Towards Optimal Taxation
Designing Tax Systems and Navigating Fiscal Challenges

Mehmet Ayaz

LMU Munich

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Introduction

Objectives of a well-designed tax-transfer system:

- Provide the necessary **revenue** for funding public goods and services
- Ensure the **efficient allocation** of resources
- Mitigate **inequality**

The key challenge is to **balance** these objectives.

It is important to consider:

- How tax-transfer systems **affect** individuals and the overall economy
- The **distributional effects** on different income groups

Overview

1. **How Should We Tax Capital?**
   - Examine **wealth and capital income taxation** taking **household portfolio compositions** into account

2. **Joint Taxation of Income and Wealth** *with Dominik Sachs*
   - Explore the **integration of income and wealth taxation**, analyzing the **efficiency gains and social implications** of such a combined approach

3. **Who Should Bear the COVID-19-Related Fiscal Pressure?** *with Lea Fricke, Clemens Fuest, and Dominik Sachs (EER, 2023)*
   - Investigate how the **optimal progressivity** of the income tax-transfer system evolves in response to increased **fiscal pressure** induced by the COVID-19 pandemic

Chapter 1

How Should We Tax Capital?

Motivation

- Different implications of wealth and capital income taxes in the case of **heterogeneous returns** across households
- Variation in **portfolio composition** is a crucial factor contributing to persistent return heterogeneity. [Fagereng et al., 2020, Kuhn et al., 2020]
- Consistent **lower returns** offered by certain classes of assets [Flavin and Yamashita, 2002, Baumol, 1986]

Research question:

What are the effects of wealth and capital income taxes when households can save in different assets that provide greater financial return or higher flow utility?

Framework and Model

- Households make labor supply, savings, and portfolio allocation decisions.
- Possibly **heterogeneous preferences** across time and assets
- Two investment assets, one yielding **greater financial return** and the other one providing **intrinsic flow utility** *(return vs. utility assets)*

Two approaches:

1. **Mechanism-design approach** to characterize the optimal allocation using non-linear capital income taxes
2. Calibration of a life cycle model to the U.S. economy to study **revenue-neutral linear capital taxation reforms**

Theoretical Results

Capital taxes distort household decisions differently.

- Wealth taxes affect **saving** decisions.
- Capital income taxes affect **saving** and **portfolio allocation** decisions.

Optimal capital taxes vary by the underlying heterogeneity.

- No preference heterogeneity → No capital taxes needed.
- e.g. Higher-income households value return assets more → Positive capital income taxes for **portfolio distortion**, negative wealth taxes for **saving correction**

Quantitative Results

From U.S. household survey data:

- Richer households save more.
- Poorer households hold more utility assets.

Why? Strong correlation between productivity and patience according to calibration

Compared to a baseline of 20% capital income tax rate with no wealth taxes:

- A **2.5% wealth subsidy** and a **53% capital income tax rate** maximize social welfare without changing tax revenue.

How? Redistribution based on portfolio allocations

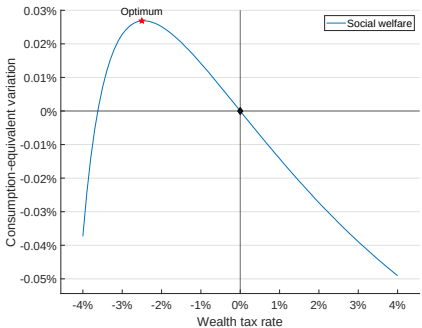


Figure: Social Welfare After Tax Reforms

Chapter 2

Joint Taxation of Income and Wealth

Motivation

- A large focus on **optimal income taxation** designed to redistribute resources most efficiently [Kaplow, 2024]
- Increasing attention towards **wealth taxation** in recent years as a means of addressing wealth concentration [Piketty, 2014]

Research question:

What are the efficiency gains and social implications of integrating income and wealth taxation?

Part 1: State-Dependent Saving Taxation

Framework and model:
A two-period model with **uncertain labor income** where the government levies **saving taxes based on labor income**

- An incentive to act as an insurer [Farhi and Werning, 2013]
- Distortionary effects?

Results:

- State-dependent saving taxes targeting lower incomes are more **distortionary**.
- **Higher saving taxes for high incomes** and lower taxes for low incomes can improve welfare beyond the insurance motive.

Part 2: Joint Tax Reforms

Framework and model:
Elementary joint tax reforms

- **Fiscal effects** of joint taxation
- Social welfare based on the **inverse-optimum** approach

Results:

- Joint taxation allows for **better targeting** (*tagging*) in the middle of income and wealth distributions while introducing larger **additional distortions** at the bottom.
- Even with **optimal separable** income and wealth taxes, joint tax reforms can further **improve welfare.**

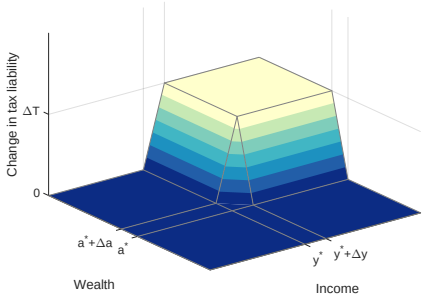


Figure: An Elementary Joint Tax Reform

Chapter 3

Who Should Bear the Covid-19-Related Fiscal Pressure?

