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Taxing Corporate or Shareholder Income

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Taxing Corporate or Shareholder Income*

Kristoffer Berg†

September 19, 2025

Abstract

As corporate income tax rates have fallen across the world, other capital taxes become more important. This paper studies the choice between income taxation at the corporate and shareholder level. I develop a sufficient-statistics framework to determine optimal tax reforms. The main result is that when the incidence of the corporate income tax on workers is higher than that of shareholder income taxes, lowering the former and reducing the latter is typically optimal. In a policy application, I derive optimal reform directions for corporate and shareholder income taxes for a large and a small economy.

JEL: F21, H21, H22. Keywords: corporate income tax, dividend taxes, optimal capital taxation, sufficient statistics

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1 Introduction

Over the last decades, a wide range of countries have reduced their corporate income tax rates (de Mooij et al., 2021). A prominent alternative to corporate income taxation is to tax shareholders on their income (dividends and capital gains) deriving from corporate profits. This paper evaluates the choice between taxing income at the corporate versus shareholder level. First, I develop a sufficient-statistics model based on the trade-off between corporate and shareholder income taxation, allowing for tax base spillovers. Second, I analyse the relationship between sufficient statistics and the optimal reform direction. In an application, I derive optimal reform directions for Norway and the U.S.

To explain why there is a trade-off between corporate and shareholder taxation, consider what an investor's after-tax income c is from an investment x. Denote by r the return rate, τ^b as the corporate income tax rate, τ^r as the shareholder income tax rate (on dividends or capital gains), and τ^p as the total tax rate on investment. After-tax income is

$$c = (1 - \tau^r)(1 - \tau^b)rx = (1 - \tau^p)rx.$$

Hence, the *total statutory marginal tax rate on investment* is the combination of taxes at the corporate and shareholder level

$$\tau^p = \tau^r + \tau^b - \tau^r\tau^b.$$

A key difference between the two taxes is to which groups they apply. Taxes on corporate income are typically applied on a *source basis*, in the country where operation takes place, such that there is a statutory corporate income tax payment by all investors in the company. Taxes on shareholder income are instead typically applied on a *residence basis*, such that they apply only to resident investors' global investments.[1] From the national government's point of view, one benefit of a corporate income tax is therefore to partly tax foreign shareholders. However, growing empirical evidence indicates that corporate income taxes affect investment and other tax bases more than shareholder income taxes do

[1] A notable counterexample is dividend withholding taxes, which apply to certain foreign investors depending on bilateral tax agreements, see Casi-Eberhard et al. (2025).

(including Chetty and Saez (2005) and Yagan (2015) on dividend taxation and Suárez Serrato and Zidar (2016) and Fuest et al. (2018) on corporate income taxation). The trade-off between these two effects is the basis for this paper.

The main contribution of the paper is to develop a tractable and applicable framework for studying the optimal taxation of corporate and shareholder income under a fixed labour income tax. The approach here is based on sufficient statistics, which involves making few assumptions on the structure of the economy and connect the welfare analysis of tax reforms to empirical estimates of tax base elasticities (Chetty, 2009b). A key point is that taxes are in the end paid by individuals, and the model therefore accounts for incidence in an optimal tax sufficient statistic framework. Incidence matters both because of fiscal externalities on other tax bases and because governments may attach different weights to workers, resident shareholders and foreign shareholders. To determine incidence, two empirical features are accounted for. First, it matters who owns corporations. Whether owners are foreigners or residents and whether they are rich or poor may affect the weights governments attach to them and thereby optimal tax policy. Second, taxes are not necessarily paid by the groups that face the statutory incidence. The extent of economic incidence on each group is determined by the elasticity of each tax base with respect to each tax rate.

The framework is used to study optimal policy under different assumptions about the relationship between tax rates on the corporate and shareholder level. Using this model and its sufficient statistics, I evaluate the optimal corporate and shareholder income tax mix. The sufficient statistics required for this analysis are the elasticities for the two tax bases in question (shareholder and corporate), four elasticities describing cross-tax base effects (on labour, shareholders and corporations) of corporate and shareholder income taxes, two own-price elasticities of ”effort” (labour supply for workers and investment for shareholders), three tax rates (on average labour income, on shareholder income, and on corporate income), and marginal welfare weights on each of the three groups of individuals (foreign investors, resident investors and resident workers). While this may appear to be too many sufficient statistics to estimate for the framework to be practical, I show how the number of necessary elasticities can be reduced by making different assumptions

about the economy. One benefit of basing the welfare analysis on these sufficient statistics is that few assumptions about the structure of the economy are necessary, which means that the framework is applicable to economies with different characteristics.

I apply the framework to a large economy, the United States, and a small open economy, Norway. In the application, welfare weights on foreign shareholders are assumed to be zero whereas weights on resident shareholders compared to workers are based on the implicit weight on high income levels in the labour income tax using an inverse optimum approach (Bourguignon and Spadaro, 2012). One result is that if all own- and cross-base elasticities are the same for the corporate and shareholder income tax, a higher corporate income tax is typically optimal, as it raises some revenue from taxing foreign investors. Another result is that the incidence on workers is a key determinant of the optimal policy mix. This is partly driven by the high relative welfare weight on workers compared to investors derived from how the current progressive labour income tax distributes from high to low earners. If corporate income taxation affects investment more than shareholder income taxation does, it is to be expected that more of incidence of corporate income taxes fall on workers, which makes it more likely that a reform towards lower corporate income tax and higher shareholder income tax is optimal.

Related literature

The paper contributes to a broad theoretical literature on effects and incidence of capital income taxation (Harberger, 1962, Diamond and Mirrlees, 1971, Atkinson and Stiglitz, 1976, Judd, 1985, Chamley, 1986, Nielsen and Sørensen, 1997 and Straub and Werning, 2020). The famous Atkinson-Stiglitz result of zero capital income taxation at the optimum does not apply in the setting here, since preferences are not assumed to be homogeneous and separable (Saez, 2002), investors may earn income above the normal rate of return, and there are foreign investors.

Another contribution of the paper is to apply the sufficient statistic framework for tax analysis (Feldstein, 1999, Saez, 2001, Chetty, 2009a, Piketty and Saez, 2013, Saez and Stantcheva, 2018, Piketty et al., 2023 and Zoutman, 2025) to corporate income taxation and incidence analysis. Saez and Zucman (2023) challenge the standard approach to tax inci-

dence. Using a neoclassical model with taxation of capital and labour, they show that supply elasticities of capital and labour are the only necessary parameters for the optimal tax problem, and that cross-base effects are irrelevant for optimal policy. Some of the reasons why results here differ are that the sufficient-statistics model allows for: non-neoclassical effects (such as super-normal returns to capital investment), tax evasion responses of corporate income to taxation that do not affect investment, and rent-sharing with workers within the firm.

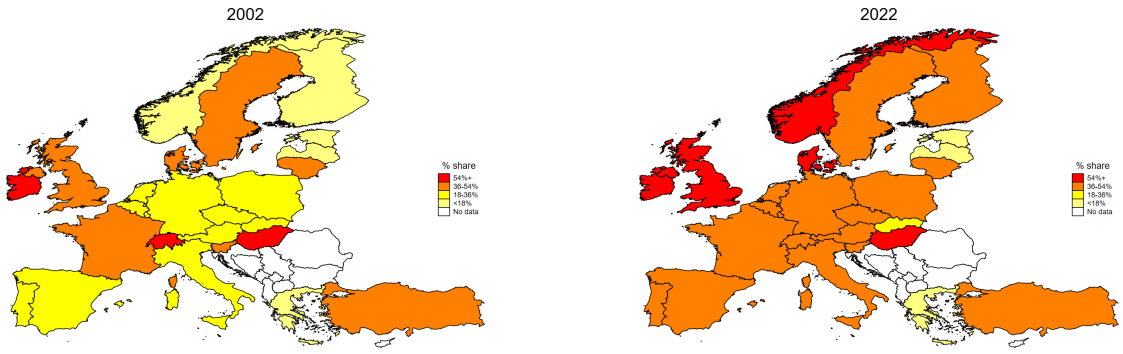
The paper also relates to specific theoretical work on corporate income taxes, dividend taxes and capital gains taxes (Feldstein and Hartman, 1979, Korinek and Stiglitz, 2009, Gourio and Miao, 2010, Auerbach and Devereux, 2018 and Bjerksund and Schjelderup, 2022). The contribution to this strand of literature is to show how aspects of these different taxes can be brought together to derive the optimal reform in a sufficient statistic framework. Most relevant, Bucovetsky and Wilson (1991) and Huizinga and Nielsen (1997) study the trade-off between taxing at income at source and at residence, but limit their analysis to qualitative insights based on representative agents. Related, Chang (1988) and Dávila and Hébert (2023) study the trade-off between taxing corporate income and corporate payouts with a focus on corporate financing. None of these contributions include effects on workers or overall welfare.

Last, the paper shows how empirical evidence from the literature on incidence and elasticities of corporate income taxation (Arulampalam et al., 2012, Devereux et al., 2014, Devereux et al., 2015, Kawano and Slemrod, 2016, Suárez Serrato and Zidar, 2016, Zwick and Mahon, 2017, Fuest et al., 2018 and Kennedy et al., 2022) and of dividend and capital gains taxation (Poterba, 2004, Chetty and Saez, 2005, Auerbach and Hassett, 2006, Desai and Dharmapala, 2011, Alstadsæter et al., 2017, Jacob and Michaely, 2017, Maffini et al., 2019, Bach et al., 2021, Isakov et al., 2021, Miller et al., 2022, Harju et al. (2022) and Bilicka et al., 2025) can inform the optimal mix of these two taxes.

The paper proceeds as follows. Section 2 describes the evolution of corporate and shareholder tax rates. Section 3 presents the model and derives the main theoretical optimal tax results. Section 4 describes the relationship between sufficient statistics and optimal reform directions. Section 5 concludes.

2 The evolution of corporate and shareholder income taxes

The relative share of corporate and shareholder income tax rates varies across countries and time. Here, I describe the international trends in corporate and shareholder taxation in OECD countries, with a focus on Europe.[2] The downward trend in corporate income tax rates has been widely discussed, for example by the International Monetary Fund (2023). Using data from the OECD (2023b), Figures 1 shows how the ratio between statutory dividend tax rates to statutory corporate income tax rates have evolved in Europe from 2001 to 2022. The development has generally been that countries have moved towards a higher share of dividend taxes to corporate income taxes, which is explained both by falling corporate income tax rates and (to a lesser extent) increased dividend tax rates.



(a) 2002. (b) 2022.

Figure 1: The share of dividend to corporate income tax rates in Europe.

Notes: Data provided by the OECD (OECD, 2023b).

To provide a more comprehensive picture, I run regressions on the tax rate developments over time for all OECD countries. The full results of these regressions are presented in Table A1-A4 in Appendix A. First, regressing the share of dividend tax rates over the total investor tax rates on time, the effect is significant. Then, I run regressions of the type

$$tax_i = \alpha + \beta t + \gamma pop_i + \eta gdp_i + \varepsilon_i, \tag{1}$$

where tax_i is either τ_i^d/τ_i^b or τ_i^d in country i, t is the year, pop_i is the population size of each

[2]The development of capital gains tax rates is less straightforward to summarize across countries, as some vary with the length of time of each investment.

country, gdp_i is the gross domestic product of each country, and ε_i is the error term. There is a significant effect of time on both the dividend tax rate and on the relative dividend to corporate tax rate. In addition, countries with larger populations have higher relative levels of corporate income taxation and lower levels of dividend taxation. All in all, this suggests that countries may substitute corporate taxation with shareholder taxation. In the following, I model this choice.

3 Model

3.1 Description

3.1.1 Individuals and tax bases

There are three types of individuals: labour income earners, l, with income z^l, resident shareholders, r, with income z^r, and foreign shareholders, f, with income z^f.[3] In addition, corporations, b, produce corporate income, z^b, which is taxable profits for each corporation. Individuals cannot relabel their income from one type to another. Each income type $k = l, b, r, f$ is distributed according to $h^k(z^k)$, total incomes of each type are denoted by Z^k, and $\bar{x}$ denotes income-weighted averages of variables x. The model allows for heterogeneous individuals and firms, but subscripts indicating specific individuals and firms are omitted for readability.

Individual utility functions for both workers and shareholders are denoted by $u^k(c^k(w^k), e^k(w^k))$, where $c^k = z^k(w^k, e^k) - T^k(z^k(w^k, e^k)$ is consumption, z^k is the individual's taxable income, $z^k(w^k, e^k) = w^k e^k(w^k)$, w^k is the price (wages or rental rates), e^k is effort exerted (labour hours or investment) in attaining z^k for each individual, $T^k(.)$ is the income tax for each income type. Utility functions are concave in c^k and strictly convex in e^k.

