Financial Systems, Taxation and Public Policy

Part I – Taxation: Lectures 1 to 5

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Course overview

Financial Systems, Taxation and Public Policy

- 24h – taught in English
- Two teachers, two complementary topics:
  - **Taxation** (Sessions 1–5, S. SD)
  - **Financial system** (Sessions 6–11, ZA)

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Prerequisites: Bachelor-level micro/macro

What this course is about

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- Why teach them together? Both are institutions through which societies govern the allocation of capital, manage risk, and arbitrate between efficiency and equity

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- An **interactive debriefing** (15 min)
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  - their 10-min oral debriefing is not a summary: it must (i) organize the session's content around the day's question and/or (ii) take a critical stance on the lecture and/or (iii) connect the content to their own experience or other courses
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- Session 12: on-site final exam, no document allowed

Assessment: why we're doing it differently

- Goal: assess your own understanding and take on the content, not a well-rehearsed (AI-prepared) slide deck prepared over several weeks
- **Oral debriefing – 20%**
  - Graded on the reconstruction and on the critical/reflective quality of the discussion that follows – not on how closely it matches the slides
  - Graded as an exercise in itself – with indulgence, but attendance and attention are essential since any student can be called on, at any session
- **Final exam – 80%**
  - On-site, no document allowed
  - Session 12 (2 hours)

Roadmap

Part I – Taxation (S. Delpeuch)

S1 (10/09): Taxation and the allocation of capital

S2 (17/09): Taxation and the cost of capital

S3 (24/09): Taxation and the globalization of capital

S4 (01/10): International tax competition

S5 (08/10): Towards alternative forms of taxation?

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Part II – Financial system (Z. Alla)

S6 (12/10): Introduction to financial markets

S7 (15/10): The evolving typology of financial intermediaries

S8 (05/11): Financial regulation: rationale and objectives

S9 (12/11): Evolution and challenges of financial regulation

S10 (19/11): Financing the economy vs. financial stability

S11 (26/11): A snapshot on financial system prospects

S12 (03/12): Final exam

Lecture 1

Taxation and the allocation of capital

Roadmap of today

1. Taxation vs. other levers: pre-tax equality or fiscal correction?
   - Predistribution vs. redistribution
2. Equity: measuring redistribution before and after tax
   - From market income to national income
   - The allocation problem
   - Effective tax rates, net contributors, net beneficiaries
3. The "ugly drop-off": regressivity at the very top
4. The corporate income tax as a safety net ?
5. Reform options: which base, which timing, which risks ?
   - A wealth-based reform: Zucman's minimum tax
   - A different objective: inheritance and equality of opportunity

Today: Session 1

Taxation and the allocation of capital

- Central question: *how can societies design a tax system that meets their distributive objectives while limiting distortions to the allocation of capital?*

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- Equity today, efficiency next week (Session 2, Cost of Capital)

1. Taxation vs. other levers: pre-tax equality or fiscal correction?

From moral philosophy to public economics

Political philosophy – which distributive justice principles should prevail?

From moral philosophy to public economics

Political philosophy – which distributive justice principles should prevail?

- **Libertarianism** (Nozick): justice = respecting property rights and voluntary exchange, not the final distribution
- **Utilitarianism** (Bentham, Mill): maximize the sum of individual well-being
- **Egalitarian theories** (Rawls): prioritize the least advantaged
- Other traditions: capabilities (Sen), equality of opportunity...

Our (liberal-democracy) current social contract is influenced by all of these principles with various degrees

Given scarcity, how should society allocate resources?

Three polar answers:

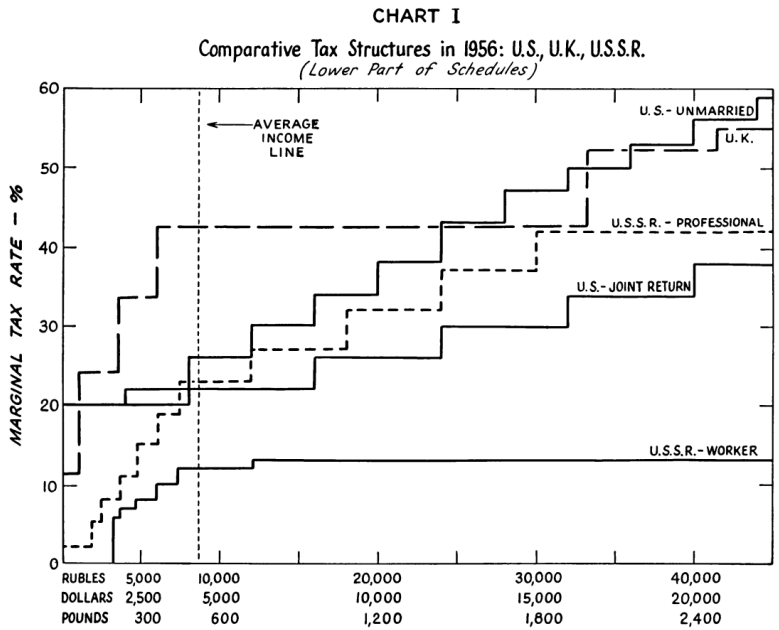
(i) **Market allocation** (*laissez-faire*): prices and voluntary exchange decide

(ii) **Allocation by property rights**: who is entitled to what is settled ex-ante – predistribution, i.e. a public policy of equality before any tax is levied

(iii) **Correction of the market outcome** via the fiscal tool: let the market allocate first, then tax and transfer

Predistribution vs. redistribution: the USSR case

- A system that allocates resources ex-ante through property rights (state ownership) can look "equal" – there is no market income left to redistribute
- Because of their ex-ante equality, these system are not ex-post progressive: formal wage-tax schedules under Soviet central planning were markedly less progressive than post-war Western income tax schedules



Source: Holzman (1958)

Taxes vs. regulation: another way to correct the market

Equity-efficency trade-off

Distributive theory	**Trade-off**
Libertarian (Nozick)	Redistribution beyond correcting a rights violation is the efficiency loss -
Utilitarian (Bentham/Mill)	The textbook version: $W = \sum u_i(c_i)$ – diminishing marginal utility favours transfers (equity gain), but taxes biases work/saving/investment incentives (efficiency loss); give rise to optimal-tax theory
Egalitarian (Rawls)	Maximin: only the worst-off's position counts. Incentives (efficiency) are tolerated only up to the point where they stop raising the floor for the least advantaged

2. Equity: measuring redistribution before and after tax

From market income to disposable income

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- Missing from that picture:
  - undistributed corporate profits (accrue to shareholders, but are not paid out)
  - indirect taxes (VAT, excise duties) embedded in prices
  - in-kind transfers (health, education) and collective public spending (defense, infrastructure)

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  - indirect taxes (VAT, excise duties) embedded in prices
  - in-kind transfers (health, education) and collective public spending (defense, infrastructure)
- To compare redistribution across countries and over time, we need an accounting framework that allocates 100% of national income to individuals

A €10 pack of cigarettes, decomposed

The DINA approach: Distributional National Accounts

- **Distributional National Accounts (DINA)**: combine national accounts, tax data, and survey data so that income distributed to individuals sums exactly to national income (as in the System of National Accounts)
- Why it matters: pretax income alone is not comparable across countries with very different tax-and-transfer systems – DINA makes the level and distribution of total resources comparable

Four income concepts, four stages of redistribution

Concept	**What it captures**
Pretax factor income	income before any redistribution (labor + capital income)
Pretax post-replacement income	+ pensions and unemployment insurance (social insurance)
Post-tax disposable income	– taxes paid + cash transfers received
Post-tax national income	+ in-kind transfers (health, education) and collective expenditure – sums to 100% of national income

Source: DINA Guidelines (Blanchet, Chancel, Flores & Morgan et al., 2024)

A DINA table in practice: the United States, 2014

Group	Pretax national income		Post-tax national income	
	Avg. income ($)	Share	Avg. income ($)	Share
Full population	64,600	100%	64,600	100%
Bottom 50%	16,200	12.5%	24,900	19.3%
Middle 40%	65,300	40.4%	67,200	41.6%
Top 10%	304,000	47.0%	253,000	39.1%
Top 1%	1,310,000	20.2%	1,010,000	15.7%
Top 0.1%	6,000,000	9.3%	4,400,000	6.8%

Who captured US growth since 1980?

