, from -10.23% to 29.30%, and the optimal wealth tax rate decreases, from 2.51% to -0.34%. Relative to the benchmark, the optimal mix taxes wealth more in the economies targeting markups of 1.2 and 1.3, and less in the other three. These are also the only two economies where replacing the capital income tax with a wealth tax raises welfare (Table 4).

The gains from the optimal mix are concentrated in the economies targeting markups of 1.2 and 1.3, where welfare rises by 1.06% and 0.25% in consumption-equivalent terms. The optimal mix lowers misallocation by 6.37 and 2.83 percentage points and raises output by 4.02% and 1.45%, at the cost of a rise in the consumption Gini of 1.80 and 0.75 points. In the economy targeting 1.2, eliminating capital income taxation already achieves most of the optimal gain, 1.00% against 1.06% (Table 4).

In the other three economies, welfare gains are at most 0.05%, since the benchmark tax rates are already close to the optimal ones: the optimal capital income tax rate is 1.3 to 4.3 percentage points above 25%, and the optimal wealth tax rate is at most 0.34 percentage points below zero. The optimal mix lowers the consumption Gini by 0.08 to 0.31 points, at the cost of a rise in misallocation of 0.31 to 1.04 percentage points and a fall in output of

[24] The peak for the economy targeting a markup of 1.2 lies just below the lowest rate shown.

Table 6: Effects of the optimal tax mix

	Optimal taxes		Efficiency			Return to saving	Aggregates			
Markup	τ_k^* (%)	τ_a^* (%)	$\Delta\mathcal{M}$ (level)	$\Delta(1+\mathcal{T}^{\mathcal{K}})$ (level)	$\Delta\Omega$ (pp)	Δ net return (pp)	ΔK (%)	ΔY (%)	Δ Gini c (points)	Δ_{tr} (% CE)
1.2	−10.23	2.51	0.016	−0.181	−6.37	−0.46	2.94	4.02	1.80	1.06
1.3	11.61	0.96	0.007	−0.082	−2.83	−0.19	0.47	1.45	0.75	0.25
1.4	26.28	−0.10	−0.001	0.009	0.31	0.02	0.05	−0.12	−0.08	0.01
1.5	28.50	−0.28	−0.003	0.025	0.85	0.09	0.17	−0.33	−0.23	0.03
1.6	29.30	−0.34	−0.003	0.026	1.04	0.14	−0.03	−0.50	−0.31	0.05

Notes: Each row reports the effects of moving from the benchmark tax system ($\tau_k = 25\%$, $\tau_a = 0$) to the capital income and wealth tax rates that maximize steady-state welfare along the government-revenue-neutral locus, τ_k^* and τ_a^*, in the economy targeting the corresponding revenue-weighted markup. Changes are relative to the benchmark economy. The net return to saving is the asset-weighted average of ω_a across all households. Δ_{tr} is the consumption-equivalent welfare change.

0.12% to 0.50%.

Appendix C.4 reports the welfare effects of moving to the optimal mix when accounting for the transition. They are small in all economies, as the gain almost disappears in the economy targeting a markup of 1.2 and turns into a loss in the one targeting 1.3.

7 Conclusion

Heterogeneity in rates of return can generate non-trivial differences between capital income and wealth taxation. When this heterogeneity comes from financial constraints, taxing wealth instead of capital income improves allocative efficiency, because it favors wealth accumulation by productive entrepreneurs, at the cost of a higher wealth concentration at the top. This paper studies how market power, in combination with financial frictions, affects this comparison. I find that the welfare gains from taxing wealth instead of capital income decrease with the level of market power and become losses when market power is high.

To this end, I build a model where entrepreneurs face collateral constraints and set markups that increase with their relative size. Two results show how market power enters the comparison. First, relaxing financial constraints raises market power, since a constrained entrepreneur who accumulates wealth sets a higher markup. Second, profits are part of the capital income tax base but not of the wealth tax base, so the larger the aggregate markup, the larger the increase in the wealth tax rate needed to keep government revenue constant, which lowers the return to saving of most households. I quantify both channels

in five economies that share the same targets for the US economy, except for the revenue-weighted markup, which ranges from 1.2 to 1.6. Replacing the capital income tax with a revenue-neutral wealth tax lowers misallocation by similar amounts in all five, but the fall in the return to saving grows with the markup, which limits capital accumulation and the gains in output. With consumption inequality rising in all economies, the welfare gain falls from 1% in consumption-equivalent terms in the economy targeting the lowest markup to a loss of 2% in the one targeting the highest. Accounting for the transition preserves this ranking but narrows the range of welfare effects. The efficiency gains build up slowly with entrepreneurial wealth, while the fall in the return to saving takes effect at once, so only the economy targeting the lowest markup still gains, and only slightly. As the markup rises, the capital income tax rate that maximizes steady-state welfare increases from -10% to 29% and the wealth tax rate decreases from 2.5% to -0.3%, with gains concentrated in the economies targeting the lowest markups. Along the transition, however, these gains largely disappear.