The key factor is that prices are endogenous, such that returns for shareholders and wages for labour income earners depend on total corporate and shareholder income while corporate income depends on shareholder income. To ease the notation, $w^l(Z^b, Z^r, Z^f)$

[3] To fix ideas, shareholder income can be the sum of dividends and capital gains at realisation. The model extends to capital gains taxed and measured at accrual. It can in principle also account for the long-run effects of dynamic considerations, such as incentives to delay realisation through the elasticities.

is abbreviated by w^l, $w^r(Z^r, Z^f, Z^b)$ is abbreviated by w^r, $w^f(Z^f, Z^r, Z^b)$ is abbreviated by w^f, $z^b(Z^r, Z^f)$ is abbreviated by z^b, $u^k(c^k(w^k), e^k(w^k))$ is abbreviated by u^k, $\partial u^k/\partial c^k$ is abbreviated by u^k_c, $\partial u^k/\partial e^k$ is abbreviated by u^k_e and $e^k(w^k)$ is abbreviated by e^k.[4]

The shareholder income tax is based on residence (applies only to resident investors) while the corporate income tax is based on source (may apply to all investments). Shareholder and corporate income taxes are flat and denoted by τ^r and τ^b, respectively, whereas $\bar{\tau}^l$ denotes the income-weighted average labour income tax.

Individuals maximize utility given their budget constraint, $c^k = w^k e^k - T(w^k e^k)$, such that their marginal utility gain from exerting effort is equal to the marginal utility cost,

$$\left(1 - \tau(z^k)\right) u^k_c \frac{\partial z^k}{\partial e^k} = -u^k_e.$$

This is the standard trade-off between leisure and consumption for labour income earners, while for shareholders the left hand side represents the value of investing one dollar into stocks and the right hand side represents the (net-of-tax) opportunity cost of investment.

The effect on a labour income earner's utility for marginal change in the net-of-tax rate change applied to labour income is

$$\frac{\partial u^l}{\partial(1 - \tau^l(z^l))} = u^l_c z^l,$$

which is a result of the envelope theorem.

Remember that w^l is a function of Z^b and Z^r. Hence, the effect on workers from a net-of-tax rate change for corporate or shareholder income is

$$\frac{\partial u^l}{\partial(1 - \tau^j)} = (1 - \tau^l(z^l)) u^l_c e^l \frac{\partial w^l}{\partial(1 - \tau^j)}, j = r, b,$$

such that the spillover on wages determines the utility change for workers.

[4]The model allows for shareholder income tax avoidance by not specifying the relationship between corporate and shareholder income such that not all after-corporate income tax corporate income increases may lead to an equivalent increase in the shareholder income tax base.

Similarly, the effect on resident shareholders from a tax change on corporate income is

$$\frac{\partial u^r}{\partial(1-\tau^b)} = (1-\tau^r)u_c^r e^r \frac{\partial w^r}{\partial(1-\tau^b)}.$$

Hence, the pass-through of corporate income taxes to shareholders' utility is determined by the effect on the return to their investment.

For resident shareholders the effect of a net-of-tax rate change applied to shareholder income consists of an additional effect, as total shareholder income may affect their returns ($w^r(Z^r, Z^f, Z^b)$), such that the extent of behavioural response of other investors to the tax change affects their returns. Hence,

$$\frac{\partial u^r}{\partial(1-\tau^r)} = u_c^r z^r + (1-\tau^r)u_c^r e^r \frac{\partial w^r}{\partial(1-\tau^r)}.$$

The total effect is a combination of the mechanical change in their consumption from a higher net-of-tax rate and the spillover from increased shareholder income of other shareholders.

Since effort changes due to price changes are welfare irrelevant on the margin (due to the envelope theorem), I define a taxable income elasticity that only accounts for price effects.[5] The *incidence elasticity of taxable income* (through effects on prices) on income type k for a tax change on base j is

$$\varepsilon_w^{kj} = e^k \frac{\partial w^k}{\partial(1-\tau^j)} \frac{1-\tau^j}{z^k}, \; k = l, r, f \text{ and } j = l, b, r. \tag{2}$$

Using this, the effects of changes to the two net-of-tax rates on resident individuals'

[5] Appendix A.1 derives the relationship between standard incidence measures and taxable income elasticities.

utility are as follows

$$\frac{\partial u^r}{\partial(1-\tau^b)} = u_c^r \frac{1-\tau^r}{1-\tau^b}\varepsilon_w^{rb} z^r, \tag{3}$$

$$\frac{\partial u^l}{\partial(1-\tau^b)} = u_c^l \frac{1-\tau^l(z^l)}{1-\tau^b}\varepsilon_w^{lb} z^l, \tag{4}$$

$$\frac{\partial u^r}{\partial(1-\tau^r)} = u_c^r(1+\varepsilon_w^{rr})z^r \text{ and} \tag{5}$$

$$\frac{\partial u^l}{\partial(1-\tau^r)} = u_c^l \frac{1-\tau^l(z^l)}{1-\tau^r}\varepsilon_w^{lr} z^l. \tag{6}$$

3.1.2 Government

The government chooses its taxes on corporate income, τ^b, and shareholder income, τ^r, subject to a fixed labour income tax, $T^l(z^l)$, to maximize welfare. Welfare consists of a concave transformation of residents' utilities, $g^k(u^k)$, which is integrated over residents' income distributions,

$$W = \int_{z^l} G^l(u^l(c^l, e^l))h^l(z^l)dz^l + \int_{z^r} G^r(u^r(c^r, e^r))h^r(z^r)dz^r.$$

It is maximized subject to the revenue requirement

$$\int_{z^b} \tau^b z^b h^b(z^b)dz^b + \int_{z^r} \tau^r z^r h^r(z^r)dz^r \geq R - \int_{z^l} T^l(z^l)h^l(z^l)dz^l,$$

where $R \geq 0$ is the exogenous revenue the government needs to raise after the revenue raised from the labour income tax. Define marginal welfare weights on the different groups by $g^k = \partial W/\partial c^k = u_c^k \times G_u^k \geq 0$, where $G_u^k = \partial G^k(u^k)/\partial u^k$. These marginal welfare weights are the marginal welfare gain from providing one more unit of consumption to the group relative to the welfare value of one unit of revenue to the government.

Define the *fiscal elasticity of taxable income*,[6] where effort changes are accounted for as they matter for revenue effects, on income type k for a tax change on base j by

$$\varepsilon^{kj} = \frac{\partial z^k}{\partial(1-\tau^j)}\frac{1-\tau^j}{z^k},\ k = l, b, r, f \text{ and } j = l, b, r. \tag{7}$$

[6]Despite not being explicitly modeled, tax competition through the response of other governments to tax changes may be reflected in the elasticities of each tax base.

Since $z^k = w^k e^k$ and e^k is a function of w^k, the fiscal elasticity of taxable income has the following relationship to the incidence elasticity of taxable income

$$\varepsilon^{kj} = \varepsilon_w^{kj}\left(1 + \varepsilon_e^{kk}\right),\ k = l, r, f \text{ and } j = l, b, r, \tag{8}$$

where $\varepsilon_e^{kk} = w^k/e^k \times \partial e^k/\partial w^k$ is defined as the elasticity of effort with respect to the price. For workers, this has a natural interpretation as the labour supply elasticity with respect to the wage, while for shareholders, it may be interpreted as the elasticity of investment with respect to the rate of return.

I study marginal tax reforms and use these to derive optimal tax rates and optimal reform directions. Optimal tax rate formulas depend on sufficient statistics *at the optimum allocation and tax system*, whereas optimal reform directions depend on sufficient statistics *at the initial allocation and tax system*. I denote by $\Delta_j X$ the change in variable X due to the tax change on base j. Effects of marginal tax reforms are first order and are assumed to be smooth.

3.2 A simplified example

To illustrate the framework, I ignore shareholders, such that $z^r = z^f = 0$. The reform is an increase in the net-of-corporate income tax rate, $1 - \tau^b$. The effects are:

1. Mechanically (all is fixed except the tax rate), such that the tax change leads to less revenue being raised,
$$M^b = -Z^b < 0.$$

2. Corporate income may increase from higher investment, which would increase revenue,
$$B^b = \frac{\tau^b \bar{\varepsilon}^{bb}}{1 - \tau^b} Z^b \geq 0.$$
This revenue effect is determined by the tax rate, $\tau^b/(1 - \tau^b)$, the average effect on the tax base, $\bar{\varepsilon}^{bb}$ and the size of the tax base, Z^b.

3. Wages may go up from higher investment, which would increase revenue through

the labour income tax,

$$B^l = \frac{\bar{\tau}^l \bar{\varepsilon}^{lb}}{1-\tau^b} Z^l \geq 0.$$

This revenue effect is determined by the tax rate on labour relative to that on corporate income, $\tau^l/(1-\tau^b)$, the average effect on the tax base, $\bar{\varepsilon}^{lb}$ and the size of the tax base, Z^l.

4. If wages go up, this also increases the individual welfare of workers,

$$I^l = \bar{g}^l \frac{(1-\bar{\tau}^l)}{1-\tau^b} \frac{\bar{\varepsilon}^{lb}}{1+\bar{\varepsilon}_e^{ll}} Z^l \geq 0.$$

This individual welfare effect is determined by the difference in net-of-tax rates on labour and corporate income, $(1-\tau^l)/(1-\tau^b)$, the average incidence effect on the workers, $\bar{\varepsilon}_w^{lb} = \bar{\varepsilon}^{lb}/\left(1+\bar{\varepsilon}_e^{ll}\right)$, the size of the tax base, Z^l, and the average weight on workers, $\bar{g}^l$.

By adding up these effects, the net change in welfare from this reform is given by

$$\Delta W = M^b + B^b + B^l + I^l = -Z^b + \frac{\tau^b \bar{\varepsilon}^{bb}}{1-\tau^b} Z^b + \frac{\bar{\tau}^l \bar{\varepsilon}^{lb}}{1-\tau^b} Z^l + \bar{g}^l \frac{(1-\bar{\tau}^l)}{1-\tau^b} \frac{\bar{\varepsilon}^{lb}}{1+\bar{\varepsilon}_e^{ll}} Z^l.$$

Appendix A.2 shows how a simple two-period saving model can be represented by such sufficient statistics model.

The next step is to use this model to study optimal tax reforms. The three policy scenarios are as following, where the first and the second provide optimal tax formulas whereas the third provides the result used in the application:

1. What is the optimal corporate income tax if the shareholder income tax is fixed?

2. What is the optimal shareholder and corporate income tax when they are set without restrictions on their relationship?

3. What is the optimal reform direction for corporate and shareholder income tax rates when the total tax rate on investment of resident investors (inclusive of the corporate income tax) is fixed?

3.3 Optimal corporate income tax with a fixed shareholder income tax

The objective here is to derive the optimal corporate income tax rate for fixed labour and shareholder income tax rates. The corporate income tax is set by trading off revenue against the spillover on workers and shareholders. The tax reform is to marginally increase the net-of-tax on corporate income and any revenue change is paid lump sum by all residents. Hence, the change in welfare from the tax reform is

$$\Delta_b W = \Delta_b R + \Delta_b V,$$

where $\Delta_b R$ is the change in revenue due to the corporate income tax change and $\Delta_b V$ is the change in welfare for those affected from the reduction in the corporate income tax rate. Revenue effects can be decomposed into the mechanical and behavioural effect, such that

$$\Delta_b R = \Delta_b M + \Delta_b B.$$

Mechanical effects are simply the effect of the tax change on the tax base itself (holding all else constant)

$$\Delta_b M = -\Delta_b (1 - \tau^b) Z^b.$$

To account for behavioural effects, responses on other tax bases must also be included. Denote by $\bar{\varepsilon}^{kj}$ the elasticity of average taxable income of type k for a tax change on base j, such that

$$\Delta_b B = \tau^b \bar{\varepsilon}^{bb} \frac{\Delta\left(1-\tau^b\right)}{1-\tau^b} Z^b + \tau^r \bar{\varepsilon}^{rb} \frac{\Delta\left(1-\tau^b\right)}{1-\tau^b} Z^r + \bar{\tau}^l \bar{\varepsilon}^{lb} \frac{\Delta\left(1-\tau^b\right)}{1-\tau^b} Z^l.$$

$\Delta_b V$ consists of the welfare of groups affected by the corporate income tax which the government places nonzero weights on: resident shareholders and workers. Welfare effects on each group depend on the effect on that group, their total income, and the social value of that utility. Hence,

$$\Delta_b V = n^r \bar{G}^r_u \Delta_b u^r + n^l \bar{G}^l_u \Delta_b u^l.$$

The utility loss to resident shareholders is determined by the pass-through of net-of-tax corporate income to returns on their investment, while for workers, changes in corporate income taxation affects them through the wages they receive.

