Micro vs. Macro Corporate Tax Incidence *

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Abstract

This paper studies the unequal incidence of corporate taxes across firms and its implications for macroeconomic outcomes. I develop a dynamic general equilibrium Harberger model with heterogeneous firms. I show that corporate tax cuts lead to stronger wage increases at capital-intensive firms, and that this heterogeneous effect, combined with general equilibrium dynamics, creates a discrepancy between micro and macro estimates of their impact on workers' income and welfare. I validate the core firm-level mechanisms using French administrative employer-employee data and multiple tax reforms. I use the reduced-form estimates to discipline the model, and quantify the short vs. long run, and micro vs. macro consequences of corporate tax reforms. When firm heterogeneity and general equilibrium dynamics are taken into account, workers bear a relatively small share of the aggregate corporate tax burden.

JEL codes: H22, H25, E22, E25

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1 Introduction

The steady decline in corporate tax rates in the OECD since 1980 (Figure 1) has motivated renewed interest in the question of how corporate tax reforms affect workers. Recent work on this issue has led to controversy and a lack of consensus: whereas studies dating back to Harberger (1962) using aggregate data find relatively little impact on workers, recent work using micro data has argued that there are large effects on workers (see, e.g., Fuest et al., 2018; Carbonnier et al., 2022; Kennedy et al., 2022). The goal of this paper is to understand the reason for these differing estimates and to assess the consequences of corporate tax reforms on workers' income and welfare.

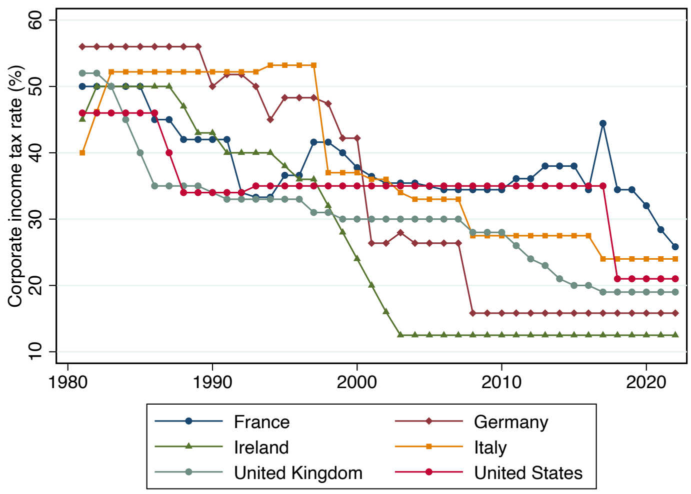
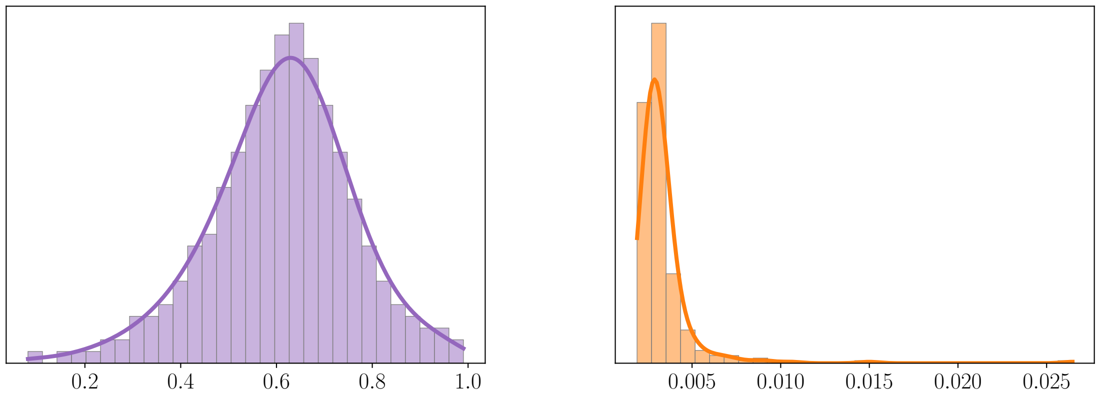


Figure 1: Top statutory corporate income tax rates

To study this question, I build a dynamic general equilibrium Harberger model with a monopsonistic labor market that explicitly models firm heterogeneity along two key dimensions: productivity and capital intensity. Because of its rich heterogeneity, the model can replicate the wide dispersion of size and labor share observed at the firm level (Figure 2), and identify heterogeneous and common components of wage responses that are missing from average micro elasticities that control for common trends. My main finding is that, following a corporate tax cut, the relative increase in wages captured by micro elasticities is substantial, while the general increase in wages, or "missing intercept", is much smaller. As a result, I estimate that changes in corporate taxes have a relatively limited impact on workers at the aggregate level.

Three key factors shape the aggregate effects of corporate tax reforms on work-



(a) Labor share

(b) Share of total employment

Figure 2: Distribution of firm labor shares and sizes in France

ers' income and welfare. First, the distribution of technologies across firms plays a crucial role in determining workers' wage gains. Unlike the traditional Harberger model, all firms in this economy are subject to the corporate income tax. However, its distortion is more pronounced at capital-intensive firms. Because of this unequal distortion, corporate tax cuts generate larger wage and employment responses at capital intensive firms. As these firms are typically larger and pay higher wages, firms' heterogeneous responses amplify the aggregate effects of corporate taxes on wages. Second, general equilibrium price dynamics influence the timing of wage adjustments. If wages respond slowly to a reform, a significant portion of workers' gains (or losses) in the labor market would be discounted, leading them to bear a smaller share of the corporate tax burden. The calibrated model quantifies these different channels and the role they play for the pass-through of corporate taxes to wages.

I derive closed-form solutions for the key elasticities that determine the incidence of corporate taxes at both the firm and aggregate levels. The results indicate that most of the cross-sectional heterogeneity can be captured by firms' labor share. At the aggregate level, the explicit expressions for macro elasticities reveal that they can be estimated with simple sufficient statistics which are based on the covariance between labor shares and firm size.

I validate the core predictions of the model using reduced-form evidence from French tax returns, covering all corporations and employees between 2009 and 2019. I leverage all corporate income tax changes in France during the sample period, and use the instrumental variable method developed by Gruber and Saez (2002) to estimate the elasticity of wages and wage bills with respect to the net-of-tax rate across the labor share distribution. The results reveal a significantly stronger response from capital-intensive firms.

I calibrate the model using these empirical elasticities, which I match by estimating the same reduced-form moments on data generated by the model. Moreover, I construct a model inversion technique inspired by the spatial economics literature (Redding and Rossi-Hansberg, 2017) to recover the non-parametric distribution of firm-level TFP and capital intensity. This method relies on the mapping between observable firm size and labor share and unobservable TFP and capital intensity derived from firm optimization.

Finally, I simulate a one percentage point cut in the corporate income tax rate and quantify its impact on the consumption and welfare of workers, shareholders, and capital owners. While using micro elasticities into a standard incidence formula suggests that workers bear 29% of the tax burden, accounting for firm heterogeneity and general equilibrium dynamics cuts this share by half. The quantitative results show that a significant average pass-through of corporate taxes to wages at the microeconomic level does not necessarily imply that workers bear a large portion of the overall corporate tax burden.

This paper is related to the theoretical literature that studies the incidence of corporate taxes. Following the seminal work of Harberger (1962), several papers (see Gravelle (2013) and Auerbach (2018) for comprehensive surveys) have developed general equilibrium models with a representative firm subject to the corporate income tax, and outside firms which represent either the non-corporate sector (Batra, 1975; Shoven, 1976; Ratti and Shome, 1977a,b; Baron and Forsythe, 1981; Atkinson and Stiglitz, 2015), or the rest of the world (Mutti and Grubert, 1985; Kotlikoff and Summers, 1987; Randolph, 2006). I also build on the literature that studies the role of capital accumulation and dynamics for the welfare consequences of capital taxation (Feldstein, 1974; Boadway, 1979; Turnovsky, 1982; Judd, 1985). Compared to these papers, the present analysis examines the importance of firm and worker heterogeneity for corporate tax incidence and its estimation.

More recently, Suárez-Serrato and Zidar (2016) have built a static general equilibrium model which combines heterogeneous firm and location-specific productivity with corporate taxation. I investigate the role of another source of firm heterogeneity, capital intensity, within a dynamic general equilibrium framework. This paper is also closely related to Swonder and Vergara (2024), who introduce a similar dimension of heterogeneity. The present framework allows for the explicit derivation of the key macro elasticities from firm-level responses, and for the quantification of new channels that affect the general equilibrium incidence.

This paper also pertains to the empirical literature that has used reduced-form evidence to measure the incidence of corporate taxes on various agents. An early literature has used time-series data to look at the response in factors' income and prices to corporate tax reforms (Krzyzaniak and Musgrave, 1963; Gordon, 1967; Cragg et al., 1967). Cragg et al. (1967) concluded that time-series data were not well suited for measuring such elasticities: "*We remain impressed by the difficulties of making inferences concerning tax incidence from time-series data*". More recent analyses have exploited cross-sectional tax rate variations across jurisdictions (Fuest et al., 2018; Giroud and Rauh, 2019), and microeconomic variations in exposure to corporate taxation (Arulampalam et al., 2012; Devereux et al., 2014; Carbonnier et al., 2022; Kennedy et al., 2022; Risch, 2024) to estimate the key elasticities that determine the share of the corporate tax burden borne by workers. I show in this paper that these high-quality micro estimates do not, on their own, summarize the incidence of corporate tax changes at the aggregate level. I derive analytically and quantify the gap between these micro elasticities and their macroeconomic counterpart.

Finally, this paper is related to the literature that explores the effect of firm heterogeneity on the aggregate consequences of fiscal reforms. Zwick and Mahon (2017) and Winberry (2020) show the role of firm heterogeneity for the aggregate consequences of bonus depreciation policies. Gourio and Miao (2010) and Gourio and Miao (2011) demonstrate that firm heterogeneity matters for the aggregate response to dividend tax changes. Kaymak et al. (Forthcoming) study the importance of the capital intensity distribution for the impact of corporate tax cuts on the labor share. I contribute to this literature by examining the role of firm heterogeneity for the incidence of corporate taxation.

The paper is organized as follows. Section 2 describes the model. Section 3 starts from a standard incidence formula and derives the sufficient statistics needed to estimate workers' share of the corporate tax burden. Section 4 characterizes the equilibrium response to a tax reform and shows analytically how heterogeneous firm responses aggregate into the sufficient statistics derived in 3. Section 5 confirms the main mechanism with reduced-form evidence. Section 6 calibrates the model. Section 7 presents the response of this calibrated model to a corporate tax cut.

2 Model

The economy consists of a mass of workers of measure one, a representative capital owner, and a representative firm owner. Workers and the firm owner are hand-to-mouth and consume their current income. The capital owner invests in the aggregate capital stock and lends it to firms. Time is discrete, and there is no uncertainty. All agents discount future utility at rate $\beta \in (0, 1)$.

The labor market is imperfectly competitive. Workers have idiosyncratic preferences over all firms and these firms set their wages without observing workers' taste, as in Berger et al. (2022). There is a continuum of firms with different technologies, which operate on a competitive market for homogeneous final consumption goods. The final good serves as the numeraire.

2.1 Workers

Each worker supplies inelastically one unit of labor every period. While equally productive, workers differ in their preferences for employers. They move freely across firms each period to solve

$$\max_j \quad \ln\Big((1-\tau_t^w)w_{j,t}\Big) + \varepsilon_{i,j} \tag{1}$$

where i and $j \in \mathcal{J} = \{1, ..., N\}$ index workers and firms, $w_{j,t}$ is firm j's wage in period t, τ_t^w is the labor income tax rate, and $\varepsilon_{i,j}$ is worker i's idiosyncratic taste for firm j, drawn from a T1EV distribution and constant across time. These random tastes can be interpreted as different location choices or different valuations of firms' amenities. Their cumulative distribution function is

$$F(\{\varepsilon_{i,j}\}_{j=1}^N) = \exp\left[-\left(\sum_j e^{-\gamma\varepsilon_{i,j}}\right)^{\frac{1}{\gamma}}\right]$$

where γ governs the dispersion of idiosyncratic tastes.

An important assumption is that firms do not observe their workers' preferences, and therefore cannot condition wages on these preferences. This is why wages are not indexed by i (the individual index). As in Card et al. (2018) and Berger et al. (2022), the solution to this discrete choice problem results in a mass of workers who choose to work for firm j equal to

$$l_{j,t} = \frac{w_{j,t}^{\gamma}}{\boldsymbol{w_t}} \tag{2}$$

where $\boldsymbol{w_t} = \sum_j w_{j,t}^{\gamma}$ is the labor market wage index. I further assume that N is large, such that firms consider themselves as atomistic and take the wage index as given. Therefore, Equation (2) shows that γ can be interpreted as the labor supply elasticity at the firm level. As γ increases, workers' idiosyncratic tastes over different firms become less dispersed, which means that they are more responsive to wage variations, and that firms face more elastic supply curves. With $\gamma \in [0, +\infty)$, firms face upward-sloping labor supply curves and benefit from some degree of monopsony power over their workers.

Importantly, the labor income tax rate, τ_t^w, was cancelled out from equation (2), which shows that this tax is non-distortionary. Two main features of the model generate this result: (i) the labor income tax rate is flat, so that it does not affect the relative after-tax wage that a worker derives from different employers; (ii) workers do not make intensive margin decisions, so that the labor income tax does not distort the amount of labor they supply.

2.2 Firms

Each period t, a firm $j \in \mathcal{J}$, with technology (z_j, α_j), rents k units of capital at price r_t and posts a wage $w_{j,t}$, which attracts $l_t(w_{j,t})$ workers. The function $l_t(w)$ is defined by equation (2). Firm j takes the labor market wage index $\boldsymbol{w_t}$ as given and chooses its inputs to maximize after-tax profits

$$\begin{aligned} \max_{k,w} \quad & (1-\tau)\left[f(k, l_t(w), \alpha_j, z_j) - w l_t(w)\right] - (1-\lambda\tau) r_t k \\ \text{s.t.} \quad & f(k, l_t(w), \alpha_j, z_j) = z_j \left(\alpha_j k^{\frac{\sigma-1}{\sigma}} + (1-\alpha_j) l_t(w)^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma\xi}{\sigma-1}} \\ & l_t(w) = \frac{w^{\gamma}}{\boldsymbol{w_t}} \end{aligned} \tag{3}$$

where z_j is the firm's total factor productivity (TFP) and $\alpha_j \in (0,1)$ represents its capital intensity. Returns to scale, ξ, the firm-level elasticity of substitution between capital and labor, σ, and the firm-level labor supply elasticity, γ, are constant across firms.

The tax system is summarized by two parameters: a corporate income tax rate, τ, and λ, the share of capital costs that firms can deduct from their tax base. This last parameter is generally interpreted as the present discounted value of depreciation allowances, which may vary across firms based on their capital structure and maturity (Zwick and Mahon, 2017). Since this model assumes that firms are capital renters facing a static problem, λ is a reduced-form way to capture the imperfect deductibility of capital costs. I assume that τ and λ are constant across firms, and that the latter do not expect any change in the tax system in the future.

Let $u_t = \frac{1-\lambda\tau}{1-\tau} r_t$ denote the user cost of capital. One can divide the objective function by $(1-\tau)$ to reformulate the maximization problem in a more traditional way, with the following objective function: $f(k, l, \alpha_j, z_j) - wl_t(w) - u_t k$.

2.3 Capital owner

A representative capital owner chooses, in each period t, her consumption of goods $\{c_{jt}^K\}_{j=1}^N$, which are perfect substitutes, and the amount of capital for the next period K_{t+1} to maximize

$$V_k = \max_{\{c_{jt}, K_{t+1}\}_{t=0}^{\infty}} \sum_{t=0}^{\infty} \beta^t \ln(C_t^K) \quad , \quad C_t^K = \int_0^N c_{jt}^K dj \tag{4}$$
$$\text{s.t. } C_t^K + [K_{t+1} - (1-\delta)K_t] + \phi\left(K_t, K_{t+1}\right) = r_t K_t$$

where $\phi(.)$ is a capital adjustment cost function. Consumption goods produced by firms $j \in \mathcal{J}$ are perfect substitutes, and their price is normalized to 1.