The broader lesson is that the comparison between capital income and wealth taxation depends not only on whether returns differ across entrepreneurs, but also on why they differ. Policy conclusions obtained with a single source of heterogeneity need not hold when several sources coexist. Evaluating a tax reform of this kind thus requires a diagnosis of which sources of heterogeneity are present in each economy and how strong each of them is.

As is common in quantitative exercises, the model abstracts from elements that may also be relevant for this comparison, such as life-cycle dynamics, risk in the returns to entrepreneurial investment or the presence of public firms, each of which could modify the results to some extent. Natural avenues for future research are to incorporate these elements and to study richer tax instruments, such as progressive schedules or taxes on profits.

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The Role of Market Power in Capital Taxation

by Juan Segura

Appendix Materials

A Theory

A.1 Final Good Producer Demands

The final good producer solves

$$\max_{\{q_i\},L} \; Q^{\alpha} L^{1-\alpha} - \int_0^{\psi} p_i q_i di - wL \qquad \text{s.t.} \quad \int_0^{\psi} \Upsilon\Big(\frac{q_i}{Q}\Big) di = 1.$$

Define the function

$$F = \int_0^{\psi} \Upsilon\Big(\frac{q_i}{Q}\Big) di - 1 = 0,$$

so that using the Implicit Function Theorem

$$\frac{dQ}{dq_i} = \Upsilon'\Big(\frac{q_i}{Q}\Big) \left[\int_0^{\psi} \Upsilon'\Big(\frac{q_j}{Q}\Big) \frac{q_j}{Q} dj \right]^{-1} = \Upsilon'\Big(\frac{q_i}{Q}\Big) D.$$

The first order conditions then yield

$$p_i = \alpha \frac{Y}{Q} \Upsilon'\Big(\frac{q_i}{Q}\Big) D, \qquad w = (1-\alpha)\frac{Y}{L}.$$

A.2 Entrepreneurs

Entrepreneurs solve

$$\begin{aligned} \pi(z,a) = \max_{k} \; & \Big\{ p(zk; Q, D)\, zk - (r+\delta)k \Big\} \\ \text{s.t.} \quad & p = \alpha \frac{Y}{Q} \Upsilon'\Big(\frac{zk}{Q}\Big) D = \Upsilon'\Big(\frac{zk}{Q}\Big) X, \\ & k \leq \lambda a. \end{aligned}$$

With $q = zk$ and Λ the multiplier on the collateral constraint, the FOC is

$$
\begin{aligned}
& z\left(p + q\frac{\partial p}{\partial q}\right) = r + \delta + \Lambda \\
& \Rightarrow p + q\Upsilon''\left(\frac{q}{Q}\right)\frac{1}{Q}X = \frac{r+\delta+\Lambda}{z} \\
& \Rightarrow p + \underbrace{\Upsilon'\left(\frac{q}{Q}\right)X}_{p} \underbrace{\left[\frac{\frac{q}{Q}\Upsilon''\left(\frac{q}{Q}\right)}{\Upsilon'\left(\frac{q}{Q}\right)}\right]}_{-\left(\sigma(q/Q)^{-\varepsilon/\sigma}\right)^{-1}} = \frac{r+\delta+\Lambda}{z} \\
& \Rightarrow p = \frac{\sigma}{\sigma - (q/Q)^{\varepsilon/\sigma}}\frac{r+\delta+\Lambda}{z}.
\end{aligned}
$$

A.3 Aggregate Wedges

Combining the firm-level and aggregate conditions gives

$$\frac{\mu(x)}{\mathcal{M}} = \frac{p(x)q}{P_Q Q}\frac{(1+\mathcal{T}^{\mathcal{K}})K}{(1+\tau^{\mathcal{K}})k}.$$