Hence, the two key equations are the revenue change from changes to the corporate income tax are

$$\frac{\Delta_b R^b}{\Delta(1-\tau^b)} = -Z^b + \bar{\varepsilon}^{bb}\frac{\tau^b}{1-\tau^b}Z^b + \bar{\varepsilon}^{rb}\frac{\tau^r}{1-\tau^b}Z^r + \bar{\varepsilon}^{lb}\frac{\bar{\tau}^l}{1-\tau^b}Z^l, \tag{9}$$

and the welfare changes,

$$\frac{\Delta_b V}{\Delta(1-\tau^b)} = \bar{g}^r\bar{\varepsilon}^{rb}_w\frac{(1-\tau^r)}{1-\tau^b}Z^r + \bar{g}^l\bar{\varepsilon}^{lb}_w\frac{(1-\bar{\tau}^l)}{1-\tau^b}Z^l. \tag{10}$$

Proposition 1. *The optimal corporate income tax for a fixed labour and shareholder income tax is given by*

$$\tau^b = \frac{1}{1+\bar{\varepsilon}^{bb}} - \frac{\left(\bar{g}^r(1-\tau^r)\bar{\varepsilon}^{rb}_w + \tau^r\bar{\varepsilon}^{rb}\right)}{1+\bar{\varepsilon}^{bb}}\frac{Z^r}{Z^b} - \frac{\left(\bar{g}^l(1-\bar{\tau}^l)\bar{\varepsilon}^{lb}_w + \bar{\tau}^l\bar{\varepsilon}^{lb}\right)}{1+\bar{\varepsilon}^{bb}}\frac{Z^l}{Z^b}.$$

This follows from that at the optimum, the optimal corporate income tax is characterised by equality between the revenue gain from a tax change with the welfare loss to those who pay more tax ($\Delta_b V/\Delta(1-\tau^b) + \Delta_b R^b/\Delta(1-\tau^b) = 0$).

The optimal corporate income tax in this case is characterised by the inverse elasticity rule minus the spillover on other tax bases both through the fiscal externality and incidences on shareholders and workers. Since the government is assumed to place no weight on firms or foreigners, the inverse elasticity rule is the optimal tax in the absence of spillovers on workers or resident shareholders, as it maximizes revenue from corporate earnings accruing to foreign investors.

3.4 Optimal unrestricted shareholder and corporate income taxes

Now, there are no constraints on the relationship between corporate and shareholder income taxes, while the labour income tax is still assumed to be fixed. The reforms consist in increasing the net-of-tax rate for shareholder income given the corporate income tax

and increasing the net-of-tax rate for corporate income for a given shareholder income tax, while revenue gains or losses are distributed lump sum.

The optimal shareholder income tax for a given corporate income tax rate is found by equalizing the revenue gain from a tax change with the welfare loss to those who pay more tax,

$$\Delta_r W = \Delta_r R + \Delta_r V.$$

Again, the revenue effect consists of the mechanical and behavioural effects, where

$$\Delta_r M = -\Delta_r (1-\tau^r) Z^r$$

and

$$\Delta_r B = \tau^b \bar{\varepsilon}^{br} \frac{\Delta\left(1-\tau^r\right)}{1-\tau^r} Z^b + \tau^r \bar{\varepsilon}^{rr} \frac{\Delta\left(1-\tau^r\right)}{1-\tau^r} Z^r + \bar{\tau}^l \bar{\varepsilon}^{lr} \frac{\Delta\left(1-\tau^r\right)}{1-\tau^r} Z^l.$$

The behavioural effect consists in the fiscal spillover on each of the tax bases (corporate, shareholder and labour income). Hence,

$$\frac{\Delta_r R^r}{\Delta(1-\tau^r)} = \bar{\varepsilon}^{br} \frac{\tau^b}{1-\tau^r} Z^b - Z^r + \bar{\varepsilon}^{rr} \frac{\tau^r}{1-\tau^r} Z^r + \bar{\varepsilon}^{lr} \frac{\bar{\tau}^l}{1-\tau^r} Z^l. \tag{11}$$

$\Delta_r V$ consists of the welfare of the groups who may bear the incidence of lower shareholder income tax, which are resident shareholders and workers,

$$\Delta_r V = n^r \bar{G}_u^r \Delta_r u^r + n^l \bar{G}_u^l \Delta_r u^l.$$

Hence,

$$\frac{\Delta_r V}{\Delta(1-\tau^r)} = \bar{g}^r \left(1 + \bar{\varepsilon}_w^{rr}\right) Z^r + \bar{g}^l \bar{\varepsilon}_w^{lr} \frac{(1-\bar{\tau}^l)}{1-\tau^r} Z^l, \tag{12}$$

such that the utility change for the resident shareholders is their mechanical change in after-tax income and the spillover from other investors changing their investment level, while for workers, the effect is determined by the spillover on wages.

Proposition 2. *The optimal tax rate on shareholder income for a fixed corporate and labour income*

tax is given by

$$\tau^r = \frac{1-\bar{g}^r\left(1+\bar{\varepsilon}_w^{rr}\right)}{1+\bar{\varepsilon}^{rr}-\bar{g}^r\left(1+\bar{\varepsilon}_w^{rr}\right)} - \left(\frac{\bar{\varepsilon}^{lr}\bar{\tau}^l+\bar{\varepsilon}_w^{lr}\bar{g}^l(1-\bar{\tau}^l)}{1+\bar{\varepsilon}^{rr}-\bar{g}^r\left(1+\bar{\varepsilon}_w^{rr}\right)}\right)\frac{Z^l}{Z^r} - \frac{\tau^b\bar{\varepsilon}^{br}}{1+\bar{\varepsilon}^{rr}-\bar{g}^r\left(1+\bar{\varepsilon}_w^{rr}\right)}\frac{Z^b}{Z^r}.$$

This follows from the fact that optimum is reached when the sum of the revenue and welfare effect for the affected groups is zero, $(\Delta_r V/\Delta(1-\tau^r)+\Delta_r R^r/\Delta(1-\tau^r)=0)$.

The optimal tax in this case consists of three terms: 1) the optimal shareholder income tax when accounting for the spillover between shareholder incomes and ignoring other groups, 2) the welfare value of the spillover on the labour income tax base, accounting both for the fiscal externality and the incidence on workers and 3) the fiscal externality on the corporate income tax base.

The expression for the optimal corporate income tax rate is the same as in Proposition 1. The jointly optimal corporate and shareholder income taxes are found by solving the Equations from Proposition 1 and from Proposition 2 simultaneously. It is important to keep in mind that even though the formulas present the main trade-offs involved, they rely on sufficient statistics *at the optimum*, which may differ from sufficient statistics at the actual tax system (since sufficient statistics are endogenous to the allocation). Hence, to provide formulas that rely on empirical evidence from *actual tax systems* I will in the following focus on marginal reforms starting from the original tax system rather than optimal tax rates.

3.5 Optimal restricted shareholder and corporate income taxes

I now assume that the the *total statutory* marginal tax rate on a resident shareholder's investment in a company is fixed and equal to $1-\hat{\tau}$.[7] The constraint is that the government must combine taxes on shareholders and corporations to abide by

$$1-\hat{\tau} = (1-\tau^r)(1-\tau^b). \tag{13}$$

I consider the following tax reform: a small decrease in $1-\tau^r$ combined with a small

[7] The rate $\hat{\tau}$ could for example be be the same as the top labour income tax rate. This could be due to income shifting becoming too large of a problem if tax rates are different, such that corporate and shareholder income taxation act as a backstop for the labour income tax. Another constraint could have been to revenue raised constant, but as the labour income tax is kept fixed, it is not clear why tax revenue from corporations and shareholders should be kept constant.

increase in $1-\tau^b$ (to abide by the constraint), such that the change in the net of corporate tax rate keeps the top total marginal tax rate for resident shareholder income constant,

$$\Delta\left(1-\tau^b\right)=\frac{(1-\hat{\tau})-(1-\tau^r)\left(1-\tau^b\right)}{1-\tau^r}-\frac{\left(1-\tau^b\right)}{1-\tau^r}\Delta\left(1-\tau^r\right). \tag{14}$$

In the following, I assume that the constraint, $1-\hat{\tau}=(1-\tau^r)(1-\tau^b)$ holds initially, such that $\Delta\left(1-\tau^b\right)=-\left(\left(1-\tau^b\right)/\left(1-\tau^r\right)\right)\Delta\left(1-\tau^r\right)$.

Hence, the change in welfare from the tax reform is

$$\Delta W=\Delta_b W+\Delta_r W=\Delta_b R+\Delta_r R+\Delta_b V+\Delta_r V,$$

where, again, $\Delta_b R$ is the change in revenue due to the corporate income tax change, $\Delta_r R$ is the change in revenue due to the shareholder income tax change, $\Delta_b V$ is the change in welfare for those affected from the reduction in the corporate income tax rate, and $\Delta_r V$ is the change in welfare for those affected from the increase in the personal capital tax.

The optimal reform direction is derived from calculating the total welfare change, ΔW, such that that the welfare change from increasing the net-of-tax rate on corporate income must be equal to the welfare change from reducing the net-of-tax rate on shareholder income. Hence, the four key equations are, in order, the revenue change from changes to the corporate income tax,

$$\frac{\Delta_b R^b}{\Delta(1-\tau^b)}=-Z^b+\bar{\varepsilon}^{bb}\frac{\tau^b}{1-\tau^b}Z^b+\bar{\varepsilon}^{rb}\frac{\tau^r}{1-\tau^b}Z^r+\bar{\varepsilon}^{lb}\frac{\bar{\tau}^l}{1-\tau^b}Z^l, \tag{15}$$

the revenue change for changes to the shareholder income tax,

$$\frac{\Delta_r R^r}{\Delta(1-\tau^r)}=\bar{\varepsilon}^{br}\frac{\tau^b}{1-\tau^r}Z^b-Z^r+\bar{\varepsilon}^{rr}\frac{\tau^r}{1-\tau^r}Z^r+\bar{\varepsilon}^{lr}\frac{\bar{\tau}^l}{1-\tau^r}Z^l, \tag{16}$$

the welfare change for those that are affected by the change to the corporate income tax,

$$\frac{\Delta_b V}{\Delta(1-\tau^b)}=\bar{g}^r\bar{\varepsilon}_w^{rb}\frac{(1-\tau^r)}{1-\tau^b}Z^r+\bar{g}^l\bar{\varepsilon}_w^{lb}\frac{(1-\bar{\tau}^l)}{1-\tau^b}Z^l, \tag{17}$$

and the welfare change for those that are affected by the change to the shareholder income

tax,

$$\frac{\Delta_r V}{\Delta(1-\tau^r)} = \bar{g}^r \left(1 + \bar{\varepsilon}_w^{rr}\right) Z^r + \bar{g}^l \bar{\varepsilon}_w^{lr} \frac{(1-\bar{\tau}^l)}{1-\tau^r} Z^l. \tag{18}$$

Proposition 3. *When the initial tax system abides by the constraint* $1-\hat{\tau} = (1-\tau^r)(1-\tau^b)$*, the total welfare change from an increase in the net-of-corporate income tax rate and a reduction in the net-of-shareholder income tax rate is*

$$\Delta W = M + B^b + B^r + I^r + B^l + I^l,$$

where

$$\begin{aligned}
M &= \frac{(1-\tau^b)\,(1-\bar{g}^r)}{1-\tau^r} Z^r - Z^b, \\
B^b &= \tau^b \left(\frac{\bar{\varepsilon}^{bb}}{1-\tau^b} - \frac{(1-\tau^b)\bar{\varepsilon}^{br}}{(1-\tau^r)^2} \right) Z^b, \\
B^r + I^r &= \left(\tau^r + \frac{(1-\tau^r)\bar{g}^r}{1+\bar{\varepsilon}_e^{rr}} \right) \left(\frac{\bar{\varepsilon}^{rb}}{1-\tau^b} - \frac{(1-\tau^b)\bar{\varepsilon}^{rr}}{(1-\tau^r)^2} \right) Z^r, \\
B^l + I^l &= \left(\bar{\tau}^l + \frac{(1-\bar{\tau}^l)\bar{g}^l}{1+\bar{\varepsilon}_e^{ll}} \right) \left(\frac{\bar{\varepsilon}^{lb}}{1-\tau^b} - \frac{(1-\tau^b)\bar{\varepsilon}^{lr}}{(1-\tau^r)^2} \right) Z^l.
\end{aligned}$$

Proposition 3 shows how the optimal reform direction depends on sufficient statistics. The proposition follows from Equations 15-18, from that when the initial system respects the constraint (Equation 13), and from $\varepsilon^{kj} = \varepsilon_w^{kj}\left(1+\varepsilon_e^{kk}\right)$, where $k = l, r$ and $j = b, r$. M is the mechanical effects on shareholder and corporate income, B^b is the behavioural effect from corporate income, $B^r + I^r$ is the behavioural and incidence effects on shareholders, and $B^l + I^l$ is the behavioural and incidence effects on workers.