2.4 Shareholder

A representative shareholder collects after-tax profits from all firms and consumes this income each period. This agent is not important for the equilibrium allocation, as it does not make any choice. However, including a representative shareholder is useful to study the distributional consequences of corporate tax changes across agents that correspond to different types of income. Moreover, it makes the distribution of the corporate tax burden more comparable to the previous literature.

I assume that the representative shareholder has log-utility to maintain consistency with other agents in the economy and align with the recent literature on corporate tax incidence (Suárez-Serrato and Zidar, 2016). Hence, its present value of utility is

$$V_f = \sum_{t=0}^{\infty} \beta^t \ln(\Pi_t^{AT}) \tag{5}$$

where Π_t^{AT} denotes the sum of firms' after-tax profits.

2.5 Government

The government finances expenditures G_t through two sources of fiscal revenue: revenue from the corporate income tax, T_t, and revenue from the labor income tax $\tau_t^w W_t$, where $W_t = \sum_j w_{j,t} l_{j,t}$ denotes aggregate labor income. It sets τ_t^w each period to balance its budget, such that

$$T_t + \tau_t^w W_t = G_t \quad \forall t \tag{6}$$

All agents in this economy, including the government, take the corporate income tax rate τ as given and expect it to remain constant in the future. The quantitative exercises in section 7 simulate the response of this economy to unexpected and permanent shock to τ.

2.6 Equilibrium

A general equilibrium is a path of prices $\{\{w_{j,t}\}_{j\in[0,N]}\}_{t=0}^{\infty}$, $\{r_t\}_{t=0}^{\infty}$, quantities $\{K_t\}_{t=0}^{\infty}$, $\{\{k_{jt}\}_{j\in\Omega_f}\}_{t=0}^{\infty}$, $\{\{l_{jt}\}_{j\in\Omega_f}\}_{t=0}^{\infty}$, $\{C_t^K\}_{t=0}^{\infty}$, $\{\Pi_t^{AT}\}_{t=0}^{\infty}$, $\{T_t\}_{t=0}^{\infty}$, and labor income tax rates $\{\tau_t^w\}_{t=0}^{\infty}$ such that, given technologies $\{(z_j, \alpha_j)\}_{j\in\Omega_f}$, σ, ξ and policies $\{\tau_t\}_{t=0}^{\infty}$ and G,

1. Taking prices as given, the representative capital owner chooses $\{C_t^K, K_{t+1}\}_{t=0}^{\infty}$ to solve (4)
2. Taking prices $\{r_t\}_{t=0}^{\infty}$ and $\{\boldsymbol{w}_t\}_{t=0}^{\infty}$ as given, firms rent capital and set wages to solve (3)
3. Capital, labor and goods markets clear

2.7 Discussion of the assumptions

Closed economy. Following the literature interested in the incidence of corporate income and capital taxation in a dynamic setting (Feldstein, 1974; Boadway, 1979; Turnovsky, 1982; Judd, 1985), I assume that the baseline economy is closed, and that investment in the capital stock has to be financed by private savings. This assumption is useful to study the impact of capital accumulation on the incidence of corporate taxes, and to estimate the share of the tax burden that capital owners bear.

Imperfect competition in the labor market. This assumption is essential to generate heterogeneous wage responses at the firm level, which is one of the empirical findings of section 5. Imperfect competition is introduced in the form of what Berger et al. (2024) name "*heterogeneous worker-firm-specific preferences*", which generate upward-sloping labor supply curves at the firm level. These non-wage amenities are an important feature of labor markets (Berger et al., 2022, 2024), and they allow me to connect the aggregate elasticities that govern the macro incidence of corporate taxes to the the typical elasticities that one would estimate with micro data. This link between micro and macro wage elasticities is examined in section 4.

Government budget constraint. The assumption that there are only two sources of revenue, corporate and labor income taxation, implies that the path of public expenditures G_t determines the extent to which lower corporate income tax revenues must be offset by higher labor income tax revenues.

If G_t directly follows the path of corporate tax revenues, labor income taxes remain unaffected by changes in corporate taxation. This assumption simplifies the analysis by abstracting from transfers when calculating the incidence of corporate taxes. Conversely, if $G_t = 0$ for all t, the revenues from the corporate income tax are directly transferred to workers, meaning that lower corporate tax revenue results in a reduced transfer. This second assumption captures the redistributive motive behind the introduction of a corporate income tax, despite its distortive effects. The primary reason workers would vote for a corporate income tax is that they benefit from associated transfers (or lower labor income taxation).[1]

In practice, the baseline model adopts the first assumption, excluding redistribution. Thus, the baseline incidence calculated in the quantitative section reflects the pre-transfer incidence. However, section 7 also explores the second assumption

[1] Judd (1985) further argues that "*this is the only interesting case since there is no point in this model to taxing capital income and returning it to capitalists*".

to assess the importance of redistribution in the aggregate incidence of corporate taxes.

3 Corporate Tax Incidence: a Sufficient Statistics Approach

The first objective of this section is to formally clarify the definition of corporate tax incidence used in this paper. It then expresses the share of the corporate tax burden borne by workers in terms of key sufficient statistics and decomposes these macro elasticities into an aggregation of firm-level responses.

3.1 Welfare Incidence

Following Suárez-Serrato and Zidar (2016) and Fuest et al. (2018), I focus on the incidence of the corporate income tax in terms of welfare. This tax creates a welfare cost, or burden, for the private part of the economy, which is distributed between its various components. The incidence on a given private agent is its share of the tax burden.

Moreover, the incidence is inherently tied to a tax reform a tax reform (which can be hypothetical). It is defined as the ratio of the change in this agent's welfare generated by the reform over the change in the overall tax burden, i.e. the change in aggregate welfare associated with this reform.

The incidence of a small tax reform $d\ln(1-\tau)$ on workers is defined as

$$I_W = \frac{\frac{dV_w}{d\ln(1-\tau)}}{\frac{dV_w}{d\ln(1-\tau)} + \frac{dV_k}{d\ln(1-\tau)} + \frac{dV_f}{d\ln(1-\tau)}} \tag{7}$$

where V_w denotes the discounted sum of workers' utility, and V_k and V_f denote the discounted sum of the representative capital owner's and shareholder's utility.

As in Feldstein (1974), these welfare changes are dynamic objects which account for utility changes along the transition path from one steady state to the other. All agents discount future utility at rate β, and value consumption through the same log-utility function. Workers' welfare is defined as

$$V_w = \sum_{t=0}^{\infty} \beta^t \sum_i \max_j [\ln((1-\tau_t^w)w_{j,t}) + \varepsilon_{i,j}]$$

This definition relies on a utilitarian aggregation of workers' welfare, treating all workers equally. Using the envelope theorem, we obtain

$$\frac{dV_w}{d\ln(1-\tau)} = \sum_{t=0}^{\infty} \beta^t \Bigg[\underbrace{\sum_j l_j \epsilon^j_{w_t,1-\tau}}_{\text{Wage effect}} + \underbrace{\epsilon_{1-\tau^w_t,1-\tau}}_{\text{Redistribution}} \Bigg] \tag{8}$$

where $\epsilon_{X,1-\tau} = d\log(X)/d\log(1-\tau)$ denotes the elasticity of X with respect to the net-of-tax rate $1-\tau$. The change in workers' welfare for each horizon t associated with a corporate tax reform can be decomposed into a wage effect resulting from an aggregate of firms' wage adjustments, and a redistribution effect stemming from the government's budget constraint.

The wage effect is a standard feature of incidence definitions. It is an employment-weighted average of microeconomic wage elasticities $\epsilon^j_{w_t,1-\tau} = d\ln w_{j,t}/d\ln(1-\tau)$. By the envelope theorem, changes in firms' employment dl_j disappear from this first-order effect. This is intuitive, as workers who change of employer following a tax reform are approximately indifferent between these employers.

We can further simplify this aggregate wage effect by noticing that it is equal to the elasticity of the labor market wage index $\boldsymbol{w}_t$ with respect to the net-of-corporate income tax rate divided by γ:

$$\sum_j l_j \epsilon^j_{w_t,1-\tau} = \frac{\sum_j w_{j,t}^{\gamma-1} \frac{dw_{j,t}}{d\ln(1-\tau)}}{\boldsymbol{w}_t} = \frac{\epsilon_{\boldsymbol{w}_t,1-\tau}}{\gamma}$$

The redistribution elasticity relies on the assumptions made about government's use of its fiscal revenue. Such assumptions are necessary for the general equilibrium model to be closed, but microeconomic incidence formulas generally abstract from it because the link between sources of fiscal revenue is less clear at the firm or local level. In section 7, I assess the quantitative importance of the redistribution channel in workers' share of the post-transfer corporate tax burden.

The representative capital owner's welfare, V_k, is defined by (4). The envelope theorem yields

$$\frac{dV_k}{d\ln(1-\tau)} = \sum_{t=0}^{\infty} \beta^t \frac{K_t r_t}{C_t^K} \epsilon_{r_t,1-\tau}$$

where $\epsilon_{r_t,1-\tau}$ is the elasticity of the rental cost of capital with respect to the net-of-tax rate, and $C_t^K = r_t K_t - [K_{t+1} - (1-\delta)K_t] - \phi(K_t, K_{t+1})$ represents the capital owner's aggregate consumption. Finally, the change in the representative shareholder's welfare is

$$\frac{dV_f}{d\ln(1-\tau)} = \sum_{t=0}^{\infty} \beta^t \epsilon_{\Pi_t^{AT},1-\tau}$$

where $\epsilon_{\Pi_t^{AT},1-\tau}$ is the elasticity of aggregate after-tax profits with respect to the net-of-corporate income tax rate.

Combining these results allows us to express workers' share of the corporate tax burden as

$$I_W = \frac{\sum_{t=0}^{\infty} \beta^t \left[\epsilon_{\boldsymbol{w}_t,1-\tau}/\gamma + \epsilon_{1-\tau_t^w,1-\tau} \right]}{\sum_{t=0}^{\infty} \beta^t \left[\epsilon_{\boldsymbol{w}_t,1-\tau}/\gamma + \epsilon_{1-\tau_t^w,1-\tau} + \frac{r_t K_t}{C_t^K} \epsilon_{r_t,1-\tau} + \epsilon_{\Pi_t^{AT},1-\tau} \right]} \tag{9}$$

where $\epsilon_{\boldsymbol{w}_t,1-\tau}$ is the elasticity of the labor market wage index with respect to the net-of-corporate income tax rate. Equation (9) shows that, given measures of aggregate capital income net of investment costs C_t^K, the capital stock K_t and the rental rate of capital r_t, we can estimate the share of the corporate tax burden borne by workers using four sufficient statistics: $\epsilon_{\boldsymbol{w}_t,1-\tau}$, $\epsilon_{1-\tau_t^w,1-\tau}$, $\epsilon_{r_t,1-\tau}$, and $\epsilon_{\Pi_t^{AT},1-\tau}$.

3.2 Micro-to-Macro Decomposition

A long literature has attempted to estimate these elasticities to assess the extent to which workers bear the burden of the corporate income tax. Recent articles leverage firm-level and local variations in tax rates or bases, together with detailed firm-level data, to obtain micro estimates for these sufficient statistics, and more particularly the wage elasticity $\epsilon_{\boldsymbol{w}_t,1-\tau}$ (Fuest et al., 2018; Carbonnier et al., 2022; Kennedy et al., 2022; Risch, 2024).

However, the elasticities described in equation (9) are aggregate elasticities. When firms j are characterized by heterogeneous treatment effects, notably heterogeneous wage elasticities $\epsilon_{w,1-\tau}^j$, the mapping between the distribution of firm-level responses and the aggregate sufficient statistics is not trivial.

Suppose we are interested in estimating the elasticity of the labor market wage index with respect to the net-of-corporate income tax rate, $\epsilon_{\boldsymbol{w}_t,1-\tau}$. This elasticity is a sufficient statistics for the numerator of our incidence equation (9) when we abstract from the fiscal externality, which is why it has been the focus of an important empirical literature. An ideal experiment that would randomize tax rates across firms would aim to estimate the average firm-level treatment effect, $\mathbb{E}[\epsilon^j_{w,1-\tau}]$. Firm-level or local variations are generally necessary to rely on plausibly exogenous treatments and to interpret estimates as causal. Yet, such empirical designs cannot capture all the components of the macro elasticity we need, $\epsilon_{\boldsymbol{w}_t,1-\tau}$. To see this, one can decompose the latter as[2]

$$\frac{\epsilon_{\boldsymbol{w}_t,1-\tau}}{\gamma} = \underbrace{\mathbb{E}\left[\epsilon^j_{w_t,1-\tau}\right]}_{\text{Average micro response}} + N \underbrace{\mathbb{C}\mathrm{ov}\left(l_j, \epsilon^j_{w_t,1-\tau}\right)}_{\text{Heterogeneous wage effects}} \tag{10}$$

where N denotes the number of firms in the economy, and l_j is firm j's initial employment share.

Equation (10) shows that the aggregate wage response is the sum of the average firm response and a covariance term that captures heterogeneity in wage responses across the firm size distribution. This second term may amplify (attenuate) the micro effect of corporate tax changes if larger firms are also the most (least) responsive.

One can further decompose our sufficient statistic by noting that firm-level elasticities $\epsilon^j_{w_t,1-\tau}$ consist of both partial equilibrium (or direct) effects and general equilibrium (or indirect) effects arising from price adjustments. Since most corporate tax reforms are macroeconomic shocks, the latter are likely to be a significant determinant of aggregate incidence.

Let $\mathbf{p}_t$ denote the vector of prices that firm j faces in period t. In the economy described in section 2, $\mathbf{p}_t = (r_t, \boldsymbol{w}_t)^\top$, where r_t is the rental cost of capital, and $\boldsymbol{w}_t$ is the labor market wage index. Its particular value $\mathbf{p_0}$ denotes the price vector just before the tax shock we consider occurs. We can rewrite the firm-level general equilibrium elasticity of wages with respect to the net-of-tax rate as

$$\epsilon^j_{w_t,1-\tau} = \underbrace{\epsilon^j_{w,1-\tau}\Big|_{\mathbf{p}=\mathbf{p_0}}}_{\text{Direct effect}} + \underbrace{(\epsilon^j_{w_t,\boldsymbol{p_t}})^\top \cdot \frac{d\ln(\mathbf{p_t})}{d\ln(1-\tau)}}_{\text{Indirect GE effects}} \tag{11}$$

where $\epsilon^j_{w_t,\boldsymbol{p_t}} = (\epsilon^j_{w_t,r_t}, \epsilon^j_{w_t,\boldsymbol{w}_t})^\top$ is the vector of elasticities of wages with respect to the price of capital and the labor market wage index, $\ln(\mathbf{p}_t) = (\ln(r_t), \ln(\boldsymbol{w}_t))^\top$,

[2]See appendix C for a proof.

and $\epsilon^j_{w,1-\tau}\Big|_{\mathbf{p}=\mathbf{p_0}}$ is the partial equilibrium elasticity of firm j's wage with respect to the net-of-tax rate, i.e. holding other prices constant.

In this economy, dynamic responses to tax shocks are generated by the progressive build-up of the aggregate capital stock, which translates into price adjustments along the transition path. Therefore, partial equilibrium elasticities, which abstract from these price dynamics, are time-invariant objects. This is why the partial equilibrium firm-level wage elasticity is not indexed by t.

For simplicity, I rewrite equation (11) as

$$\epsilon^j_{w_t,1-\tau} = \underbrace{\epsilon^{j,PE}_{w,1-\tau}}_{\text{Direct effect}} + \underbrace{\epsilon^{j,GE}_{w_t,1-\tau}}_{\text{Indirect GE effects}}$$

where $\epsilon^{j,PE}_{w,1-\tau}$ denotes the partial equilibrium elasticity $\epsilon^j_{w,1-\tau}\Big|_{\mathbf{p}=\mathbf{p_0}}$ and $\epsilon^{j,GE}_{w_t,1-\tau}$ denotes the general equilibrium feedback from price adjustments $(\boldsymbol{\epsilon^j_{w_t,p}})^\top \cdot \frac{d\mathbf{p}_t}{d(1-\tau)}$.