Motivation

- **Growing strain** on public finances due to the COVID-19 pandemic, the economic fallout of the Ukraine war, the climate crisis, etc.
- Calls to make tax-transfer systems **more progressive** while *"striking a balance between equity and efficiency"* [de Mooij et al., 2020]

Research question:

How does the optimal progressivity of the income tax-transfer system evolve in response to increased fiscal pressure induced by the COVID-19 pandemic?

Framework and Model

- Apply the workhorse optimal income taxation model based on Mirrlees [1971].
- Focus on five European countries: France, Germany, Italy, Spain, and the U.K.
- Assume pre-pandemic tax-transfer systems are **optimal** and measure fiscal pressure by the increase in **debt-to-GDP** ratio.
- Solve for the optimal tax-transfer system, accounting for **debt repayment**.

Results

- If there are **income effects** or **diminishing marginal utility**, changes in fiscal pressure affect the optimal marginal tax rates.
- Governments face an increase in fiscal pressure ranging **from 2.4% to 4.7%** of their GDP per year.
- Transfers should decrease and taxes should increase. Overall, the tax-transfer system should be **less progressive** across all countries.

Why? Tax rates at the top are closer to the revenue-maximizing rate.

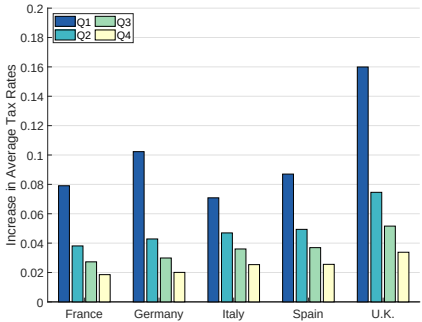


Figure: Increase in Average Tax Rates

Conclusion

Key Takeaways

Incorporating wealth taxation alongside capital income taxation allows further redistribution without losing revenue.

Joint taxation of income and wealth can enhance efficiency and improve equity by considering the joint distribution.

An increase in fiscal pressure leads to a less progressive tax-transfer system.

→ Utilizing **new and different forms of taxation** can offer innovative solutions.

→ Tax systems should be **carefully adjusted** when faced with fiscal pressure.

Appendix to Chapter 1

Household optimization

$$\begin{aligned} \max_{y,c_1,c_2,a_U,a_R} \quad & u(c_1) + \beta_i u(c_2) + \phi_i(a_U) - v\left(\frac{y}{\theta_i}\right) \\ \text{s. t.} \quad & c_1 = y - a_R - a_U \\ & c_2 = a_R(1+r) + a_U \end{aligned}$$

First-order conditions:

$$\begin{aligned} u'(c_1) - v'\left(\frac{y}{\theta_i}\right)\frac{1}{\theta_i} &= 0 \\ -u'(c_1) + \beta_i u'(c_2)(1+r) &= 0 \\ -u'(c_1) + \beta_i u'(c_2) + \phi_i'(a_U) &= 0 \end{aligned}$$

Welfare maximization

$$\max_{y^i, c_1^i, c_2^i, a_U^i} \quad \sum_{i=l,h} \tilde{f}^i U_i(y^i, c_1^i, c_2^i, a_U^i)$$

$$\text{s.t.} \quad \sum_{i=l,h} f^i y^i \geq \sum_{i=l,h} f^i \left(c_1^i + \frac{c_2^i}{1+r} + \frac{r a_U^i}{1+r} \right)$$

$$U_h(y^h, c_1^h, c_2^h, a_U^h) \geq U_h(y^l, c_1^l, c_2^l, a_U^l)$$

Wedge definitions:

$$t_y = 1 - \frac{v'\left(\frac{y}{\theta_i}\right)\frac{1}{\theta_i}}{u'(c_1)} \qquad t_w = 1 - \frac{u'(c_1) - \phi_i'(a_U)}{\beta_i u'(c_2)} \qquad t_k = 1 - \frac{1}{r}\frac{\phi_i'(a_U)}{u'(c_1) - \phi_i'(a_U)}$$