With estimates of sufficient statistics at the initial allocation, the result can be used to evaluate both ex ante and ex post tax reforms with minimal assumptions on the behaviour of firms, shareholders and workers. Welfare gains from the increase in shareholder income taxation and reduction in corporate income taxation are derived by inserting for current tax rates, marginal welfare weights, elasticities and income levels. If $\Delta W > 0$, increasing shareholder income tax rates while reducing corporate income tax rates creates a welfare gain. The opposite holds if $\Delta W < 0$.

The optimal combination of the corporate income tax and the shareholder income tax

such that the top tax rate on resident investors is fixed, is found when the welfare change is zero, $\Delta W = 0$. Remember the constraint $1-\hat{\tau} = (1-\tau^r)(1-\tau^b)$. Inserting for the constraint and setting the welfare change equal to zero implicitly defines the optimal combination of τ^b and τ^r for given labour income tax, $\bar{\tau}^l$, and total tax rate on resident investment, $\hat{\tau}$. To solve for the optimal tax, insert for the relative tax rates and $1 - \tau^r = (1 - \hat{\tau})/(1 - \tau^b)$, and solve for $1 - \tau^b$. The resulting equation defines the optimal corporate income tax rate, τ^b given the constraint on the relationship with changes in the shareholder income tax, τ^r, and the fixed tax rates, $\bar{\tau}^l$ and $\hat{\tau}$. The resulting equation for optimal tax rates is a third order polynomial in tax rates (and is therefore not included). Since the objective is to derive optimal reform directions rather than optimal tax rates, Proposition 3 provides the necessary result.

Example

To illustrate the reform direction result, I input the following values for the sufficient statistics: $\hat{\tau} = 0.36$, $\tau^r = 0.2$, $\tau^b = 0.2$, $\bar{g}^l = 1$, $\bar{g}^r = 0.3$, $\bar{g}^f = 0$, $Z^l = 0.9$, $Z^r = 0.15$, $Z^b = 0.2$, $\bar{\varepsilon}^{lr} = 0$, $\bar{\varepsilon}^{rr} = 0.1$, $\bar{\varepsilon}^{br} = 0$, $\bar{\varepsilon}^{lb} = 0.1$, $\bar{\varepsilon}^{rb} = 0.25$, $\bar{\varepsilon}^{ll}_e = 0$, $\bar{\varepsilon}^{rr}_e = 0$ and $\bar{\varepsilon}^{bb} = 0.275$. Then, the change in welfare as a share of resident income is $dW/(Z^l + Z^r) = 4\% > 0$, such that a reform towards higher shareholder income taxation in place of corporate income taxation is welfare improving. The main reason is that the shareholder income tax creates less change in behaviour and the low marginal welfare weight on resident shareholders. If instead the marginal welfare weight on resident shareholders is the same as for workers, $\bar{g}^r = 1$, then $dW/(Z^l + Z^r) = -3\%$, such that a higher corporate income tax and a lower shareholder income tax would be welfare improving, as it would shift some of the burden from resident shareholders, whom now have a high welfare weight, to foreign shareholders, whom have no weight.

3.6 The relationship between corporate and shareholder income

To prepare the optimal reform direction framework for application, it is useful to introduce some further theoretical assumptions. Hence, I introduce a structure to the relationship between corporate and shareholder income.

I divide spillovers on shareholders from changes in corporate income tax rates into two parts, the ”mechanical spillover” and ”behavioural spillover” effect. If the corporate income tax is reduced, shareholders benefit mechanically by paying less tax on their investments at the corporate level such that shareholder income increases. This simultaneously mechanically increases revenue from the shareholder income tax, such that the government recoups some of the lost revenue by the reduction in the corporate income tax. Shareholders may also be affected from behavioural cahnges in corporate investment due to the tax change.

Specifically, I model (long-run discounted) shareholder income as a function of (long-run) discounted after-tax corporate income, $(1-\tau^b)z^b$ depending on the resident ownership share of corporate income, s^r, and shareholder income from shares abroad and other ways shareholder income is created as a function of corporate income (such as tax benefits from delayed realisation and tax evasion at the shareholder level), $f(z^b, z^{rf})$. The derivative of the latter with respect to corporate income is denoted by f_{z^b}. Hence,

$$z^r = s^r(1-\tau^b)z^b + f(z^b, z^{rf}). \tag{19}$$

This means that the elasticity of shareholder income with respect to the net-of-corporate income tax is given by

$$\varepsilon^{rb} = s^r\left(1-\tau^b\right)\frac{z^b}{z^r} + \left(s^r\left(1-\tau^b\right) + f_{z^b})\right)\varepsilon^{bb}\frac{z^b}{z^r}, \tag{20}$$

where $s^r(1-\tau^b)z^b/z^r$ is the mechanical component while the rest is the behavioural component. Using this, the change in welfare is given by

$$\Delta W = MR + MI^r + B^b + BB^r + BI^r + B^l + I^l, \tag{21}$$

where

$$
\begin{aligned}
MR &= \frac{(1-\tau^b)}{1-\tau^r} Z^r - \left(1-\tau^r s^r\right) Z^b, \\
MI^r &= \frac{(1-\tau^r)\bar{g}^r s^r}{1+\bar{\varepsilon}_e^{rr}} Z^b - \frac{(1-\tau^b)\bar{g}^r}{1-\tau^r} Z^r, \\
BB^r + BI^r &= \left(\tau^r + \frac{(1-\tau^r)\bar{g}^r}{1+\bar{\varepsilon}_e^{rr}}\right)\left(\frac{\left(s^r\left(1-\tau^b\right)+f_{z^b}\right)\bar{\varepsilon}^{bb}}{(1-\tau^b)}\frac{Z^b}{Z^r} - \frac{(1-\tau^b)\bar{\varepsilon}^{rr}}{(1-\tau^r)^2}\right) Z^r.
\end{aligned}
$$

Now, MR is the mechanical revenue effect, MI^r is the mechanical incidence on shareholders, and BB^r and IB^r are the revenue and incidence on shareholders, respectively, due to behavioural changes in tax bases. The other effects (B^b, B^l and I^l) are the same as in Proposition 3. From MR and MI^r it is clear that lowering of the corporate income tax mechanically increases shareholder income as there is more after tax profit. This has a revenue effect, $\tau^r s^r Z^b$, depending on the share of income from national corporations owned by residents, and an incidence effect on shareholders, $(1-\tau^r)\bar{g}^r s^r Z^b/(1+\varepsilon^{rr})$.[8]

The benefit of this formulation is that it is easier to measure mechanical compared to behavioural effects. An alternative way to relate mechanical effects on shareholders to corporate income tax changes is to measure effects of corporate income tax changes on the value of investors' portfolios (see the framework with portfolio values in Appendix A.3).

4 Sufficient statistics and optimal reform directions

4.1 Setup

To pin down tax policy implications from the model, I proceed to derive optimal reform directions depending on the signs and sizes of the sufficient statistics. As a reminder, the sufficient statistics are the following:

1. Tax rates: $\bar{\tau}^l$, τ^r and τ^b.

[8]The mechanical incidence depends on the effort elasticity for shareholders, ε_e^{rr}, because the utility relevant incidence has to account for the difference between the fiscal spillover on shareholder income and the incidence spillover, where the latter only accounts for the effect on returns, and not for the effect on effort, as it has no effect on utility due to the envelope condition. In one sense, dividing by $1+\varepsilon_e^{rr}$ neutralises the effect that return changes has on effort, such that the utility-relevant spillover is obtained.

2. Tax bases: Z^l, Z^b and Z^r.

3. Tax base and effort elasticities: $\bar{\varepsilon}^{lr}$, $\bar{\varepsilon}^{rr}$, $\bar{\varepsilon}^{br}$, $\bar{\varepsilon}^{lb}$, $\bar{\varepsilon}^{rb}$, $\bar{\varepsilon}^{bb}$, $\bar{\varepsilon}_e^{ll}$ and $\bar{\varepsilon}_e^{rr}$.

4. Marginal welfare weights: $\bar{g}^r/\bar{g}^l$.

In the case where all elasticities are zero, it is optimal to move in the direction of higher corporate and lower shareholder income taxation, as the corporate income tax raises revenue from foreign shareholders without affecting resident shareholders or workers.

Using the framework, I show how certain special cases can assist in narrowing down the optimal reform direction. Second, I analyze the relationship between the sufficient statistics and the optimal reform direction, and illustrate how each sufficient statistic affects optimal reform directions. Third, I describe how current global developments may affect the different sufficient statistics. Fourth, I perform an analysis of optimal reform direction depending on different values of the sufficient statistics. Fifth, I apply the framework to optimal reform directions in United States and Norway.

4.2 Special cases

I present three special cases. The microfoundations for these cases is presented in Appendix A.3. Three additional cases (The new view, Open economy, and Resident investors only invest abroad) are presented in Appendix A.4.

Case 1. Closed capital markets

In this baseline case, all corporations in the country rely on financing from resident investors and resident investors can only invest in these firms. Taxation of corporations affects investment through capital demand such that $\bar{\varepsilon}^{rb} > 0$ and $\bar{\varepsilon}^{lb} > 0$. Taxation of resident shareholders affect investment of all firms through lower capital supply, such that $\bar{\varepsilon}^{br} > 0$ and $\bar{\varepsilon}^{lr} > 0$. Taxation of shareholder income shifts capital supply whereas taxation of corporate income shifts capital demand, such that effects depend on the shape of these curves at the initial allocation.

Case 2. Separated capital markets

Now, some firms rely on financing from resident investors and resident investors have a home bias such that they invest in some local firms even at lower rates of return. Taxation of corporations affects investment and rate of returns in corporations that rely only on financing by resident investors such that $\bar{\varepsilon}^{rb} > 0$ and $\bar{\varepsilon}^{lb} > 0$. Taxation of resident shareholders may affect investment in firms that rely on financing from these investors such that $\bar{\varepsilon}^{br} > 0$ and $\bar{\varepsilon}^{lr} > 0$. First, corporate income taxes raise some revenue from foreign shareholders, making the joint reform more attractive. Second, shareholder income taxes affect a smaller section of firms than in the closed capital markets case, as firms can also rely on funding from foreign investors. Hence, starting from the same tax rates, the joint reform with higher shareholder income taxation and lower corporate income taxation is more attractive in a separated compared to in Case 1. However, if the resident ownership share is lower in Case 2, the relationship between the two is not clear since resident shareholders benefit differentially from the joint reform in the two cases. If shareholders have no weight, the joint reform is more attractive in Case 2.

Case 3. Open capital markets

In this case, investment can always be financed from foreign investors. Shareholder taxation does not affect investment, as resident shareholders do not affect the level of investment. Hence, there are no spillovers from shareholder taxation, $\bar{\varepsilon}^{br} = \bar{\varepsilon}^{lr} = 0$. There is still a mechanical effect on resident shareholders from corporate income tax changes depending on initial ownership shares, $\bar{\varepsilon}^{rb} \neq 0$. By Proposition 3, the optimal reform direction is towards higher shareholder taxation and lower corporate taxation whenever

$$\Delta W = \frac{(1-\tau^b)(1-\bar{g}^r)}{1-\tau^r} Z^r - Z^b + \tau^b \frac{\bar{\varepsilon}^{bb}}{1-\tau^b} Z^b$$
$$+ \left(\tau^r + \frac{(1-\tau^r)\bar{g}^r}{1+\bar{\varepsilon}_e^{rr}}\right)\left(\frac{\bar{\varepsilon}^{rb}}{1-\tau^b} - \frac{(1-\tau^b)\bar{\varepsilon}^{rr}}{(1-\tau^r)^2}\right) Z^r + \left(\bar{\tau}^l + \frac{(1-\bar{\tau}^l)\bar{g}^l}{1+\bar{\varepsilon}_e^{ll}}\right)\frac{\bar{\varepsilon}^{lb}}{1-\tau^b} Z^l > 0.$$

There is no longer a negative spillover on corporations or workers from shareholder taxation, such that in this case, the joint reform towards higher shareholder income tax rates

relative to corporate income tax rates is more appealing than if $\bar{\varepsilon}^{br} > 0$ or $\bar{\varepsilon}^{lr} > 0$. Hence, starting from the same tax system, the joint reform is more attractive than in the separated economy case (Case 2).

