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Equity Prices, Market Power, and Optimal Corporate Tax Policy

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ABSTRACT

We study the optimal design of corporate tax policy in a textbook life-cycle model featuring two key deviations: (i) firms are imperfectly competitive and (ii) households save by purchasing equity shares in a stock market. In this simple environment, the financial wealth of savers is equal to the sum of the productive capital owned by firms and a component capturing the NPV of unproductive rents –what we term "market power wealth" (MPW). We show that this novel component has non-trivial macroeconomic effects, with important implications for optimal corporate tax policy. In particular, MPW significantly crowds out productive investment and accordingly can rationalize a high corporate tax rate. The optimal corporate tax code in our setting assigns the statutory corporate tax rate to target the financial value of pure profits while incentivizing capital accumulation with a partial expensing of firm investment costs.

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1 Introduction

Interest in the macroeconomic and welfare implications of corporate taxation gained prominence in policy discussions in recent years, fueled in part by rising inequality and the growing revenue demands of governments. In the U.S. context, interest has centered on the debate around the macroeconomic implications of the *Tax Cuts and Jobs Act* of 2017, which significantly lowered the statutory corporate tax rate and modified tax code provisions related to the treatment of investment expensing. A common strand in this debate is that the corporate tax can be approximately understood as a tax on capital. Consequently, many argue for minimizing corporate taxes, often invoking the well-known conclusion from the optimal capital taxation literature that the long-run optimal capital tax rate is zero (Chamley 1986; Kenneth L. Judd 1985).

While the literature on optimal capital taxes is deep, there is comparatively less formal work on the corporate tax and it is not obvious what results from the former literature carry over to the latter. Indeed, real world tax codes often feature provisions that allow businesses to deduct substantial portions of the cost of investment from their tax liability.[1] This common feature of the corporate tax code has led to an alternative view, first articulated by Stiglitz (1973; 1976), that the corporate tax is first and foremost a tax on pure profits and can be used to target unproductive rents arising from the exercise of market power.[2] A theory of how the corporate tax interacts with market power in general equilibrium is all the more pressing given recent evidence on the rise of market power in the U.S. and other advanced economies (De Loecker, Eeckhout, and Unger 2020b; De Loecker and Eeckhout 2018).

This paper examines these issues through the lens of a textbook life-cycle model in the tradition of Diamond (1965) with two simple but crucial extensions. First, firms are assumed to be imperfectly competitive and charge a constant markup over marginal costs. Second, we assume that households do not own the productive capital directly but instead save by buying equity shares in firms. The price of a share, as a result, will reflect the value of their installed productive capital as well as the present value of their market power rents – what we term "market power wealth" (MPW).

The existence of MPW has non-trivial macroeconomic effects and implications for the optimal corporate tax. In particular, market power wealth produces significant crowding out effects that discourage capital accumulation. Since the capitalized value of pure profits represent an alternative vehicle for households' savings (an alternative store of value), these directly decrease the savings allocated to productive investment, decreasing economic growth and the long-run capital-labor ratio. Put differently, market power wealth increases the return on equity, thus raising the cost of capital for firms. Since the elasticity of savings is finite in our OLG setting, the capital-labor

[1] As discussed below, businesses in the U.S. can expense around 80% of equipment investments and this rate was temporarily raised to 100% under the 2017 Tax Cuts and Jobs Act. See Barro and Furman (2018) for a detailed account of these provisions.

[2] More recently, Clausing (2023) has argued that the corporate tax can be used to correct market power distortions.

ratio must fall in equilibrium.

An implication that arises naturally in this setting is that the corporate tax can have an *expansionary effect* on aggregate investment by "taxing away" the financial value of rents from market power and thus reducing the crowding out effects from MPW. This is because – due to the ability to deduct a fraction of investment expenses from the firm's tax base – the corporate tax primarily affects the market power wealth component of a firm's equity value. Thus, a higher corporate tax in our framework reduces the stock market value of firms, lowering the return on equity and hence the cost of capital in general equilibrium.

This general equilibrium mechanism can justify a high corporate tax rate. Indeed, when policymakers are unconstrained and can choose any feasible tax code, we show that the optimal corporate tax code that maximizes aggregate consumption features an 100% tax rate and a partial expensing of investment costs. In this unconstrained benchmark, policymakers can implement the economy's "Golden Rule" capital-labor ratio (that maximizes steady state consumption) by assigning the corporate tax rate to correcting the crowding out effect from MPW while leaving the expensing rate to incentivize investment at the appropriate level.[3]

We also establish that the long-run optimal corporate tax rate will typically be positive even in cases when the Golden Rule benchmark is unattainable because policymakers are constrained in the design of the tax base. This is because the steady state capital-labor ratio in our framework is always below the Golden Rule whenever MPW is positive. In other words, the steady state in our model necessarily features underaccumulation of capital, in contrast to the textbook Diamond model in which both under and overaccumulation are possible, depending on the economy's parameters. Therefore, taxing corporate profits can increase welfare by stimulating capital accumulation and raising steady state consumption.

Our optimal tax results thus stand in contrast to the common assertion that the optimal corporate tax rate is zero[4], even with less than full investment expensing allowances. A well-known result in the public finance literature is that, abstracting from the role of risk, with full expensing the corporate tax does not affect the cost of capital and therefore is not distortionary.[5] We shed light on this question in our model by accommodating both cases with full expensing and intermediate regimes with partial expensing of investment costs. In the constrained case in which the Golden Rule is unattainable, we establish an intuitive sufficient condition for a positive optimal corporate tax rate that depends on a minimum – albeit partial – amount of expensing.

MPW is also quantitatively relevant. In a stylized calibration of the U.S. economy,

[3]It is worth noting that our framework abstracts from other sources of corporate profits, such as the return on risk taking. For instance, if loss offsetting provisions in the tax code are imperfect, the corporate tax would discourage investment in the presence of risk, implying a lower optimal tax rate. Similarly, the existence of quasi-rents from innovation may also lower the optimal tax rate.

[4]See, for example, Atkeson, Chari, and Kehoe (1999).

[5]See, for example, Stiglitz (1973).

we show that the crowding out effects from MPW are not only sizable but also significantly amplify the static misallocation effects due to the markup alone. We also show that these large MPW effects may imply that the constrained optimal corporate tax rate is high. For example, when the tax base design allows firms to deduct 30 percent of investment expenses from their tax liabilities, the optimal corporate tax rate that maximizes consumption is 52%. The optimal corporate tax rate is even higher for empirically relevant calibrations of the tax base: when the investment expensing rate is 75%, the optimal tax rate is nearly 70%.