Optimal distortions

High-productivity households

$$t_y^h = 0$$

$$t_w^h = 0$$

$$t_k^h = 0$$

Low-productivity households

$$t_y^l = (g_l - 1)\frac{v'\left(\frac{y^l}{\theta_l}\right)\frac{1}{\theta_l} - v'\left(\frac{y^l}{\theta_h}\right)\frac{1}{\theta_h}}{u'(c_1^l)}$$

$$t_w^l = (g_l - 1)\left(\frac{\beta_h - \beta_l}{\beta_l} + \frac{\phi_h'(a_U^l) - \phi_l'(a_U^l)}{\beta_l u'(c_2^l)}\right)$$

$$t_k^l = -(g_l - 1)\frac{1+r}{r}\frac{\phi_h'(a_U^l) - \phi_l'(a_U^l)}{u'(c_1^l) - \phi_l'(a_U^l)}$$

Simplified life cycle model

$$\max_{y,c_w,c_r,a_U,a_R} \quad \beta_i^w \left[u(c_w) - v\left(\frac{y}{\theta_i}\right) \right] + \beta_i^r \left[u(c_r) \right] + \beta_i^\phi \phi_i(a_U) + \phi_i^C$$

$$\text{s. t.} \quad c_w = y(1-\tau_y) - \delta_R a_R - \delta_U a_U$$

$$c_r = \sigma_R a_R + \sigma_U a_U$$

where $\beta_i^w = \sum_{t=1}^{T_w} (\beta_i)^t$ and $\beta_i^r = \sum_{t=T_w+1}^{T_w+T_r} (\beta_i)^t$.

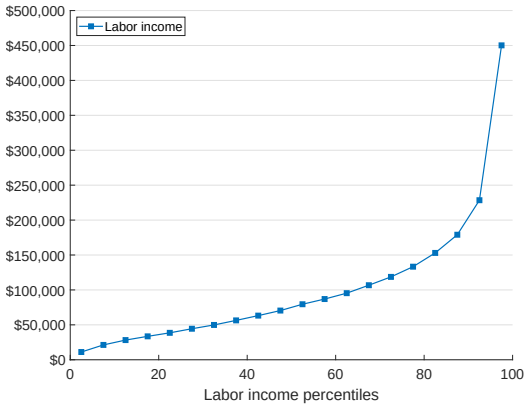
Functional-form assumptions:

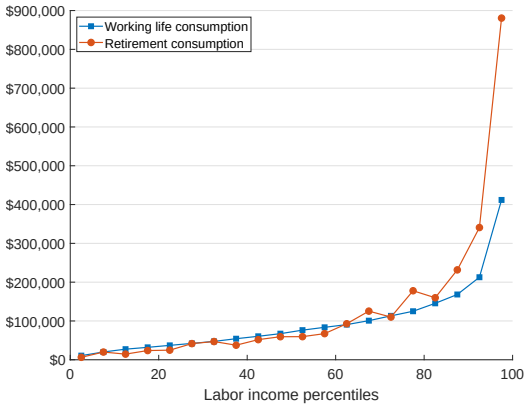
$$u(c) = \frac{u^{1-\gamma} - 1}{1-\gamma} \qquad v(l) = \frac{l^{1+\frac{1}{\varepsilon}}}{1+\frac{1}{\varepsilon}} \qquad \phi(a_U) = \xi \cdot \frac{a_U^{1-\mu} - 1}{1-\mu}$$

Calibration parameters

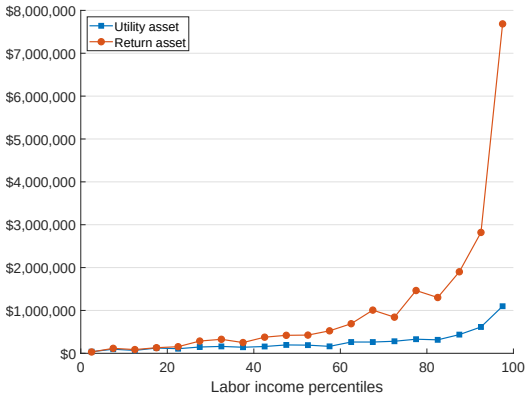
Parameter		Value	Source
Labor income tax rate	τ_y	24.7%	OECD [2023]
Capital income tax rate	τ_k	20%	*Long-term capital gains tax rate*
Wealth tax rate	τ_w	0%	*No wealth taxation*
Interest of return asset	r_R	9.31%	Jordà et al. [2019]
Interest of utility asset	r_U	5.86%	Jordà et al. [2019]
Working life (yrs.)	T_w	42	Federal Reserve [2019]
Retirement (yrs.)	T_r	18	World Bank [2022]
Frisch elasticity	ε	0.5	Chetty et al. [2011]
Curvature of consumption utility	γ	2	Calvet et al. [2021]
Curvature of wealth utility	μ	2	–