Source: Piketty, Saez & Zucman (2018), *Distributional National Accounts*, *QJE*; authors' replication data, `https://gabriel-zucman.eu/usdina/`

The allocation problem: whose share of a public good?

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- In-kind transfers and collective expenditure are not: how do you split a fighter jet, a highway, or street lighting across 65 million people?
- Two polar conventions:
  - **Lump-sum allocation**: the same euro amount to every adult – maximal equality of government spending, an upper bound on measured redistribution
  - **Proportional allocation**: in proportion to post-tax disposable income – leaves the distribution of income unchanged, a lower bound on measured redistribution

Why does the convention matter?

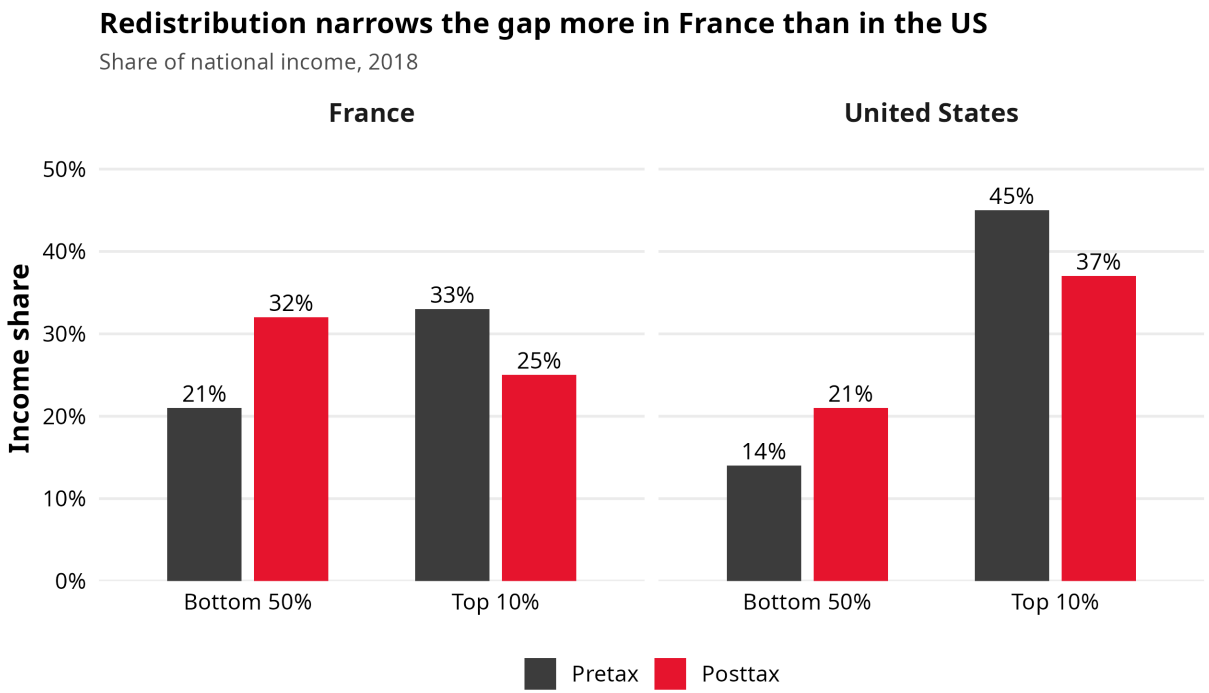
Empirical illustration 1: does the allocation choice matter in practice?

- André, Germain & Sicsic (2023), INSEE Working Paper No. 2023-07: apply an extended redistribution framework to France, allocating 100% of national income and transfers – including in-kind health and education spending – across households
- Result: measured inequality reduction is twice as large under the extended approach as under the standard monetary-only approach, with health and education spending doing most of the extra work

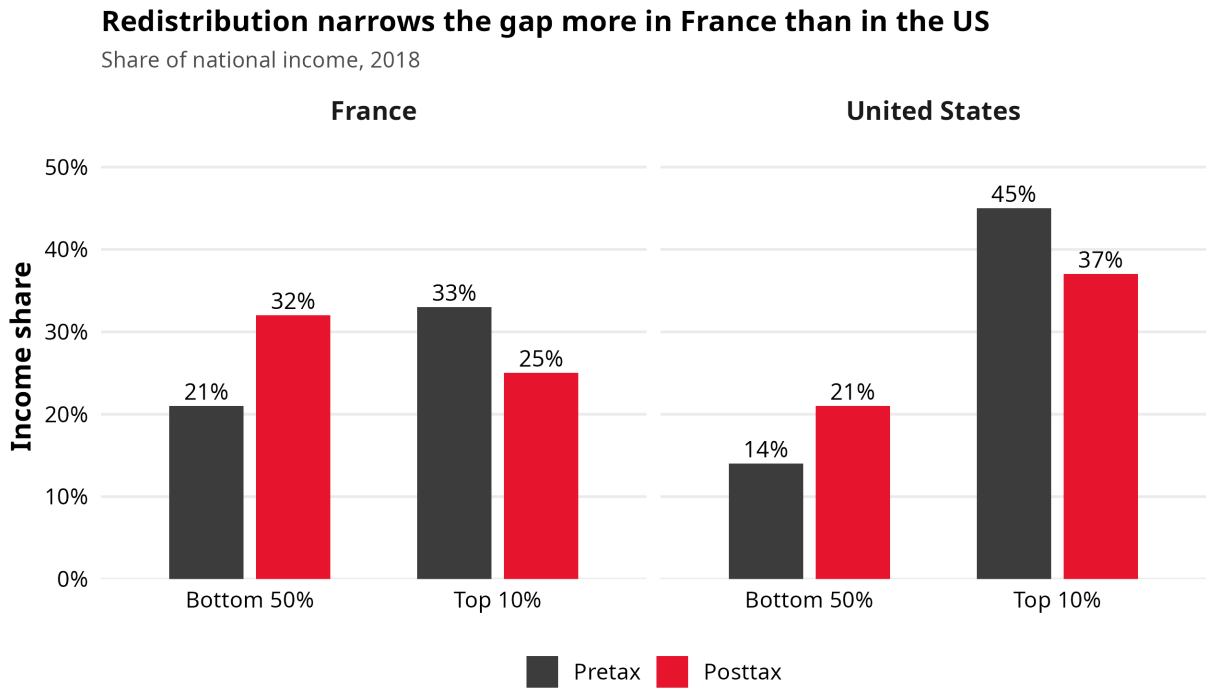
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- Result: measured inequality reduction is twice as large under the extended approach as under the standard monetary-only approach, with health and education spending doing most of the extra work
- Under this extended definition, about 60% of French households are net beneficiaries of redistribution – a very different number from what a cash-only measure would give