This paper is related to previous papers that have separately extended the textbook OLG to include imperfect competition and a stock market. Our two-period OLG with imperfect competition is similar to Ball and Mankiw (2022), which also studies the aggregate effects of markups, albeit with a different focus on the impact of government debt and without a stock market. Our specification of the stock market is similar to Magill and Quinzii (2003). From a modeling perspective, our framework differentiates itself from these previous papers by considering both imperfect competition and a stock market together and studying how these two features interact in general equilibrium.

The relationship between asset prices and market power, on which our model is based, is well established in the empirical industrial organization literature, for example, in Lindenberg and Ross (1981) and Salinger (1984). These studies use Tobin's Q to measure monopoly power and examine the link between market structure and profitability.

More recently, Tobin's Q has been used to empirically explain macro-finance trends in wealth, markups, and factor shares (Greenwald, Lettau, and Ludvigson 2019; Kerspien and Madsen 2024). The link between Tobin's Q and these macro-finance trends has also been studied in Ramsey-type economies, as seen in Lafourcade (2003), Farhi and Gourio (2018), and Eggertsson, Robbins, and Wold (2021). However, in these models, market power does not generate general equilibrium (GE) effects beyond the standard partial equilibrium (PE) distortion from markups. This is because the Ramsey framework assumes infinitely elastic asset demand, meaning that while MPW is implicitly present and affects asset valuations, it does not produce any GE effects.

In contrast, in our model, the expansion of asset supply driven by market power rents generates meaningful GE effects due to the finite asset demand elasticity in our OLG setup. A similar mechanism is present in Brun and Gonzalez (2017), as well as in Brun, Gonzalez, and Montecino (2023), who use Aiyagari-type economies, although these papers focus on aggregate distributional effects but do not consider optimal policy.

Our paper is also related to previous work on optimal taxation in the presence of imperfect competition. Judd (1997; 2002) argues using a Ramsey-style framework that the existence of market power implies that capital should be *subsidized*, with revenue financed from taxes on labor income and other sources. Others have used similar frameworks to show that the optimal capital tax rate may be positive under certain conditions when labor taxes are sufficiently distortionary and profits are a large potential source of revenue (Guo and Lansing 1999; Atesagaoglu and Yazici 2021). The key difference from our paper is that in these models taxing rents has no purpose *per se*, besides financing capital subsidies aimed at correcting markup distortions, which can sometimes give rise to tradeoffs if policymakers cannot perfectly distinguish between rents and the returns to capital. In contrast, rents in our model give rise to crowding-out effects in general equilibrium that go beyond the standard markup distortions. Optimal tax policy in our model is thus driven by a motive to reduce these crowding-out effects and encourage capital accumulation, even when abstracting from a need to finance revenue.

In contemporaneous work, Eeckhout et al. (2021) show that market power is an important factor for optimal labor and profit taxes in a setting with oligopolistic competition and rich household and firm heterogeneity. Eeckhout et al. derive optimal tax formulas that depend on the classic equity-efficiency trade-off, a Pigouvian motive to correct externalities from market power, and a reallocation effect, in which taxes reallocate factors of production from low productivity to high productivity firms. Notably, their paper finds that the trend of rising markups since the 1980s has led to a higher optimal profit tax rate. While our paper also provides a rationale for a high optimal tax on profits, our theoretical mechanism is based on the existence of MPW and does not depend on a social preference for redistribution, as in their model. Another noteworthy difference between our results is that, while the Pigouvian motive pushes the optimal tax rate downwards in Eeckhout et al.'s framework, correcting the externalities from MPW is a motive for *higher* optimal tax rates in our model.

The remainder of the paper is structured as follows. Section 2 introduces the model and describes its equilibrium properties. Section 3 studies optimal corporate taxation in our framework. Section 4 discusses a stylized calibration and reports tentative optimal corporate tax estimates from the model. The final section concludes.

2 The Model

Consider an economy that is identical to the canonical Diamond (1965) model except for two minor but essential differences. First, firms are assumed to have market power in product markets and as a consequence prices are set as a fixed markup over marginal costs. Second, we assume that households do not own the productive capital directly but instead save by buying equity shares of firms. In what follows, we will focus exclusively on fundamental equilibria, abstracting from the potential for bubbles.[6]

[6] It can be shown that bubbles in the equity price of the firm are possible in our setting and can give rise to multiple steady-states and indeterminacy. Since our focus in this paper is on the fundamental properties of MPW and its implications for corporate tax policy, we do not pursue the topic of non-fundamental equilibria in the main body of the text. We refer interested readers to Appendix B, which describes additional results on the existence of bubbles and the model's transitional dynamics.

Households A generation born at time t consists of N_t households. We assume that population grows at an exogenous rate n and that preferences are described by

$$U_t = \ln c_t^y + \beta \ln c_{t+1}^o$$

where c_t^y and c_{t+1}^o denote consumption during youth and old-age, respectively, and $\beta \in (0,1)$ is the subjective discount rate. Their budget constrains during each period of life are

$$c_t^y = W_t - x_{t+1}V_t + T_t^y \tag{1a}$$
$$c_{t+1}^o = x_{t+1}(D_{t+1} + V_{t+1}) + T_{t+1}^o \tag{1b}$$

Young households earn wage income W_t and save for retirement by purchasing x_{t+1} equity shares at a price V_t. During retirement, households receive dividends D_{t+1} and sell their equity stakes at the price V_{t+1}. We will assume throughout that the aggregate number of shares is exogenously fixed and normalize this quantity to unity (i.e. $N_t x_{t+1} = 1$). During both periods, households also potentially receive lump-sum government transfers T_t^y and T_{t+1}^o.

Household savings $s_t = x_{t+1}V_t$ are pinned down by the following Euler equation:

$$\frac{c_{t+1}^o}{c_t^y} = \beta \left[\frac{D_{t+1} + V_{t+1}}{V_t}\right] = \beta R_{t+1} \tag{2}$$

where the second equality has defined the *return on equity* $R_{t+1} \equiv (D_{t+1} + V_{t+1})/V_t$. Savings are therefore given by:

$$s_t = x_{t+1}V_t = \left(\frac{1}{1+\beta}\right)\left(\beta[W_t + T_t^y] + \frac{T_{t+1}^o}{R_{t+1}}\right) \tag{3}$$

Final Good Firms The final consumption good is produced by a continuum of perfectly competitive firms employing a CES production function:

$$Y_t = \left(\int_0^1 Y_t(i)^{\frac{\rho-1}{\rho}} di\right)^{\frac{\rho}{\rho-1}}$$

where $Y_t(i)$ denotes inputs of a differentiated intermediate good $i \in [0,1]$. The inverse demand for variety i is thus given by:

$$p(i) = P\left(\frac{Y(i)}{Y}\right)^{-\frac{1}{\rho}} \tag{4}$$

where $p(i)$ is the price of variety i and $P = 1$ is the price index and numeraire.