4.3 Developments and sufficient statistics

I now discuss how the framework can incorporate and shed light on some recent international developments.

One recent development in taxation of corporations is the reforms initiated by the OECD, in particular on the Global Minimum Tax (Pillar 2) (Hebous and Keen, 2023 and OECD, 2023a). If successful, it is plausible that it could reduce the elasticity of corporate income with respect to the corporate income tax rate, as profit shifting opportunities may become more limited. The minimum tax also places a further restriction on the optimal combination of shareholder and corporate income tax rates, such that a successful minimum tax introduces two main effects. First, a lower elasticity of corporate income is beneficial for most countries, as it reduces the negative effect taxation has on revenue and the likelihood of spillovers on workers. This would make a reform towards lower corporate income taxation and higher shareholder income taxation less appealing. Second, if the optimal corporate income tax from the national perspective is below the minimum tax rate even at lower elasticities, the minimum tax imposes a loss by restricting the country from setting its optimal tax rates. If the total tax rate on resident shareholders investment is fixed, this means that a reform towards lower corporate income taxation and higher shareholder income taxation may have been optimal, but the country is constrained from benefiting from such a tax change.[9] These effects depends on how low the optimal corporate income tax rate is, and more extensive simulation work is necessary to produce credible estimates of corporate income elasticities with a broad adoption of the global minimum tax.

Another relevant international reform is the automatic exchange of information (AEOI) (Boas et al., 2024). These reforms involve increasing the information available to govern-

[9] Even if this may be optimal from the national perspective, it may not be optimal from the global perspective.

ments on shares held abroad by resident shareholders that governments. This could imply that the shareholder income tax base increases and that the elasticity of shareholder income with respect to shareholder income taxation decreases, as there are fewer avoidance and evasion opportunities. All in all, these reforms can make shareholder income taxation more effective and thereby more appealing relative to corporate income taxation.

The mobility of high-wealth individuals may have increased over time (Kleven et al., 2020). If shareholders are becoming more mobile, this may increase $\bar{\varepsilon}^{rr}$ and reduce Z^r in countries with high taxation of shareholders. As long as shareholders also hold shares abroad, this makes the joint reform of lower corporate income taxation and higher shareholder taxation less attractive. This is because shareholders are more affected by an equivalent increase in the shareholder tax, which they pay depending on their residency, relative to the corporate tax, which they pay depending on where they invest. Taxation of individuals unrealised capital gains when emigrating may mitigate some of this effect.

Related, capital gains taxation at realisation may incentivize delayed realisation. In many cases, such delayed realisation is tax-favoured, either explicitly with lower capital gains tax rates on shares held for longer periods or from returns made on the tax payment shareholders would have faced, had they realised the gain. Lower taxation of long-term gains reduces the tax base, such that tax increases that lead to delayed realisation may also reduce the long-term tax base. If such base-erosion is becoming larger over time, ε^{rr} may increase and Z^r decrease, which makes a reform towards higher shareholder income taxation and lower corporate income taxation less attractive.

4.4 Comparative sufficient statistics

To illustrate the relationship between the optimal reform direction and the size of the different sufficient statistics, I exploit Equation 21 to simulate optimal reform directions for

different values of sufficient statistics[10]

$$\Delta W = MR + MI^r + B^b + BB^r + BI^r + B^l + I^l.$$

This setup ensures that welfare changes are measured in monetary units. In all simulations, I divide ΔW with revenue from the two taxes, such that the welfare change is $\Delta W / \left(\tau^r Z^r + \tau^b Z^b\right)$.

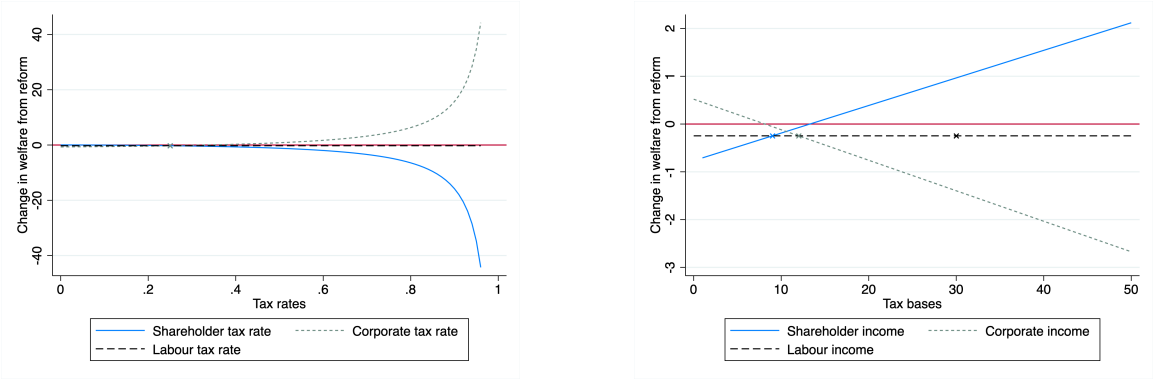
As a baseline, I set the specific values, see Table 1. These values are selected to make corporate and shareholder income taxes similar. Labour income is 2.5 times as large as corporate income and shareholder income is the same size as after-tax corporate income ($Z^l = 2.5Z^b = Z^r/(1-\tau^b)$). Resident investors own half of all shares in corporations with corporate income subject to the corporate income tax in the country ($s^r = 0.5$). There is no indirect effect of corporate income on shareholder income, $f_{z^b} = 0$. All tax rates are 25 percent ($\tau^r = \tau^b = \bar{\tau}^l = 0.25$). The relative weight on shareholders is 0.5 ($\bar{g}^r/\bar{g}^l = 0.5$). All fiscal elasticities are set to 0.25 whereas effort elasticities are set to 0.1 ($\bar{e}^{lr} = \bar{e}^{br} = \bar{e}^{ll} = \bar{e}^{rr} = \bar{e}^{lb} = \bar{e}^{bb} = 0.25$ and $\bar{e}_e^{rr} = \bar{e}_e^{ll} = 0.1$) except for $\bar{e}^{rb} = 0.625$ due to the mechanical effect corporate income has on shareholder income (reflecting $s^r = 0.5$).

Table 1: Initial values of variables

Variable	**Initial value**
Z^r	9
Z^b	12
Z^l	30
$t^r = t^b = \bar{t}^l$	0.25
$\bar{g}^r/\bar{g}^l$	0.5
$\bar{\varepsilon}^{lr} = \bar{\varepsilon}^{rr} = \bar{\varepsilon}^{br} = \bar{\varepsilon}^{lb} = \bar{\varepsilon}^{bb}$	0.25
$\bar{\varepsilon}_e^{rr} = \bar{\varepsilon}_e^{ll}$	0.1
s^r	0.5
f_{z^b}	0
Implied $\bar{\varepsilon}^{rb}$	0.625

[10]While the exercise illustrates the importance of each sufficient statistic, changing one of them while keeping others fixed is not necessarily providing an accurate description of what the economy would be like were one of the statistics different, as they are all endogenous to the allocation. Hence, the exercise can more accurately illustrate the role of parameter uncertainty for a given economy, such that if everything else stays the same, it describes what happens if, for example, one tax base is more elastic than empirical estimates suggest.

Figures 2a, 2b, 3a and 3b display the net welfare effect of increasing the corporate income net-of-tax rate while decreasing the shareholder income net-of-tax rate. When the net effect is positive, a reform towards higher shareholder income taxation and lower corporate income taxation is optimal. Along a curve, only the tax or tax base in question changes, whereas all else is constant. In Figure 2a, tax rates on the different tax bases are on the x-axis. This shows that the higher is the tax on the base, the higher is the welfare gain of reducing the tax rate. This is due to the traditional "Laffer-effect": when the tax rate is higher, less revenue is raised from increasing it further. Effects are fairly symmetric, since elasticites are assumed to be quite similar for shareholder and corporate income. Figure 2b shows the effect of the different tax base sizes. The larger is a tax base, the more social gain is there in increasing the tax rate on it, as the tax rate increase raises more revenue and all other effects are kept constant. When all tax bases are as in Table 1, it is optimal to replace shareholder income taxation with corporate income taxation.



(a) Tax rates.

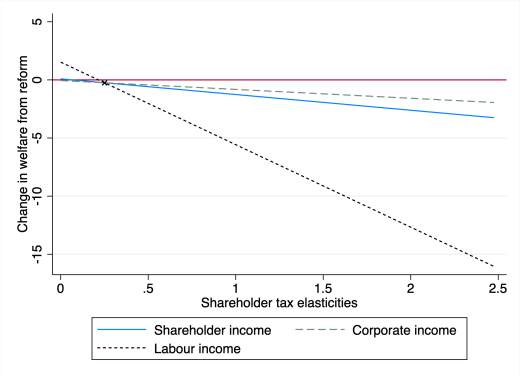
(b) Tax bases.

Figure 2: Welfare change depending on initial tax rates and tax bases.

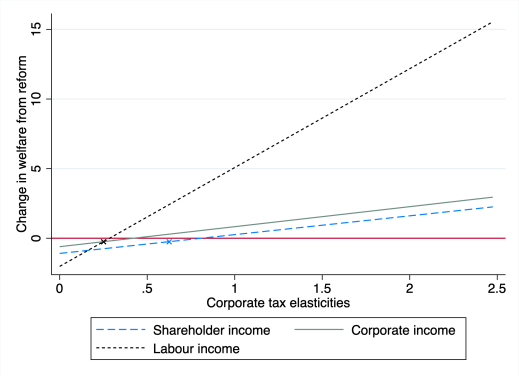
Notes: The figure displays the net effect of a reform towards higher net-of-tax rate on corporate income and a lower net-of-tax rate on shareholder income for different tax rates in a) and for different sizes of tax bases in b), keeping everything else constant. When the effect is positive (negative) a reform towards a higher (lower) shareholder income tax rate and a lower (higher) corporate income tax rate is optimal. The y-axis is measured in terms of the monetary value of welfare per revenue from the corporate income tax and shareholder income tax. Crosses indicate baseline values.

In Figure 3a, elasticities of shareholder taxation are on the x-axis while in 3b elasticities of corporate taxation are on the x-axis. This shows that the higher is the tax on the base, the higher is the welfare gain of reducing the tax rate. Both graphs show that the larger are elasticities with respect to the tax, the larger is the social welfare gain from reducing the

tax rate. In addition, both graphs show that the impact on workers is particular important. This is because the labour income tax base is assumed to be five times larger than the other tax bases and that workers are assumed to have twice the welfare weight of shareholders.



(a) Shareholder tax elasticities.



(b) Corporate tax elasticities.

Figure 3: Welfare change depending on fiscal taxable income elasticites.

Notes: The figure displays the net effect of a reform towards higher net-of-tax rate on corporate income and a lower net-of-tax rate on shareholder income for different shareholder tax elasticities a) and for different corporate tax elasticities in b), keeping everything else constant. When the effect is positive (negative) a reform towards a higher (lower) shareholder income tax rate and a lower (higher) corporate income tax rate is optimal. The y-axis is measured in terms of the monetary value of welfare per revenue from the corporate income tax and shareholder income tax. Crosses indicate baseline values.

4.5 Comparative sufficient statistics in open and closed capital markets

Returning to the special cases discussed in Section 4.2, I set the following baseline parameter values to illustrate the interaction between the different special cases for capital markets and the marginal welfare weight on shareholders. In the open capital markets case, shareholder taxes have no behavioural effects whereas corporate taxation affects workers and revenue and the resident ownership share is low, $s^r = 0.1$. In the separated capital market case, shareholder income is responsive to shareholder taxation, but there are limited effects on workers or corporate income, whereas the corporate income tax affects workers and shareholders (mechanically) and is somewhat less elastic than in the open capital markets case. The closed capital markets case is the same as the initial values in Table 1 except that resident shareholders own all shares in corporations subject to the corporate income tax in the country, $s^r = 1$.

Table 2: Parameter values for different cases

Case	ε^{lr}	ε^{rr}	ε^{br}	ε^{lb}	ε^{bb}	s^r
Open capital markets	0.00	0.00	0.00	0.50	1.00	0.10
Separated capital markets	0.10	0.20	0.10	0.25	0.5	0.50
Closed capital markets	0.25	0.25	0.25	0.25	0.25	1.00

Figure 4 shows the net welfare effect of a reform towards higher net-of-tax rate on corporate income and a lower net-of-tax rate on shareholder income for different marginal welfare weights on shareholders. This shows that, for these parameters, in all market types, moving towards more shareholder rather than corporate taxation is optimal independently of how much lower weights are on shareholders compared to workers. The social welfare gains from the reform are largest in an open capital market and smaller in a separated or closed capital market. In the closed capital markets case with these parameters, a higher weight on shareholders increases the welfare gain of the reform. This is because there is no foreign ownership, such that resident shareholders reap all the mechanical gains from lower corporate income taxation. With the low resident ownership share in the open capital market case, the relationship is downward sloping. Interestingly, the joint reform is more attractive in the closed capital market case when $\bar{g}^r > 0.6$. Of course, the economy may be smaller or larger in the open capital market case and complementarities between foreign and domestic investment are not accounted for (Desai et al., 2005).