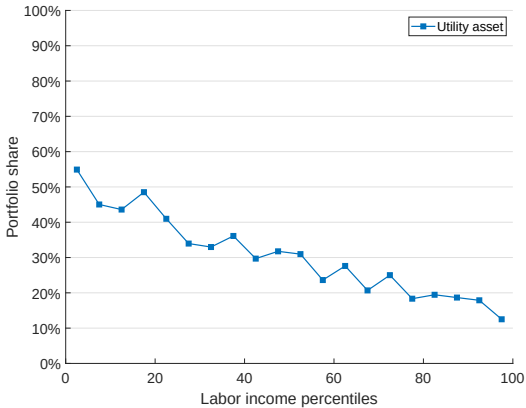
Calibrated income and consumption





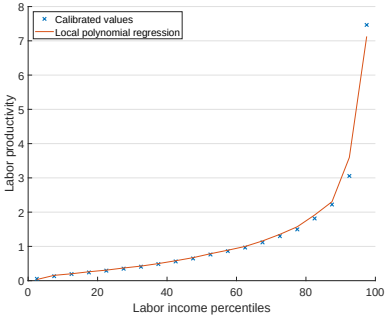
Calibrated assets



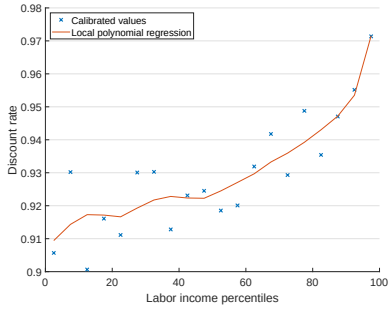


Calibrated parameters

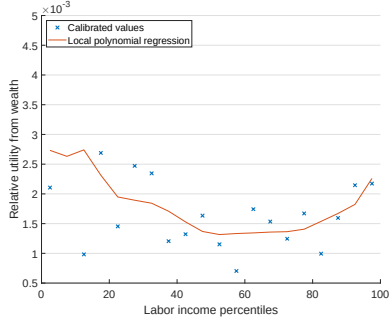
Labor productivity (θ)



Time preference (β)



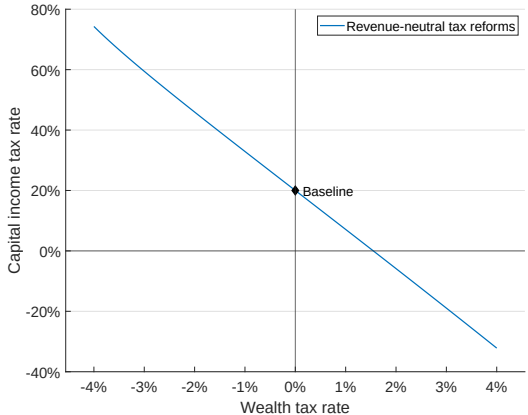
Relative utility from wealth (ξ)



Correlation matrix

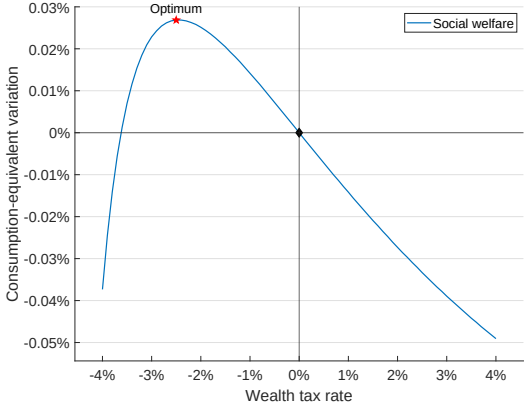
θ_i	β_i	ξ_i	
1	**.814**	-.013	θ_i
	1	.196	β_i
		1	ξ_i

Revenue-neutral tax reforms



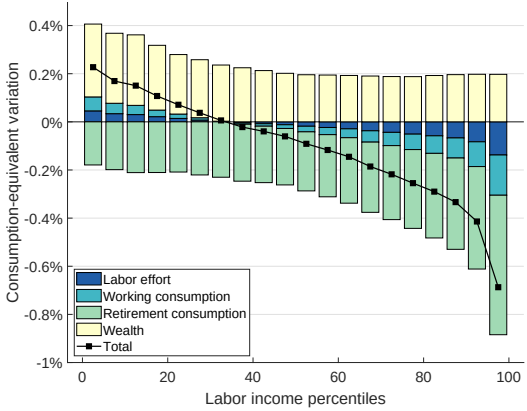
Optimal capital tax reform

Social welfare



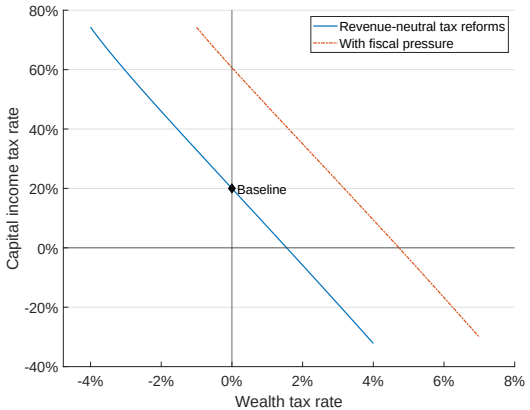
$$\sum_i U_i(y_i', c_i', a_i') = \sum_i U_i(y_i, c_i \cdot (1+\overline{CE}), a_i)$$