Corporate Sector Firms produce their differentiated variety using a Cobb-Douglas production function:

$$Y_t(i) = K_t(i)^{\alpha} L_t(i)^{1-\alpha} \tag{5}$$

where $\alpha \in (0,1)$. Unlike households, firms own their productive capital directly and accumulate it according to:

$$K_{t+1}(i) = (1-\delta)K_t(i) + I_t(i) \tag{6}$$

where $\delta \in [0,1]$ is the physical depreciation rate and $I_t(i)$ refers to investment. Firms are assumed to distribute dividends to shareholders:

$$D_t(i) = \pi_t(i) - I_t(i) - \tau \mathcal{B}_t(i)$$

where $\pi_t(i) = p_t(i)Y_t(i) - W_t L_t(i)$ denotes gross profits. Firms pay corporate taxes $\tau \mathcal{B}_t(i)$, where $\tau \in [0,1]$ is the corporate tax rate and $\mathcal{B}_t(i)$ is their tax base, defined as:

$$\mathcal{B}_t(i) = \pi_t(i) - \psi I_t(i)$$

which allows firms to deduct a fraction $\psi \in [0,1]$ of the cost of investment.

While households only live for two periods, firms exist over an infinite horizon and transfer ownership claims on their production decisions through the stock market. We assume that firm's act in the best interest of their current shareholders. While the labor input decision is contemporaneous, capital is assumed to take one period to install and hence today's investment I_t affects the resale value of the firm $V_t(i)$. This implies that the firm's problem can be expressed as:

$$\max_{L_t(i), I_t(i)} \; D_t(i) + V_t(i)$$

subject to $V_t(i) = (D_{t+1}(i) + V_{t+1}(i))/R_{t+1}$ and (6). The firm's first-order condition for the choice of labor is given by:

$$W_t = \left(\frac{1-\alpha}{\mu}\right) p_t(i) k_t(i)^{\alpha} \tag{7}$$

where $k_t(i)$ is the capital-labor ratio and $\mu \equiv \rho/(\rho-1)$ is the markup. The FOC for the choice of capital K_{t+1} is:

$$R_{t+1} = \left(\frac{1-\tau}{1-\psi\tau}\right)\left(\frac{\alpha}{\mu}\right) p_{t+1}(i) k_{t+1}(i)^{\alpha-1} + 1 - \delta \tag{8}$$

Government To close the model, we assume that government spending is completely unproductive. That is

$$T_t^y N_t = 0 \qquad \text{and} \qquad T_t^o N_{t-1} = 0$$

This assumption serves two purposes. First, it sidesteps the need to specify the distribution of transfers between generational cohorts. Second, it focuses attention on the core macroeconomic issue of taxing market power wealth, independently of how those tax revenues are spent and subsequently affect household savings. We will relax this assumption below when we turn to optimal tax policy.

General Equilibrium To keep things simple, we will restrict our attention to a symmetric equilibrium. It follows that $p_t(i) = P_t = 1$, $Y_t(i) = Y_t$, and so on for all $i \in [0, 1]$. An equilibrium in this economy consists of allocations $\{K_t, L_t\}$ and prices $\{W_t, V_t\}$ for $t = 0, 1, \ldots$ such that:

- Firms satisfy the first-order conditions (7) and (8);
- Households satisfy their Euler equation (2);
- The markets for labor, goods, and equity clear;

for a given tax code $\boldsymbol{z} = (\tau, \psi)$.

Steady State We now characterize the properties of the economy's long-run steady state. A steady state in this economy can be represented as a capital-labor ratio k^* such that per worker savings equal stock market capitalization. Let $s(k)$ denote per capita savings from equation (3) and $v(k, \boldsymbol{z})$ stand for steady state per capita equity valuation given k and tax code $\boldsymbol{z}$. The steady state is defined implicitly by:

$$s(k) = v(k, \boldsymbol{z}) \tag{9}$$

Lemma 1 (Firm valuation) *The steady state valuation of a firm can be expressed as:*

$$v = (1 + n)\left[(1 - \psi\tau)k + (1 - \tau)\xi\right] \tag{10}$$

where ξ denotes the net present value of market power rents and is given by:

$$\xi = \frac{\left(1 - \frac{1}{\mu}\right) k^{\alpha}}{r - n} \tag{11}$$

The equity price $v(k, \boldsymbol{z})$ is upward sloping, convex, and satisfies $\lim_{k \to \tilde{k}^-} v = \infty^+$.

Proof. See Appendix A.1. ■

Intuitively, Lemma 1 states that the market valuation of the firm – its equity price – is equal to the sum of two components: (i) the value of its productive capital net of effective taxes and (ii) the NPV of its market power rents net of statutory taxes. It is in this precise sense that a portion of household savings are held as "market power wealth." Combining the equilibrium condition (9) with (10), we can see that the existence of market power wealth directly *crowds out productive capital accumulation* by diverting savings towards unproductive rents:

$$k = \frac{s(k)}{(1-\psi\tau)(1+n)} - \left(\frac{1-\tau}{1-\psi\tau}\right)\xi(k, \boldsymbol{z})$$

A related implication of equation (10) is that the corporate tax will disproportionately fall on market power wealth ξ when investment expensing provisions are present $\psi \in (0,1)$. Put differently, the design of the corporate tax code allows policymakers to differentially target the market value of productive capital and unproductive rents. As a result, increasing the corporate tax can improve efficiency by reducing the crowding out effects arising from MPW.

It is worth noting that this model nests the original Diamond steady state in the special case with no market power and zero taxes. This is because when there is no markup (i.e. $\mu = 1$), MPW vanishes from the equity price equation (i.e. $\xi = 0$).[7] We will return to this point below in Section 4.