Empirical illustration 2: distributing 100% of national income



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- Bozio, Garbinti, Goupille-Lebret, Guillot & Piketty (2024, *AEJ: Applied Economics*) build 120 years of posttax DINA series for France and compare them to the US
- Most of the France/US gap in posttax inequality comes from differences in pretax inequality, not from how much each country redistributes

Defining what people actually pay: Effective Tax Rates

- **Effective Tax Rate (ETR)** = total taxes paid (direct + indirect + employer contributions) / a broad pretax income base

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- An ETR computed only on taxable cash income overstates progressivity if capital income is under-reported, or understates it if consumption taxes are ignored
- Once we have ETRs by income (or wealth) group, we can classify individuals as:
  - net contributors: taxes paid $>$ transfers and public services received
  - net beneficiaries: the reverse
- This split – not the average tax rate alone – is what a redistributive tax system is ultimately judged on

Equity: what aggregate measures still miss

- We now have the tools to describe redistribution rigorously: DINA income concepts, an explicit allocation convention, ETRs, net contributors vs. beneficiaries

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- We now have the tools to describe redistribution rigorously: DINA income concepts, an explicit allocation convention, ETRs, net contributors vs. beneficiaries
- But every number so far was a decile or percentile average – and we just flagged that wealth composition itself is least understood exactly where it is most concentrated
- Next: zoom all the way into the top 0.1%, where the aggregate picture stops telling the whole story

3. The “ugly drop-off”: regressivity at the very top

From aggregate redistribution to the very top

- So far, DINA income concepts and effective tax rates described redistribution in aggregate, across deciles and percentiles

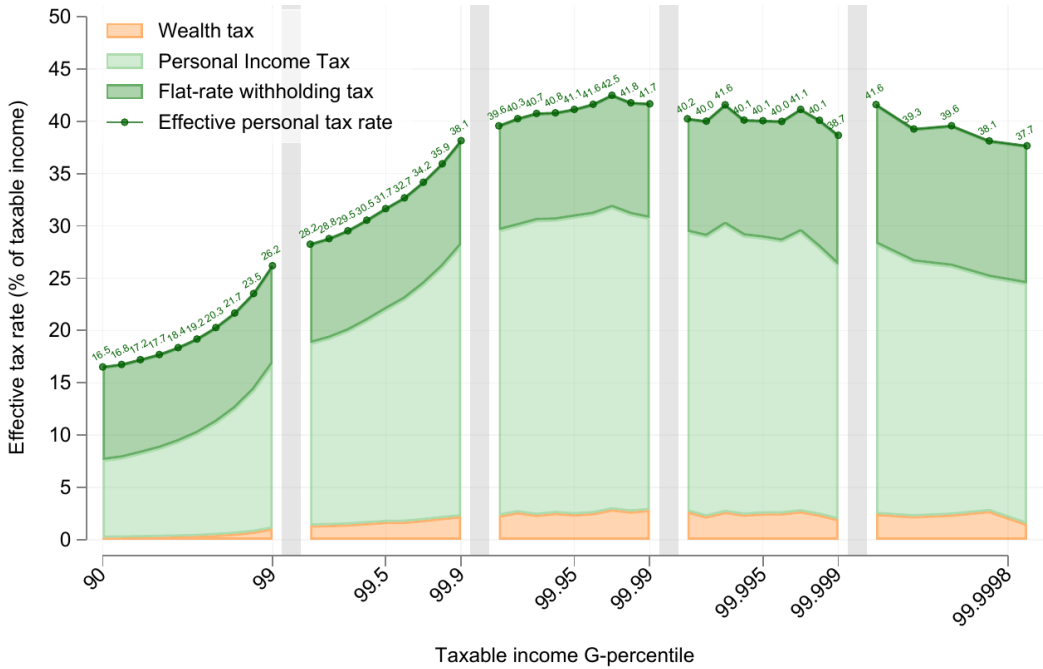
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- This section asks a narrower, sharper question: is the tax system still progressive all the way up to the top 0.001%, or does it break down?
- We start in France (Bozio et al., matched tax records), then check whether the pattern is a France-only story (Zucman et al., six countries)

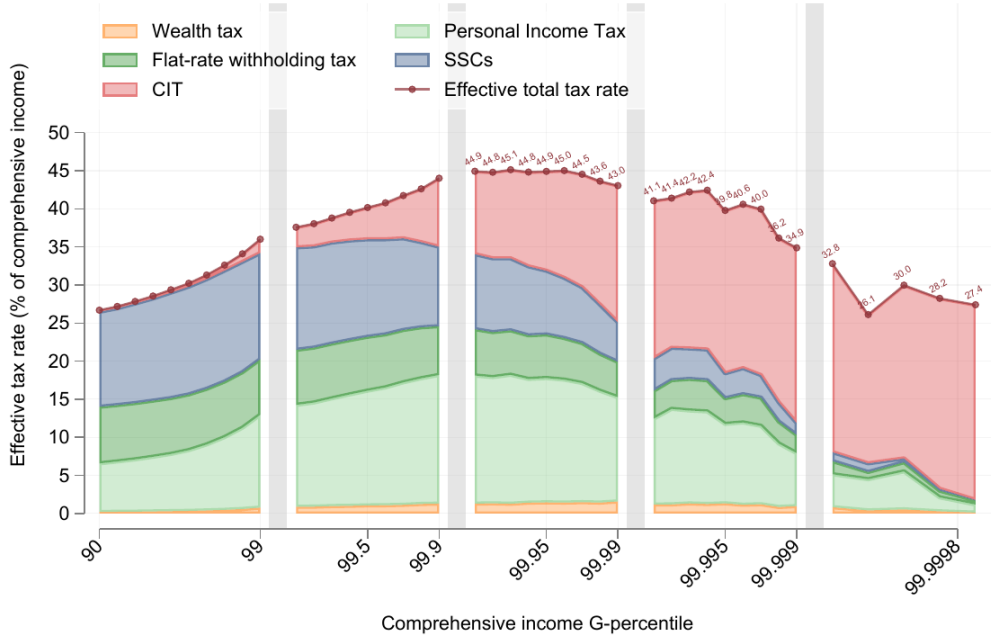
If you only look at taxable income...



- Effective personal tax rate (PIT + wealth tax + flat withholding, on **taxable** income) rises smoothly from ≈17% (P90) to over 40% near the top – "rates seemingly increasing until the very top"