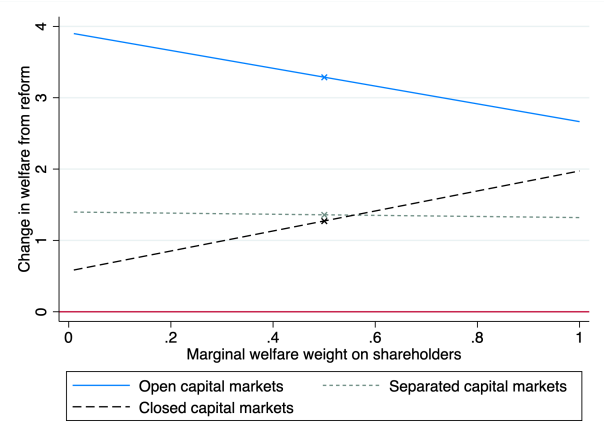


Figure 4: Welfare change for each case depending on shareholder weight.

Notes: The figure displays the net effect of a reform towards higher net-of-tax rate on corporate income and a lower net-of-tax rate on shareholder income for different marginal welfare weights on shareholders, keeping everything else constant. When the effect is positive (negative) a reform towards a higher (lower) shareholder income tax rate and a lower (higher) corporate income tax rate is optimal. The y-axis is measured in terms of the monetary value of welfare per revenue from the corporate income tax and shareholder income tax. Crosses indicate baseline values.

4.6 Country applications

Next, I apply the framework to find the optimal reform direction for the US, a large economy, and Norway, a smaller and more open economy. Whereas tax rates and tax bases can be measured directly based on aggregate data, I rely on the empirical literature to select tax base elasticities and effort elasticities.

For marginal welfare weights on workers, I assume that the value of revenue is equal to the value of providing one more unit of consumption for workers, such that $\bar{g}^l = 1$. For shareholders, I exploit that the reforms considered keep the labour income tax schedule fixed, such that one can use the design of the labour income tax to assign marginal welfare weights to investors. The idea is to assume that high income earners are assigned with the same weight irrespective of whether their income derives from labour or from investment. I follow Bourguignon and Spadaro (2012) to reveal the implicit marginal welfare weights on high labour income earners. I assign $\bar{g}^r$ by assuming that $g^l(z^l) = \bar{g}^r(z^r)$, where z^l is some high income level with a flat top income tax rate and where the income distribution is better described by a Pareto distribution than a lognornmal distribution (see the role of the Pareto tail in Saez (2001)). I infer $g^l(z^l)$ from high income wage earners by using

estimates of the labour income distribution Pareto parameter and the top tax rate. Solving this for the average marginal welfare weight $g(z^l)$ gives

$$\hat{g}(z^l) = 1 - \frac{\tau^l}{1-\tau^l} \frac{\bar{\varepsilon}^l \hat{z}^l / z^l - \hat{\eta}^l}{\hat{z}^l / z^l - 1}, \tag{22}$$

where $\hat{z}^l$ is the average income, $\bar{\varepsilon}^l$ is the average (uncompensated) elasticity, $\hat{\eta}^l$ is the average income effect, all among labour income earners in the top tax bracket.

Corporations are also owned by governments and institutions. As state ownership may involve different objectives and a different tax treatment, I exclude firms completely owned by the government. The taxation of institutional owners vary and pension funds are typically exempted from paying shareholder taxes. However, taxation may be paid when individuals receive their pensions. Hence, I assume that institutional owners are taxed at the same rate as individual investors.

Benchmark numbers for the U.S. and Norway are provided in Table 3. The Norwegian tax rates reported in the table are sourced from the Norwegian Tax Authority (2025), while the corresponding tax bases are derived from Statistics Norway (2025), excluding the petroleum sector due to its unique tax regime. I assume Norway has the features of a small economy with open capital markets, such that the shareholder income tax has small spillovers. For the U.S., tax rates are obtained from the Tax Foundation (2025), with shareholder tax rates calculated as a weighted average of dividend and capital gains tax rates, where the weights reflect the relative importance of dividends and capital gains. The U.S. tax bases are sourced from the OECD (2023c), whereas resident shareholder income and the split into dividend and capital gains for the purpose of calculating the average tax rate is gathered from the Luxembourg Income Study (2025). According to Yagan (2015), dividend tax changes did not affect investment in the U.S., such that I assume that the spillover from shareholder income taxation on workers and corporations is small. The other elasticities for the U.S. are inspired by those in Kennedy et al. (2022). The foreign ownership shares of corporate value for the U.S. are taken from Tax Policy Center (2022) whereas for Norway, I calculate the share of direct investment as a share of total investment using Statistics Norway (2025). Marginal welfare weights rely on Hendren (2020) for the U.S.

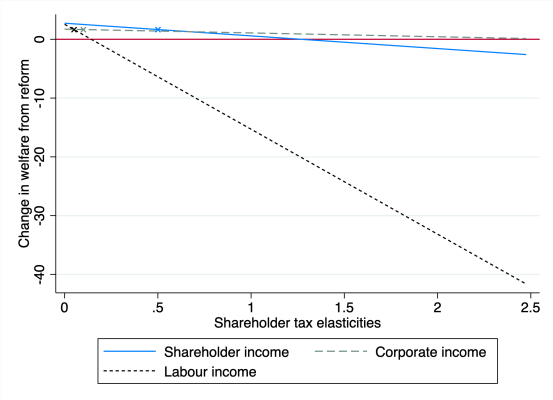
and Berg (2025) for Norway. The implied $\bar{\varepsilon}^{rb}$ follows from applying Equation 20.

Table 3: Initial Values for U.S. and Norway in 2022

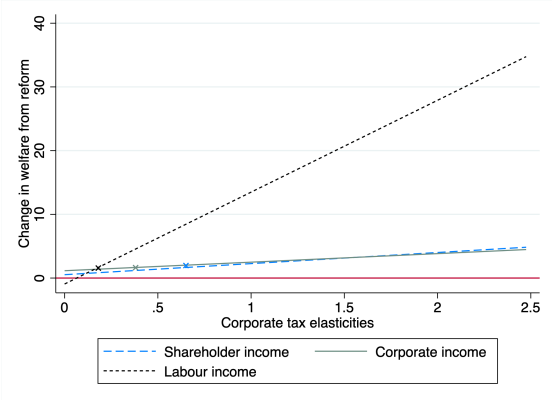
Category	U.S.	Norway
Tax rates		
Average marginal labor tax rate ($\bar{\tau}^l$)	30%	35%
Shareholder income tax rate (τ^r)	29%	37.84%
Corporate income tax rate (τ^b)	21%	22%
Tax bases (bn. currency)		
Labour income (Z^l)	USD 2,300	NOK 1,750
Resident shareholder income (Z^r)	USD 384	NOK 202
Corporate income (Z^b)	USD 370	NOK 478
Share of non-foreign ownership (s^r)	62%	56%
Elasticities		
$\bar{\varepsilon}^{lr}$	0.05	0.02
$\bar{\varepsilon}^{rr}$	0.50	0.25
$\bar{\varepsilon}^{br}$	0.10	0.03
$\bar{\varepsilon}^{lb}$	0.18	0.25
$\bar{\varepsilon}^{bb}$	0.38	0.275
$\bar{\varepsilon}_e^{ll}$	0.10	0.05
$\bar{\varepsilon}_e^{rr}$	0.10	0.05
f_{z^b}	0	0
Implied $\bar{\varepsilon}^{rb}$	0.65	1.32
Marginal welfare weights		
$\bar{g}^l$	1	1
$\bar{g}^r$	0.6	0.4

Notes: U.S. tax rates are from the Tax Foundation (2025), and tax bases are from the OECD (2023c) and the Luxembourg Income Study (2025). Norwegian tax rates are from the Norwegian Tax Authority (2025), and tax bases are from Statistics Norway (2025), excluding the petroleum sector. U.S. elasticities are based on Yagan (2015) and Kennedy et al. (2022).

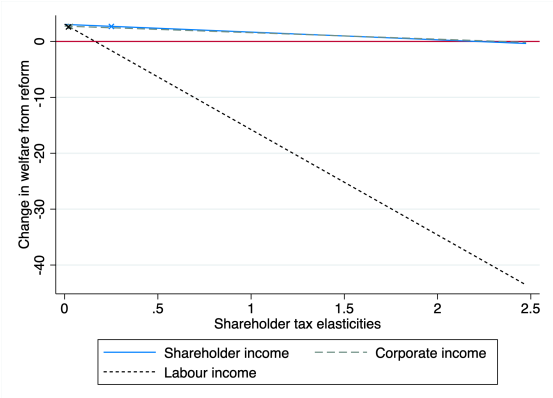
Using the formulas for the relationship between elasticities and incidence derived in the Appendix (Equation A.2), elasticity numbers for the U.S. imply that 56 percent and 16 percent of the incidence on residents falls on workers for corporate and shareholder income tax changes, respectively. For Norway, elasticities imply that 74 percent and 0 percent of the incidence on residents falls on workers for corporate and shareholder income tax changes, respectively.



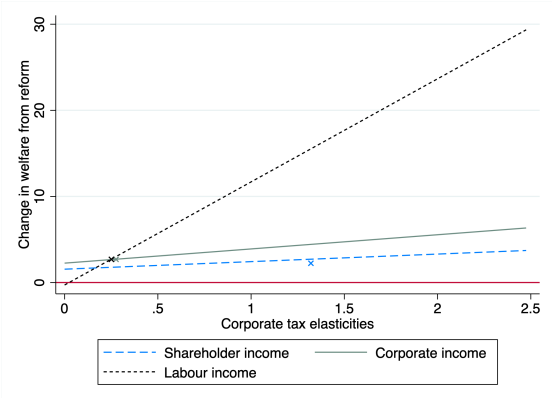
(a) U.S.: Shareholder tax elasticities.



(b) U.S.: Corporate tax elasticities.



(c) Norway: Shareholder tax elasticities.



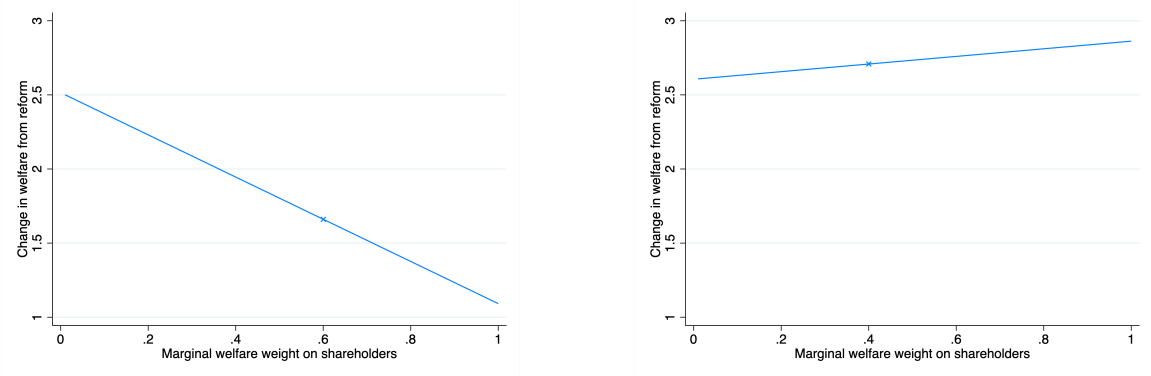
(d) Norway: Corporate tax elasticities.

Figure 5: Welfare change as a function of elasticities: U.S. and Norway.

Notes: Each panel shows the net welfare effect of a reform that raises the net-of-tax rate on corporate income while lowering the net-of-tax rate on shareholder income (holding other parameters constant). Panels (a)–(b) report U.S. results; panels (c)–(d) report Norway. Positive (negative) values imply that a higher (lower) shareholder income tax rate combined with a lower (higher) corporate income tax rate is optimal. The y-axis is the monetary value of welfare per unit of revenue from the corporate income tax and shareholder income tax. Crosses indicate baseline values.

The baseline numbers imply that it is optimal for the U.S. to reduce the corporate income tax and increase the shareholder income tax. Figures 5a and 5b show results of different elasticites on the welfare change depending on the reform direction for the U.S. If shareholder tax elasticites are high, it is optimal to replace shareholder income taxes with corporate income taxes, whereas the opposite holds for corporate income tax elasticites. The figures illustrate that the effect on workers is particularly important for the optimal reform direction, and the baseline assumes that the corporate income tax affects workers more than the shareholder income tax does.