Example: No depreciation and zero population growth Before proceeding further with the equilibrium properties of the model, we present a tractable special case that yields closed-form solutions. Specifically, we assume that capital does not depreciate ($\delta = 0$), there is zero population growth ($n = 0$), and the parameters satisfy $\alpha > \mu - 1$. Combining equations (8)-(11), the equilibrium steady state capital stock k^* is given by:

$$k^* = \left[\frac{\left(\frac{\beta}{1+\beta}\right)\left(\frac{1-\alpha}{\mu}\right)}{(1-\psi\tau)\left(1-\frac{\mu-1}{\alpha}\right)}\right]^{\frac{1}{1-\alpha}} \tag{12}$$

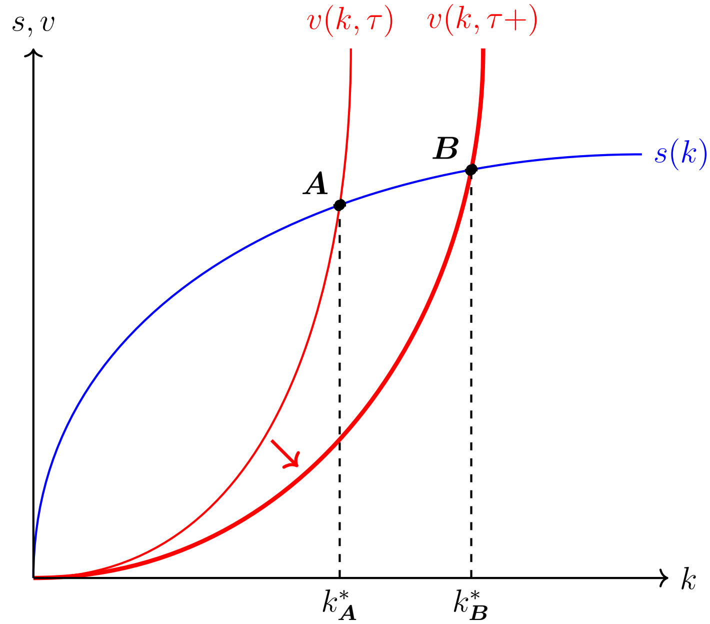
An immediate implication is that, for a given investment deduction rate $\psi \in (0,1]$, *increasing the corporate tax rate τ is always expansionary.* Moreover, it can be shown that in this special case increasing the corporate tax rate always increases aggregate consumption since the Golden Rule of capital satisfies $k^{GR} \to \infty^+$.

General Equilibrium Effects of Corporate Taxes We now focus on the properties of the steady state and the general equilibrium effects of corporate taxes in the general case with $\delta > 0$ and $n > 0$. As already noted, corporate taxes in our model have dramatically different macroeconomic effects than in textbook models. This is because, depending on the expensing parameter ψ, the corporate tax may primarily

[7] To see this, set $\mu = 1$ and note that market power wealth (11) vanishes $\xi = 0$. Thus, with $\tau = 0$, we can solve (9) to obtain

$$k^*|_{\mu=1} = \left[\left(\frac{\beta}{1+\beta}\right)\left(\frac{1-\alpha}{1+n}\right)\right]^{\frac{1}{1-\alpha}}$$

Figure 1: Expansionary Corporate Tax Increase ($\uparrow \tau$)



fall on the NPV of unproductive rents. Moreover, increasing the corporate tax rate can reduce the crowding out effects from market power wealth and thus stimulate aggregate investment.[8]

The general equilibrium effect of increasing the corporate tax rate can be characterized by implicitly differentiating the equity market clearing condition (9) evaluated at the steady state:

$$\left.\frac{dk^*}{d\tau}\right|_{k^*} = -\frac{v_\tau}{v_k - s_k} \tag{13}$$

where the notation v_τ, for instance, refers to the partial derivative of v with respect to τ. Since the denominator is unambiguously positive, the sign of $dk^*/d\tau$ will depend on the sign of the partial equilibrium effect on the equity price v_τ:

$$v_\tau = -(1+n)\left[\psi k + \xi - (1-\tau)\xi_\tau\right]$$

Here, $\xi_\tau > 0$ is the partial derivative of ξ with respect to the tax rate τ. It can be shown that the second derivative $\xi_{\tau\tau} > 0$. It therefore follows that the sign of v_τ and by extension $dk^*/d\tau$ are ambiguous and depend on the levels of τ and ψ. In particular, increasing the corporate tax will reduce asset prices and stimulate capital accumulation $dk^*/d\tau > 0$ if τ is not initially too large or if expensing ψ is sufficiently high.

[8] It is worth noting that the corporate tax rate would still be expansionary in our model if market power was absent (i.e. with $\mu = 1$) so long as investment is partially expensible. In this respect, there are two necessary conditions to overturn the textbook result that the corporate tax is contractionary: assuming a finite elasticity of equity demand (as in our OLG setting) and at least partial investment expensing.

This logic can be seen in Figure 1, which depicts the equity market clearing condition, restricting our attention to the region with a fundamental steady state. Suppose the corporate tax is increased from some level τ to τ^+. As can be seen in the figure, the higher corporate tax decreases the firm's equity value for a given capital-labor ratio. This corresponds to a downward shift in the $v(k, \tau)$ schedule. In general equilibrium, this lowers the return on equity and therefore reduces the cost of capital for firms. The result is a change from steady state $\boldsymbol{A}$ to $\boldsymbol{B}$, corresponding to a higher steady state capital-labor ratio.[9]

Relation to Textbook Models To understand why our general equilibrium result is qualitatively different from a more familiar textbook model, we can express the firm's demand for capital from (8) as a function $k^* = k(r, \boldsymbol{z})$ of the return on equity r and the tax code parameters $\boldsymbol{z} = (\tau, \psi)$. With a finite elasticity of savings, in general equilibrium the equity return is itself a function of $\boldsymbol{z}$. We can therefore express the aggregate effect of the corporate tax as the sum of two effects:

$$\frac{dk}{d\tau} = \underbrace{k_\tau}_{(-)} + \underbrace{k_r \frac{dr}{d\tau}}_{(+)}$$

The first component $k_\tau \leq 0$ is the direct partial equilibrium effect on the demand for capital, which has the conventional negative sign when $\psi \in [0, 1)$ and equals zero with full expensing $\psi = 1$. Thus, as in most standard models, a higher corporate tax rate distorts the investment decision, raising the cost of capital and reducing investment demand. However, this conventional contractionary effect can be outweighed by the second term above, which captures the general equilibrium effect. This second component is positive since $dr/d\tau < 0$ and $k_r < 0$. If the general equilibrium effect dominates, the net aggregate effect will be expansionary – that is, $dk/d\tau > 0$.