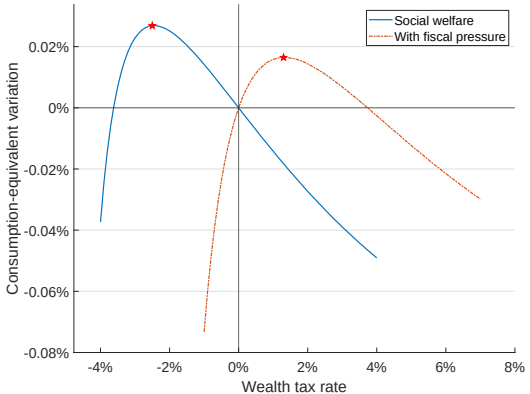
Redistributive effects



$$U_i(y_i', c_i', a_i') = U_i(y_i, c_i \cdot (1 + CE_i), a_i) \quad \forall i$$

Effect of fiscal pressure





Appendix to Chapter 2

Individual optimization

$$
\begin{aligned}
\max_{a} \quad & U = u(c_1) + \mathbb{E}\left[u(c_{2i})\right] \\
\text{s. t.} \quad & c_1 = I - a \\
& c_{2i} = \begin{cases} a(1-\tau_l) + \theta_l, & \text{if } i = l \\ a(1-\tau_h) + \theta_h, & \text{if } i = h \end{cases}
\end{aligned}
$$

$$
\varepsilon_{a,1-\tau_i} = \frac{p_i(1-\tau_i)u'(c_{2i})}{-\psi(a)a}\left(1 + \frac{u''(c_{2i})}{u'(c_{2i})}a(1-\tau_i)\right)
$$

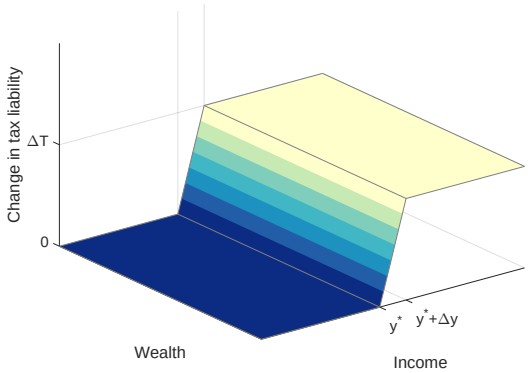
Optimal tax rates

$$\max_{\tau_l, \tau_h} \quad u(c_1) + \sum_{i=h,l} p_i u(c_{2i})$$
$$\text{s. t.} \quad G \leq (p_l \tau_l + p_h \tau_h) a$$

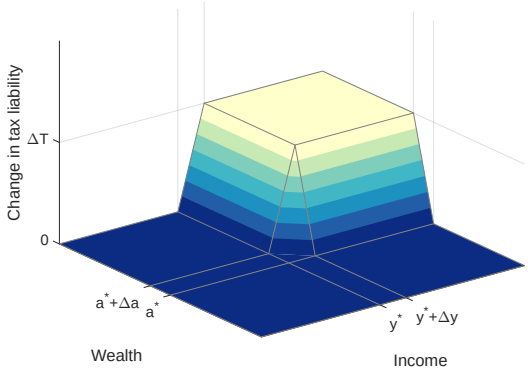
$$\frac{\tau_l}{1-\tau_l} = \frac{1}{\varepsilon_{a,1-\tau_l}} \cdot \left(1 - \frac{u'(c_{2l})}{\lambda}\right) \cdot \frac{p_l}{p_l + p_h \frac{\tau_h}{\tau_l}}$$
$$\frac{\tau_h}{1-\tau_h} = \frac{1}{\varepsilon_{a,1-\tau_h}} \cdot \left(1 - \frac{u'(c_{2h})}{\lambda}\right) \cdot \frac{p_h}{p_l \frac{\tau_l}{\tau_h} + p_h}$$

Illustration of joint tax reforms

Separable income tax reform



Joint tax reform



Marginal excess burden weights

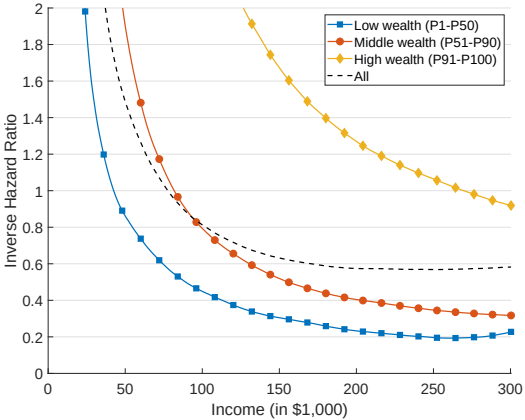
$$MEB_{\text{joint}}(y^*, a^*) = -\frac{\Delta R_Y^E(y^*, a^*) + \Delta R_A^E(y^*, a^*)}{\Delta R^M(y^*, a^*)}$$
$$= w_Y(y^*, a^*) MEB_Y(y^*) + w_A(y^*, a^*) MEB_A(a^*)$$

where $w_Y(y, a)$ and $w_A(y, a)$ denote the weights determined by the joint distribution of income and wealth, respectively.