Define the aggregate capital wedge as the capital-weighted average of individual capital wedges:

$$1 + \mathcal{T}^{\mathcal{K}} = \int_{s,z,a}(1+\tau^{\mathcal{K}}(z,a))\frac{k(z,a)}{K}d\Gamma(s,z,a).$$

In the same fashion as Edmond et al. (2023), rearranging and integrating on both sides, the aggregate markup can be expressed as a revenue-weighted harmonic average of firm-level markups,

$$\mathcal{M} = \left[\int_{s,z,a}\frac{1}{\mu(x(z,a))}\frac{p(x(z,a))q(z,a)}{P_Q Q}d\Gamma(s,z,a)\right]^{-1}.$$

A.4 Aggregate Productivity and Misallocation

Aggregate productivity Z is defined in Section 3.2 by $Q = ZK$. Combining this expression with the firm-specific production function $q = zk$, Z can be expressed as a harmonic

mean of individual productivities weighted by their quantity market shares $x = q/Q$,

$$\begin{aligned}
&\frac{q}{Q} = x = \frac{zk}{ZK} \\
&\Rightarrow \frac{x}{z} = \frac{1}{Z}\frac{k}{K} \\
&\Rightarrow Z = \Big[\int_{s,z,a} 1\{z > \bar{z}\}\frac{x(z,a)}{z} d\Gamma(s,z,a)\Big]^{-1}. \qquad (12)
\end{aligned}$$

I measure misallocation relative to the social planner's solution of Section 3.2. Inverting equation (11), the efficient allocation is

$$x^{\text{eff}} = \left[\max\left\{1 + \varepsilon \log\left(\frac{X^{\text{eff}}(\sigma-1)z}{\sigma\nu}\right), 0\right\}\right]^{\sigma/\varepsilon}.$$

Substituting into the aggregate productivity expression (12) yields the productivity under the efficient allocation

$$Z^{\text{eff}} = \Big[\int_{s,z,a} 1\{z > \bar{z}^{\text{eff}}\}\frac{x^{\text{eff}}(z)}{z} d\Gamma(s,z,a)\Big]^{-1}.$$

Misallocation, as defined in Section 3.2, is then

$$\Omega = 1 - \frac{Z}{Z^{\text{eff}}}.$$

A.5 Proof of Proposition 1

If the constraint is slack, $q = q^*(z)$ solves (5) with $\Lambda = 0$, so neither $x^* = q^*(z)/Q$ nor $\tau^{\mathcal{K}} = 0$ depends on a.

If it binds, $k = \lambda a$ and $q = z\lambda a$, so relative size increases with wealth,

$$x = \frac{z\lambda a}{Q}, \qquad \frac{dx}{da} = \frac{z\lambda}{Q} > 0.$$

Markups increase with relative size, $\mu'(x) > 0$ by (2), where the strict inequality comes from $\varepsilon > 0$; hence $d\mu/da > 0$ by the chain rule.

Rearranging the optimality condition (4),

$$1 + \tau^{\mathcal{K}} = \frac{zX}{r+\delta}\frac{\Upsilon'(x)}{\mu(x)}, \qquad \frac{d}{dx}\left(\frac{\Upsilon'(x)}{\mu(x)}\right) = \frac{\Upsilon''(x)\mu(x) - \Upsilon'(x)\mu'(x)}{\mu(x)^2} < 0,$$

since $\Upsilon'' < 0$ and $\mu' > 0$. Again by the chain rule, it follows that $d\tau^{\mathcal{K}}/da < 0$. □

A.6 Proof of Proposition 2

Government revenue is $G = \tau_c C + \tau_l wL + \tau_k(rA + \Pi) + \tau_a A$, with $A = \int_{s,z,a} a \, d\Gamma(s,z,a)$ and $\Pi = \int_{s,z,a} \pi(z,a) \, d\Gamma(s,z,a)$. Holding prices, quantities and the distribution of households fixed, revenue neutrality requires

$$(rA + \Pi)\Delta\tau_k + A\,\Delta\tau_a = 0 \quad \Longrightarrow \quad \Delta\tau_a = -\Big(r + \frac{\Pi}{A}\Big)\Delta\tau_k.$$

Capital market clearing gives $A = K$, and aggregate profits are $\Pi = P_Q Q - (r+\delta)K$. Substituting the expression for aggregate ARPK (10), I get

$$\frac{\Pi}{K} = (r+\delta)\Big[\mathcal{M}\big(1 + \mathcal{T}^{\mathcal{K}}\big) - 1\Big].$$