Then, we can extend the decomposition in (10) to include the distinction between partial and general equilibrium effects, which gives

$$\begin{aligned} \frac{\epsilon_{\boldsymbol{w}_t,1-\tau}}{\gamma} = & \underbrace{\mathbb{E}\left[\epsilon^{j,PE}_{w,1-\tau}\right]}_{\text{Average direct effect}} + N \underbrace{\mathbb{Cov}\left(l_j, \epsilon^{j,PE}_{w,1-\tau}\right)}_{\text{Distribution of direct effects}} \\ & + \underbrace{\mathbb{E}\left[\epsilon^{j,GE}_{w_t,1-\tau}\right]}_{\text{Average indirect effect}} + N \underbrace{\mathbb{Cov}\left(l_j, \epsilon^{j,GE}_{w_t,1-\tau}\right)}_{\text{Distribution of indirect effects}} \end{aligned} \tag{12}$$

Equation (12) shows that firm heterogeneity and general equilibrium effects create a discrepancy between the average partial equilibrium firm response to a tax change and its aggregate wage effect.

The first term on the right-hand side of this equation is the moment that an average treatment effect abstracting from general equilibrium would estimate. Micro empirical analyses often exploit local exogenous variations between firms, such as tax code thresholds, to define a treatment and a control group, and thus leave out general equilibrium adjustments that would affect both groups. This is why the first moment that one can estimate with local variations is an average firm-level partial equilibrium elasticity of wages.

A first discrepancy appears from heterogeneous responses across firms. As we will see more explicitly in the next section, various factors, starting with technological differences, can make the elasticity of wages with respect to the corporate income tax rate vary across firms. This heterogeneity gives rise to the second term of the right-hand side of equation (12), which is the covariance between firms' employment shares and partial equilibrium responses to a tax change. A second discrepancy springs from general equilibrium price adjustments, which can also be decomposed into an average effect across firms and a covariance term reflecting heterogeneous responses to these price movements.

Importantly, both covariance terms may be positive or negative, leading to an amplification or an attenuation of the average partial equilibrium response to a corporate income tax reform. Additionally, price adjustments are dynamic as the economy progressively reacts to a tax shock and transitions to a new steady state. This is why the macro elasticity on the left-hand side of equation (12) and the last two terms on its right-hand side are indexed by t, which denotes the number of periods after a change in the tax rate. The elasticity of the aggregate wage effect with respect to the net-of-tax rate, and therefore its incidence on workers, are dynamic.

Finally, we have focused on the elasticity of labor income, but we can decompose the elasticity of aggregate profits with respect to the net-of-tax rate, in the denominator of equation (9), in exactly the same way. Heterogeneity across firms creates a gap between the micro and macro elasticities. The remaining two sufficient statistics, namely the elasticities of the rental cost of capital and the labor income tax rate with respect to the net-of-corporate income tax rate, can either be estimated with macroeconomic data, or through the general equilibrium model calibrated in section 6.

The next section uses the general equilibrium model described in 2 to explore the different components of the macro elasticity described in (12).

3.3 Consumption Incidence

Before deriving explicit expressions for these wage elasticities, I demonstrate that they are equally important for incidence when defined in terms of consumption rather than welfare.

Defining incidence in terms of consumption has the advantage of being less reliant on assumptions about utility functions. While these assumptions still influence the equilibrium allocation, they do not affect the definition of consumption incidence itself. In terms of consumption, the incidence of a corporate tax reform on workers is

$$I_W^C = \frac{\sum_{t=0}^{\infty} \beta^t \left[\epsilon_{W_t^{AT},1-\tau} W_0^{AT} \right]}{\sum_{t=0}^{\infty} \beta^t \left[\epsilon_{W_t^{AT},1-\tau} W_0^{AT} + \epsilon_{r_t K_t,1-\tau} r_0 K_0 + \epsilon_{\Pi_t^{AT},1-\tau} \Pi_0^{AT} \right]} \tag{13}$$

where W_t^{AT} is the after-tax and transfer aggregate labor income in period t, $r_t K_t$ is capital income, and Π_t^{AT} denotes aggregate after-tax profits.

The elasticity of aggregate labor income with respect to the net of tax rate can be expressed as a function of wage and transfer elasticities,

$$\begin{aligned} \epsilon_{W_t^{AT},1-\tau} &= \mathbb{E}\left[\epsilon_{w_t,1-\tau}^{j,PE}\right] - N\gamma \mathbb{Cov}\left(l_j, \epsilon_{w_t,1-\tau}^{j,PE}\right) + \frac{N}{W_0^{AT}}(1+\gamma)\mathbb{Cov}\left(l_j w_j, \epsilon_{w_t,1-\tau}^{j,PE}\right) \\ &+ \mathbb{E}\left[\epsilon_{w_t,1-\tau}^{j,GE}\right] - N\gamma \mathbb{Cov}\left(l_j, \epsilon_{w_t,1-\tau}^{j,GE}\right) + \frac{N}{W_0^{AT}}(1+\gamma)\mathbb{Cov}\left(l_j w_j, \epsilon_{w_t,1-\tau}^{j,GE}\right) + \epsilon_{1-\tau_t^w,1-\tau} \end{aligned} \tag{14}$$

Thus, the elasticity of aggregate labor income with respect to the net-of-tax rate can be expressed as a function of average wage responses and covariance terms that capture the distribution of heterogeneous wage responses across firms. This formulation highlights that understanding the determinants of these firm-level wage responses, as explored in the next section, is crucial not only for assessing the incidence of corporate taxes on workers in terms of welfare but also in terms of consumption. In the quantitative section of this paper, I will estimate the distribution of the corporate tax burden from both perspectives.

4 Micro and Macro Responses to a Corporate Tax Cut

4.1 Wage elasticity

We can use the model described in section 2 to derive the elasticities that determine the incidence of corporate taxes. Given the focus of this paper on the incidence of corporate taxes on workers, this section will be particularly interested in analyzing the elasticity of wages with respect to the net-of-tax rate at the firm level[3]:

$$\epsilon^j_{w_t,1-\tau} = \underbrace{-[1-\sigma(1-\xi)]\Lambda_r(s^j_{l,0})\epsilon_{u_t,1-\tau}}_{\text{Capital cost channel}} + \underbrace{\Lambda_w(s^j_{l,0})\epsilon_{\boldsymbol{w}_t,1-\tau}}_{\text{Labor cost channel}} \tag{15}$$

where $s^j_{l,t}$ denotes firm j's labor share in t,

$$s^j_{l,t} = \frac{w_{j,t}l_{j,t}}{y_{j,t}} = \xi\frac{\gamma}{1+\gamma}\frac{(1-\alpha_j)^\sigma\left(\frac{1+\gamma}{\gamma}w_{j,t}\right)^{1-\sigma}}{\alpha_j^\sigma u_t^{1-\sigma} + (1-\alpha_j)^\sigma\left(\frac{1+\gamma}{\gamma}w_{j,t}\right)^{1-\sigma}} \tag{16}$$

as derived in appendix D.5, and where $\Lambda_r(s^j_{l,t})$ and $\Lambda_w(s^j_{l,t})$ are defined as

$$\Lambda_r(s^j_{l,t}) = \frac{\left(1-\frac{1+\gamma}{\gamma}\frac{s^j_{l,t}}{\xi}\right)}{(1-\xi)(\gamma+\sigma)+[1-\sigma(1-\xi)]\frac{1+\gamma}{\gamma}\frac{s^j_{l,t}}{\xi}}$$

$$\Lambda_w(s^j_{l,t}) = \frac{(1-\xi)}{(1-\xi)(\gamma+\sigma)+[1-\sigma(1-\xi)]\frac{1+\gamma}{\gamma}\frac{s^j_{l,t}}{\xi}}$$

Equation (15) shows that firms' wage response to a corporate tax change is determined by two channels that arise from capital and labor costs. Let me now derive the results that will allow us to sign these channels.

First, we can derive the following lemma, which states that any firm j's labor share is bounded above by $\xi\frac{\gamma}{1+\gamma}$.

Lemma 1. *For all j and t, $s^j_{l,t} \leq \xi\frac{\gamma}{1+\gamma}$.*

Proof. From (16), we see that the labor share is the product of $\xi\frac{\gamma}{1+\gamma}$ and a positive and lower than one ratio. □

We can derive the following corollary from Lemma 1,

Corollary 1. *If $\sigma(1-\xi) < 1$, then for any j and t, $\Lambda_r(s^j_{l,t}) \geq 0$ and $\Lambda_w(s^j_{l,t}) \geq 0$, and both $\Lambda_r(s^j_{l,t})$ and $\Lambda_w(s^j_{l,t})$ are decreasing in firms' labor share $s^j_{l,t}$.*

where σ is the firm-level elasticity of substitution between capital and labor, which is common to all firms.

[3] See appendix D.7

These results produce the following relationship between the elasticities of the user cost of capital and the labor market wage index with respect to the net-of-corporate income tax rate,

Lemma 2. *If $\sigma(1-\xi) < 1$, then, for all t, the elasticity of the wage index with respect to the net-of-corporate income tax rate is positive, i.e. $\epsilon_{\boldsymbol{w}_t,1-\tau} \geq 0$, and the elasticity of the user-cost of capital with respect to this net-of-tax rate is negative, i.e. $\epsilon_{u_t,1-\tau} \leq 0$.*

Proof. See Appendix C.

Lemma 2 shows that, when the elasticity of substitution between capital and labor is small enough, the equilibrium wage index increases after a corporate tax cut. This result springs from the fact that the elasticity of substitution, σ, determines the relative strengths of substitution and scale effects at the firm level. When capital and labor are complements, the latter dominates the former, which yields an increase in labor demand when the user cost of capital falls.

In line with Oberfield and Raval (2021), I estimate, in section 6, a firm-level elasticity of substitution σ lower than one, and $\xi \leq 1$ by definition of decreasing returns to scale. The premise of Lemma 2 is satisfied, so that a corporate income tax cut reduces the user cost of capital and boosts the wage index.

Corollary 1 and Lemma 2 pin down the signs of the capital cost and labor costs channels in equation (15). The first term on the right-hand-side of this equation represents the impact of a shock to the net-of-tax rate on a firm's wage policy which goes through a change in the user cost of capital u_t. As corporate tax cuts reduce the user-cost of capital, they create an incentive for firms to substitute away from labor, and drive them to scale up production by renting more capital and hiring more workers. The substitution effect draws wages down, while the scale effect pushes wages up. An elasticity of substitution between capital and labor, σ, lower than one makes the latter dominate the former. Hence, the capital cost channel is positive.

The second term on the right-hand side of equation 15 represents the effect of a shock to the net-of-tax rate on a firm's wage policy which goes through a change in the labor market wage index $\boldsymbol{w}_t$. Following a corporate income tax cut, the demand for labor increases, notably through the capital cost channel just described, which pushes wages up. This general wage increase feeds back to firms' wages as they compete for workers through their relative wage rates. Thus, the labor cost channel is positive.

These results imply that all wages rise after a corporate income tax cut. It is important to note, however, that it does not mean that all firms grow in size. Relative wage changes across firms determine the movement of workers across employers. Some firms raise wages more than others following a corporate tax cut, causing a reallocation of workers towards those firms.

We are interested in the heterogeneity of firm-level responses to tax changes. It is a source of discrepancy between the micro and macro elasticities presented in section 3.2. Corollary 1 and Lemma 2 imply that the wage elasticity defined in equation (15) is decreasing in a firm's labor share, s_l^j. Capital intensive firms benefit more from corporate tax cuts and workers are reallocated away from labor intensive firms. This heterogeneous response pattern arises from the fact that corporate income taxes distort input choices in favor of labor, which is fully deductible from firms' tax bases. Firms using capital intensive technologies are more hindered by this distortion. As the distortion goes away, capital intensive firms grow, while labor intensive firms are hit by the rising wage.

Following the method used in section 3.2, one can decompose the general equilibrium elasticity from equation (15) into a partial equilibrium and a price component. We can isolate the partial equilibrium component by setting $dr_t = d\boldsymbol{w}_t = 0$:

$$\epsilon_{w_t,1-\tau}^{j,PE} = \Lambda_r(s_{l,t}^j)\frac{1-\lambda}{1-\lambda\tau} > 0 \tag{17}$$

The direct effect of a corporate tax cut on wages is positive for all firms and decreasing in their initial labor share $s_{l,0}^j$.

The indirect effect is summarized by the following elasticity:

$$\begin{aligned}\epsilon_{w_t,1-\tau}^{j,GE} &= \epsilon_{w_t,1-\tau}^{j} - \epsilon_{w_t,1-\tau}^{j,PE} \\ &= -[1-\sigma(1-\xi)]\Lambda_r(s_{l,0}^j)\frac{1-\lambda\tau}{1-\tau}\epsilon_{r_t,1-\tau} + \Lambda_r(s_{l,0}^j)\epsilon_{\boldsymbol{w}_t,1-\tau}\end{aligned} \tag{18}$$

This general equilibrium effect results from capital and labor price adjustments. Following a corporate tax cut, the price of capital rises as demand shifts up while supply slowly adjusts. Therefore, we can expect $\epsilon_{r_t,1-\tau}$ to be positive after a corporate income tax cut, which will be confirmed in the quantitative exercise of section 7. The sign of this indirect effect is ambiguous.

4.2 Aggregate Wage Effect

We can use the expressions derived in the previous section to uncover the sign and magnitude of the last three terms of the right-hand side of our aggregate wage effect in (12), which represent the discrepancy between micro and macro wage elasticities,

$$\frac{\epsilon_{\boldsymbol{w}_t,1-\tau}}{\gamma} = \mathbb{E}\left[\epsilon^{j,PE}_{w,1-\tau}\right] + \underbrace{N\mathbb{Cov}\left(l_j, \epsilon^{j,PE}_{w,1-\tau}\right) + \mathbb{E}\left[\epsilon^{j,GE}_{w_t,1-\tau}\right] + N\mathbb{Cov}\left(l_j, \epsilon^{j,GE}_{w_t,1-\tau}\right)}_{\text{Gap between micro and macro elasticities}} \tag{19}$$

where t is the horizon we consider to evaluate this elasticity after a tax change.

The first covariance term springs from heterogeneous firm-level technologies, which determine the distribution of partial equilibrium elasticities[4]:

$$\mathbb{Cov}\left(l_j, \epsilon^{j,PE}_{w,1-\tau}\right) = [1-\sigma(1-\xi)]\frac{1-\lambda}{1-\lambda\tau}\mathbb{Cov}\left(l_j, \Lambda_r(s_l)\right) \tag{20}$$

where $\mathbb{Cov}\left(l_j, \Lambda_r(s^j_l)\right)$ is the covariance between initial employment shares l_j and a decreasing function of their initial labor shares s^j_l. If capital intensive firms tend also to be the largest firms, this covariance is positive and the first component of the micro-macro gap amplifies the average firm-level effect.

The second element of the discrepancy between micro and macro wage responses is the average indirect effect across firms,

$$\mathbb{E}\left[\epsilon^{j,GE}_{w_t,1-\tau}\right] = -[1-\sigma(1-\xi)]\frac{1-\lambda\tau}{1-\tau}\mathbb{E}\left[\Lambda_r(s^j_l)\right]\epsilon_{r_t,1-\tau} + \mathbb{E}\left[\Lambda_w(s^j_l)\right]\epsilon_{\boldsymbol{w}_t,1-\tau} \tag{21}$$

Importantly, the price elasticities $\epsilon_{r_t,1-\tau}$ and $\epsilon_{\boldsymbol{w}_t,1-\tau}$ are horizon-specific, which is why the average indirect effect is dynamic.

The last term on the right-hand-side of equation (12) can be rewritten as

$$\begin{aligned}\mathbb{Cov}\left(l_j, \epsilon^{j,GE}_{w_t,1-\tau}\right) = &-[1-\sigma(1-\xi)]\frac{1-\lambda\tau}{1-\tau}\mathbb{Cov}\left(l_j, \Lambda_r(s^j_l)\right)\epsilon_{r_t,1-\tau} \\ &+ \mathbb{Cov}\left(l_j, \Lambda_w(s^j_l)\right)\epsilon_{\boldsymbol{w}_t,1-\tau}\end{aligned} \tag{22}$$

As the first (partial equilibrium) covariance term, its sign depends on the co-

[4]By definition, it abstracts from price movements, which are the source of dynamics in this framework. This is why this first covariance term does not require any horizon index t.

variance of employment and decreasing functions of labor shares across firms, $\mathbb{Cov}\left(l_j, \Lambda_r(s_l^j)\right)$ and $\mathbb{Cov}\left(l_j, \Lambda_w(s_l^j)\right)$.