Similarly, the baseline numbers imply that it is also optimal for Norway to reduce the corporate income tax and increase the shareholder income tax. Figures 5c and 5d show results of different elasticites on the welfare change depending on the reform direction. If shareholder tax elasticites are high, it is optimal to replace shareholder income taxes with corporate income taxes, whereas the opposite holds for corporate income tax elasticites. Compared to the U.S. case, more elasticity numbers imply that it is optimal to reduce the corporate income tax and increase the shareholder income tax. This makes sense, given that Norway has more features of a small open economy than the U.S. has. While only one elasticity changes along a curve, Figure 5c suggests that a spillover on workers may be necessary for the opposite reform direction to be optimal for Norway.



(a) U.S. (b) Norway.

Figure 6: Welfare change depending on resident shareholder weights: U.S. and Norway.

Notes: The figure displays the net effect of a reform towards higher net-of-tax rate on corporate income and a lower net-of-tax rate on shareholder income in the U.S. and Norway for different marginal welfare weights on shareholders, keeping everything else constant. When the effect is positive (negative) a reform towards a higher (lower) shareholder income tax rate and a lower (higher) corporate income tax rate is optimal. The y-axis is measured in terms of the monetary value of welfare per revenue from the corporate income tax and shareholder income tax. Crosses indicate baseline values.

Last, Figure 6 shows the effects of different marginal welfare weights on resident shareholders on the optimal reform direction. Whereas for the U.S., the higher the weight on shareholders, the smaller is the gain of replacing corporate with shareholder income taxation, the case for Norway is the opposite. The slope of the line depends on the ownership share and the effect that shareholder and corporate income taxes have on shareholders. If the resident ownership share in Norway were 45 percent, the line would be flat.

5 Conclusion

This paper has presented a general sufficient statistic framework for studying the trade-off between taxing income at the corporate and the shareholder level.[11] The main trade-off is between the taxation of the more elastic corporate income tax base partly paid by foreign investors and a less elastic shareholder income tax base for which foreign investors are exempt. One result is that the incidence on workers is a key sufficient statistic, since it is a large tax base and it is plausible that the government attaches higher marginal welfare weights to workers than to resident investors. By combining the theory with estimates from the literature on effects of the corporate and shareholder income tax base, I derive optimal reform directions.

The framework of this paper relies on a national perspective, where effects on other countries are not accounted for. This means that when a country lowers its corporate income tax, it only considers the effects on its own residents. An alternative framework with a different social welfare evaluation is required to study optimal tax policy from the perspective of the world rather than for each individual country.

Importantly, the optimal policy analysis here is based on local analysis of reforms using estimates of effects in actual tax systems. Even though local formulas for optimal tax rates display the policy trade-offs involved, it is unlikely that sufficient statistics would stay constant under a different tax system. This means that the framework cannot be straightforwardly applied to simulate optimal tax rates that are not in the vicinity of the initial tax system. Hence, the objective has instead been to present results on the optimal reform direction given the initial tax system. Local estimates of effects for the initial tax system are then exactly the relevant sufficient statistics for this reform analysis. An implication of this is that the framework presented here is not an alternative but rather a complement to more structural analysis of tax policy (such as Suárez Serrato and Zidar, 2016). In any case, given estimates of effects in different tax systems from such structural approaches, the framework in this paper provides a guide to optimal policy implications.

[11] There are other alternatives to taxing income from corporate profits, such as taxing pure profits at final sales through a destination-based cash-flow-tax (Devereux et al., 2020). To include destination-based taxation in the model presented here would be an interesting extension, which I leave to future work.

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A Supplemental Appendix

A.1 The relationship between incidence and elasticities

Empirical estimates are sometimes defined in terms of marginal incidence. I first define marginal incidence, t^{kj}, as what ends up being paid by the monetary value of a utility change for each group ($\Delta_j u^k / u_c^k$) as a share of after-tax income on the taxed tax base ($(1-\tau^j)Z^j$).[12] The role of u_c^k is to define incidence in terms of monetary rather than utility. Marginal welfare weights translate incidence measures into social welfare measures.

For a tax change on a (potentially) different base,

$$t^{kj} = \frac{(1-\tau^k)}{1-\tau^j}\varepsilon_w^{kj}\frac{Z^k}{Z^j}\ \forall k,j. \tag{A.1}$$

This highlights that if the incidence elasticity is zero, $\varepsilon_w^{kj}=0$, there is no incidence on this group for a tax change on a different tax base. When $k=j$ and $\varepsilon_w^{kj}=1$, the expression becomes the mechanical effect. When $k=j=r$, $\varepsilon_w^{kj}=(1+\varepsilon_w^{rr})$, which implies that the incidence of shareholder taxes on shareholders is weakly larger than 1, since it combines the mechanical and indirect effect of the tax on shareholders.

A simpler definition of incidence, $\hat{t}^{kj}$, ensures that the total incidence on residents sums to 1,

$$\hat{t}^{kj} = \frac{(1-\tau^k)\varepsilon_w^{kj}Z^k}{\sum_K(1-\tau^K)\varepsilon_w^{Kj}Z^K}\forall k,j. \tag{A.2}$$

This is more line in with the definition of incidence in Fuest et al. (2018), where they explain their incidence measure as follows: "We do so by relating the welfare change of workers induced by a marginal change in the net-of-tax rate to the sum of the welfare changes of workers and firm owners" (Fuest et al., 2018, p. 403).

If all elasticities are zero, incidence is fully borne by the base on which the tax applies and mechanical effects determine incidence.[13]

[12] An alternative measure of incidence is to account for the elasticity of the tax base on which the tax is levied in the denominator, such that incidence is measured as a share of new revenue raised on that tax base.

[13] The approach focuses on residents and incidence on foreigners is not accounted for, as they are assumed to have no weight. This is why Equation A.2 measures incidence as a share of incidence on residents.

A.2 Two-period saving model

A representative individual lives for two periods, $t = 1, 2$, earns income $y_t = wl_t$ in each period, w is a fixed wage rate and l_t is labour supply in each period, and saves $s = (1 - t_y)y_1 - c_1$. There are flat taxes on income, t_y, such that $c_1 = (1 - t_y)y_1 - s$. The individual saves at interest rate r and savings are taxed at a flat rate of t_s, such that $c_2 = (1 + r)(1-t_s)s+(1-t_y)y_s+R$ where R is a lump sum transfer. The individual has lifetime utility $u(c_1, c_2, l_1, l_2)$, which is increasing and concave in consumption in each period and decreasing and convex in labour supply in each period. The individual maximizes lifetime utility, which gives optimal values c_1^*, c_2^*, l_1^* and l_2^*.

The government faces a zero interest rate, such that $R = t_y y_1 + t_y y_2 + t_s s$, and values revenue at $W(R)$. Consider a tax reform where $1 - t_s$ increases marginally while $1 - t_y$ is fixed. Government welfare is the utility of the representative agent and the value of revenue, $W(u(c_1, c_2, l_1, l_2), R) = u(c_1, c_2, l_1, l_2) + W(R)$. The individual welfare effect is given by the mechanical effect $\partial u(c_1, c_2, l_1, l_2)/\partial(1 - t_s) = u_{c_2} s$ (due to the envelope theorem) while the revenue is affected by the behavioural response to the savings tax,

$$\frac{\partial W(R)}{\partial(1-\tau_s)} = W'(R)\left(-s + t_y \frac{y_1}{(1-t_s)}\varepsilon_{y_1} + t_y \frac{y_2}{(1-t_s)}\varepsilon_{y_2} + t_s \frac{s}{(1-t_s)}\varepsilon_s\right),$$

where $\varepsilon_x = \partial x/\partial(1 - t_s) \times (1 - t_s)/x$. In total, the reform is welfare increasing if

$$\left(1 - \frac{W'(R)}{u_{c_2}}\right) s + \frac{W'(R)}{u_{c_2}} \frac{t_y}{(1-t_s)}\varepsilon_{y_1} y_1 + \frac{W'(R)}{u_{c_2}} \frac{t_y}{(1-t_s)}\varepsilon_{y_2} y_2 + \frac{W'(R)}{u_{c_2}} \frac{t_s}{(1-t_s)}\varepsilon_s s > 0.$$

Comparing it to the model presented in Section 3, $W'(R)/u_{c_2}$ represents relative weights on the average individual compared to group that the tax is changed for. The total welfare effect depends on the mechanical effect, $(1 - W'(R)/u_{c_2})\, s$, and fiscal spillovers on the three tax bases, $W'(R)/u_{c_2} \times t_y/(1-t_s)\varepsilon_{y_1} y_1 + W'(R)/u_{c_2} \times t_y/(1-t_s)\varepsilon_{y_2} y_2 + W'(R)/u_{c_2} \times t_s/(1 - t_s)\varepsilon_s s$. This illustrates that as long as sufficient statistics account for long-term effects, the two-period saving model can be (locally) represented by the sufficient statistic framework.

A.3 A model of investment

In this section, I specify a model for investment behaviour which provides one possible foundation for the various elasticities with respect to corporate and shareholder income tax changes. Of course, many other aspects that those discussed here determine differences between national and international investors and thereby rates of return, such as information differences, management effects from different investors, and extensive margin responses to corporate income tax rates.

There are two types of firms $b = 1, 2$, some attract foreign investments (type 1) and some attract national investment (type 2). (After-tax) profits are

$$\pi_b(k_b, l_b) = (1 - \tau) f(k_b, l_b) - w_b^i k_b - (1 - \tau) w_b^l l_b, b = 1, 2, \tag{A.3}$$

where $\tau > 0$ denotes the corporate income tax rate (without a deduction for the cost of equity), $k_b > 0$ denotes capital used in the production, $w_k^i > 0$ denotes returns, $w_b^l > 0$ denotes wages and $l_b > 0$ denotes labour. For simplicity, the production function takes the form $f(k_b, l_b) = k_b^{1/2} l_b^{1/2}$, such that complementarity between capital and labour is assumed.

Wages are determined by the marginal product of labour in the type of firm in the short run and by the average marginal product of labour across firm types in the long run.

Capital demand, k_b^d, is given by

$$k_b^d = \frac{(1 - \tau) l_b}{(w_b^i)^2}, b = 1, 2. \tag{A.4}$$

Labour demand, l_b^d, is given by

$$l_b^d = \frac{k_b}{(w_b^l)^2}, b = 1, 2. \tag{A.5}$$

Resident investors, r, save $k^r = k^f + k_s$ to invest, such that their preferences are

$$u^r(k^r) = c^r(k^r) - (k^r)^2. \tag{A.6}$$

Their shares in national corporations have an initial value $v_2(\pi_2)$, which is a function of profits of the corporations they own stocks in (investors assume they cannot affect profits with their capital investment).[14] Hence, their budget constraint is

$$c^r(k_f, k_2) = (1-t)\left(\alpha\left((w_f^i)k_f + v_f\right) + (1-\alpha)\left((w_2^i)(k_2 - k^f) + v_2(\pi_2)\right)\right), \tag{A.7}$$

where t denotes the shareholder income tax rate and $1-\alpha$ denotes the share of investment at home relative to abroad, the 'home bias'. If there is no home bias, resident and foreign investors behave the same way.

Resident investors maximize utility such that their capital supply, k_b^s, is given by

$$k_f^s = \frac{\alpha(1-t)w_f^i}{2} \text{ and } k_2^s = \frac{(1-\alpha)(1-t)w_2^i}{2}. \tag{A.8}$$

Foreign investors face a fixed return rate in the country, $\bar{w}^i$, invest k^f in firms of type $b = 1$ in the country, and hold initial value $v^f(\pi_1)$ in the country.

One key question whether investment abroad by resident investors and foreign investment are endogeonous or not.

A.3.1 Open capital markets

In this case, α and k^f are endogenous. Capital is affected by the corporate income tax

$$\frac{\partial k_b}{\partial(1-\tau)} = \frac{l_b}{(w_b^i)^2} > 0. \tag{A.9}$$

This means that capital in national firms goes up as corporate income tax rates go down, which implies that corporate income also goes up

$$\varepsilon^{bb} = \frac{\partial f(k_b, l_b)}{\partial(1-\tau)}\frac{(1-\tau)}{f(k_b, l_b)} = \frac{(1-\tau)}{w_b^i w_b^l} > 0. \tag{A.10}$$

Importantly, $w_1^i = w_2^i = \bar{w}^i$, such that the return to investment is fixed after any adjust-

[14] In a stochastic dynamic model, the initial value is determined by the present value of expected future profits and the investment decision based on expected future returns. Empirically, this feature can be incorporated by measuring the effect on values by changes in stock prices.

ments. This implies that market returns to investors are unaffected by corporate income taxation, as they simply invest where returns are higher.