For the second part, derive the marginal return to saving from equation (3) as $\omega_a(z,a) = (1-\tau_a) + (1-\tau_k)[r + \pi_a(z,a)]$. Holding r and π_a fixed,

$$\Delta\omega_a = -\Delta\tau_a - (r + \pi_a)\,\Delta\tau_k.$$

Substituting $\Delta\tau_k = -\Delta\tau_a/(r + \Pi/K)$ gives the result. □

B Additional Tables

Table B.1 reports the fit of each calibrated economy, and Table B.2 the sensitivity of the welfare gain from the tax reform to the demand parameters.

Table B.1: Targeted moments, by economy

		Revenue-weighted markup				
Target	US Data	1.2	1.3	1.4	1.5	1.6
Fraction of entrepreneurs	0.117	0.119	0.116	0.115	0.121	0.119
Interest rate (%)	2.00	1.98	1.97	1.96	1.97	1.99
Hours worked	0.33	0.324	0.325	0.325	0.332	0.324
Business debt / GDP	1.29	1.235	1.243	1.210	1.202	1.200
Revenue-weighted markup	1.2–1.6	1.220	1.286	1.401	1.513	1.596
Gini wealth	0.85	0.832	0.836	0.832	0.834	0.832
Top 50% wealth share	0.985	0.995	0.996	0.995	0.996	0.995
Top 10% wealth share	0.764	0.713	0.697	0.690	0.696	0.694
Top 1% wealth share	0.372	0.388	0.401	0.382	0.379	0.377
Gini income	0.57	0.593	0.600	0.589	0.592	0.599
Top 50% income share	0.855	0.882	0.884	0.877	0.880	0.884
Top 10% income share	0.467	0.472	0.483	0.472	0.474	0.478
Top 1% income share	0.192	0.161	0.172	0.173	0.170	0.170
Wealth share of entrepreneurs	0.46	0.479	0.475	0.465	0.474	0.472
Income share of entrepreneurs	0.31	0.254	0.256	0.259	0.264	0.264
Mean absolute % deviation		4.71	4.73	4.10	4.31	4.28

Notes: Each column reports the moments of the economy targeting the corresponding revenue-weighted markup, given in the column header. Sources for the targets are listed in Table 2.

Table B.2: Welfare gain from the wealth tax: sensitivity to σ and ε/σ

	Super-elasticity of demand ε/σ				
σ	0.132	0.147	0.162	0.177	0.192
	Panel A. Revenue-weighted markup 1.2				
13.97	0.26	0.07	−0.18	−0.51	−0.82
14.47	0.36	0.12	−0.07	−0.37	−0.69
14.97	0.46	0.19	**0.00**	−0.24	−0.55
15.47	0.54	0.26	0.02	−0.16	−0.42
15.97	0.63	0.35	0.09	−0.12	−0.34
	Panel B. Revenue-weighted markup 1.3				
12.32	0.43	0.12	−0.22	−0.67	−1.18
12.82	0.48	0.19	−0.10	−0.46	−0.91
13.32	0.61	0.30	**0.00**	−0.32	−0.75
13.82	0.76	0.38	0.11	−0.17	−0.56
14.32	1.70	0.54	0.25	−0.08	−0.38
	Panel C. Revenue-weighted markup 1.4				
9.22	0.54	0.01	−0.52	−1.03	−1.50
9.72	0.80	0.23	−0.17	−0.69	−1.24
10.22	0.97	0.55	**0.00**	−1.41	−1.06
10.72	1.10	0.84	0.35	−0.22	−1.62
11.22	1.43	0.86	0.64	0.10	−0.35
	Panel D. Revenue-weighted markup 1.5				
7.58	0.47	0.02	−0.24	−1.11	−2.93
8.08	0.99	0.28	−0.09	−0.43	−1.28
8.58	1.10	0.58	**0.00**	−0.42	−0.61
9.08	1.54	0.96	0.47	−0.13	−0.56
9.58	1.70	1.27	0.77	0.20	−0.34
	Panel E. Revenue-weighted markup 1.6				
6.90	0.56	−0.02	−0.72	−1.61	−2.68
7.40	0.92	0.36	−0.14	−0.65	−2.76
7.90	1.12	0.58	**0.00**	−0.45	−0.77
8.40	1.63	0.99	0.44	−0.05	−0.55
8.90	1.92	1.36	0.74	0.19	−0.24

Notes: Each entry is the change, in percentage points, in the consumption-equivalent welfare gain Δ_{tr} from replacing the capital income tax with a revenue-neutral wealth tax, relative to the calibrated economy (in bold), where only σ and ε/σ are varied. Steady-state comparisons only. Positive entries indicate a larger gain from the wealth tax than in the calibrated economy. Each panel corresponds to an economy targeting a different revenue-weighted markup as described in Table 1.