Equations (20), (21) and (22) characterize the discrepancy between micro and macro, as well as between short and long run elasticities of wages with respect to the net-of tax rate. They highlight the fact that, given a set of parameters $\{\xi, \sigma, \lambda, \gamma\}$, one can estimate these differences using simple sufficient statistics.

Finally, we can collect these results to express the key elasticity for workers' welfare as

$$\frac{\epsilon_{\boldsymbol{w}_t,1-\tau}}{\gamma} = [1-\sigma(1-\xi)]\frac{N\mathbb{E}\left[l_j\Lambda_r(s_l^j)\right]}{1-\gamma N\mathbb{E}\left[l_j\Lambda_w(s_l^j)\right]}\left(\frac{1-\lambda}{1-\lambda\tau}+\frac{1-\lambda\tau}{1-\tau}\epsilon_{r_t,1-\tau}\right) \tag{23}$$

One can estimate $\mathbb{E}\left[l_j\Lambda_r(s_l^j)\right]$ and $\mathbb{E}\left[l_j\Lambda_w(s_l^j)\right]$ directly from micro data. However, we generally need more structure to estimate the elasticity of the rental price of capital, $\epsilon_{r_t,1-\tau}$. One common assumption in the literature on local corporate tax incidence is the small open economy, with which $\epsilon_{r_t,1-\tau}$ is set to zero. In the case of national tax reforms, which is the focus of this paper, an endogenous capital price that clears the capital market is generally required. This is why we need to solve the general equilibrium model to recover the entire wage pass-through.

5 Reduced-form evidence

This section estimates firm-level elasticities of wages and labor income with respect to the net-of-corporate income tax rate using French administrative data provided by the Ministry of Finance (DGFiP) and the National Institute of Statistics and Economic Studies (Insee). The goal is to confirm the main predictions of the model described in sections 2 and 4 and to provide micro-level moments that are used to calibrate the model in section 6. To achieve this, I exploit multiple reforms implemented in France between 2009 and 2019 that altered the corporate income tax schedule faced by firms.

The three main datasets—DADS, FARE, and BIC-RN—contain detailed information on all firms and employees in France, collected from tax returns. These datasets are linked using the unique administrative firm identifier common across data sources. Appendix B provides a detailed description of the data, as well as the sample and variable definitions used in this analysis.

5.1 Empirical design

Each reform introduced during the sample period (2009-2019) modified the corporate income tax schedule for targeted groups of firms[5]. For example, a reform known as "exceptional contributions" increased the marginal tax rate for firms with sales above 2.5 million euros, targeting very large firms by French standards. A second reform, introduced in 2017, reduced all marginal tax rates above 38,120 euros of corporate income. The variety in scale and targets of the reforms throughout the sample period is advantageous, as it allows me to leverage both tax cuts and hikes across firms with diverse characteristics to estimate the elasticities of interest.

I estimate the firm-level elasticity of average wages with respect to the net-of-tax rate described in equations (15) and (17) using the following specification:

$$\ln(w_{j,t}/w_{j,t-1}) = \delta_j + \delta_t + e \cdot \ln([1-\tau_{j,t}]/[1-\tau_{j,t-1}]) + \varepsilon_{j,t} \tag{24}$$

where $w_{j,t}$ denotes firm j's average wage in year t. δ_j and δ_t denote firm and year fixed effects, $\tau_{j,t}$ denotes the marginal corporate income tax rate that firm j faces in year t, and $\varepsilon_{j,t}$ is an error term.

Tax variations are measured using firms' marginal tax rate, rather than their average tax rate, because it is the relevant determinant of firms' choices in the model presented in section 2.

The coefficient of interest, $\widehat{e}$, is an estimate of the corporate tax elasticity of average wages at the firm level. A well-known source of endogeneity in this type of settings comes from firms' behavioral response to changes in the tax schedule. Firm j's marginal tax rate, $\tau_{j,t}(\pi^b_{j,t})$, is a function of its tax base (or before-tax corporate income), $\pi^b_{j,t}$, which is determined by its production choices and thus correlated with its wages.

To address this endogeneity, I follow the framework developed by Gruber and Saez (2002) for individual income and instrument the change in corporate income tax rate by the predicted change if firms' tax bases had remained constant. More formally, $\ln([1-\tau_{j,t}(\pi^b_{j,t})]/[1-\tau_{j,t-1}(\pi^b_{j,t-1})])$ in equation (24) is instrumented by

[5] In practice, I build a tax function that I apply to firms' reported income, and which includes multiple rules and reforms on top of the standard rate ("taux normal"): the reduced rate for small firms ("taux réduit"), the "contribution sociale sur les bénéfices", the "contributions exceptionnelles", the sequential 2017 reform. See Bach et al. (2019) for more details.

$\ln([1-\tau_{j,t}(\pi^b_{j,t-1})]/[1-\tau_{j,t-1}(\pi^b_{j,t-1})])$. This method isolates the mechanical response to tax rate changes, which is uncorrelated with simultaneous wage changes.

In the preferred specification, I use two-year differences rather than one in order to abstract from very short-run adjustment frictions like the time needed to change production plans. As a robustness check, I estimate the same specification with one-year differences and show that the estimates are very close.

5.2 Average micro elasticities

I first estimate the specification described in (24) on the whole sample of firms. Column (1) of Table 1 shows the estimated firm-level elasticity of wages with respect to the net-of-corporate income tax rate using two-year differences and controlling for time and firm fixed effects. As expected from section 4, this elasticity is positive and significant. The average firm-level elasticity is 0.012, which means that a one percent increase in the net-of-tax rate increases average wages by .012%. This relatively small average effect hides heterogeneous wage responses across different firms, as explored in the next section.

Table 1: Estimated micro elasticities

	Δ log(Average wage)			Δ log(Wage bill)		
	2-year diff		1-year diff	2-year diff		1-year diff
	(1)	(2)	(3)	(4)	(5)	(6)
Δ Net-of-tax rate	.012	.030	.017	.074	.152	.095
	(.004)	(.004)	(.004)	(.008)	(.009)	(.008)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	No	Yes	Yes	No	Yes
Obs (millions)	1.3	1.4	1.6	1.4	1.4	1.6

Columns (2) and (3) estimate the wage elasticity using different versions of the specification described in (24), by removing firm fixed effects in (2) and using one-year differences in (3). The estimated elasticities are positive, significant, and close to the preferred estimate in (1). In the quantitative exercise of section 7, I use these microeconomic estimates to assess the distribution of the corporate tax burden and compare the results to macroeconomic estimates computed through the general equilibrium model described in section 2.

Columns (4)-(6) estimate the elasticity of firms' wage bill with respect to the net-of-tax rate. As expected, these estimates are positive, significant, and larger than their wage counterparts (in columns (1)-(3)). Indeed, since firms benefit from monopsony power in the labor market, an increase in their wage not only increases the labor cost associated with each of their incumbent employees on the intensive margin but also expands their workforce, thereby increasing labor costs at the extensive margin.

5.3 Heterogeneous firm-level elasticities

Since heterogeneous responses to corporate tax changes across the labor share distribution are central to the main mechanisms of the model, I validate this pattern by estimating equation (24) for different quintiles of labor share[6].

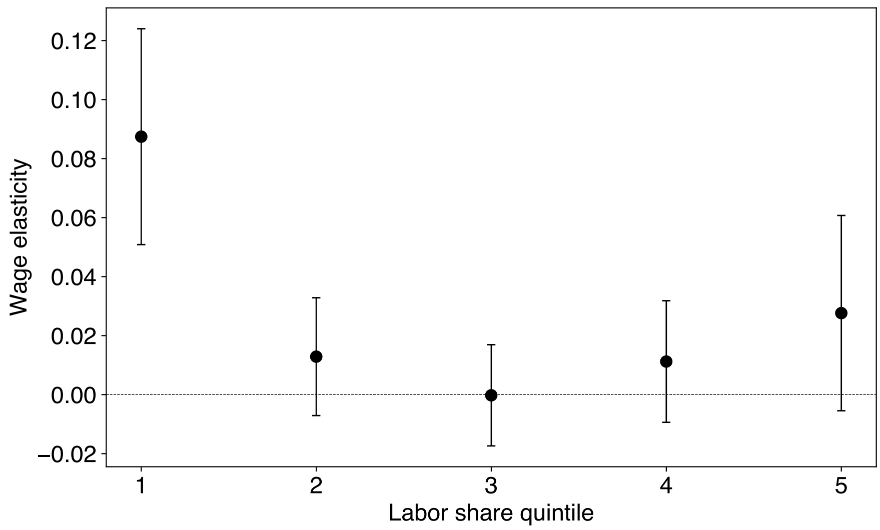


Figure 3: Firm-level elasticity of average wages w.r.t. the net-of-tax rate for different quintiles of labor share

Figure 3 shows that the elasticity of wages with respect to the net-of-corporate income tax rate is weakly positive across all labor share quintiles, with a much larger effect for firms in the first quintile, i.e. with low labor shares. The point estimates decrease over the first three quintiles and then slightly increase for the last two, although these latter coefficients are not significantly different from zero.

[6]These quintiles are defined in the year prior to the tax rate changes, that is in $t-2$ when considering two-year differences.

These results confirm the prediction from section 4 that wages increase following a corporate income tax cut, particularly for firms with low labor shares.

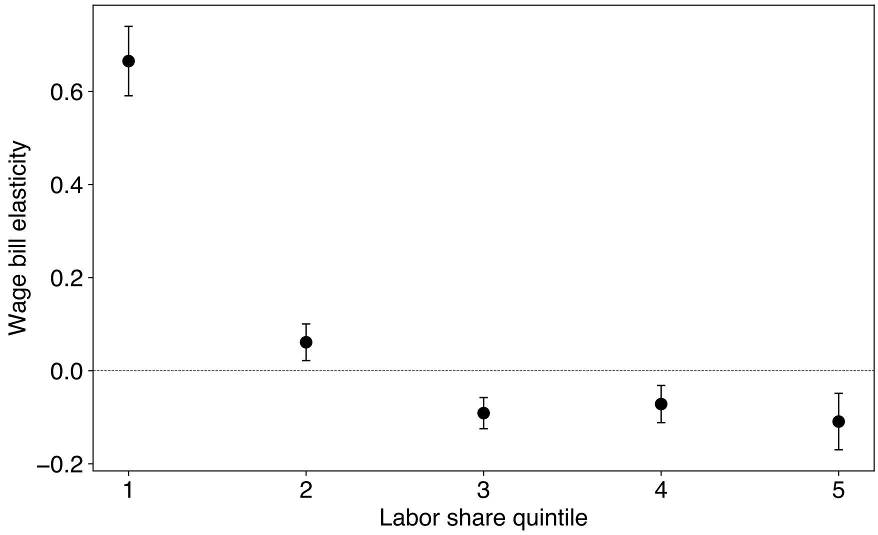


Figure 4: Firm-level elasticity of labor income w.r.t. the net-of-tax rate for different quintiles of labor share

Figure 4 presents results from a version of (24) where the outcome variable is the log-change in wage bill. It shows that the effect of corporate tax cuts on wage bills decreases with firms' labor share. Labor income elasticities are positive and significant for the first two quintiles of labor share, and negative, significant, and relatively close for the last three quintiles. Firms that see substantial labor income growth following a corporate tax cut are concentrated at the top of the capital intensity distribution. On average, a 1% increase in the net-of-tax rate generates a .67% increase in labor income at firms in the first quintile of labor share. As corporate tax rates fall, workers reallocate from labor-intensive to capital-intensive employers, corroborating the findings of section 4.

6 Calibration

The calibration strategy proceeds as follows. First, I calibrate multiple parameters using estimates from the recent literature and observable aggregates either as direct values or as targets. Secondly, I estimate the remaining economy-wide parameters by replicating the reduced-form regression from the previous section and minimizing the distance between its results and the moments estimated from French administrative data. Finally, I recover the distribution of technologies across firms by inverting the model. Given a set of economy-wide parameters, there is a one-to-one mapping between observed pairs of (labor share, size) and unobserved pairs of technologies (α, z), which allows us to identify the non-parametric distribution of technologies.

6.1 External calibration

I use estimates from the literature as well as my own estimates (based on the micro data described in the previous section) to calibrate parameters $\{ \delta, \beta, \lambda, \psi, \tau_0, r_0 \}$. The last two parameters, τ_0 and r_0, denote the initial corporate income tax rate and return on capital. The exercise presented in the next section simulates the response of this economy to an exogenous tax cut. This unanticipated reform is introduced while the economy is in an initial steady state. This is why we need to specify initial values for τ and r, which participate in the definition of this first steady state.

The capital depreciation rate δ is set to 0.095, as in Gourio and Miao (2011). All agents' preferences are characterized by the annual discount factor β, set to 0.9615 ($\beta = 1/(1+0.04)$), and log utility derived from consumption. I set the initial rate of return on capital r_0 to 0.07, which corresponds to the average rate of return on equity for all establishments in France from 1996 to 2022 computed with data provided by the Bank of France. Given $\{\beta, \delta, r_0\}$, the capital adjustment cost parameter ψ is pinned down by steady state necessary conditions, as derived in appendix D.1.

The corporate income tax schedule is summarized by two parameters: the corporate income tax rate τ_0 and the present value of depreciation allowances λ. I set the former to 0.3333, which was the main statutory corporate income tax rate in France at the beginning of the sample used for the empirical analysis. I compute λ using tax returns data. As in the United States, each type of capital defined in the French tax code features a legal rate at which firms are required to formally depreciate their assets. Tax deductions are then inferred from these legal depreciation rates. Hence,

$$\lambda = \sum_{a \in A} \gamma_a \sum_{t=1}^{T_a} \frac{D_{a,t}}{(1+r)^t} \tag{25}$$

where $a \in A$ are asset categories defined in the tax code, γ_a is their share of total assets measured in the data, T_a is the number of years on which a firm is allowed to depreciate its asset of class a, and $D_{a,t}$ is the share of its value that can be depreciated and deducted from a firm's tax base t years after being purchased. Firms discount these future depreciation allowances with the initial rate of return on capital, i.e. $r = r_0$ in (25). Doing so yields a value of λ equal to 0.68.

I examine two scenarios regarding the use of public funds. In the benchmark scenario, I assume that tax revenues finance expenditures that do not impact any agent's income. This scenario follows the assumption that G_t directly tracks corporate tax revenues, resulting in outcomes that can be interpreted as the pre-transfer incidence—i.e., the effects of corporate tax changes without considering the allocation of tax revenues across agents. In the second scenario, I assume the government uses corporate income tax revenues as direct transfers to workers, implying that $G_t = 0$ for all t in equation (6).

6.2 Model inversion

What remains to be estimated is the set of parameters $\{\gamma, \sigma, \xi\}$, common to all firms, and the distribution of technologies $(\alpha_j, z_j)_{j\in\mathcal{J}}$ across firms. Conditional on parameters $\{\gamma, \sigma, \xi\}$ and an initial wage index $\boldsymbol{w}_0$, one can invert the model to recover the non-parametric distribution of capital intensity and productivity (α, z) from observed pairs of labor and employment shares.

Hence, I use the actual distribution of (s_l, l) across firms in the data to jointly identify the full set of technologies $\{\alpha_j, z_j\}_{j\in\mathcal{J}}$. I set the number of firms in this economy to 300 and the initial wage index $\boldsymbol{w}_0$ to u_0, the initial user cost of capital. The distribution of labor and employment shares is generated from the 2010 data as follows. I group firms in the data into 300 quantiles of labor share. Each of these quantiles represents a firm, for which I compute its labor share as well as its share of total employment.

This method builds on the spatial economics literature, which uses model assumptions to recover the distribution of unobservable amenities across space (Redding and Rossi-Hansberg, 2017). It generates a non-parametric distribution of technologies that fits exactly the observed characteristics of firms, once considered through the lens of the model.