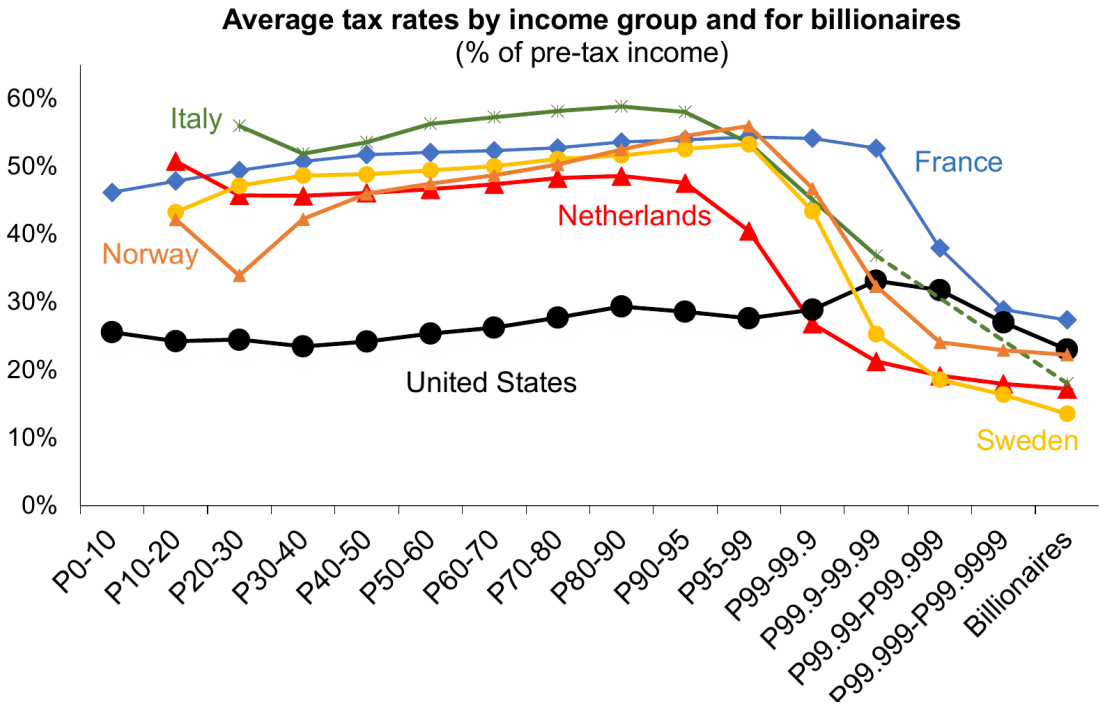
  Source: Bach, Bozio, Guillouzouic & Malgouyres (2023, 2025), *Do Billionaires Pay Taxes?*, matched personal and corporate tax records, France 2016

The ugly drop-off



- Same data, but the denominator is now **comprehensive** income (adding undistributed corporate profits controlled by the tax unit) and the numerator adds CIT
- Progressive up to top 0.05% (max. ≈45%) – then sharply regressive, down to ≈27% for the top 0.0002%

Not a France-only story



France, Norway, Italy, the Netherlands and Sweden all show the same shape: rates rise with income, then collapse for billionaires. The US starts and stays much lower throughout – a different, and separate, problem.

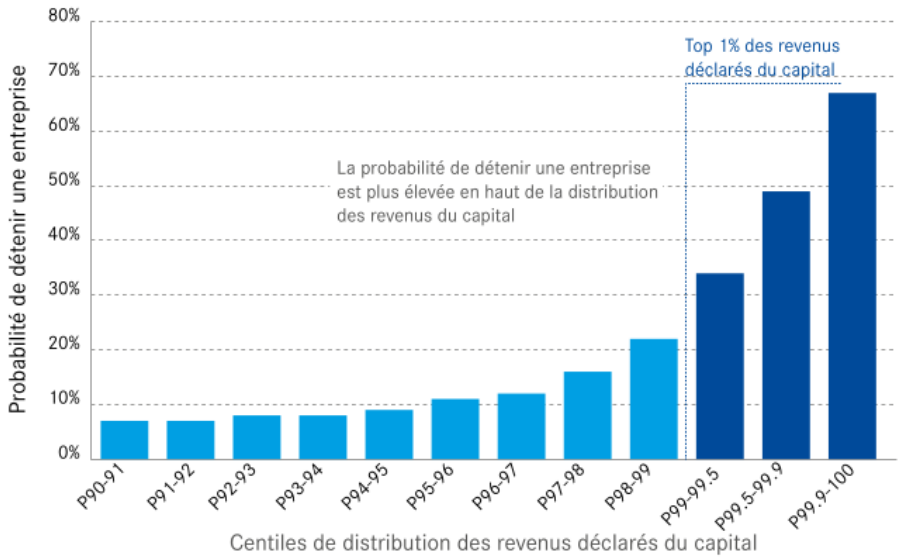
Not all income looks the same at the top

- So far we treated "income" as a single number. But for business owners, income is a **choice** between three forms:
  - **salary** (taxed as labour income, including social contributions)
  - **dividends** paid out of the firm (taxed as capital income at the personal level, after corporate tax)
  - **retained earnings** left inside the firm, often inside a family holding company (taxed only at the corporate rate, until – and unless – ever distributed)

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- This choice is exactly why the top-of-distribution ETR falls: income sitting as retained earnings inside a company is real economic income, but it is largely invisible to the personal income tax

Empirical illustration: wealth composition across the distribution



Source: CAE (2025)

- In France, the probability of owning a business rises steeply with income – from negligible below P90 to close to certainty at the very top
- Business ownership – and the retained earnings that come with it – is itself a large and growing share of wealth as we move up the distribution

The same pattern in the Netherlands

The mechanism: labour-capital tax arbitrage

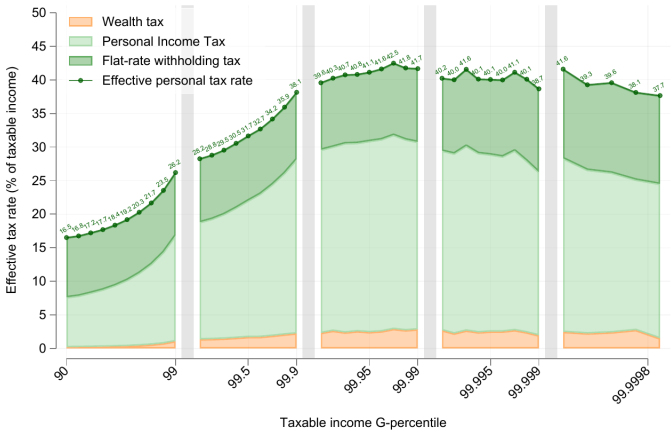
- Whenever the combined tax rate on (corporate tax + dividend tax) differs from the tax rate on salary, business owners have an incentive to relabel income, not just to work or invest differently

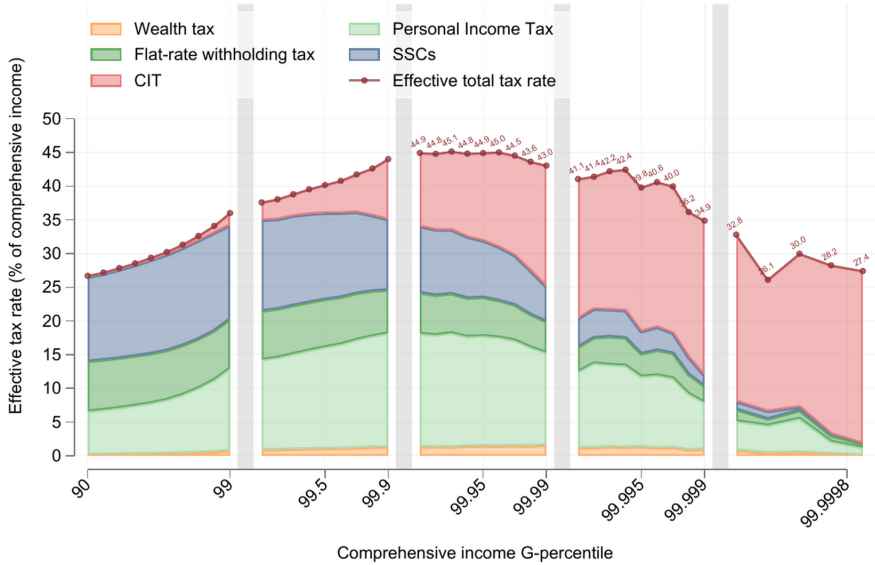
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- Zawisza, Perret, O'Reilly & Ramm (2024), OECD Taxation Working Paper No. 70, *Tax arbitrage through closely held businesses*:
  - incentives to incorporate and retain earnings inside a company have increased across OECD countries over the last two decades
  - combined with dividend, capital gains, and inheritance tax rules, this creates strong incentives to retain earnings rather than pay them out
- Implication: any ETR or income-share statistic that ignores retained earnings will systematically understate top incomes and overstate progressivity

How does retained income eventually get taxed?