C Transitions

C.1 Equilibrium Along the Transition

The economy is in the benchmark steady state at $t = 0$, with tax rates $\{\tau_c, \tau_l, \tau_a, \tau_k\}$ and distribution of households $\Gamma_b(s, z, a)$. At $t = 1$, the labor income, capital income and wealth tax rates change to τ_l', τ_k' and τ_a', while the consumption tax rate does not change. The change is unexpected and permanent, and there is no aggregate uncertainty, so from $t = 1$ on, households know the path of prices and taxes and only face idiosyncratic risk.

For the reform of Section 5, $\tau_k' = 0$ and τ_a' is the revenue-neutral rate in Table 4. For the optimal mix of Section 6, τ_k' and τ_a' are the rates in Table 6. In both cases, government spending stays at its benchmark value G in every period. The government finances the difference between spending and tax revenue with one-period debt held by households, which pays the market interest rate. Let B_t denote this debt at the end of period t, with $B_0 = 0$; negative values are government assets. Following Guvenen et al. (2023), the labor income tax rate τ_l' balances the budget in the new steady state, including the interest on the debt. Since the debt accumulated along the transition depends on τ_l', this tax rate is determined jointly with the path.

Given the path of prices, the problem of a household in state (s, z, a) at date $t \geq 1$ is

$$\begin{aligned} v_t(s, z, a) = \max_{c,h,a'} \; & u(c, h) + \beta \, \mathbb{E}\left[v_{t+1}(s', z', a')\right] \\ \text{s.t.} \quad & (1 + \tau_c)c + a' = (1 - \tau_l')w_t s h + \omega_t(z, a; \tau_a', \tau_k') \\ & a' \geq 0. \end{aligned}$$

Given Γ_b and $\{\tau_c, \tau_a', \tau_k'\}$, an equilibrium along the transition is a labor income tax rate τ_l' and, for $t \geq 1$, a sequence of value functions and decision rules $\{v_t, g_{c,t}, g_{h,t}, g_{a,t}, g_{k,t}\}$, aggregates $\{Q_t, L_t, D_t, K_t\}$, prices $\{p_t(x), r_t, w_t\}$, government debt B_t and probability measures $\Gamma_t(s, z, a)$ such that

1. The decision rules and v_t solve the household problem given the path of prices and taxes.

2. At each date, the solution to the final good producer's problem sets the pricing of varieties function $p_t(x)$ and wages w_t.

3. At each date, production factors come from aggregation of households' and firms' decisions, as in condition 3 of the steady-state equilibrium in Section 2.

4. The capital market clears, with household wealth financing capital and the debt issued in the previous period:

$$K_t = A_t - B_{t-1}.$$

5. Government debt evolves according to $B_t = (1 + r_t)B_{t-1} + G - R_t$, where R_t is tax revenue:

$$\begin{aligned} R_t = \tau_c \int_{s,z,a} g_{c,t}(s,z,a)\, d\Gamma_t(s,z,a) + \tau_l' w_t L_t \\ + \tau_k' \int_{s,z,a} \big(r_t a + \pi_t(z,a)\big)\, d\Gamma_t(s,z,a) + \tau_a' \int_{s,z,a} a\, d\Gamma_t(s,z,a). \end{aligned}$$

6. The goods market clears:

$$Y_t - \big[K_{t+1} - (1-\delta)K_t\big] - G = \int_{s,z,a} g_{c,t}(s,z,a)\, d\Gamma_t(s,z,a).$$

7. The distribution starts at $\Gamma_1 = \Gamma_b$, since wealth is predetermined when the reform is announced, and Γ_{t+1} follows from Γ_t, the savings rule $g_{a,t}$ and the productivity processes G_s and G_z.