6.3 Indirect inference

This mapping between unobservable technologies and observable firm characteristics is conditional on the firm-level labor supply elasticity γ, the elasticity of substitution between capital and labor σ, and the parameter governing returns to scale ξ, which I estimate using the method of moments. I estimate reduced-form elasticities of wages and wage bills with respect to the net-of-tax rate on data generated by the model[7], using the same specification (24) as the one used on French administrative data. I calibrate parameters $\{\gamma, \sigma, \xi\}$ to minimize the mean squared errors between the empirical elasticities from section 5 and their model counterparts

$$\boldsymbol{p}^* = \arg\min_{\boldsymbol{p}\in\mathcal{P}} \sum_{\epsilon\in\mathcal{E}} \left(\epsilon^{model} - \epsilon^{data}\right)^2, \qquad \boldsymbol{p} = \{\gamma, \sigma, \xi\}$$

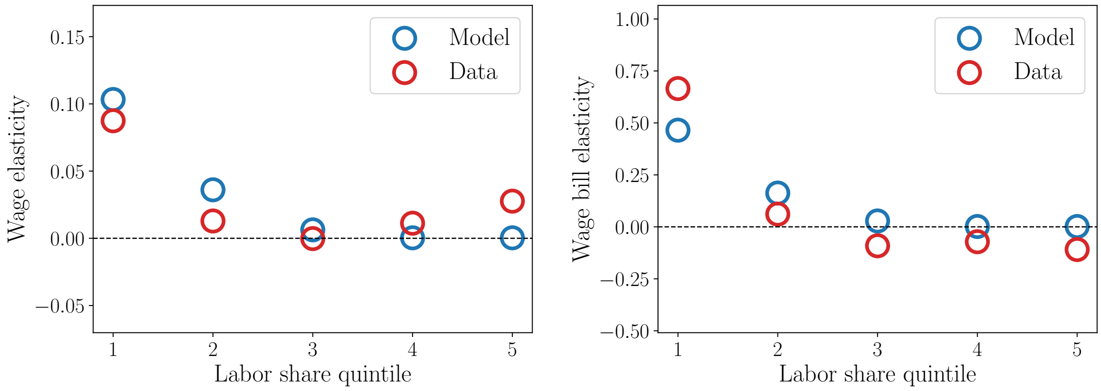
where $\boldsymbol{p}^*$ denotes the resulting set of parameters, $\mathcal{P}$ denotes the domain on which these parameters are optimized, and $\mathcal{E}$ denotes the set of elasticities used as targets.

Figure 5 shows that the elasticities generated by the calibrated model (in blue) are very close to the corresponding empirical elasticities from section 5 (in red). This method yields a firm-level labor supply elasticity γ equal to 3.5. This value is close to but lower than the labor supply elasticity estimated by Azar et al. (2022) in the US with application data (4.8). This gap is consistent with the fact that the French labor market is characterized by a lower mobility of workers. It implies that workers receive 78% of their marginal product in wages.

The resulting firm-level elasticity of substitution between capital and labor is 0.47, which is in the range of values estimated by Oberfield and Raval (2021). Finally, the returns to scale ξ are equal to 0.82. This value is consistent with the literature, which considers values from 0.60 (Gourio and Kashyap, 2007) to 0.92 (Khan and Thomas, 2008).

Figure A.8 plots the distributions of labor share and employment share across firms in the data (Panels (a) and (b)), and the resulting marginal distributions of technological parameters (α, z). Table 4 summarizes the calibrated parameters.

[7] In practice, I randomize firm-level tax changes in the model in order to generate variation at the firm-level to identify the relevant elasticities.



(a) Wage elasticity (b) Wage bill elasticity

Figure 5: Empirical elasticities vs. Model elasticities

Table 2: Calibrated parameters

External calibration					
Parameter	Description	Value	Source/Target		
δ	Capital depreciation	0.095	Gourio & Miao (2011)		
λ	PDV of deprec. allowances	0.68	Data		
β	Discount factor	0.96			
Internal calibration					
Parameter	Description	Value	Target	Model	Data
ψ	Capital adjustment cost	0.16	Return on equity	0.06	0.06
σ	Elast. of substitution K-L	0.47	Reduced-form elast. (see 6.3)		
γ	Firm-level labor supply elast.	3.50	Reduced-form elast. (see 6.3)		
ξ	Returns to scale	0.82	Reduced-form elast. (see 6.3)		
$\mathbb{E}[\alpha]$	Average capital intensity	0.194	Avg. labor share	0.57	0.61
std(α)	Std. capital intensity	0.19	Std. labor share	0.10	0.15
$\mathbb{E}[z]$	Average TFP	0.06	Avg. empl. share	0.003	0.003
std(z)	Std. TFP	0.016	Std. empl. share	0.002	0.002
Corr(α, z)	Corr(cap. int., TFP)	0.64	Corr(labor share, empl. share)	-0.25	-0.24

7 Results

This section describes the response of the calibrated economy to a one percentage point corporate income tax cut along multiple dimensions.

7.1 Dynamic corporate tax incidence

Figure 6 shows the paths of welfare gains for workers, the representative shareholder and the representative capital owner, expressed as shares of the total welfare gains, following a one percentage point corporate income tax cut. The fiscal assumption made in this first experiment is that the revenues from the corporate income tax are used for an external expenditure. Therefore, it abstracts from the distribution of public funds across agents.

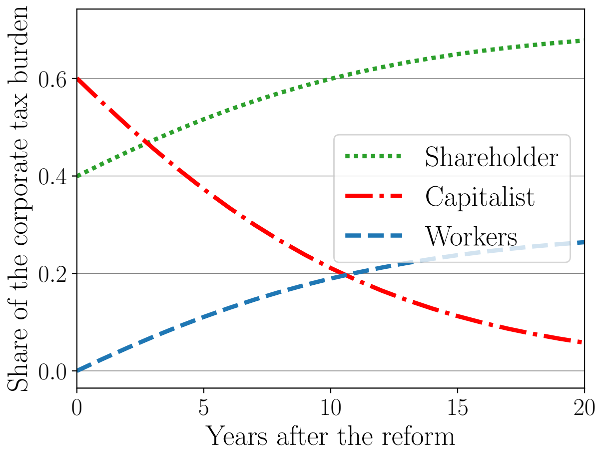


Figure 6: Corporate tax incidence

The representative capital owner (red line in Figure 6) realizes large welfare gains in the short run, which slowly vanish along the transition path. As shown in section 3.1, these first-order gains are generated by movements in the rental price of capital r_t. Figure 7 shows that this price jumps immediately when the tax cut is introduced, and then slowly returns to its steady-state level. The reform increases firms' demand for capital, but the supply of capital is relatively inelastic in the short run. The price of capital r_t rises and offsets the exogenous reduction in the user cost resulting from the tax cut. As capital supply builds up, r_t falls and the user cost u_t with it. Capital is perfectly elastic in the long run, which is why its share of the burden converges to zero.

Capital and labor are complements at the firm level, implying a partial equilibrium increase in labor demand from all firms as the user cost of capital decreases, which drives up the aggregate wage index (purple line in Figure 7). The capital stock builds up progressively over time, which generates a slow movement in prices and firm behavior.

Finally, the representative shareholder (green line in Figure 6) derives utility from aggregate after-tax profits. These profits mechanically increase when the corporate tax cut is implemented and then grow along the transition path as the user cost of capital goes down. This is why the shareholder's share of the burden grows over time.

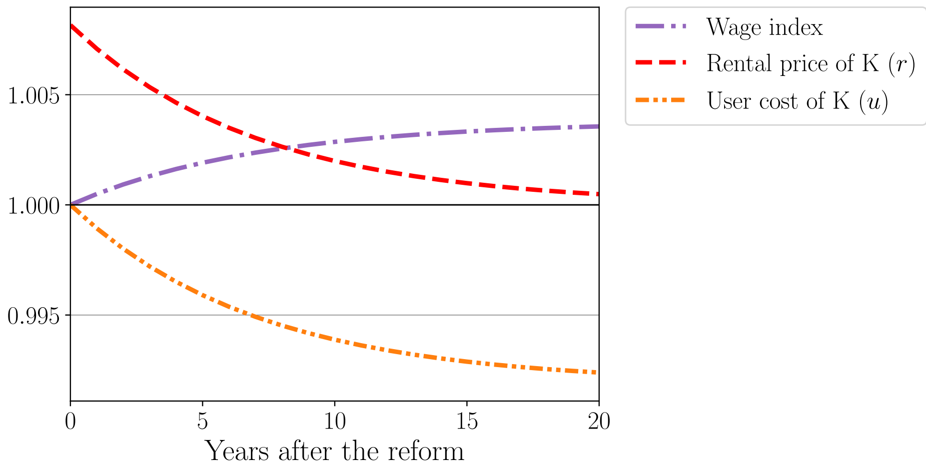


Figure 7: Aggregate price responses

Following the definition of dynamic incidence shares presented in equation 7, I compute the net present value of welfare gains for workers, the representative shareholder, and the representative capital owner, and express them as shares of the total welfare gains generated by the corporate tax cut. These results are reported in column (2) of Table 3.

In the baseline model, workers experience a small increase in lifetime utility. The present value of their welfare gains is equal to 15% of the total welfare gains generated by the reform. The representative capital owner obtains 24% of the discounted welfare gains, although her share is close to 60% in the short run. In contrast, the representative shareholder experiences 61% of the total welfare gains, although her share is about 40% in the short run.

Overall, these findings indicate that workers bear a relatively small share of the corporate income tax burden, which can even become negative when considering that revenues from corporate tax changes may be transferred to workers. Shareholders, on the other hand, bear the majority of this burden. Moreover, the significant difference between the short-run and long-run distribution of the corporate tax burden highlights the importance of accounting for dynamics when assessing its incidence. These results are somewhat surprising given the recent literature on corporate tax incidence, which suggests that workers bear between 30% and 50% of the tax burden (Fuest et al., 2018; Carbonnier et al., 2022; Kennedy et al., 2022). Section 7.2 explains that this discrepancy arises from the macroeconomic perspective of this paper, as well as the underlying micro heterogeneity.

7.2 Micro vs. Macro estimates

To compare these results with micro estimates, I introduce common assumptions made at the micro level in frameworks interested in the incidence of corporate taxes. First, I use the wage elasticity estimated from the micro-empirical specification (24) to account for wage effects of corporate taxes. This estimate is an average treatment effect and controls for general equilibrium effects that are common to all firms.

The second assumption is the absence of redistribution. The connection between corporate tax revenues and public expenditures is often unclear at local or regional levels, particularly when revenues are collected at the national level and subsequently redistributed among local entities. This observation provides a rationale for this assumption.

The third assumption is that the reform occurs in a small open economy. Microeconomic estimates typically adopt this assumption because firm-level or local variations in corporate tax rates do not influence the price of capital. The small open economy assumption abstracts from any welfare effect on capital owners, as capital prices are fixed. The corporate tax burden is only distributed between workers and shareholders.

Table 3: Micro vs. Macro estimates

	Share of the CIT burden				
	Micro estimate	Macro estimates			
		Baseline	w/o Firm het.	Redistribution	Consumption
	(1)	(2)	(3)	(4)	(5)
Workers	0.29	0.15	0.05	-0.05	0.16
Shareholder	0.71	0.61	0.80	0.77	0.81
Capital owner	-	0.24	0.15	0.28	0.03

Note: This table reports the estimated shares of the corporate income tax (CIT) burden borne by workers and the representative shareholder and capital owner. Column (1) uses the average elasticity estimated with (24). Column (2) reports the results from the baseline model. Column (3) removes firm heterogeneity. Column (4) introduces redistribution of the tax revenues to workers. Column (5) reports the consumption incidence shares in the baseline model.

Column (1) of Table 3 shows the distribution of the corporate tax burden under these micro-relevant assumptions. Workers bear 29% of the corporate tax burden, while the representative shareholder bears the remaining 71%. The present result is consistent with, though slightly below, the findings of the recent literature based on estimates of average microeconomic effects with the same underlying assumptions. This literature finds that workers' share of the corporate tax burden lies between 32.5% (Suárez-Serrato and Zidar, 2016) and 50% (Carbonnier et al., 2022). Figure A.9 makes a more extensive comparison between this paper's estimates and the recent literature.

Hence, the general equilibrium model estimate reduces workers' share of the corporate tax burden by half compared to the micro estimate.

The primary driver of this discrepancy between micro and macro incidence is the gap between wage elasticities at these two levels. Short-run price responses play a key role in general equilibrium as they drive down the macro elasticity. Wages increase following a corporate tax cut because firms demand more capital, which, in turn, raises the demand for labor as a complementary factor. In general equilibrium, the amount of capital that firms use slowly increases as the aggregate capital stock builds up. The associated wage gains take time to realize. Due to discounting, this dimension reduces the impact of corporate taxes on workers.

Column (3) in Table 3 shows the result from an economy similar to baseline one except that all firms are the average firm, i.e. they all have the same technology $(\mathbb{E}[\alpha], \mathbb{E}[z])$. In this economy without firm heterogeneity, workers bear an even smaller share of the corporate tax burden. The reason for this outcome is that, when firms are heterogeneous, corporate income tax changes generate different wage effects across firms. We saw in section 4 that capital intensive firms respond more intensely to such changes. Given that they are also larger and pay higher wages on average, the wage effect of a corporate tax cut is amplified by these heterogeneous responses. In other words, the first covariance term in equation (12) is positive. Without firm heterogeneity, and without the amplification coming from this covariance term, corporate tax cuts generate lower wage gains for workers.

Column (4) adds redistribution to the baseline model by assuming that the revenues from the corporate income tax are used as transfers to workers. In this scenario, workers actually experience a welfare loss after a corporate tax cut. The sign and magnitude of this effect depend on the initial position of the economy on the corporate tax Laffer curve. This fiscal channel has a negative impact on workers' share of the tax burden because the economy is on the increasing portion of the Laffer curve. At much higher tax rates, on the decreasing portion of the Laffer curve, this fiscal externality would have the opposite sign, increasing workers' share of the burden. Overall, these results indicate that the use of public funds is a significant determinant of incidence shares at the aggregate level.

Finally, column (5) shows the distribution of the corporate income tax burden in terms of consumption in the baseline model. The share of the change in aggregate consumption associated with the tax reform that workers represent is 16%, which is line with the welfare results of column (2).

Overall, these results highlight the importance of general equilibrium effects, firm heterogeneity and dynamics in shaping incidence outcomes at the aggregate level.

8 Conclusion

In this paper, I introduce firm and worker heterogeneity and capital adjustment costs into a Harberger model to estimate the share of the corporate tax burden borne by workers. These new ingredients generate stronger wage responses at capital intensive firms than at labor intensive firms following a corporate tax cut. I confirm this prediction using French administrative data that collect information from tax returns.

I calibrate the model using these data and show that heterogeneous technologies and general equilibrium dynamics generate a share of 15% of the total welfare gains from this tax cut accruing to workers. I show that using average micro estimates rather than aggregate general equilibrium elasticities to measure the change in workers' welfare leads to an overestimation of their share of the tax burden. I derive a closed-form expression for the discrepancy between micro and macro elasticities, and demonstrate that it is a function of another set of sufficient statistics that can be recovered from empirical analyses.

The present analysis could be extended in many interesting directions. One avenue would be to add other margins that make capital and labor income more or less elastic to corporate tax rates, like international mobility (Gordon and Hines Jr, 2002), income shifting, or the salience of this incidence (Aghion et al., 2023). Another extension could be to introduce different types of workers, characterized by heterogeneous levels of complementarity with capital, as in Krusell et al. (2000), and thus heterogeneous shares of the corporate tax burden.

References

Aghion, Philippe, Ufuk Akcigit, Maxime Gravoueille, Matthieu Lequien, and

Stefanie Stantcheva, "Tax simplicity or simplicity of evasion? Evidence from self-employment taxes in France," 2023.

Arulampalam, Wiji, Michael P. Devereux, and Giorgia Maffini, "The direct incidence of corporate income tax on wages," *European Economic Review*, 8 2012, *56*, 1038–1054.