Locating the drop-off





Locating the drop-off

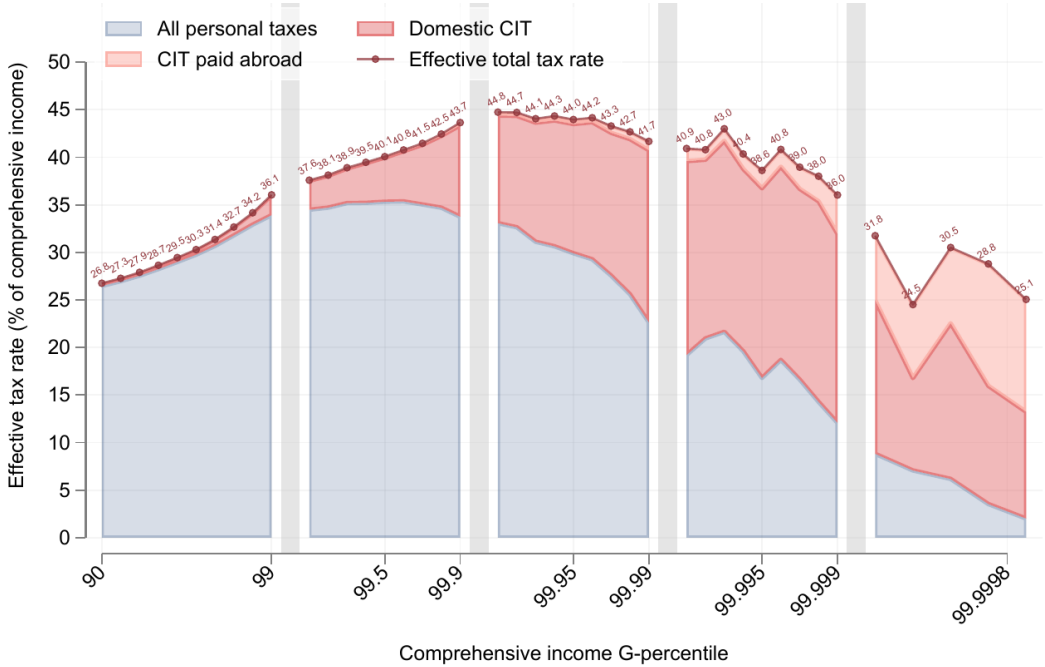
- The gap between the two charts above (taxable-income ETR vs. comprehensive-income ETR) is, by construction, corporate tax on retained earnings
- So the tax system is not failing randomly at the top – it is failing exactly where income shifts from "salary/dividends" to "profits retained inside a firm"
- That puts the CIT center stage: it is the only lever currently taxing that retained slice at all

4. The corporate income tax as a safety net ?

Corporate tax as a backstop: the logic

- Whenever personal tax can be deferred or avoided by leaving income inside a firm, the tax paid at the firm level is the only thing standing between that income and zero personal taxation until (if ever) it is distributed or realized
- Without CIT there would be almost no income tax paid at the very top – the 40–45% comprehensive-income ETRs up to top 0.05% (previous section) are mechanically driven by the CIT slice of the stack, not by PIT
- This is the oldest argument for corporate/personal tax integration: CIT as a withholding tax on the personal income tax (Mieszkowski 1972, McLure 1979, Ballard et al. 1985; Hubbard 1993)
- But is it enough ?

Crack 1: The backstop stops at the border



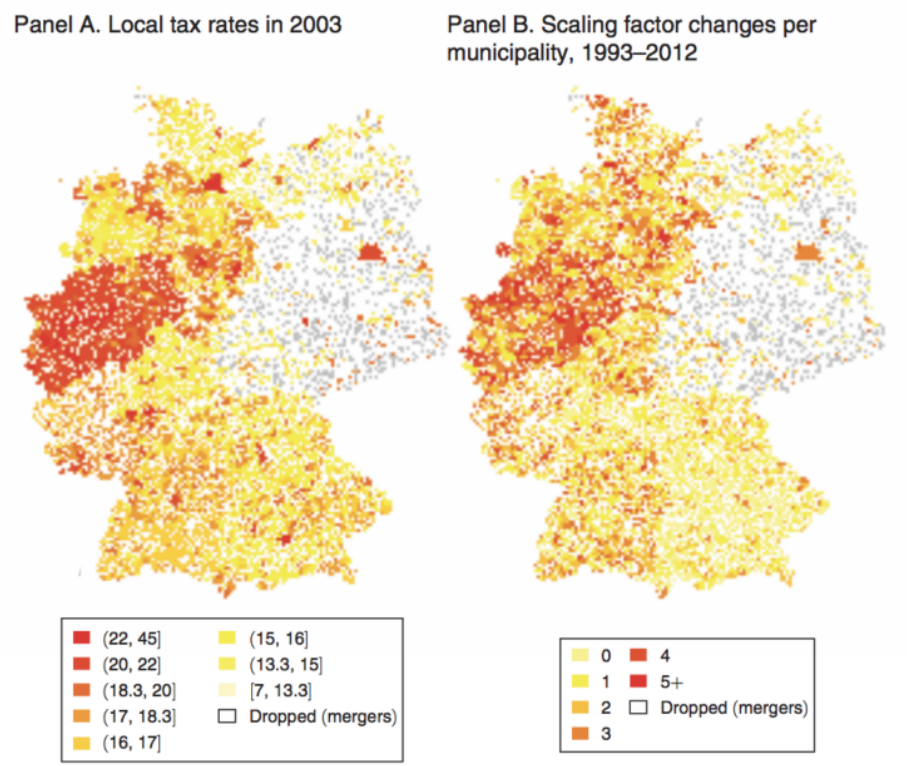
At the very top, comprehensive income increasingly comes from multinational structures. A growing share of the CIT actually owed is paid **abroad**, at whatever rate the other jurisdiction sets: "CIT is largely global" at the top, and "international tax competition has severely undermined this backstop" (see in Session 3)