8. There is a date T such that, for $t \geq T$, all objects are constant at the values of a steady state with debt B_T. In this steady state, condition 5 implies $R_T = G + r_T B_T$, which determines τ_l'.

C.2 Welfare Measures

The tables of transition results report three consumption-equivalent measures, all relative to the benchmark steady state. Each is the value of Δ that solves

$$\int_{s,z,a} v_b(s,z,a,\Delta)\, d\Gamma_b(s,z,a) = W,$$

where $v_b(s,z,a,\Delta)$ is defined in Section 5.1 and W is aggregate welfare after the tax change. The three measures differ only in W. In the *Steady states* column, W is aggregate welfare in the new steady state without debt, as in Section 5.1:

$$W = \int_{s,z,a} v_n(s,z,a,0)\, d\Gamma_n(s,z,a).$$

In the *New steady state* column, W is aggregate welfare in the terminal steady state of the transition, with debt B_T and labor income tax rate τ_l':

$$W = \int_{s,z,a} v_T(s,z,a) d\Gamma_T(s,z,a).$$

In the *Transition* column, W is aggregate welfare at $t = 1$, which accounts for the whole path:

$$W = \int_{s,z,a} v_1(s,z,a) d\Gamma_b(s,z,a).$$

The first two measures differ only in the steady state the economy reaches, and the last two only in the path to it.

C.3 Tax Reform

Figure C.1 plots the paths of the main variables along the transition after the reform of Section 5, in the five economies.