3 Optimal Corporate Tax Policy

We now study the design of optimal corporate tax policies in the presence of market power wealth. For simplicity, we restrict our attention to tax codes that maximize per capita aggregate consumption in a steady state.[10] This allows us to focus exclusively on the long-run efficiency implications of taxing market power wealth, but implies that we ignore costs along the transition path.

[9] It is worth noting that Figure 1 is drawn under the assumption of unproductive government spending. As discussed above, this isolates the effect of taxing MPW, producing a single shift in the equity price schedule. If we were to allow for transfers to young households, as we do below in Section 3, the higher tax rate would additionally produce a shift in the savings schedule, potentially amplifying the general equilibrium effect on the capital-labor ratio.

[10] Focusing instead on an alternative normative criterion such as steady-state welfare yields qualitatively similar results, albeit at the expense of analytical tractability.

In the analysis that follows, we modify one assumption from the previous section and assume that tax revenues are rebated lump-sum to generations during their youth. Thus, the government must now satisfy a balanced budget constraint $N_t T_t^y = \tau \mathcal{B}_t$, which states that aggregate transfers $N_t T_t^y$ must equal aggregate corporate tax revenues $\tau \mathcal{B}_t$. The balanced budget constraint can be expressed alternatively in per capita terms as:

$$T_t^y = \tau b_t \tag{14}$$

where b_t refers to the per capita corporate tax base and in a steady state is equal to

$$b = \left[1 - \frac{1-\alpha}{\mu}\right] k^\alpha - \psi(n+\delta)k \tag{15}$$

Using the household budget constraints (1), the normalization $N_t x_{t+1} = 1$, and the government's budget constraint (14), aggregate per capita consumption is equal to:

$$C(k) \equiv c^y + \frac{c^o}{1+n} = k^\alpha - (n+\delta)k \tag{16}$$

Golden Rule Benchmark Consider a planner who can choose the economy's capital-labor ratio directly in order to maximize (16). The optimal capital-labor ratio k_{GR} satisfies the famous Golden Rule $\alpha k^{\alpha-1} = n + \delta$, which equates the marginal product of capital to the rate of population growth plus depreciation. As in the textbook OLG model, there is no reason for the decentralized steady state to converge to k_{GR}. In fact, in the absence of corporate taxation, the economy will never converge to the Golden Rule.

Proposition 1 (Impossibility of the Golden Rule) *Suppose corporate taxes are zero $\tau = 0$. Then k^{GR} is not a decentralized steady state.*

Proof. The proposition follows from the definition of k_{GR} and by noting that when the Golden Rule is satisfied the effective rate of return is

$$r_{GR} - n = \left(\frac{\alpha}{\mu}\right) k_{GR}^\alpha - \delta - n \;\Rightarrow\; r_{GR} - n = -\left[1 - \frac{1}{\mu}\right](n+\delta)$$

Using (10) and the definition of market power wealth (11), we can express the steady state equity price at the Golden Rule capital stock as:

$$v_{GR} = -(1+n)k_{GR}\left(\frac{1-\alpha}{\alpha}\right) < 0$$

which is clearly negative for $\alpha \in (0,1)$. Since, by free disposal, the equity price must be non-negative it follows that $k = k_{GR}$ cannot be an equilibrium. ■

Unconstrained Tax Policy We now characterize optimal corporate tax policy when policymakers are unconstrained and free to choose any feasible tax code (τ, ψ). The policymaker's problem consists of choosing (τ, ψ) in order to maximize aggregate per capita consumption subject to the economy's implementability constraint $k^* = k(\tau, \psi)$. Formally, the policymaker's problem can be stated as:

$$\max_{\{\tau,\psi\}} C(k) = k^\alpha - (n+\delta)k \quad \text{subject to} \quad k^* = k(\tau, \psi) \tag{17}$$

Lemma 2 (Implementation with $\tau = 1$) *Let $\tau = 1$ and $\psi \in [0,1]$. The unique steady state capital-labor ratio is given by:*

$$k(\psi) = \left[(1+n)(1-\psi) + \left(\frac{\beta}{1+\beta}\right)(n+\delta)\psi\right]^{\frac{1}{\alpha-1}} \tag{18}$$

which is increasing $\forall\ \psi \in [0,1]$.

Lemma 2 establishes that when the corporate tax rate is set at 100%, the steady state capital-labor ratio is an increasing function of the investment expensing rate ψ. This is because setting $\tau = 1$ completely taxes away the market power wealth and leaves ψ free to target investment. It follows that the policymaker can target any capital-labor ratio in the interval $[k(0), k(1)]$ by setting $\tau = 1$ and choosing an appropriate expensing rate $\psi \in [0,1]$.

Proposition 2 (Golden Rule Tax Code) *Suppose that $\alpha > (n+\delta)/(1+n)$. The Golden Rule capital-labor ratio k_{GR} that maximizes aggregate steady state consumption (16) can be implemented by a tax code $(\hat{\tau}, \hat{\psi})$ characterized by*

- *An 100% corporate tax rate $\hat{\tau} = 1$;*
- *a partial investment expensing rate $\hat{\psi} \in (0,1)$*

where the optimal expensing rate is equal to:

$$\hat{\psi} = \frac{\left(\frac{1+n}{n+\delta}\right) - \frac{1}{\alpha}}{\left(\frac{1+n}{n+\delta}\right) + \left(\frac{\beta}{1+\beta}\right)} \tag{19}$$

Proof. The proof follows directly from Lemma 2 and the definition of the Golden Rule capital-labor ratio, which maximizes aggregate consumption when $\alpha k_{GR}^{\alpha-1} = n+\delta$. Using this condition, setting $\tau = 1$, and rearranging the implementability constraint (18), we get:

$$k(\psi)^{\alpha-1} = \frac{n+\delta}{\alpha} = (1+n)(1-\psi) + \theta(n+\delta)\psi$$

where we defined $\theta = \beta/(1+\beta)$. Solving for ψ yields equation (19). Since the denominator is clearly greater than one, the numerator must be positive, which requires $\alpha > \left(\frac{n+\delta}{1+n}\right)$. ■

The preceding proposition states that a tax code featuring an 100% corporate tax rate and partial expensing implements the Golden Rule and is optimal in the sense that it solves the policymaker's problem (17). This result follows from Lemma 2, which establishes that any capital-labor ratio $k(\psi) \in [k(0), k(1)]$ can be implemented as a decentralized steady state with an appropriately chosen expensing rate ψ.