Crack 2: Holding companies

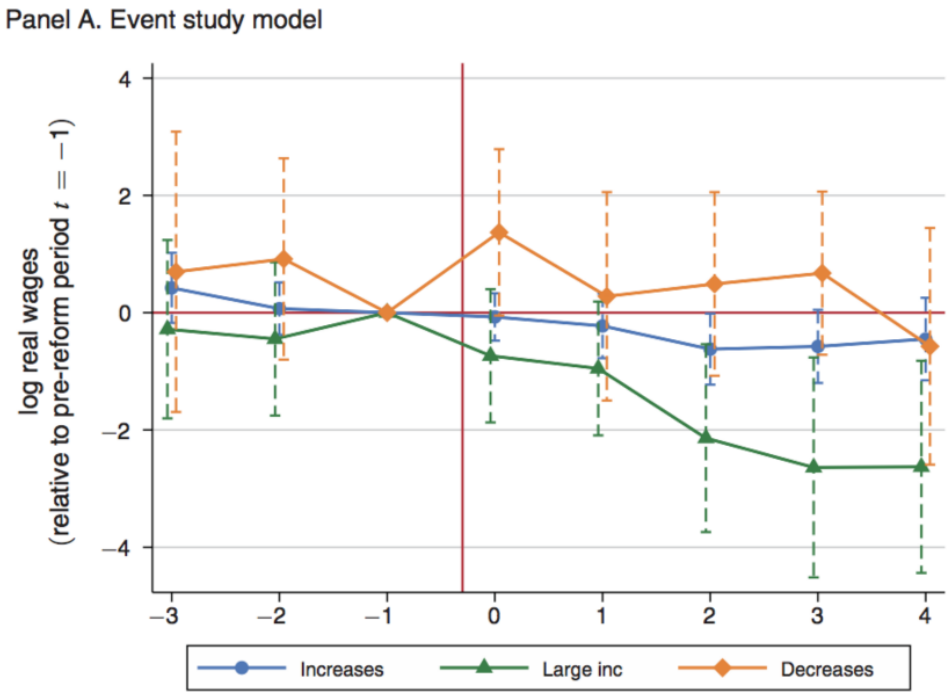
- In France, among the very richest households (96% of whose income is kept inside their firms), holding a personal holding company is close to universal
- In Sweden and Norway – very different tax systems, much higher top marginal rates – roughly half of undistributed corporate income is stored inside holding structures too
- EU Parent-Subsidiary Directive: no taxation of intra-group dividends $\Rightarrow$ with a holding vehicle, dividends received by the holding do not trigger personal taxation, and can be reinvested or accumulated indefinitely
- The US Personal Holding Company tax – 20% on undistributed passive income of closely-held firms – closes exactly this gap. There is no EU equivalent

Crack 3: Does CIT even fall on capital owners?

- Evidence from Germany. Germany's local business tax sits on top of the federal corporate tax: each of Germany's ≈11,400 municipalities sets its own **scaling factor** – thousands of quasi-independent local tax changes to exploit
- Design: matched employer-employee data linked to each firm's municipality; difference-in-differences on firms in municipalities that raise/cut the rate, before vs. after – **firm** FE and **state** × **year** FE (firms compared only within their own state)

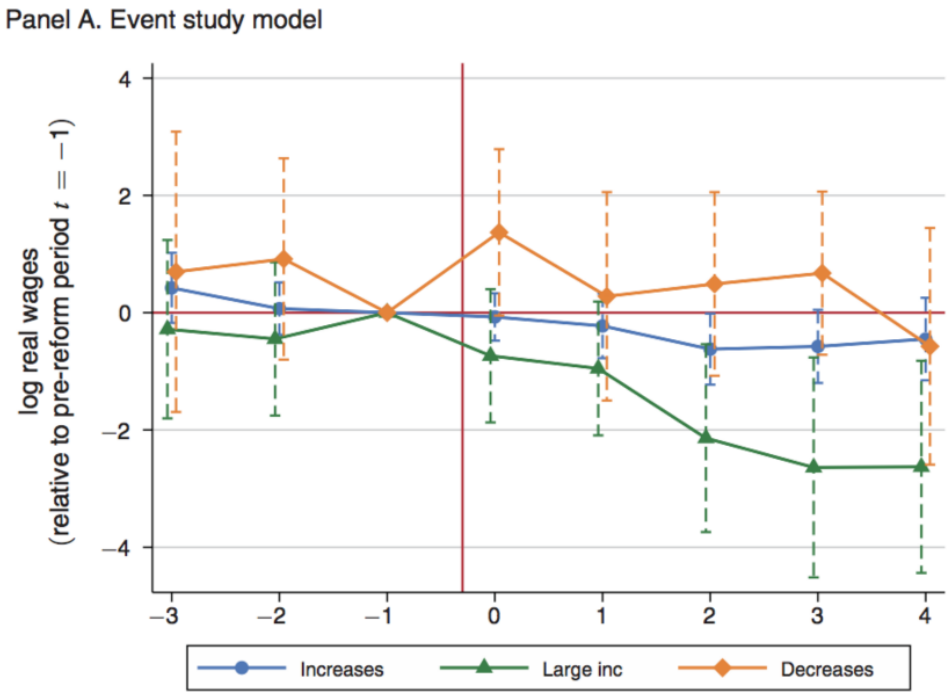


The result: wages fall when the local tax rises



- Event-study design: no pre-trend before the tax change (log real wages flat relative to $t = -1$) – reassuring for the identification strategy

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- Event-study design: no pre-trend before the tax change (log real wages flat relative to $t = -1$) – reassuring for the identification strategy
- After a tax increase, wages fall progressively over the following years – more so for large increases; after a decrease, wages tend to rise (or stay flat, within the confidence interval)

How much of the tax is passed on to workers?

TABLE 1—DIFFERENCE-IN-DIFFERENCES ESTIMATES: BASELINE WAGE EFFECTS

	(1)	(2)	(3)	(4)	(5)	(6)
log net-of-LBT rate	0.388	0.229	0.386	0.396	0.343	0.399
	(0.127)	(0.110)	(0.127)	(0.128)	(0.164)	(0.118)
Incidence (I^w)	0.505	0.288	0.502	0.516	0.442	0.520
	(0.170)	(0.140)	(0.170)	(0.172)	(0.217)	(0.159)
"State × year" fixed effects	✓			✓	✓	✓
Year fixed effects		✓				
CZ × year fixed effects			✓			
Municipal controls $t-2$				✓		
Firm controls $t-2$					✓	
Worker shares						✓
Observations	44,654	44,654	44,654	44,654	25,241	44,654

- Incidence coefficient I^w ≈0.3–0.5 across specifications (firm/state/year FE, commuting-zone × year FE, municipal and firm controls, worker-composition controls) – workers bear half of the local business tax burden in the long run
- Similar effects found in the US and in France
- Statutory incidence (who pays on paper) is not economic incidence (who bears the cost)

Three cracks in the safety net

Crack	**Effect**
International competition	CIT owed on foreign profits paid (or not) abroad (see Session 3)
Holding companies	Intra-group dividends untaxed; retained earnings accumulate indefinitely
Uncertain incidence	Part of the CIT burden may fall on workers, not owners (complement in Session 2)

5. Reform options: which base, which timing, which risks ?

Three design questions, not one tax rate

- The debate on capital taxation is less about "how high should the rate be" than about three design choices:
  - **Which base?** a flow of income, or a stock of wealth?
  - **Which timing?** annually, at realization, or at death?
  - **For which objective?** annual equality before the law, or lifetime equality of opportunity?