Atkinson, Anthony B and Joseph E Stiglitz, *Lectures on public economics: Updated edition*, Princeton University Press, 2015.

Auerbach, Alan J., "Measuring the effects of corporate tax cuts," *Journal of Economic Perspectives*, 9 2018, *32*, 97–120.

Azar, José A, Steven T Berry, and Ioana Marinescu, "Estimating labor market power," Technical Report, National Bureau of Economic Research 2022.

Bach, Laurent, Antoine Bozio, and Clément Malgouyres, "L'hétérogénéité des taux d'imposition implicites des profits en France," *IPP report*, 2019, (26).

Baron, David P and Robert Forsythe, "Uncertainty and the theory of tax incidence in a stock market economy," *International Economic Review*, 1981, pp. 567–576.

Batra, Raveendra N, "A general equilibrium model of the incidence of corporation income tax under uncertainty," *Journal of Public Economics*, 1975, *4* (4), 343–360.

Berger, David, Kyle Herkenhoff, and Simon Mongey, "Labor market power," *American Economic Review*, 2022, *112* (4), 1147–93.

_ , _ , Andreas R Kostøl, and Simon Mongey, "An anatomy of monopsony: Search frictions, amenities, and bargaining in concentrated markets," *NBER Macroeconomics Annual*, 2024, *38* (1), 1–47.

Boadway, Robin, "Long-run tax incidence: A comparative dynamic approach," *The Review of Economic Studies*, 1979, *46* (3), 505–511.

Carbonnier, Clément, Clément Malgouyres, Loriane Py, and Camille Urvoy, "Who benefits from tax incentives? The heterogeneous wage incidence of a tax credit," *Journal of Public Economics*, 2022, *206*, 104577.

Card, David, Ana Rute Cardoso, Joerg Heining, and Patrick Kline, "Firms and Labor Market Inequality: Evidence and Some Theory," *Journal of Labor Economics*, 2018, *36.*

Cragg, John G, Arnold C Harberger, and Peter Mieszkowski, "Empirical evidence on the incidence of the corporation income tax," *Journal of Political Economy*, 1967, *75* (6), 811–821.

Devereux, Michael P, Li Liu, and Simon Loretz, "The elasticity of corporate taxable income: New evidence from UK tax records," *American Economic Journal: Economic Policy*, 2014, *6* (2), 19–53.

Feldstein, Martin, "Incidence of a capital income tax in a growing economy with variable savings rates," *The Review of Economic Studies*, 1974, *41* (4), 505–513.

Fuest, Clemens, Andreas Peichl, and Sebastian Siegloch, "Do higher corporate taxes reduce wages? Micro evidence from Germany," *American Economic Review*, 2018, *108* (2), 393–418.

Giroud, Xavier and Joshua Rauh, "State Taxation and the Reallocation of Business Activity: Evidence from Establishment-Level Data," *Journal of Political Economy*, 2019, *127*, 1262–1316.

Gordon, Robert J, "The incidence of the corporation income tax in US manufacturing, 1925-62," *The American Economic Review*, 1967, *57* (4), 731–758.

Gordon, Roger H and James R Hines Jr, "International taxation," *Handbook of public economics*, 2002, *4*, 1935–1995.

Gourio, Francois and Anil K Kashyap, "Investment spikes: New facts and a general equilibrium exploration," *Journal of Monetary Economics*, 2007, *54*, 1–22.

Gourio, François and Jianjun Miao, "Firm Heterogeneity and the Long-run Effects of Dividend Tax Reform," *AEJ: Macroeconomics*, 2010, *2*, 131–168.

_ **and** _ , "Transitional Dynamics of Dividend and Capital Gains Tax Cuts," *Review of Economic Dynamics*, 2011, *14*, 368–283.

Gravelle, Jennifer, "Corporate tax incidence: review of general equilibrium estimates and analysis," *National Tax Journal*, 2013, *66* (1), 185–214.

Gruber, Jon and Emmanuel Saez, "The elasticity of taxable income: evidence and implications," *Journal of public Economics*, 2002, *84* (1), 1–32.

Harberger, Arnold C, "The Incidence of the Corporation Income Tax," *The Journal of Political Economy*, 1962, *70.*

Judd, Kenneth L, "Redistributive taxation in a simple perfect foresight model," *Journal of public Economics*, 1985, *28* (1), 59–83.

Kaymak, Barıs, Immo Schott et al., "Corporate tax cuts and the decline of the labor share," *Econometrica*, Forthcoming.

Kennedy, Patrick, Christine Dobridge, Paul Landefeld, and Jake Mortenson, "The Efficiency-Equity Tradeoff of the Corporate Income Tax: Evidence from the Tax Cuts and Jobs Act," *Unpublished manuscript*, 2022.

Khan, Aubhik and Julia K Thomas, "Idiosyncratic Shocks and the Role of Nonconvexities in Plant and Aggregate Investment Dynamics," *Econometrica*, 2008, *76*, 395–436.

Kotlikoff, Laurence J and Lawrence H Summers, "Tax incidence," in "Handbook of public economics," Vol. 2, Elsevier, 1987, pp. 1043–1092.

Krusell, Per, Lee E Ohanian, Jose-Victor Rios-Rull, and Giovanni L. Violante, "Capital-Skill Complementarity And Inequality: A Macroeconomic Analysis," *Econometrica*, 2000, *68*, 1029–1053.

Krzyzaniak, Marian and Richard Abel Musgrave, "The shifting of the corporation income tax: An empirical study of its short-run effect upon the rate of return," 1963.

Mutti, John and Harry Grubert, "The taxation of capital income in an open economy: the importance of resident-nonresident tax treatment," *Journal of Public Economics*, 1985, *27* (3), 291–309.

Oberfield, Ezra and Devesh Raval, "Micro data and macro technology," *Econometrica*, 2021, *89* (2), 703–732.

Randolph, William Carl, *International burdens of the corporate income tax*, Congressional Budget Office Washington, DC, 2006.

Ratti, Ronald A and Parthasarathi Shome, "The general equilibrium theory of tax incidence under uncertainty," *Journal of Economic Theory*, 1977, *14* (1), 68–83.

_ and _ , "The incidence of the corporation income tax: A long-run, specific factor model," *Southern Economic Journal*, 1977, pp. 85–98.

Redding, Stephen J and Esteban Rossi-Hansberg, "Quantitative spatial economics," *Annual Review of Economics*, 2017, *9*, 21–58.

Risch, Max, "Does taxing business owners affect employees? Evidence from a change in the top marginal tax rate," *The Quarterly Journal of Economics*, 2024, *139* (1), 637–692.

Shoven, John B, "The incidence and efficiency effects of taxes on income from capital," *Journal of Political Economy*, 1976, *84* (6), 1261–1283.

Suárez-Serrato, Juan-Carlos and Owen Zidar, "Who benefits from state corporate tax cuts? A local labor markets approach with heterogeneous firms," *American Economic Review*, 9 2016, *106*, 2582–2624.

Swonder, Dustin and Damián Vergara, "A Simple Model of Corporate Tax Incidence," in "AEA Papers and Proceedings," Vol. 114 American Economic Association 2014 Broadway, Suite 305, Nashville, TN 37203 2024, pp. 352–357.

Turnovsky, Stephen J, "The incidence of taxes: A dynamic macroeconomic analysis," *Journal of Public Economics*, 1982, *18* (2), 161–194.

Winberry, Thomas, "Lumpy Investment, Business Cycles, and Stimulus Policy," *American Economic Review*, 2020.

Zwick, Eric and James Mahon, "Tax policy and heterogeneous investment behavior," *American Economic Review*, 1 2017, *107*, 217–248.

APPENDIX

A Additional figures

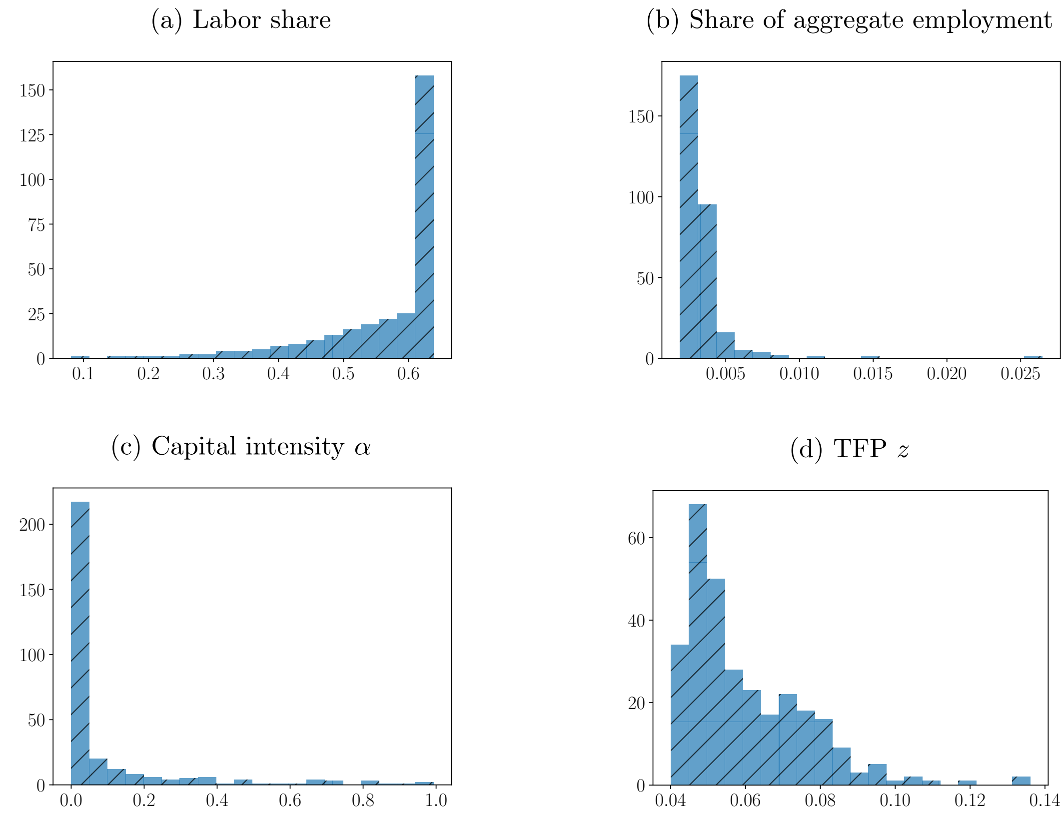


Figure A.8: Firm distribution

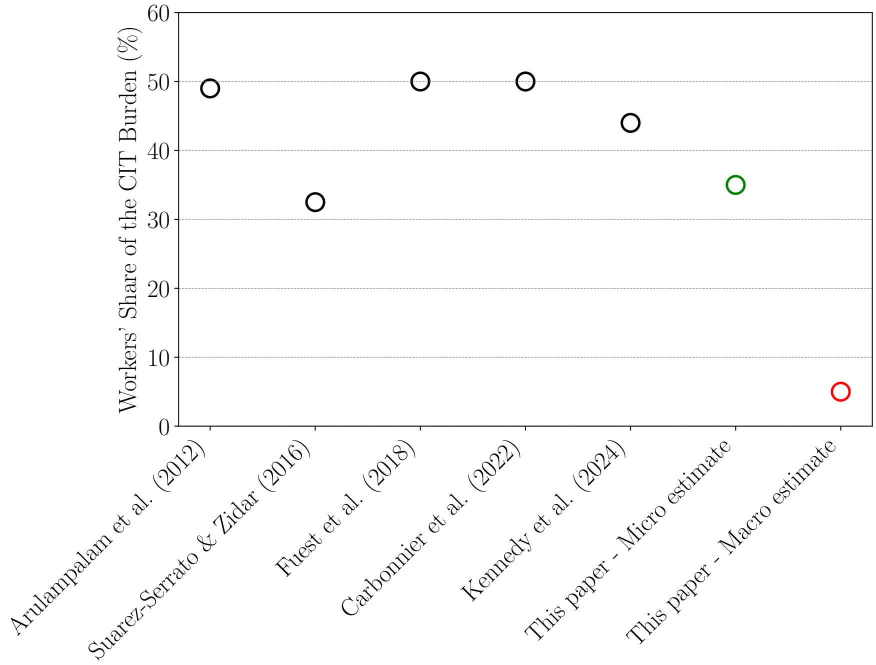


Figure A.9: Comparison to the recent literature

B Data

I use French administrative data provided by the Public Finance Administration (DGFiP) and the National Institute of Statistics and Economic Studies (Insee). The three main datasets are employee and firm data called DADS, FARE and BIC-RN.

The DADS (*Déclarations Annuelles des Données Sociales*) dataset gathers social security reports provided to the French administration by every firm operating in France. It provides information at the contract level on gross and net wage earnings, hours worked, type of contract, age, gender. Each contract is assigned an employee identifier as well as a firm identifier. The latter remains constant across years, which gives a panel dimension at the firm level. This firm identifier is the same across datasets, which gives the possibility to match the DADS dataset with FARE data. I use DADS data for all worker-related variables, typically employment, wages, and skills.

FARE gathers firm-level balance sheet data based on their tax and social security reports. It covers all firms in France except financial and agricultural industries. It is an unbalanced panel on the 2009-2019 sample period. I use FARE data for the majority of firm-related variables that have no direct link with employment and wages, for example value added and sales.

Finally, I use BIC-RN (*Bénéfices industriels et commerciaux - Régime normal*) data for tax related variables. BIC-RN provides all information present on firms' tax returns. It notably provides firms' tax bases, or taxable corporate income, which is very useful to determine firms' marginal and average tax rates, as well as predicted changes in these two outcomes.

B.1 Sample selection

As is common in the literature, I drop firms that have less than five employees. I also drop the few firms that end up with a negative labor share because they have a negative value added or a negative wage bill in the data. As described above, using firms that are present in these datasets implies to restrict the sample to the corporate sector. All firms in the final dataset are taxed under the "normal regime", which means that their are subject to the corporate income tax. This is an equivalent of C-corporations in the US. Moreover, the final dataset excludes financial and agricultural industries.

B.2 Marginal tax rates

I build a tax function that I apply to firms' reported income, and which includes multiple rules and reforms on top of the standard rate ("taux normal"): the reduced rate for small firms ("taux réduit"), the "contribution sociale sur les bénéfices", the "contributions exceptionnelles", the sequential 2017 reform. See Bach et al. (2019) for more details. These features yield a tax schedule and a thus a marginal tax rate for any reported income.

This tax function allows me to create the instrument used in the empirical design, which relies on a predicted marginal tax rate corresponding to the mechanical effect of a tax reform. This predicted tax rate is computed by plugging the previous years' reported income in the current tax function.

B.3 Employment and wage variables

Employment and wage data are taken from the DADS dataset. This data report before-tax income, hours worked, contract type, and many other information for each contract a firm has with an employee. An observation in this data is a contract in a given year. Workers can have multiple contracts in the same year, typically if they have multiple jobs. I drop observations that report negative hours worked, negative days worked, or negative wages.

I compute firms' wage bill as the sum of gross income reported in each of their contracts. Firms' employment is the sum of days worked in each of their contracts, divided by 360, which is the maximum number of days worked for a contract. Firms' average wage in a given year is then simply their wage bill divided by their employment.

B.4 Summary statistics

Table 4: Summary statistics

Variable	Mean	Std. Dev.	Median
Value added	2,649.4	47,334.5	597.6
CIT bill	106.3	3,681.9	3.6
Total assets	14,975.4	631,976.2	1,280.3
EBE	713.1	21,687.0	78.2
Wage bill	1,371.0	21,653.8	358.2
Sales	10,035.4	184,147.3	1,587.8
Employment	38.9	670.2	11.0
Investment (intangible)	118.8	18,655.7	0.0
Investment (tangible)	414.6	20,130.0	14.1
Reported income	589.9	25.9	73.8

Note: All values, except for Employment, are expressed in thousands of 2015 euros.