Intuitively, the optimal tax code completely taxes away the MPW embedded in the equity price. This eliminates the crowding out effects on productive capital accumulation. While the tax rate τ is assigned to correcting the distortions from market power, the investment expensing rate ψ is chosen to subsidize investment at the socially appropriate amount.[11]

Constrained Corporate Tax Policy We now examine the welfare implications of corporate taxes in the empirically relevant case when policy is constrained, with the tax on corporate profits being less than 1 and a fixed expensing rate – that is, $\tau < 1$ and $\bar{\psi} \in [0, 1]$.

Lemma 3 (Steady State Underaccumulation) *Let $\tau \in [0, 1)$ and $\psi \in [0, 1]$. The steady state always features under accumulation. That is, $k^* < k_{GR}$ is always satisfied.*

Proof. See Appendix A.2. ■

Lemma 3 establishes that when policy is constrained such that $\tau \in [0, 1)$, the steady state features a capital-labor ratio k^* that is inefficiently low relative to the Golden Rule level that maximizes steady state consumption. It is worth noting that this contrasts with the textbook Diamond model, in which both under and overaccumulation are possible steady state outcomes. An immediate implication is that a policy intervention that maximizes k^* also maximizes aggregate consumption in a constrained sense.

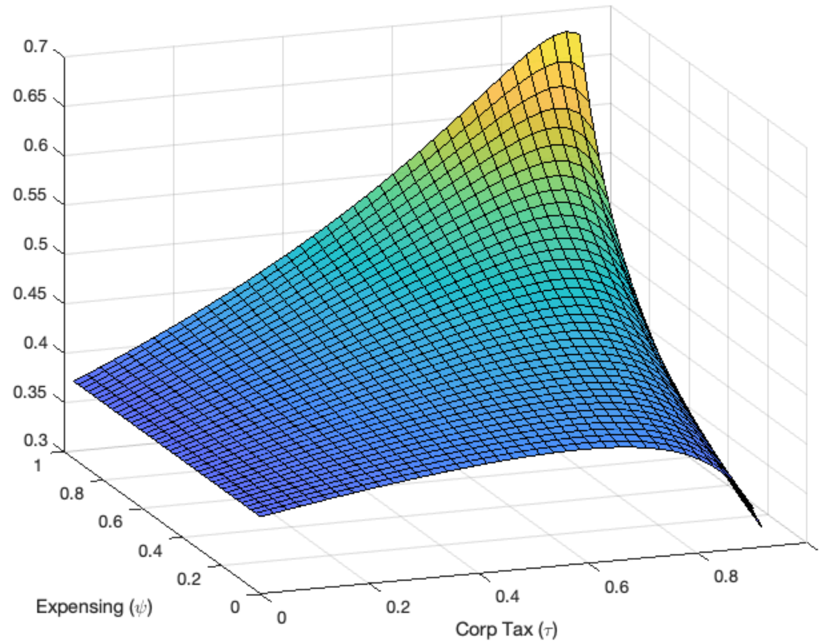
Proposition 3 (Optimal Corporate Tax Rate) *Suppose the corporate tax rate is constrained such that $\tau \in [0, 1)$ and the expensing rate is fixed $\bar{\psi} \in [0, 1]$. The constrained policymaker's problem consists of solving*

$$\max_{\tau \in [0,1)} C(k) \quad s.t. \quad k^* = k(\tau, \bar{\psi})$$

where k^* refers to the steady state given $(\tau, \bar{\psi})$.

[11] It is worth noting that when $\tau = 1$ and, consequently, the value of MPW is zero, the steady state may feature overaccumulation, as in the standard Diamond model. This is why the optimal tax code features a partial investment expensing rate $\hat{\psi} \in (0, 1)$, as it is not socially desirable to stimulate capital accumulation in excess of the Golden Rule level.

Figure 2: Aggregate consumption $C(k)$ in (τ, ψ)-space



The optimal corporate tax rate (i) maximizes the long-run capital-labor ratio k^* and (ii) is positive $\tau^* > 0$ if the following sufficient condition is satisfied:

$$\bar{\psi} > \frac{n + \delta}{r + \delta}$$

Proof. See Appendix A.3. ■

An implication is that when $\tau = 1$ is infeasible and the choice of the tax base is constrained, it may nevertheless be optimal to set a positive long-run corporate tax rate. Proposition 3 establishes that the optimal corporate tax rate will be positive if the fixed expensing rate is above a certain threshold. It is worth emphasizing that the optimal tax rate may still be positive in cases with $\psi = 0$ in which the sufficient condition is not met as long as the corporate tax base b and the savings rate $\beta/(1 + \beta)$ are sufficiently large.

The intuition for these results are depicted graphically in Figure 2, which shows how the two tax code instruments (τ, ψ) interact to determine steady state aggregate consumption $C(k)$. As can be seen in the figure, $C(k)$ is increasing in τ even at low expensing rates. In addition, the optimal corporate tax rate is itself larger as the expensing provisions become more generous.

Discussion of Results and Role of Assumptions Although we have intentionally kept our model simple, it is reasonable to wonder if the transparency and analytical tractability we have gained comes at the expense of generality to alternative assumptions. We now briefly discuss a few noteworthy theoretical channels missing from our model that may be relevant for corporate taxation.

First, our model does not feature endogenous growth from innovation, as in Schumpetarian models *à la* Aghion and Howitt (1992). In this class of models, innovation is incentivized by the existence of quasi-rents, as innovators gain temporary monopoly profits after successfully inventing a new product vintage. Since the value of innovating is driven by monopoly rents, corporate taxation would likely decrease the rate of innovation and economic growth. The optimal corporate tax rate would also likely be lower in a model featuring this mechanism, though potentially still positive and sizable depending on the strength of our MPW channel.

However, it is worth noting that the corporate tax, as in the case of capital investment, may be similarly non-distortionary for innovation if one allows for sufficient expensing of R&D expenditures. This point is made by Peretto (2007) using a Schumpetarian growth model. In fact, in Peretto's model the corporate tax rate can actually stimulate innovation and economic growth. On the other hand, full expensing of R&D may not be necessarily desirable from a policy perspective if R&D is a source of rents and supernormal profits, as argued by Avi-Yonah (2024).

Second, our model abstracts from firm heterogeneity and therefore does not feature a distribution of markups. Several papers have documented that the rise of market power over recent decades has largely been driven by a few large firms (Van Reenen 2018; De Loecker, Eeckhout, and Unger 2020a; Autor et al. 2020) and that large firms also explain most of the rise in valuation ratios, such as Tobin's Q (Crouzet and Eberly 2023). Our theoretical mechanism would remain relevant in a modified setting with markup heterogeneity. This is because the general equilibrium channel operates through the aggregate price of equity, which has implications for the cost of capital for all firms.