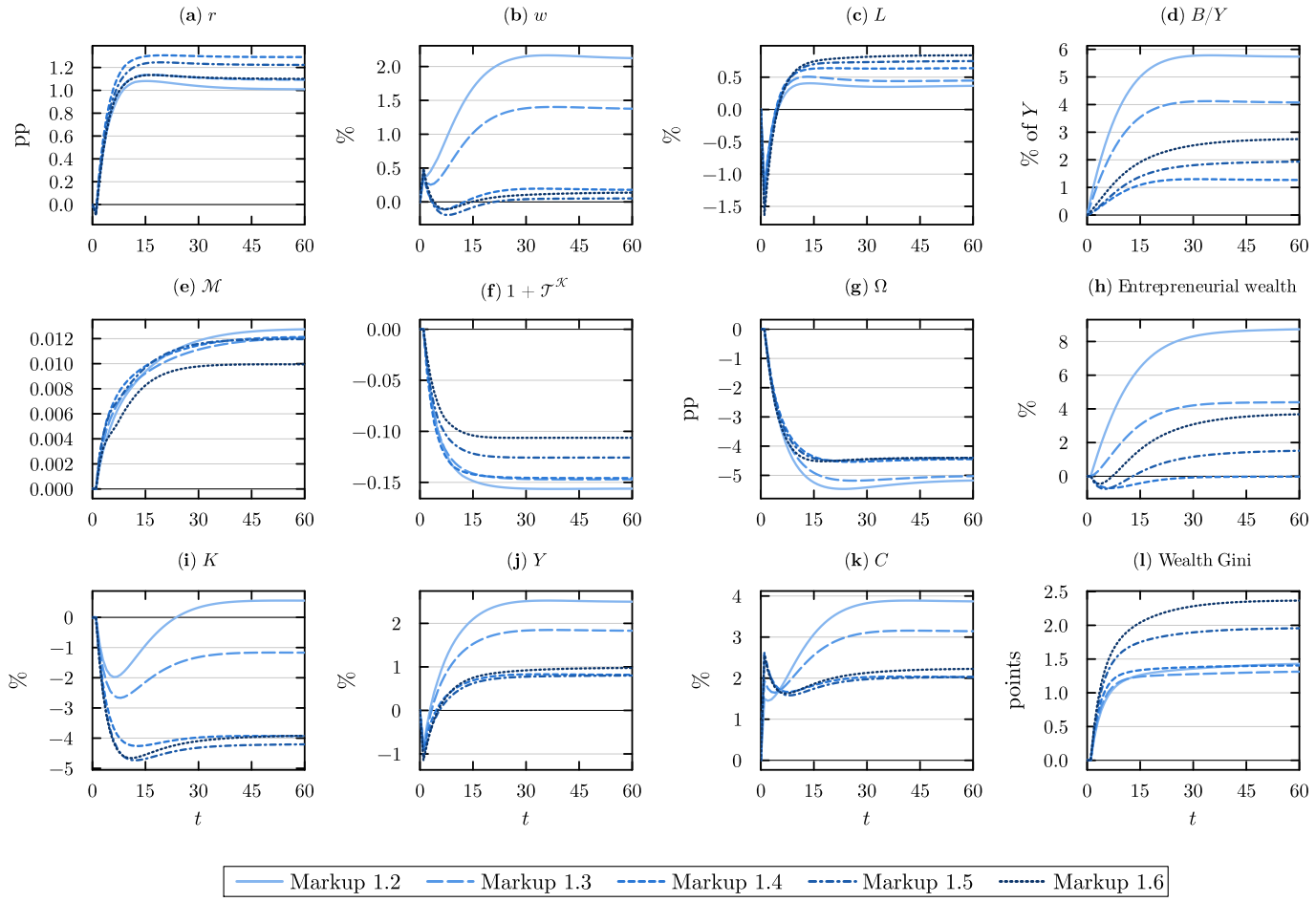
C.4 Optimal Mix

The optimal mix of Section 6 maximizes steady-state welfare. This subsection explores whether moving to it still raises welfare once the transition is accounted for. The design and welfare measures are those of Appendices C.1 and C.2. Table C.1 reports the welfare effects, and Figure C.2 plots the paths of the main variables in the five economies.

Accounting for the transition, moving to the optimal mix has small welfare effects in all economies, between a loss of 0.11% and a gain of 0.09% of consumption. In the economies targeting markups of 1.2 and 1.3, the optimal mix lowers the capital income tax rate and raises the wealth tax rate, as the reform of Section 5 does, and the transition lowers welfare for the same reasons. The government borrows along the transition, so the terminal steady state carries debt and a higher labor income tax rate. In addition, the efficiency gains build up only as entrepreneurs accumulate wealth, and households discount them. As a result, the gain falls from 1.06% to 0.03% in the economy targeting a markup of 1.2, and turns into a loss of 0.11% in the one targeting 1.3. With the transition, eliminating the capital income tax raises welfare by more than the optimal mix in the economy targeting 1.2 (Table 5), since the optimal mix leaves more debt and a higher labor income tax rate.

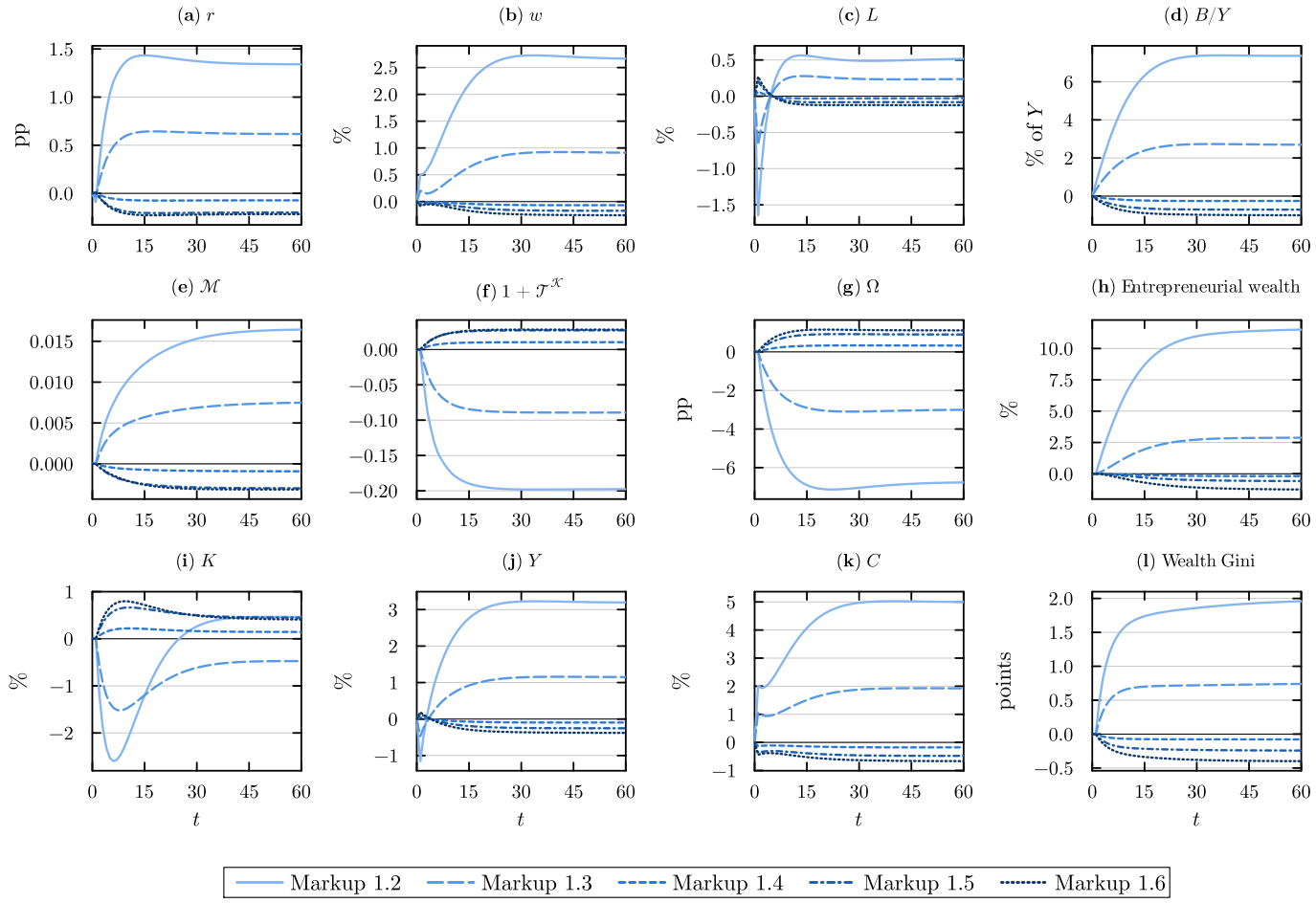
In the other three economies, the optimal mix raises the capital income tax rate slightly and subsidizes wealth. The government accumulates assets along the transition, which