Zucman's proposal: an annual minimum tax on the ultra-wealthy

- Diagnosis restated: individual taxes actually paid by billionaires are tiny relative to their wealth across every country studied (next slide)

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- Stock, not flow: wealth exists at the moment the tax is levied. A flow of income can be deferred, retimed, or reclassified (as we just saw); a stock is harder to make disappear

Mobility of personal tax base

- A key question is the elasticity of wealthy individuals to tax rates
- Jakobsen et al. (2024) show the intensive and extensive margin response to the removal of a wealth tax in Sweden in 2007:
  - Extensive margin: 1 euro collected $\Rightarrow$ 0.2 cent lost
  - Intensive margin: 1 euro collected $\Rightarrow$ 0.54 cent lost
- Growing consensus on existing but low migration responses to tax (France, UK...)
- The international landscape of regulation for individuals is changing (more in Session 3 and 5)

Inheritance: a different objective

- Everything so far – DINA, ETRs, the ugly drop-off, Zucman's tax – targets annual equality before the law
- Inheritance taxation answers a different question: the intergenerational transmission of inequality, not annual redistribution
- Scale of the issue: the share of inherited wealth in total wealth rose from 35% (1970) to over 60% (2020); the top 0.1% of heirs inherit ≈€13 million – a ratio of 180× the median inheritance, versus only 10× for labour income between the same groups (CAE Note)

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- Three loopholes do almost all the work:
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  - **Assurance-vie** (life insurance): preferential flat-rate regime outside the ordinary schedule
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  - **Démembrement**: splitting bare ownership from usufruct to shrink the taxable base
- Meanwhile indirect (non-direct-line) transfers are taxed heavily by the nominal schedule: less than 10% of capital transmitted, but $\approx$50% of inheritance tax revenue

Behavioural responses: avoidance beats real responses

- Goupille-Lebret & Infante (2018): using discontinuities in France's *assurance-vie* rules, substantial retiming of contributions around the tax-favoured age threshold (elasticity $\approx$0.83), but only modest long-run effects on real account balances (elasticity 0.1–0.3)
- Broader literature (decedent and heir side): deathbed planning, asset shifting, strategic gifting – avoidance/evasion responses systematically dominate real responses (saving, labour supply, entrepreneurship)
- If the behavioural margin that actually moves is avoidance, the answer is to close loopholes, not to lower the rate

Lecture 1, in brief

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- **CIT as a safety net – with cracks**: it backstops personal income tax avoidance, but the backstop stops at the border, leaks through holding companies, and falls substantially on wages, not just shareholders
- **Reform options**: wealth minimum tax on centi-millionaires', looking through holdings and inheritance-tax reform – all aimed at restoring tax progressivity with tax bases that are hard to shift or hide

Oral debriefing — Do we need a wealth tax ?

Lecture 2

Taxation and the cost of capital

Today's question

How does taxation affect firms' and capital owners' investment decisions and the economy ?

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- Today we try to understand whether taxes can change the size of the cake, and not how taxes can adjust slices' sizes.
- Slide deck inspired by Antoine Bozio's material on cost of capital

Roadmap of today

6. What is being taxed? A typology of business taxation
7. Does taxing profit change investment?
8. Does taxing payouts change investment?
9. Fine-tuning: do tax incentives always work ?
10. Wrap-up

The equity–efficiency trade-off in business taxation

- This lecture will focus on CIT and payout taxes
- Taxes with effects on capital owners and firms are key in the equity-efficency trade-off
  - **Equity**: Business ownership is a specificity of the top of the wealth distribution (last week)
  - **Efficiency:**
    - Investment-saving decisions matter for aggregate output
    - Location decision in an open economy (next week)

1. What is being taxed? A typology of business taxation

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- Non-corporate ("pass-through") firms: liability is tied to the owner's personal wealth – in exchange, profit is taxed once, directly as the owner's personal income
- In the U.S., S-corporations are all liable to personal income tax; only C-corporations pay CIT. France has an equivalent split (SA/SAS/SARL $\rightarrow$ CIT; EURL $\rightarrow$ personal income tax)

Corporate taxation: two layers

- **Taxes on profit**: corporate income tax (CIT) on corporate firms; personal income tax (PIT) on profit from pass-through firms

Corporate taxation: two layers

- **Taxes on profit**: corporate income tax (CIT) on corporate firms; personal income tax (PIT) on profit from pass-through firms
- **Payout taxes**, once after-tax profit leaves the firm:
  - dividends $\rightarrow$ taxed as personal income (τ_{div})
  - share repurchases $\rightarrow$ capital gains tax (τ_{cg})
  - retained earnings $\rightarrow$ capital gains tax only when eventually realised (deferral lowers the effective rate)

The CIT tax base, formally

- Statutory rate τ_{cit}, applied to the tax base:

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  - R: Operating revenue: $F(K, L)$
  - C: Current costs - compensation to employees wL; intermediate inputs rK
  - Dep: Depreciation costs, capital investments lose value over time (economic depreciation)
  - I: Interest payments, financing costs

CIT and Tax credits

- The statutory CIT is simply given by CIT rate $\times$ CIT tax base: $\tau_{cit}\, Y$
- The effective CIT is obtained after deduction of tax credits (if any) and potential loss re-treatment

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- Tax credit (TC): a credit against specific spending (e.g. investment or R&D) – can push CIT negative, turning it into a subsidy
- Loss treatment: most tax schedules allow firms to carry losses forward and offset current profits with past losses

Equity financing and paid out taxes

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- Debt escapes the first layer: interest I is deducted *before* CIT (recall $Y = R - (C + \text{Dep} + I)$)
- This asymmetry feeds into firms' financing choice – debt vs. equity

CIT vs. production taxes (1/2)

- CIT is known to be non-distortive because it applies on profits and not on production factors or revenue
  - CIT

$$\max_{K,L} (1-\tau)\big[F(K,L) - wL - rK - \delta K - i\big] \quad \Longrightarrow \quad F_L = w, \;\; F_K = r+\delta$$

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  - A "production tax" on capital use (e.g. France's *CFE*), rate t_K per unit of K:

$$\max_{K,L} \; F(K,L)-wL-(r+t_K+\delta)K-i \quad \Longrightarrow \quad F_L = w, \;\; F_K = r+t_K+\delta$$

    - F_L is untouched but F_K must rise. The firm substitutes away from capital toward labour – not neutral.

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- With input-output linkages, this higher price becomes an input cost for downstream firms $\Rightarrow$ a cascading effect through the production chain

Backup: from w, r to price

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- A Pigouvian tax can lower a given producer's private efficiency (higher cost, lower profit-maximising output) while raising aggregate efficiency: it corrects a price that ignored the externality's true social cost
- CO2 emissions is an example: unpriced warming of 1°C is estimated to cut world GDP by 20%+ in the long run, (recent estimates for France: 3.6% of GDP loss by 2050

Sources: Bilal & Känzig (2026), "The Macroeconomic Impact of Climate Change: Global vs. Local Temperature", *QJE* 141(2), 889; French Ministry of Economy (Bercy), note of 11 September 2026, reported in *Le Monde*.