One way firm heterogeneity might push the optimal corporate tax rate downward is factor reallocation effects between low and high productivity firms in response to policy changes. This mechanism is present in models with oligopolistic competition and endogenous markups, as in Eeckhout et al. (2021). A core consideration for corporate tax policy in this context is the targeting of rents. Designing the tax base to capture rents allows policymakers to account for high market power rents by design. In sum, while our model assumes a representative sector for simplicity, its mechanism remains well-suited for real-world scenarios with richer heterogeneity.

Third, we do not consider labor supply effects from market power. Endogenizing the labor supply decision in our model would most likely not qualitatively alter our results. An expansionary corporate tax increase in our framework would still boost investment, raising wages and producing a positive labor supply response. Perhaps more relevant in a setting with market power are the consequences of combining an endogenous labor supply with monopsony power. In this case, the resulting monopsonic wage markdowns would represent an additional source of rents and would boost the financial value of MPW. We conjecture that an extension with monopsony power would amplify our general equilibrium effect and push the optimal corporate tax upwards.

Finally, our model omits risk, which is an important and empirically relevant source of corporate profits that likely operates in the opposite direction of our MPW channel. Indeed, if investment is risky and corporate profits partially reflect the return on risk-taking, corporate taxes would tend to discourage investment. This channel would therefore push the optimal tax rate down. On the other hand, if loss offsetting provisions are significant, then the tax authority effectively shares a portion of the investment risk. This is the well-known Domar-Musgrave effect (Domar and Musgrave 1944). If this risk-sharing effect is large enough, a higher corporate tax rate could actually increase investment.

4 Stylized Calibration

This section presents the results from a stylized quantitative exercise calibrated to fit the U.S. economy. We modify the model in two ways. First, we introduce trend productivity growth into the production function

$$Y_t = K_t^{\alpha}(A_t L_t)^{1-\alpha}$$

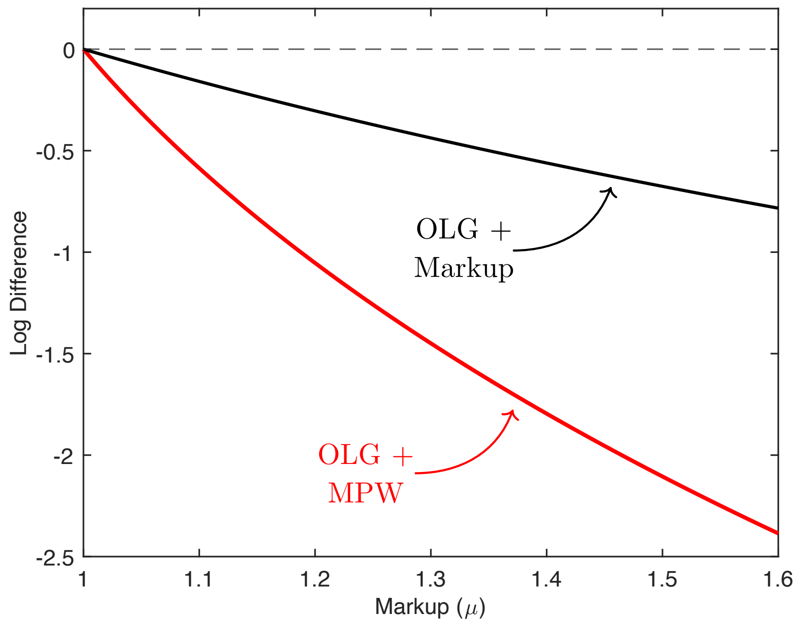
where technology A_t is assumed to augment labor and grows exogenously according to $A_{t+1}/A_t = 1 + a$. Second, we relax the assumption of logarithmic utility and allow a non-unitary intertemporal elasticity of substitution $\sigma \neq 1$. This entails the following modified saving function for young households:

$$s(W, R, T^y) = \frac{W + T^y}{1 + \beta^{-\frac{1}{\sigma}} R^{1-\frac{1}{\sigma}}}$$

Our baseline calibration is parameterized as follows:

- Capital share of output – $\alpha = 1/3$
- Markup – $\mu = 1.15$
- Population growth rate – $n = 0.1$
- Productivity growth rate – $a = 0.3$
- Depreciation rate – $\delta = 0.1$
- Discount factor – $\beta = 0.8$

Figure 3: Long-run k^* relative to competitive benchmark ($\mu = 1$)



These parameters were chosen in order to roughly target an annual rate of return of 4 percent and a Tobin's Q ratio of 1.8. It is worth noting that the population growth rate, which is set at $n = 0.1$, should be interpreted as a 10 percent increase in a generational cohort size. Similarly, the productivity growth rate is calibrated to reflect a 30 percent increase in productivity between generational periods.

The markup is calibrated at a conservative 15 percent (i.e. $\mu = 1.15$). This value is below the benchmark estimate for the U.S. in De Loecker, Eeckhout, and Unger (2020a) but above other estimates in the empirical literature.[12] We also report optimal tax results over a grid of markups, ranging from $\mu = 1.1$ to as high as $\mu = 1.7$.

Crowding Out Effects We demonstrate the quantitative significance of the market power wealth mechanism by calculating the crowding out effect on the steady state capital stock. As already noted, our model nests the textbook OLG model in the special case with perfect competition (i.e. $\mu = 1$). We therefore calculate the log difference between the long-run capital-labor ratio k^* in our model featuring market power wealth and the competitive benchmark, which we label as k^C. This is shown in Figure 3, which depicts the log difference $\log k^* - \log k^C$ in red for a range of possible markups μ.[13]

As can be seen in the figure, even moderate markups imply substantial crowding out effects. For example, a 10 percent markup (i.e. $\mu = 1.1$) implies a crowding out

[12] For a detailed discussion of the empirical literature on the estimation of markups, see Basu (2019).

[13] For a clean comparison with the textbook OLG, we set the corporate tax rate to zero in this exercise.