C Omitted proofs

Derivation of (10)

$$\begin{aligned}
\frac{\epsilon_{\boldsymbol{w_t},1-\tau}}{\gamma} &= \sum_j l_j \epsilon^j_{w,1-\tau} \\
&= N\mathbb{E}\left[l_j \epsilon^j_{w,1-\tau}\right] \\
&= \mathbb{E}\left[\epsilon^j_{w,1-\tau}\right] + N\mathbb{C}\mathrm{ov}\left(l_j, \epsilon^j_{w,1-\tau}\right)
\end{aligned}$$

Sufficient conditions for Lemma 2

Multiply both sides of equation 15 by l_j, and sum over firms j to obtain

$$\epsilon_{\boldsymbol{w}_t,1-\tau} = -\frac{[1-\sigma(1-\xi)]\sum_j l_j \Lambda_r(s^j_{l,0})}{1-\sum_j l_j \Lambda_w(s^j_{l,0})}\epsilon_{u_t,1-\tau}$$

The numerator is positive, which means that we need to prove that

$$1 - \sum_j l_j \Lambda_w(s^j_{l,0}) > 0$$

i.e.

$$\gamma + \sigma + \frac{1-\sigma(1-\xi)}{1-\xi}\frac{1+\gamma}{\gamma}\frac{s^j_{l,t}}{\xi} > 1$$

Straightforward sufficient conditions this inequality to hold are that $\gamma \geq 1$ and $\sigma > 0$, given that third term of the left-hand side is weakly positive. This is the case in all the cases considered in this paper, notably the main calibration which sets $\gamma = 4.8$ (based on Azar et al. (2022)) and $\sigma = 0.5$ (based on Oberfield and Raval (2021)).

□

D Model - Details

D.1 Capital owner

The representative capital owner chooses, in each period t, her consumption of each good c_{jt} and next period capital K_{t+1} to maximize

$$V_k = \max_{\{c_{jt}, K_{t+1}\}_{t=0}^{\infty}} \sum_{t=0}^{\infty} \beta^t \ln(C_t^K) \quad , \quad C_t^K = \int_0^N c_{jt}^K dj \tag{26}$$
$$\text{s.t. } C_t^K + [K_{t+1} - (1-\delta)K_t] + \phi(K_t, K_{t+1}) = r_t K_t$$

The first order conditions of the problem are

$$\frac{\beta^t}{C_t^K} = \xi_t$$
$$\xi_t [1 + \phi_2 (K_t, K_{t+1})] = [r_{t+1} + (1-\delta) - \phi_1 (K_{t+1}, K_{t+2})] \xi_{t+1}$$

Combining these two equations yields the Euler equation:

$$\frac{C_{t+1}^K}{\beta C_t^K} = \frac{r_{t+1} + (1-\delta) - \phi_1 (K_{t+1}, K_{t+2})}{1 + \phi_2 (K_t, K_{t+1})} \tag{27}$$

Assuming $\phi(K, K') = \psi \frac{(K' - (1-\delta)K)^2}{2K}$, the Euler equation becomes

$$\frac{C_{t+1}^K}{C_t^K} = \beta \frac{r_{t+1} + (1-\delta) + \frac{\psi}{2} \left(\frac{K_{t+2}}{K_{t+1}} \right)^2}{1 + \psi \left(\frac{K_{t+1}}{K_t} - (1-\delta) \right)}$$

In steady state:

$$1 = \beta \frac{r^* + (1-\delta) + \frac{\psi}{2}}{1 + \psi (1 - (1-\delta))} \implies r^* = \frac{1 + \psi\delta}{\beta} - (1-\delta) - \frac{\psi}{2}$$

D.2 Firm problem

Firms choose a vector of inputs (k, l) and a wage w to maximize

$$\begin{aligned} \max_{k,l,w} \quad & zf(k,l,\alpha) - lw - uk \\ \text{s.t.} \quad & f(k,l,\alpha) = \left(\alpha k^{\frac{\sigma-1}{\sigma}} + (1-\alpha) l^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma\xi}{\sigma-1}} \\ & l(w) = \frac{w^{\gamma}}{\boldsymbol{w}} \end{aligned}$$

or

$$\max_{k,w} \quad z\left(\alpha k^{\frac{\sigma-1}{\sigma}} + (1-\alpha)(w^{\gamma}\boldsymbol{w}^{-1})^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma\xi}{\sigma-1}} - w^{1+\gamma}\boldsymbol{w}^{-1} - uk$$

The FOC's are

$$\begin{aligned} (k) \quad & z\xi\left(\alpha k^{\frac{\sigma-1}{\sigma}} + (1-\alpha) l^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma\xi}{\sigma-1}-1} \alpha k^{-\frac{1}{\sigma}} = u \\ (w) \quad & z\xi\left(\alpha k^{\frac{\sigma-1}{\sigma}} + (1-\alpha)(w^{\gamma}\boldsymbol{w}^{-1})^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma\xi}{\sigma-1}-1} (1-\alpha)\boldsymbol{w}^{-\frac{\sigma-1}{\sigma}}\gamma w^{\gamma\frac{\sigma-1}{\sigma}-1} = (1+\gamma)w^{\gamma}\boldsymbol{w}^{-1} \end{aligned}$$

Rearranging the second equation yields

$$(w) \quad z\xi\left(\alpha k^{\frac{\sigma-1}{\sigma}} + (1-\alpha)(\boldsymbol{w}^{-1}w^{\gamma})^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma\xi}{\sigma-1}-1} (1-\alpha)\boldsymbol{w}^{\frac{1}{\sigma}}\frac{\gamma}{1+\gamma}w^{-\frac{\gamma+\sigma}{\sigma}} = 1$$

Dividing (k) by (w) gives

$$\frac{\alpha}{1-\alpha}\frac{k^{-\frac{1}{\sigma}}}{\boldsymbol{w}^{\frac{1}{\sigma}}w^{-\frac{\gamma+\sigma}{\sigma}}} = \frac{\gamma}{1+\gamma}u$$

i.e.

$$k^{\frac{\sigma-1}{\sigma}} = \left(\frac{\gamma}{1+\gamma}u\frac{1-\alpha}{\alpha}\right)^{1-\sigma}\boldsymbol{w}^{-\frac{\sigma-1}{\sigma}}w^{\frac{(\gamma+\sigma)(\sigma-1)}{\sigma}}$$

D.3 Wage bill

We can take our FOC (w)

$$z\xi\left(\alpha k^{\frac{\sigma-1}{\sigma}} + (1-\alpha)(\boldsymbol{w}^{-1}w^{\gamma})^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma\xi}{\sigma-1}-1} (1-\alpha)\boldsymbol{w}^{\frac{1}{\sigma}}\frac{\gamma}{1+\gamma}w^{-\frac{\gamma+\sigma}{\sigma}} = 1$$

and use our previous result to substitute for k

$$z\xi\left(\alpha\left(\frac{\gamma}{1+\gamma}u\frac{1-\alpha}{\alpha}\right)^{1-\sigma}\boldsymbol{w}^{-\frac{\sigma-1}{\sigma}}w^{\frac{(\gamma+\sigma)(\sigma-1)}{\sigma}}+(1-\alpha)(\boldsymbol{w}^{-1}w^{\gamma})^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma\xi}{\sigma-1}-1}$$
$$(1-\alpha)\boldsymbol{w}^{\frac{1}{\sigma}}\frac{\gamma}{1+\gamma}w^{-\frac{\gamma+\sigma}{\sigma}}=1$$

$$\implies\quad z\xi\left(\alpha^{\sigma}\left(\frac{\gamma}{1+\gamma}\frac{u}{w}(1-\alpha)\right)^{1-\sigma}+(1-\alpha)\right)^{\frac{\sigma\xi}{\sigma-1}-1}(1-\alpha)\boldsymbol{w}^{1-\xi}\frac{\gamma}{1+\gamma}w^{-[1+\gamma(1-\xi)]}=1$$

$$\implies\quad z\xi\left(\alpha^{\sigma}u^{1-\sigma}+(1-\alpha)^{\sigma}\left(\frac{1+\gamma}{\gamma}w\right)^{1-\sigma}\right)^{\frac{\sigma\xi}{\sigma-1}-1}\left(\frac{1+\gamma}{\gamma}w\right)^{1-\sigma(1-\xi)}$$
$$(1-\alpha)^{\sigma(1-\xi)}\boldsymbol{w}^{1-\xi}\frac{\gamma}{1+\gamma}w^{-[1+\gamma(1-\xi)]}=1$$

$$\implies\quad z\xi\left(\alpha^{\sigma}u^{1-\sigma}+(1-\alpha)^{\sigma}\left(\frac{1+\gamma}{\gamma}w\right)^{1-\sigma}\right)^{-\frac{1-\sigma(1-\xi)}{1-\sigma}}$$
$$(1-\alpha)^{\sigma(1-\xi)}\left(\frac{\gamma}{1+\gamma}\right)^{\sigma(1-\xi)}\boldsymbol{w}^{(1-\xi)}w^{-(\gamma+\sigma)(1-\xi)}=1$$

$$\implies\quad (z\xi)^{\frac{1}{1-\xi}}\left(\alpha^{\sigma}u^{1-\sigma}+(1-\alpha)^{\sigma}\left(\frac{1+\gamma}{\gamma}w\right)^{1-\sigma}\right)^{-\frac{1-\sigma(1-\xi)}{(1-\sigma)(1-\xi)}}$$
$$(1-\alpha)^{\sigma}w^{(1-\sigma)}\left(\frac{\gamma}{1+\gamma}\right)^{\sigma}=\boldsymbol{w}^{-1}w^{1+\gamma}=wl$$

D.4 Output

Back to the FOCs:

$$(k)\quad z\xi\left(\alpha k^{\frac{\sigma-1}{\sigma}}+(1-\alpha)l^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma\xi}{\sigma-1}-1}\alpha k^{-\frac{1}{\sigma}}=u$$
$$(w)\quad z\xi\left(\alpha k^{\frac{\sigma-1}{\sigma}}+(1-\alpha)(\boldsymbol{w}^{-1}w^{\gamma})^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma\xi}{\sigma-1}-1}(1-\alpha)\boldsymbol{w}^{\frac{1}{\sigma}}\frac{\gamma}{1+\gamma}w^{-\frac{\gamma+\sigma}{\sigma}}=1$$

Dividing (k) by (l) gives

$$k^{\frac{\sigma-1}{\sigma}}=\left(\frac{\gamma}{1+\gamma}u\frac{1-\alpha}{\alpha}\right)^{1-\sigma}\boldsymbol{w}^{-\frac{\sigma-1}{\sigma}}w^{\frac{(\gamma+\sigma)(\sigma-1)}{\sigma}}$$

Let's rewrite the FOCs as

$$\begin{aligned}
(k) \quad & z^{\frac{\sigma-1}{\sigma\xi}} \xi y^{\frac{1-\sigma(1-\xi)}{\sigma\xi}} \alpha k^{-\frac{1}{\sigma}} = u \\
(w) \quad & z^{\frac{\sigma-1}{\sigma\xi}} \xi y^{\frac{1-\sigma(1-\xi)}{\sigma\xi}} (1-\alpha) \boldsymbol{w}^{\frac{1}{\sigma}} \frac{\gamma}{1+\gamma} w^{-\frac{\gamma+\sigma}{\sigma}} = 1
\end{aligned}$$

or

$$\begin{aligned}
(k) \quad & z^{\frac{\sigma-1}{\sigma\xi}} \left(\frac{\xi\alpha}{u}\right)^{\sigma-1} y^{\frac{(1-\sigma(1-\xi))(\sigma-1)}{\sigma\xi}} = k^{\frac{\sigma-1}{\sigma}} \\
(w) \quad & z^{\frac{(\sigma-1)^2}{\sigma\xi}} \left(\frac{\xi(1-\alpha)}{w} \frac{\gamma}{1+\gamma}\right)^{\sigma-1} y^{\frac{(1-\sigma(1-\xi))(\sigma-1)}{\sigma\xi}} = (\boldsymbol{w}^{-1} w^{\gamma})^{\frac{\sigma-1}{\sigma}}
\end{aligned}$$

where I used $f = y/z$.

We can use this to substitute for k and l in the production function:

$$\begin{aligned}
& y = z\left(\alpha k^{\frac{\sigma-1}{\sigma}} + (1-\alpha) l^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma\xi}{\sigma-1}} \\
\implies \quad & y = z^{\frac{1}{(1-\xi)}} \xi^{\frac{\xi}{1-\xi}} \left(\alpha^{\sigma} u^{1-\sigma} + (1-\alpha)^{\sigma} \left(\frac{1+\gamma}{\gamma} w\right)^{1-\sigma}\right)^{\frac{\xi}{(\sigma-1)(1-\xi)}}
\end{aligned}$$

or simply rearranging (w),

$$y = \left(\frac{1+\gamma}{\gamma\xi(1-\alpha)}\right)^{\frac{\sigma\xi}{1-\sigma(1-\xi)}} z^{-\frac{\sigma-1}{1-\sigma(1-\xi)}} \boldsymbol{w}^{-\frac{\xi}{1-\sigma(1-\xi)}} w^{\frac{(\gamma+\sigma)\xi}{1-\sigma(1-\xi)}}$$

and when $\xi = 1$,

$$y = \left(\frac{1+\gamma}{\gamma(1-\alpha)}\right)^{\sigma} z^{1-\sigma} \boldsymbol{w}^{-1} w^{\gamma+\sigma}$$

D.5 Labor share

We can easily compute a firm's labor share, s_l, with our last results:

$$\begin{aligned}
s_l &= \frac{wl}{y} \\
&= \frac{(z\xi)^{\frac{1}{1-\xi}} \left(\alpha^\sigma u^{1-\sigma} + (1-\alpha)^\sigma \left(\frac{1+\gamma}{\gamma} w \right)^{1-\sigma} \right)^{-\frac{1-\sigma(1-\xi)}{(1-\sigma)(1-\xi)}} (1-\alpha)^\sigma w^{(1-\sigma)} \left(\frac{\gamma}{1+\gamma} \right)^\sigma}{z^{\frac{1}{(1-\xi)}} \xi^{\frac{\xi}{1-\xi}} \left(\alpha^\sigma u^{1-\sigma} + (1-\alpha)^\sigma \left(\frac{1+\gamma}{\gamma} w \right)^{1-\sigma} \right)^{\frac{\xi}{(\sigma-1)(1-\xi)}}} \\
&= \xi \frac{(1-\alpha)^\sigma w^{1-\sigma} \left(\frac{\gamma}{1+\gamma} \right)^\sigma}{\alpha^\sigma u^{1-\sigma} + (1-\alpha)^\sigma \left(\frac{1+\gamma}{\gamma} w \right)^{1-\sigma}} \\
&= \xi \frac{\gamma}{1+\gamma} \frac{(1-\alpha)^\sigma \left(\frac{1+\gamma}{\gamma} w \right)^{1-\sigma}}{\alpha^\sigma u^{1-\sigma} + (1-\alpha)^\sigma \left(\frac{1+\gamma}{\gamma} w \right)^{1-\sigma}}
\end{aligned}$$

D.6 Capital share

From the FOC:

$$k = \left(\frac{\gamma}{1+\gamma} \frac{u}{w} \frac{1-\alpha}{\alpha} \right)^{-\sigma} \boldsymbol{w}^{-1} w^\gamma$$

Thus, the firm-level capital share is

$$\begin{aligned}
s_k &= \frac{rk}{y} \\
&= \left(\frac{\gamma}{1+\gamma} \frac{u}{w} \frac{1-\alpha}{\alpha} \right)^{-\sigma} r \frac{l}{y} \\
&= \left(\frac{\gamma}{1+\gamma} \frac{u}{w} \frac{1-\alpha}{\alpha} \right)^{-\sigma} \frac{r}{w} s_l \\
&= \left(\frac{\gamma}{1+\gamma} \frac{u}{w} \frac{1-\alpha}{\alpha} \right)^{-\sigma} \frac{r}{w} \xi \frac{\gamma}{1+\gamma} \frac{(1-\alpha)^\sigma \left(\frac{1+\gamma}{\gamma} w \right)^{1-\sigma}}{\alpha^\sigma u^{1-\sigma} + (1-\alpha)^\sigma \left(\frac{1+\gamma}{\gamma} w \right)^{1-\sigma}} \\
&= \frac{1-\tau}{1-\lambda\tau} \xi \frac{\alpha^\sigma u^{1-\sigma}}{\alpha^\sigma u^{1-\sigma} + (1-\alpha)^\sigma \left(\frac{1+\gamma}{\gamma} w \right)^{1-\sigma}} \\
&= \frac{1-\tau}{1-\lambda\tau} \left(\xi - \frac{1+\gamma}{\gamma} s_l \right)
\end{aligned}$$