Figure C.1: Transition after the tax reform



Notes: Each panel plots the change in an object relative to the benchmark steady state along the transition that follows the unexpected and permanent replacement of the capital income tax with a government-revenue-neutral wealth tax at $t = 1$. $\mathcal{M}$ and $1 + \mathcal{T}^{\mathcal{K}}$ are in levels; r and Ω are in percentage points; w, L, entrepreneurial wealth, K, Y and C are percent deviations; B/Y is government debt as a percentage of output; the wealth Gini is in points. The horizontal axis shows years after the reform. Economies are labeled by their targeted revenue-weighted markup.

Figure C.2: Transition to the optimal tax mix



Notes: Each panel plots the change in an object relative to the benchmark steady state along the transition that follows the unexpected and permanent move to the capital income and wealth tax rates of Table 6 at $t = 1$. $\mathcal{M}$ and $1+\mathcal{T}^{\mathcal{K}}$ are in levels; r and Ω are in percentage points; w, L, entrepreneurial wealth, K, Y and C are percent deviations; B/Y is government debt as a percentage of output, and negative values are government assets; the wealth Gini is in points. The horizontal axis shows years after the reform. Economies are labeled by their targeted revenue-weighted markup.

allows a labor income tax rate below its benchmark value in the terminal steady state. The welfare gains are therefore slightly larger than in the steady-state comparison, although they remain below 0.1%.

Table C.1: Welfare effects of the optimal tax mix with transitions

	Welfare change, Δ_{tr}			End of transition	
Markup	Steady states (% CE)	New steady state (% CE)	Transition (% CE)	τ_l (%)	B/Y (%)
1.2	1.06	0.49	0.03	22.94	7.38
1.3	0.25	0.07	−0.11	22.56	2.69
1.4	0.01	0.02	0.02	22.39	−0.25
1.5	0.03	0.08	0.07	22.37	−0.71
1.6	0.05	0.13	0.09	22.35	−1.01

Notes: Each row reports the effects of moving from the benchmark tax system ($\tau_k = 25\%$, $\tau_a = 0$) to the capital income and wealth tax rates that maximize steady-state welfare, τ_k^* and τ_a^* in Table 6, in the economy targeting the corresponding revenue-weighted markup. Welfare changes are relative to the benchmark economy. The *Steady states* column compares the benchmark and the new steady state without debt, as in Table 6. The *New steady state* column compares the benchmark with the terminal steady state of the transition, which carries government debt or assets. The *Transition* column uses households' valuations at the time of the reform. τ_l is the labor income tax rate and B/Y the ratio of government debt to output at the end of the transition; negative values are government assets.