Table 1: Consumption and revenue maximizing corporate tax

	Consumption $C(k)$	Revenue $\tau b(k)$
Expensing:		
$\psi = 0.3$	0.52	0.77
$\psi = 0.75$	0.69	0.84
$\psi = 0.9$	0.78	0.89
Golden Rule Tax Code:		
$\hat{\tau}$	1	
$\hat{\psi}$	0.42	

effect of nearly 60 log percentage points. As a reference, we also provide results for a modified version of the Diamond model featuring imperfect competition but no market power wealth. This is shown in black. As can be seen in the figure, market power wealth greatly amplifies the static misallocation effects due to the markup alone.

Optimal Taxes We now present quantitative estimates of the optimal corporate tax implied by our model in the stylized calibration. Unless noted otherwise, we restrict our attention to a constrained tax policy, when $\tau = 1$ is ruled out. For a given expensing rate ψ, we calculate two conceptually different optimal corporate taxes. The first is the tax τ that maximizes aggregate consumption $C(k)$, whose properties were characterized analytically above in Section 3.[14] The second is the corporate tax that maximizes total government revenues (i.e. $\max_\tau \tau b(k) \;\; s.t. \; k^* = k(\tau)$).

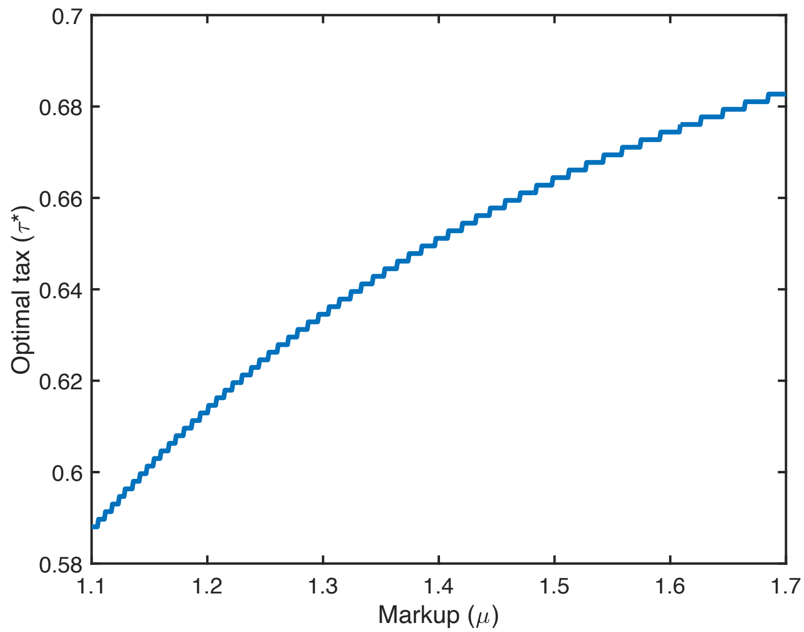
The consumption and revenue maximizing corporate tax rates are reported in Table 1. As can be seen in the table, the consumption maximizing tax rate is quite high, even at a modest investment expensing rate. For instance, when 30 percent of investment can be deducted (i.e. $\psi = 0.3$), the consumption maximizing corporate tax is around 50 percent. The second column of Table 1 reports the revenue maximizing corporate tax rate. As can be seen in the table, this rate tends to be substantially higher than the consumption maximizing rate, ranging from 77 percent when $\psi = 0.3$ to as high as 89 percent when $\psi = 0.9$.

Though this calibration is highly stylized, it suggests that the current U.S. corporate tax rate is below the optimal rate implied by our model. Indeed, the effective investment expensing rate is substantial for certain categories of investment. For instance, the expensing rate is around 80 percent for investments in equipment.[15] Since the current statutory tax rate is 21 percent, this implies that τ could more than double without compromising capital accumulation.

[14] It is worth recalling that, following Lemma 3, the tax that maximizes the capital-labor ratio necessarily also maximizes aggregate consumption.

[15] It is worth noting that the *Tax Cuts and Jobs Act* of 2017 temporarily raised the equipment investment expensing rate to 100 percent, with a gradual phasing out. See R. J. Barro and Furman (2018) for a detailed discussion of the policy details and their effects on the user cost of capital.

Figure 4: Optimal corporate tax τ^* as a function of the markup μ



As a reference, the bottom of Table 1 also reports the unconstrained tax code that implements the Golden Rule, as described in Proposition 3, for our benchmark parametrization. The unconstrained optimal corporate tax is 100 percent, completely taxing away the existence of market power wealth. Calculating $\hat{\psi}$ according to equation (19), the optimal expensing rate is around 42 percent.

We carry out a series of sensitivity tests on how the calculated optimal tax depends on the parameters of the model. Figure 4 depicts the constrained optimal tax τ^* as a function of the markup μ. As can be seen, the optimal tax is increasing for higher values of the markup, ranging from around 59 percent when $\mu = 1.1$, to as high as 68 percent for $\mu = 1.7$. Next, we examine the sensitivity of τ^* to alternative values of the intertemporal elasticity of substitution σ. This is reported in Table 2, along with alternative combinations of μ and ψ. Although the optimal corporate tax is indeed somewhat lower for smaller values of σ, it is nevertheless still close to 60 percent for a reasonable markup $\mu = 1.2$ and an expensing rate $\psi = 0.5$.

5 Conclusion

This paper has proposed a novel theory of how market power affects aggregate economic activity through its interaction with equity prices. In particular, we have shown through simple extensions of the textbook life-cycle model that the combination of imperfect competition and a stock market leads to strong crowding out effects on investment due to what we have termed "market power wealth." These general equilibrium effects on investment amplify the static allocative inefficiencies that typically

Table 2: Optimal tax sensitivity analysis

	Expensing		
	$\psi = 0$	$\psi = 0.5$	$\psi = 0.75$
$\sigma = 1.2$			
$\mu = 1.2$	0.48	0.63	0.72
$\mu = 1.5$	0.56	0.68	0.76
$\sigma = 1$			
$\mu = 1.2$	0.44	0.61	0.71
$\mu = 1.5$	0.52	0.66	0.75
$\sigma = 0.8$			
$\mu = 1.2$	0.38	0.59	0.70
$\mu = 1.5$	0.47	0.64	0.74

emerge in models with imperfect competition.

Our framework suggests that the optimal corporate tax is not only positive in the long-run but may be quite high depending on the design of the tax base and other factors such as the degree of market power in the economy. From a policy perspective, our results rationalize the idea that the corporate tax is a useful tool for correcting distortions arising from market power. Indeed, we show that contrary to traditional intuitions, raising the corporate tax rate can actually stimulate aggregate investment by "taxing away" market power wealth. This effect is all the more relevant when the tax code features generous expensing provisions for the cost of investment.

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