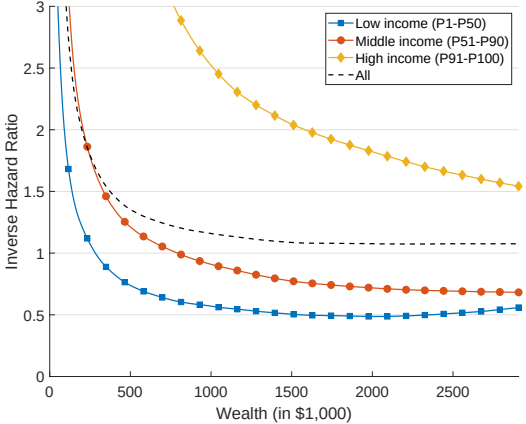
$$w_Y(y^*, a^*) = \frac{f_Y(y^*|a > a^*)}{1 - F_Y(y^*|a > a^*)} \frac{1 - F_Y(y^*)}{f_Y(y^*)}$$
$$w_A(y^*, a^*) = \frac{f_A(a^*|y > y^*)}{1 - F_A(a^*|y > y^*)} \frac{1 - F_A(a^*)}{f_A(a^*)}$$

Joint distribution of income and wealth

Across income distribution

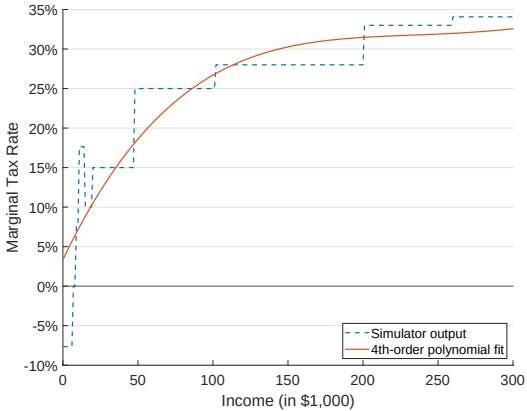


Across wealth distribution



Baseline separable tax systems

Income taxation



Wealth taxation

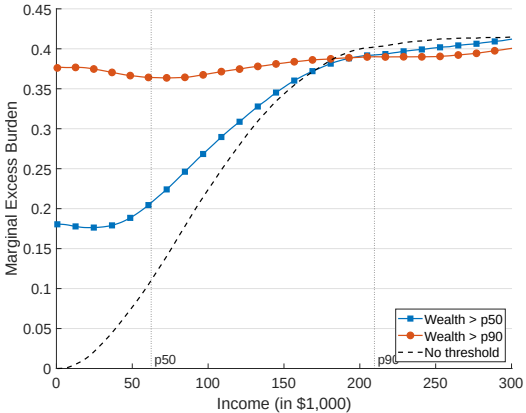
$$\tau_A = \frac{r\tau_K}{1+r}$$

Combine 20% LT capital gains tax rate with an annual return of 6.3% [Jordà et al., 2019].