D.7 Labor income elasticity

$$wl = (z\xi)^{\frac{1}{1-\xi}} \left(\alpha^\sigma u^{1-\sigma} + (1-\alpha)^\sigma \left(\frac{1+\gamma}{\gamma} w\right)^{1-\sigma}\right)^{-\frac{1-\sigma(1-\xi)}{(1-\sigma)(1-\xi)}} (1-\alpha)^\sigma w^{(1-\sigma)} \left(\frac{\gamma}{1+\gamma}\right)^\sigma$$

$$\begin{aligned}
d\ln(wl) &= -\frac{1-\sigma(1-\xi)}{(1-\sigma)(1-\xi)} d\ln\left(\alpha^\sigma u^{1-\sigma} + (1-\alpha)^\sigma \left(\frac{1+\gamma}{\gamma} w\right)^{1-\sigma}\right) + (1-\sigma) d\ln(w) \\
&= -\frac{1-\sigma(1-\xi)}{(1-\xi)} \left(1 - \frac{1+\gamma}{\gamma}\frac{s_l}{\xi}\right) d\ln u \\
&\quad + \left[(1-\sigma) - \frac{1-\sigma(1-\xi)}{(1-\xi)}\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}\right] d\ln w
\end{aligned}$$

Using

$$\begin{aligned}
wl = \boldsymbol{w}^{-1} w^{1+\gamma} &\implies d\ln(wl) = -d\ln(\boldsymbol{w}) + (1+\gamma) d\ln(w) \\
&\implies d\ln(w) = \frac{1}{1+\gamma}[d\ln(wl) + d\ln(\boldsymbol{w})]
\end{aligned}$$

we can express the log change in wage bill as

$$d\ln(wl) = -\frac{\frac{1-\sigma(1-\xi)}{(1-\xi)}\left(1 - \frac{1+\gamma}{\gamma}\frac{s_l}{\xi}\right)}{1 - \frac{1-\sigma}{1+\gamma} + \frac{1-\sigma(1-\xi)}{(1-\xi)}\frac{s_l}{\gamma\xi}} d\ln u - \frac{\left[\frac{1-\sigma}{1+\gamma} + \frac{1-\sigma(1-\xi)}{(1-\xi)}\frac{s_l}{\gamma\xi}\right]}{1 - \frac{1-\sigma}{1+\gamma} + \frac{1-\sigma(1-\xi)}{(1-\xi)}\frac{s_l}{\gamma\xi}} d\ln \boldsymbol{w}$$

The elasticity of labor income with respect to the net-of-tax rate is

$$\begin{aligned}
\epsilon_{wl,1-\tau} &= \frac{d\ln(wl)}{d\ln(1-\tau)} \\
&= -\frac{[1-\sigma(1-\xi)]\left(1 - \frac{1+\gamma}{\gamma}\frac{s_l}{\xi}\right)}{1 - \xi - \frac{(1-\xi)(1-\sigma)}{1+\gamma} + [1-\sigma(1-\xi)]\frac{s_l}{\gamma\xi}} \frac{d\ln u}{d\ln(1-\tau)} \\
&\quad + \frac{\left[\frac{(1-\xi)(1-\sigma)}{1+\gamma} - [1-\sigma(1-\xi)]\frac{s_l}{\gamma\xi}\right]}{1 - \xi - \frac{(1-\xi)(1-\sigma)}{1+\gamma} + [1-\sigma(1-\xi)]\frac{s_l}{\gamma\xi}} \frac{d\ln \boldsymbol{w}}{d\ln(1-\tau)}
\end{aligned}$$

If $\xi = 1$,

$$\epsilon_{wl,1-\tau} = -\frac{\gamma - (1+\gamma)s_l}{s_l} \frac{d\ln u}{d\ln(1-\tau)} - \frac{d\ln \boldsymbol{w}}{d\ln(1-\tau)}$$

In partial equilibrium, i.e. $dr = d\boldsymbol{w} = 0$,

$$\epsilon^{PE}_{wl,1-\tau} = \frac{\frac{1-\sigma(1-\xi)}{(1-\xi)}\left(1 - \frac{1+\gamma}{\gamma}\frac{s_l}{\xi}\right)}{1 - \frac{1-\sigma}{1+\gamma} + \frac{1-\sigma(1-\xi)}{(1-\xi)}\frac{s_l}{\gamma\xi}} \frac{1-\lambda}{1-\lambda\tau} > 0$$

If $\xi = 1$,

$$\epsilon^{PE}_{wl,1-\tau} = -(1+\gamma)\frac{\frac{\gamma}{1+\gamma} - s_l}{s_l}\frac{1-\lambda}{(1-\tau)^2} r$$

The indirect effect is summarized by the following elasticity:

$$\begin{aligned}
\epsilon^{GE}_{wl,1-\tau} &= \epsilon_{wl,1-\tau} - \epsilon^{PE}_{wl,1-\tau} \\
&= -\frac{\frac{1-\sigma(1-\xi)}{(1-\xi)}\left(1 - \frac{1+\gamma}{\gamma}\frac{s_l}{\xi}\right)}{1 - \frac{1-\sigma}{1+\gamma} + \frac{1-\sigma(1-\xi)}{(1-\xi)}\frac{s_l}{\gamma\xi}} \frac{1-\lambda\tau}{1-\tau} \frac{d\ln r}{d\ln(1-\tau)} + \frac{\left[\frac{1-\sigma}{1+\gamma} - \frac{1-\sigma(1-\xi)}{(1-\xi)}\frac{s_l}{\gamma\xi}\right]}{1 - \frac{1-\sigma}{1+\gamma} + \frac{1-\sigma(1-\xi)}{(1-\xi)}\frac{s_l}{\gamma\xi}} \frac{d\ln \boldsymbol{w}}{d\ln(1-\tau)}
\end{aligned}$$

D.8 Wage elasticity

From our previous results,

$$\begin{aligned}
d\ln(wl) = &-\frac{1-\sigma(1-\xi)}{(1-\xi)}\left(1 - \frac{1+\gamma}{\gamma}\frac{s_l}{\xi}\right) d\ln u \\
&+ \left[(1-\sigma) - \frac{1-\sigma(1-\xi)}{(1-\xi)}\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}\right] d\ln w
\end{aligned}$$

Using

$$wl = \frac{w^{1+\gamma}}{\boldsymbol{w}} \implies d\ln(wl) = (1+\gamma) d\ln(w) - d\ln \boldsymbol{w}$$

then,

$$\begin{aligned}
d\ln w &= \frac{-\frac{1-\sigma(1-\xi)}{(1-\xi)}\left(1 - \frac{1+\gamma}{\gamma}\frac{s_l}{\xi}\right) d\ln u + d\ln \boldsymbol{w}}{\gamma + \sigma + \frac{1-\sigma(1-\xi)}{(1-\xi)}\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}} \\
&= \frac{-[1-\sigma(1-\xi)]\left(1 - \frac{1+\gamma}{\gamma}\frac{s_l}{\xi}\right) d\ln u + (1-\xi) d\ln \boldsymbol{w}}{(1-\xi)(\gamma+\sigma) + [1-\sigma(1-\xi)]\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}}
\end{aligned}$$

and,

$$\epsilon_{w,1-\tau} = \underbrace{-\frac{[1-\sigma(1-\xi)]\left(1-\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}\right)}{(1-\xi)(\gamma+\sigma)+[1-\sigma(1-\xi)]\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}}}_{<0}\frac{d\ln u}{d\ln(1-\tau)}$$

$$+\underbrace{\frac{(1-\xi)}{(1-\xi)(\gamma+\sigma)+[1-\sigma(1-\xi)]\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}}}_{>0}\frac{d\ln \boldsymbol{w}}{d\ln(1-\tau)}$$

If $\xi = 1$,

$$d\ln w = \left(1-\frac{\gamma}{(1+\gamma)s_l}\right)d\ln u$$

and

$$\epsilon_{w,1-\tau} = \underbrace{-\left(\frac{\gamma/(1+\gamma)}{s_l}-1\right)}_{<0}\frac{d\ln u}{d\ln(1-\tau)}$$

In partial equilibrium, i.e. $dr = d\boldsymbol{w} = 0$,

$$\epsilon^{PE}_{w,1-\tau} = \frac{[1-\sigma(1-\xi)]\left(1-\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}\right)}{(1-\xi)(\gamma+\sigma)+[1-\sigma(1-\xi)]\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}}\frac{1-\lambda}{1-\lambda\tau} > 0$$

If $\xi = 1$,

$$\epsilon^{PE}_{w,1-\tau} = \left(\frac{\gamma/(1+\gamma)}{s_l}-1\right)\frac{1-\lambda}{1-\lambda\tau} > 0$$

The indirect effect is summarized by the following elasticity:

$$\begin{aligned}\epsilon^{GE}_{w,1-\tau} &= \epsilon_{w,1-\tau} - \epsilon^{PE}_{w,1-\tau}\\ &= -\frac{[1-\sigma(1-\xi)]\left(1-\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}\right)}{(1-\xi)(\gamma+\sigma)+[1-\sigma(1-\xi)]\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}}\frac{1-\lambda\tau}{1-\tau}\frac{d\ln r}{d\ln(1-\tau)}\\ &\quad+\frac{(1-\xi)}{(1-\xi)(\gamma+\sigma)+[1-\sigma(1-\xi)]\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}}\frac{d\ln \boldsymbol{w}}{d\ln(1-\tau)}\end{aligned}$$

If $\xi = 1$,

$$\epsilon^{GE}_{w,1-\tau} = -\left(\frac{\gamma/(1+\gamma)}{s_l} - 1\right)\frac{1-\lambda\tau}{1-\tau}\frac{d\ln r}{d\ln(1-\tau)}$$

D.9 Aggregate wage effect

$$\begin{aligned}
\mathbb{E}\left[\epsilon^{PE}_{w,1-\tau}\right] &= [1-\sigma(1-\xi)]\frac{1-\lambda}{1-\lambda\tau}\mathbb{E}\left[\frac{\left(1-\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}\right)}{(1-\xi)(\gamma+\sigma)+[1-\sigma(1-\xi)]\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}}\right] \\
\mathbb{Cov}\left(l_j, \epsilon^{PE}_{w,1-\tau}\right) &= [1-\sigma(1-\xi)]\frac{1-\lambda}{1-\lambda\tau}\mathbb{Cov}\left(l_j, \frac{\left(1-\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}\right)}{(1-\xi)(\gamma+\sigma)+[1-\sigma(1-\xi)]\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}}\right) \\
\mathbb{E}\left[\epsilon^{GE}_{w,1-\tau}\right] &= -[1-\sigma(1-\xi)]\frac{1-\lambda\tau}{1-\tau}\mathbb{E}\left[\frac{\left(1-\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}\right)}{(1-\xi)(\gamma+\sigma)+[1-\sigma(1-\xi)]\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}}\right]\frac{d\ln r}{d\ln(1-\tau)} \\
&\quad + \mathbb{E}\left[\frac{(1-\xi)}{(1-\xi)(\gamma+\sigma)+[1-\sigma(1-\xi)]\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}}\right]\frac{d\ln \boldsymbol{w}}{d\ln(1-\tau)} \\
\mathbb{Cov}\left(l_j, \epsilon^{GE}_{w,1-\tau}\right) &= -[1-\sigma(1-\xi)]\frac{1-\lambda\tau}{1-\tau}\mathbb{Cov}\left(l_j, \frac{\left(1-\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}\right)}{(1-\xi)(\gamma+\sigma)+[1-\sigma(1-\xi)]\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}}\right)\frac{d\ln r}{d\ln(1-\tau)} \\
&\quad + \mathbb{Cov}\left(l_j, \frac{(1-\xi)}{(1-\xi)(\gamma+\sigma)+[1-\sigma(1-\xi)]\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}}\right)\frac{d\ln \boldsymbol{w}}{d\ln(1-\tau)}
\end{aligned}$$

or

$$\begin{aligned}
\mathbb{E}\left[\epsilon^{PE}_{w,1-\tau}\right] &= [1-\sigma(1-\xi)]\frac{1-\lambda}{1-\lambda\tau}\mathbb{E}\left[\Lambda_r(s_l)\right] \\
\mathbb{Cov}\left(l_j, \epsilon^{PE}_{w,1-\tau}\right) &= [1-\sigma(1-\xi)]\frac{1-\lambda}{1-\lambda\tau}\mathbb{Cov}\left(l_j, \Lambda_r(s_l)\right) \\
\mathbb{E}\left[\epsilon^{GE}_{w,1-\tau}\right] &= -[1-\sigma(1-\xi)]\frac{1-\lambda\tau}{1-\tau}\mathbb{E}\left[\Lambda_r(s_l)\right]\frac{d\ln r}{d\ln(1-\tau)} \\
&\quad + \mathbb{E}\left[\Lambda_w(s_l)\right]\frac{d\ln \boldsymbol{w}}{d\ln(1-\tau)} \\
\mathbb{Cov}\left(l_j, \epsilon^{GE}_{w,1-\tau}\right) &= -[1-\sigma(1-\xi)]\frac{1-\lambda\tau}{1-\tau}\mathbb{Cov}\left(l_j, \Lambda_r(s_l)\right)\frac{d\ln r}{d\ln(1-\tau)} \\
&\quad + \mathbb{Cov}\left(l_j, \Lambda_w(s_l)\right)\frac{d\ln \boldsymbol{w}}{d\ln(1-\tau)}
\end{aligned}$$

where

$$\Lambda_r(s_l) = \frac{\left(1 - \frac{1+\gamma}{\gamma}\frac{s_l}{\xi}\right)}{(1-\xi)(\gamma+\sigma) + [1-\sigma(1-\xi)]\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}}$$

$$\Lambda_w(s_l) = \frac{(1-\xi)}{(1-\xi)(\gamma+\sigma) + [1-\sigma(1-\xi)]\frac{1+\gamma}{\gamma}\frac{s_l}{\xi}}$$

Moreover, if $\xi = 1$,

$$\mathbb{E}\left[\epsilon^{PE}_{w,1-\tau}\right] = \frac{1-\lambda}{1-\lambda\tau}\left(\frac{\gamma}{1+\gamma}\mathbb{E}\left[\frac{1}{s_l}\right] - 1\right)$$

$$\mathbb{C}\mathrm{ov}\left(l_j, \epsilon^{PE}_{w,1-\tau}\right) = \frac{1-\lambda}{1-\lambda\tau}\frac{\gamma}{1+\gamma}\mathbb{C}\mathrm{ov}\left(l_j, \frac{1}{s_l}\right)$$

$$\mathbb{E}\left[\epsilon^{GE}_{w,1-\tau}\right] = -\frac{1-\lambda\tau}{1-\tau}\left(\frac{\gamma}{1+\gamma}\mathbb{E}\left[\frac{1}{s_l}\right] - 1\right)\frac{d\ln r}{d\ln(1-\tau)}$$

$$\mathbb{C}\mathrm{ov}\left(l_j, \epsilon^{GE}_{w,1-\tau}\right) = -\frac{1-\lambda\tau}{1-\tau}\frac{\gamma}{1+\gamma}\mathbb{C}\mathrm{ov}\left(l_j, \frac{1}{s_l}\right)\frac{d\ln r}{d\ln(1-\tau)}$$

E Model inversion

Let N denote the number of firms in the economy. For a given labor supply elasticity and an initial normalization of $\boldsymbol{w}_0$, there is a one-to-one mapping between firms' observed employment shares $l_{j,0}$ and their wages $w_{j,0}$, defined by the labor supply equation (2). Using this mapping, I recover firms' initial wages from the observed distribution of employment in 2010.

Then, we can recover firms' capital intensity α_j from these wages and firms' observed labor share $s^j_{l,0}$ in 2010, using equation (16), for given values of the parameters $\{\sigma, \xi, \gamma\}$.

Finally, we can recover firms' TFP z_j from the vector of wages, the vector of capital intensities, parameters $\{\sigma, \xi, \gamma, \boldsymbol{w}_0\}$, and firms' FOC derived in appendix D.3.