However, given initial holdings, the value of holdings in resident corporations increase due to higher after-tax profits, $v_2'(\pi_2) > 0$ and $v^{f\prime}(\pi_1) > 0$. This is the *mechanical effect on investors.* The size of the mechanical effect depends on the share of ownership and the effect on profits. Hence, even though market returns are fixed, shareholders are affected by changes in profits due to capitalisation effects of the tax change. The size of mechanical effects is determined by the effect the tax changes has on after-tax profits

$$M_\tau^r = \frac{\partial c^r(k_f, k_2)}{\partial(1-\tau)} = \frac{\partial v_2(\pi_2)}{\partial(1-\tau)} = (1-\alpha)\frac{\partial \pi_2}{\partial(1-\tau)} > 0 \tag{A.11}$$

and

$$M_\tau^f = \frac{\partial v^f(\pi_1)}{\partial(1-\tau)} = \frac{\partial \pi_1}{\partial(1-\tau)} > 0. \tag{A.12}$$

Hence, there is a similar mechanical effect on resident and foreign shareholders depending on their ownership shares in corporations in the country increasing the net-of-tax rate on corporate income. Clearly, when resident shareholders only invest abroad, $\alpha = 1$ initially, there is no mechanical effect on resident shareholders.

Workers are affected by higher investment, such that

$$\frac{\partial w_b^l}{\partial(1-\tau)} > 0, \tag{A.13}$$

which implies that $\varepsilon^{bl} > 0$.

As long as $k_f > 0$, an increase in the shareholder income tax rate does not affect firms that rely on financing by resident investors. The tax change reduces savings by resident investors, but since returns are fixed, $w_f^i = w_2^i$, investment in these firms is unaffected as long as resident investors save abroad as well as at home.[15]

Shareholder taxation has no effects on returns, investments, returns, wages or profits, since the investment of resident shareholders do not affect the cost of capital in an open

[15] If resident investors do not invest abroad, savings may be too low to ensure that returns are equalised for corporations that rely on their funding and all other corporations.

capital market,

$$\frac{\partial w_b^i}{\partial(1-t)} = \frac{\partial k_b}{\partial(1-t)} = \frac{\partial \pi_b}{\partial(1-t)} = \frac{\partial w_b^l}{\partial(1-t)} = 0. \tag{A.14}$$

Values of shares are also unaffected. Shareholder taxes do however mechanically affect resident shareholders through their budget constraint, such that

$$M_t^r = \frac{\partial c^r(k_f, k_2)}{\partial(1-t)} = \frac{c^r(k_f, k_2)}{1-t} > 0. \tag{A.15}$$

A.3.2 Closed capital markets

In this case, $\alpha = 0$, $k^f = 0$ and $k_1 = 0$. Hence, there are only corporations financed by resident investors and they make profits

$$\pi_2 = (1-\tau)f(k_2, l_2) - w_2^i k_2 - (1-\tau)w_2^l l_2. \tag{A.16}$$

There are only resident investors with the budget constraint

$$c^r(k_2) = (1-t)\left(w_2^i k_2 + v_2(\pi_2)\right). \tag{A.17}$$

Capital demand and supply will be equal and given by

$$k_2^d = \frac{(1-\tau)l_2}{(w_2^i)^2} = k_2^s = \frac{(1-t)w_2^i}{2}. \tag{A.18}$$

An increase in the net-of-tax rate on corporate and shareholder income increases capital demand and supply, respectively. Due to the capital-labour complementarity, workers receive higher wages. Hence, the key difference from the open capital markets case is that shareholder income taxation affects capital and thereby firms and workers.

Shareholders benefit mechanically from both changes, as the value of their shares goes up due to the former and after-tax consumption goes up due to the latter. Beyond the mechanical effect, an increase in net-of-tax rate on corporate increases profits through more capital, which benefits shareholders through the value of their portfolio. The behavioural effect of an increase in net-of-tax rate on shareholder income has no effect on shareholders' utility due to the envelope theorem.

A.3.3 Separated capital markets

In this case, α is fixed $\in (0, 1)$. After-tax profits are back to being given by

$$\pi_b(k_b, l_b) = (1-\tau)f(k_b, l_b) - w_b^i k_b - (1-\tau)w_b^l l_b, b = 1, 2. \tag{A.19}$$

Resident investors have the budget constraint

$$c^r(k_f, k_2) = (1-t)\left(\alpha\left((w_f^i)k_f + v_f\right) + (1-\alpha)\left((w_2^i)(k_2 - k^f) + v_2(\pi_2)\right)\right). \tag{A.20}$$

Capital demand and supply are equal for firms that rely on financing from resident investors

$$k_2^d = \frac{(1-\tau)l_2}{(w_2^i)^2} = k_2^s = \frac{(1-\alpha)(1-t)w_2^i}{2}. \tag{A.21}$$

In this case, an increase in $1-t$ increases investment both at home and abroad for resident investors due to the increased incentive to save. Since α is fixed, returns are not necessarily equalised, $w_f^i \neq w_2^i$. Resident investors may demand a lower or higher rate of return for investment in these corporations depending on α. Hence, reduced taxation of resident shareholder income increases overall investment which increases k_2. This also affects workers, such that wages in corporations relying on resident financing, w_2^l, go up. The size of the effect depends on the share of firms that rely on financing from resident investors.

Changes to corporate income tax rates have similar effects as in the above cases and will affect investment depending on the share of firms that rely on resident investors.

A.4 Additional cases

Case 4. The "new view"

According to the new view, marginal capital is raised from retained earnings such that dividend taxation does not affect the price of capital for the firm (Zodrow, 1991). When retained earnings is the marginal source of finance, capital gains taxation also does not affect the cost of financing, such that the outcome is the same as in Case 1. In the long-run, cor-

porations may require capital from other sources than retained earnings, and shareholder taxes may raise the cost of other sources of capital for investment. The importance of the new view depends on how many firms that require financing with new equity. There may be some overlap in which firms rely on new equity for financing of investment with firms that rely on resident investors, such that this case is similar to Case 2.

Case 5. Open economy

Similarly to Case 3, there is a fixed rate of return, such that corporate and shareholder taxation has no effect on rates of return. Since corporate income may be partly created by location-specific factors, it may still not be infinitely elastic despite capital being so, $\bar{\varepsilon}^{bb} \leq \infty$. However, the responsiveness of corporate income with respect to the corporate income tax is likely to increase with the openness of the economy, as capital becomes more elastic. Since the elasticity of corporate income is likely higher for a small open economy, given initial tax rates, the joint reform is more attractive than in the open capital markets case (Case 3).[16]

Case 6. Resident shareholders only invest abroad

If resident shareholders hold only foreign shares, there are no spillovers on workers or corporations in the residence country from a shareholder income tax and resident shareholders are unaffected by the corporate income tax rate in their country. Hence, $\bar{\varepsilon}^{br} = \bar{\varepsilon}^{lr} = \bar{\varepsilon}^{rb} = 0$. By Proposition 3, a move towards higher shareholder taxation and lower corporate income taxation is optimal whenever

$$\Delta W = \frac{(1-\tau^b)(1-\bar{g}^r)}{1-\tau^r} Z^r - Z^b + \tau^b \frac{\bar{\varepsilon}^{bb}}{1-\tau^b} Z^b - \left(\tau^r + \frac{(1-\tau^r)\bar{g}^r}{1+\bar{\varepsilon}_e^{rr}}\right) \frac{(1-\tau^b)\bar{\varepsilon}^{rr}}{(1-\tau^r)^2} Z^r + \left(\bar{\tau}^l + \frac{(1-\bar{\tau}^l)\bar{g}^l}{1+\bar{\varepsilon}_e^{ll}}\right) \frac{\bar{\varepsilon}^{lb}}{1-\tau^b} Z^l > 0.$$

On the one hand, resident shareholders no longer benefit from lower corporate income taxes, such that the joint reform is less attractive. On the other hand, shareholder taxes

[16] As seen in Table A4, a larger population and higher GDP are associated with a higher corporate income tax rate and a lower relative dividend tax rate in OECD countries.

create no negative spillovers on the corporate tax base or on workers, which makes the reform more attractive. If the welfare weight on shareholders, $\bar{g}^r$, is low, the latter is likely to dominate, such that the reform is more attractive than in the closed capital markets case (Case 1). Whether the joint reform is more attractive than in the other cases depends on the size of the two effects. Even if $\bar{g}^r = 0$ and this is an open economy with resident shareholder that only invest abroad, the reform is less attractive than in the open economy case, since no revenue from a lower corporate income tax is recouped by the taxation of resident shareholders.

A.5 Further empirical results

Table A1: Development of the share of dividend taxes over the total tax rate

	Dividend tax rate over the total tax rate			
	Panel A: All OECD countries			
	Basic	With population	With GDP	With both
Year	0.636***	0.644***	0.647***	0.502***
	(0.094)	(0.094)	(0.095)	(0.095)
Obs	836	836	836	836
R^2	0.052	0.064	0.053	0.103
	Panel B: Only Europe			
Year	0.708***	0.704***	0.674***	0.659***
	(0.109)	(0.109)	(0.112)	(0.121)
Obs	594	594	594	594
R^2	0.066	0.069	0.070	0.070

Notes: Year is year dummies from 2001 to 2022. "With population" adds the population of the country (in millions) as a control. With GDP adds the GDP ($ million) as control. "Both" includes both population and GDP as controls. *** indicates significance at 1%, ** at 5%, * at 10%.

Table A2: Development of the dividend tax rate percentage

	Dividend tax rate %			
	Panel A: All OECD countries			
	Basic	With population	With size	With both
Year	0.217***	0.215***	0.193***	0.122*
	(0.064)	(0.064)	(0.064)	(0.065)
Obs	836	836	836	836
R^2	0.014	0.017	0.027	0.054
	Panel B: Only Europe			
Year	0.222***	0.214***	0.133*	0.045
	(0.076)	(0.075)	(0.075)	(0.081)
Obs	594	594	594	594
R^2	0.014	0.048	0.072	0.083

Notes: Year is year dummies from 2001 to 2022. "With population" adds the population of the country (in millions) as a control. With GDP adds the GDP ($ million) as control. "Both" includes both population and GDP as controls. *** indicates significance at 1%, ** at 5%, * at 10%.

Table A3: Development of the total tax rate

	Total tax rate %			
	Panel A: All OECD countries			
	Basic	With population	With size	With both
Year	-0.089*	-0.101*	-0.140***	-0.133**
	(0.055)	(0.053)	(0.053)	(0.054)
Obs	836	836	836	836
R^2	0.003	0.081	0.086	0.087
	Panel B: Only Europe			
Year	-0.119*	-0.133**	-0.251***	-0.321***
	(0.070)	(0.066)	(0.065)	(0.071)
Obs	594	594	594	594
R^2	0.005	0.113	0.157	0.166

Notes: Year is year dummies from 2001 to 2022. "With population" adds the population of the country (in millions) as a control. With GDP adds the GDP ($ million) as control. "Both" includes both population and GDP as controls. *** indicates significance at 1%, ** at 5%, * at 10%.

Table A4: The Relationship Between Tax Rates, GDP, and Population Size for the OECD and Europe

	OECD countries				Only Europe			
	Relative dividend tax rate				Relative dividend tax rate			
GDP	-0.012*		0.116***		GDP	-0.003		0.233***
	(0.007)		(0.019)			(0.026)		(0.064)
Population		-1.428***	-6.933***		Population		-1.700*	-9.897***
		(0.349)	(0.982)				(0.993)	(2.461)
Obs	836	836	836		Obs	594	594	594
R^2	0.004	0.020	0.060		R^2	0.000	0.005	0.027
	Corporate income tax rate				Corporate income tax rate			
GDP	0.800***		-1.428***		GDP	2.319***		0.141
	(0.078)		(0.208)			(0.254)		(0.628)
Population		0.526***	0.120***		Population		0.096***	0.091***
		(0.004)	(0.105)				(0.010)	(0.024)
Obs	836	836	836		Obs	594	594	594
R^2	0.112	0.190	0.233		R^2	0.124	0.144	0.144
	Total tax rate				Total tax rate			
GDP	1.003***		0.614*		GDP	4.075***		4.811***
	(0.119)		(0.341)			(0.422)		(1.056)
Population		0.501***	0.210		Population		0.139***	-0.031
		(0.603)	(0.173)				(0.017)	(0.041)
Obs	836	836	836		Obs	594	594	594
R^2	0.078	0.076	0.080		R^2	0.136	0.107	0.137

Notes: Population is in billions and GDP is in trillion USD. Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.