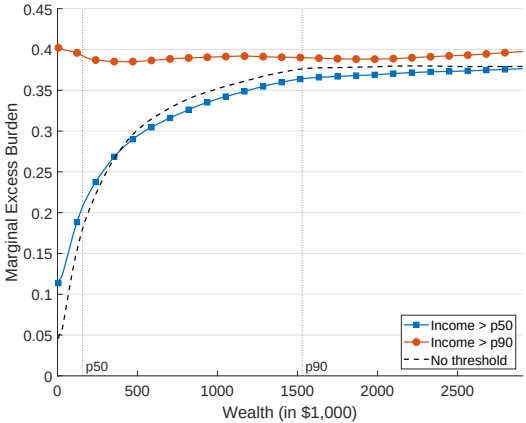
$$\tau_A = 1.19\%$$

MEB of joint elementary tax reforms

Across income distribution

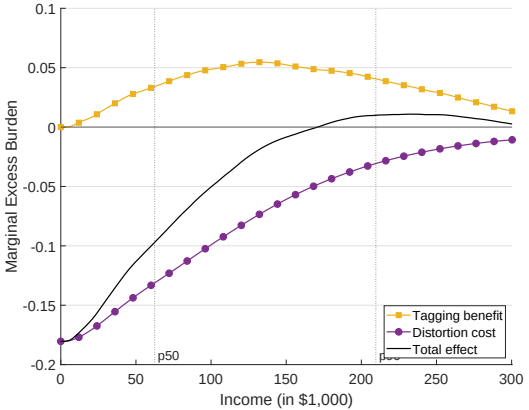


Across wealth distribution

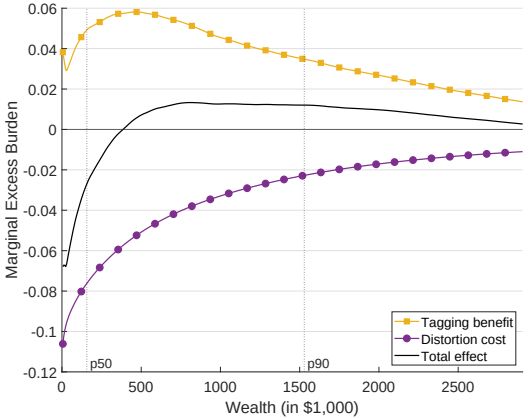


Tagging benefit vs. distortion costs

Across income distribution

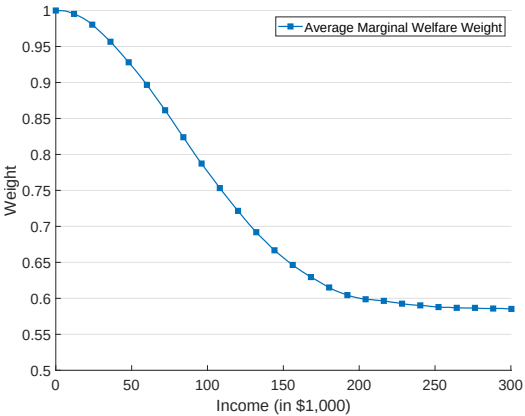


Across wealth distribution

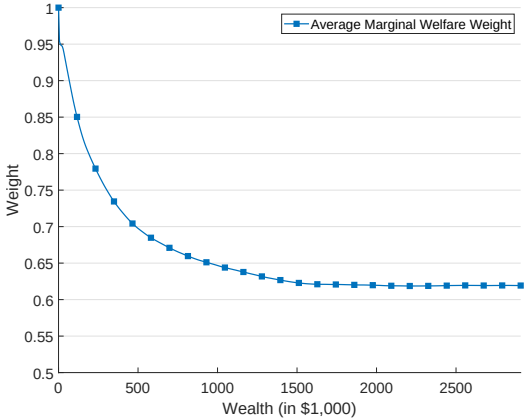


Inverse-optimum welfare weights

Across income distribution

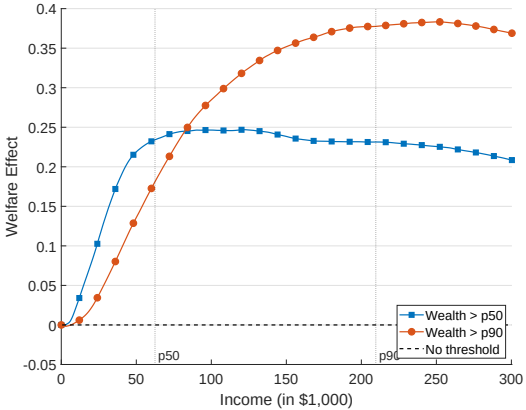


Across wealth distribution

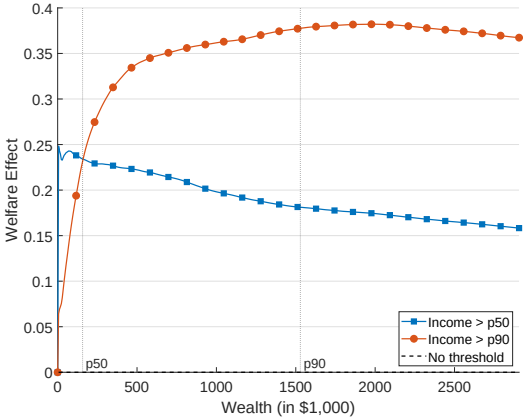


Welfare effects

Across income distribution



Across wealth distribution



Appendix to Chapter 3

Optimal income tax formula

$$\frac{T'(y(w))}{1-T'(y(w))} = \left(1+\frac{1}{\varepsilon}\right)\frac{\int_w^{\overline{w}}\left(1-\frac{u_c(x)s(x)}{\tilde{\lambda}}+\eta(x)\,T'(y(x))\right)f(x)dx}{f(w)w}$$

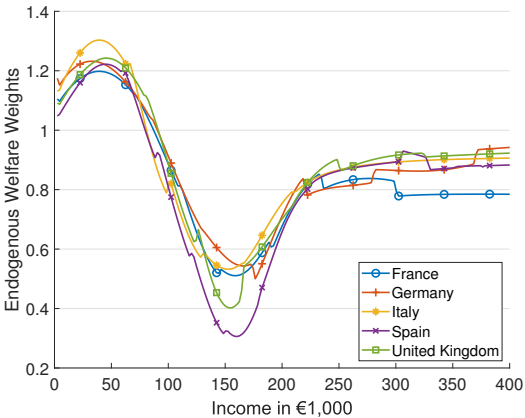
- Decreasing marginal utility
- Income effects

Parameters for calibration

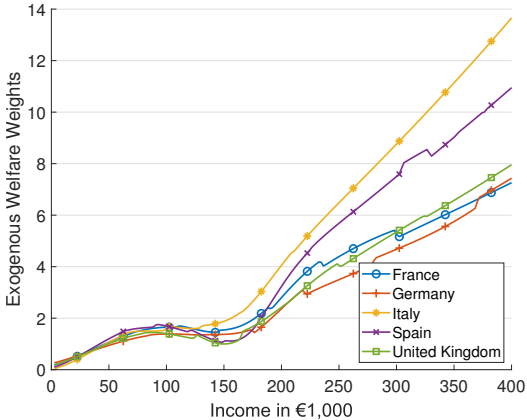
	France	Germany	Italy	Spain	U.K.
Calibration					
Pareto Thres. Start	€150,000	€150,000	€150,000	€150,000	€150,000
Pareto Thres. Constant	€250,000	€250,000	€250,000	€250,000	€250,000
Pareto Param. Start	2.8	2.95	2.56	2.21	2.34
Pareto Param. Constant	2.20	1.67	2.22	2.11	1.78
Share with No Earnings	5.6%	4.4%	3.2%	3.8%	7.0%
Lump-Sum Transfer	€13,347	€20,763	€2,540	€6,991	€15,037
Fiscal Pressure					
5-year Payback	2.65%	2.96%	3.52%	3.58%	4.90%
10-year Payback	1.32%	1.48%	1.76%	1.79%	2.45%

Calibrated welfare weights

Endogenous weights

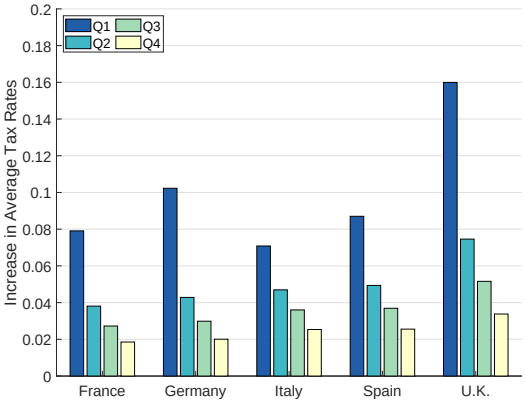


Exogenous weights

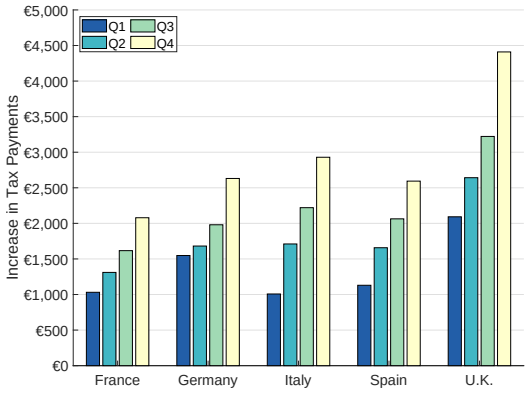


Change in average tax rates

Average tax rates

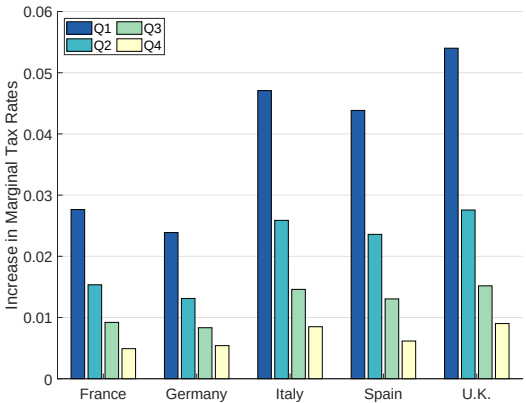


Tax liabilities

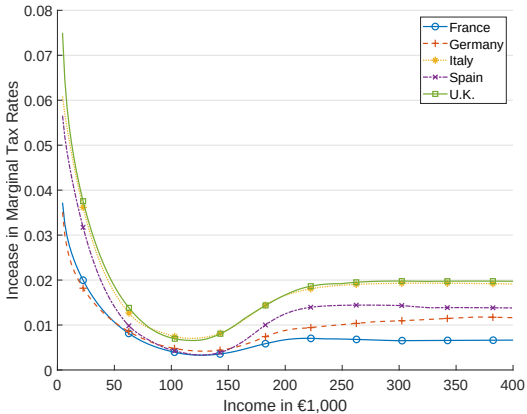


Change in marginal tax rates

Quartiles



Income levels



Revenue-maximizing tax rates