2. Does taxing profit change investment?

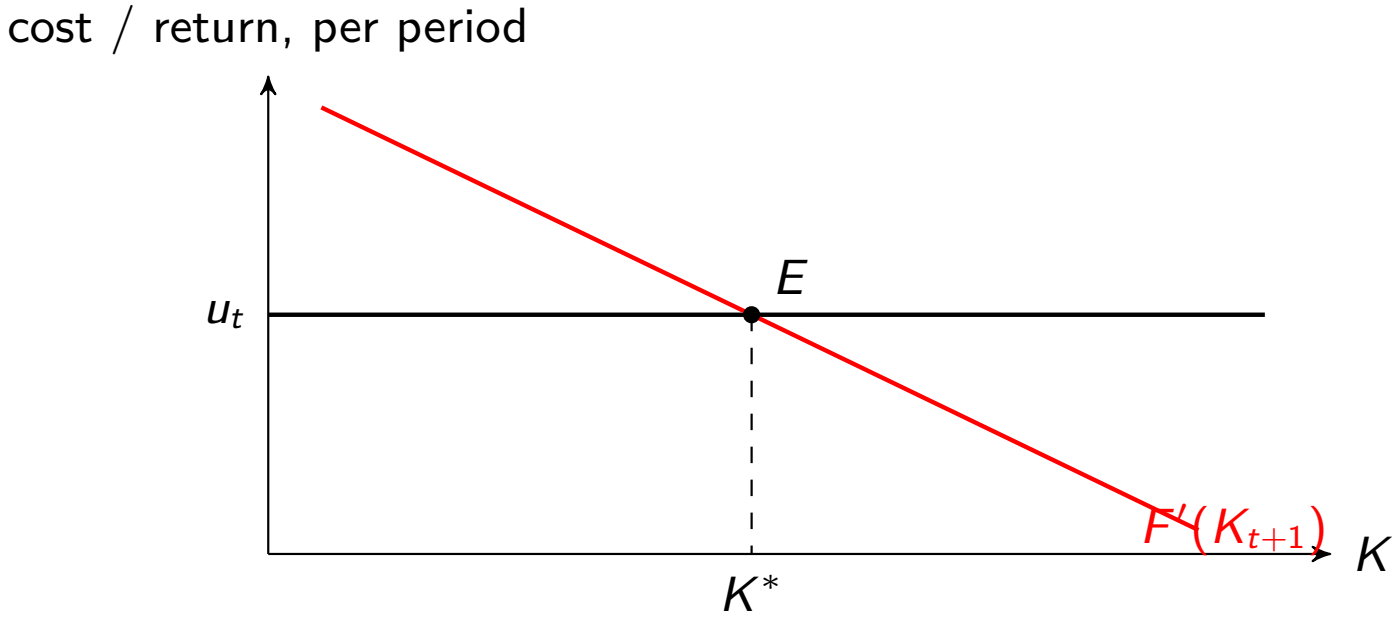
The investment decision: setting up the model

- So far we have seen the effect of taxes on operating production. Taxes also affect investment decisions
- Firm chooses how much capital K_t to accumulate; profit function $F(K_t)$ concave; price of capital goods q_t; depreciation rate δ; required rate of return ρ

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- Firm chooses how much capital K_t to accumulate; profit function $F(K_t)$ concave; price of capital goods q_t; depreciation rate δ; required rate of return ρ
- Decision rule: invest up to the point where the marginal benefit of one more unit of capital equals its marginal cost, evaluated one period ahead
- References: Hall & Jorgenson (1967); Hassett & Hubbard (2002); Auerbach (2002)

The investment decision, graphically



- U_t: the user cost of capital, independent of how much is invested
- $F'(K_{t+1})$: the marginal product – falls as K rises (concavity of F)
- The firm invests up to K^*, where the two objects derived on the previous slide meet at E $(F'(K_{t+1}) - U_t = 0)$

Deriving the user cost of capital

- One more unit of capital: pay for it today, cover its depreciation, and collect its payoff next period. Net present value of that marginal unit, dK_{t+1}:

$$NPV(dK_{t+1}) = \underbrace{-q_t}_{\text{buy the unit today}} \underbrace{-\delta q_t}_{\text{extra set aside to offset depreciation}} + \underbrace{\frac{F'(K_{t+1}) + q_{t+1}}{1+\rho}}_{\text{marginal product + resale value, discounted one period}}$$

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- At the optimum this NPV is zero (marginal benefit = marginal cost). Rearranging:

$$F'(K_{t+1}) \approx q_t \left(\underbrace{\delta}_{\text{depreciation}} + \underbrace{\rho}_{\substack{\text{opportunity cost} \\ \text{of the funds}}} - \underbrace{\frac{q_{t+1} - q_t}{q_t}}_{\substack{\text{expected capital gain} \\ \text{on the equipment}}} \right)$$

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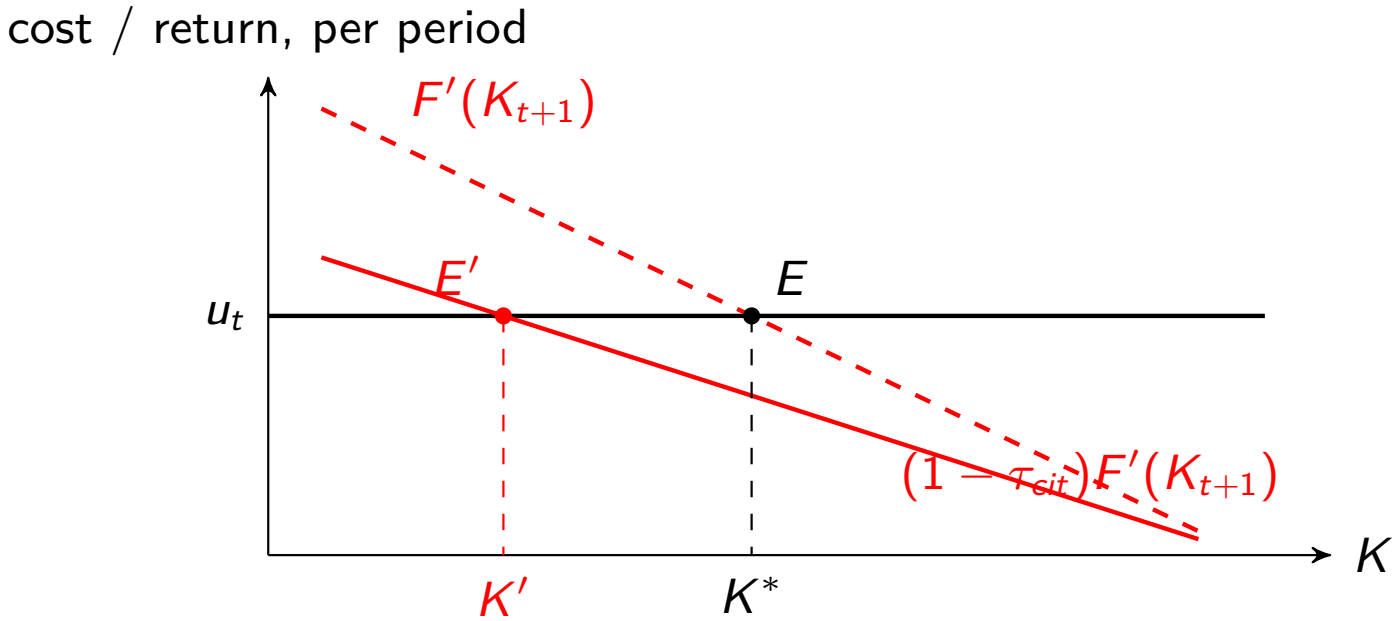
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- This is the user cost of capital, u_t. With constant capital-goods prices ($q_{t+1} = q_t$), it collapses to $u_t = q_t(\delta + \rho)$.

Impact on investment: a CIT without depreciation deductions



- With no depreciation deduction at all, CIT taxes away a share τ_{cit} of the marginal return itself: the firm keeps only $(1-\tau_{cit})F'(K_{t+1})$ from one more unit of capital, while the cost side u_t is a real economic cost, untouched by the tax

Partial expensing and the user cost of capital

- Let $\Gamma_t \in [0,1]$ be the present value of the tax savings from depreciation deductions the code allows on today's investment:

$$\Gamma_t = \sum_{z=t}^{\infty} (1+r)^{-(z-t)} \underbrace{\tau_{cit} D_{z-t}}_{\substack{\text{tax saved by the deduction} \\ \text{taken in year } z-t}}$$

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- Redoing the NPV condition with CIT in the picture:

$$F'(K_{t+1}) \approx q_t \underbrace{\left(\frac{1-\Gamma_t}{1-\tau_{cit}}\right)}_{\text{tax wedge}} \left(\delta + \rho - \frac{q_{t+1}(1-\Gamma_{t+1}) - q_t(1-\Gamma_t)}{q_t(1-\Gamma_t)}\right)$$

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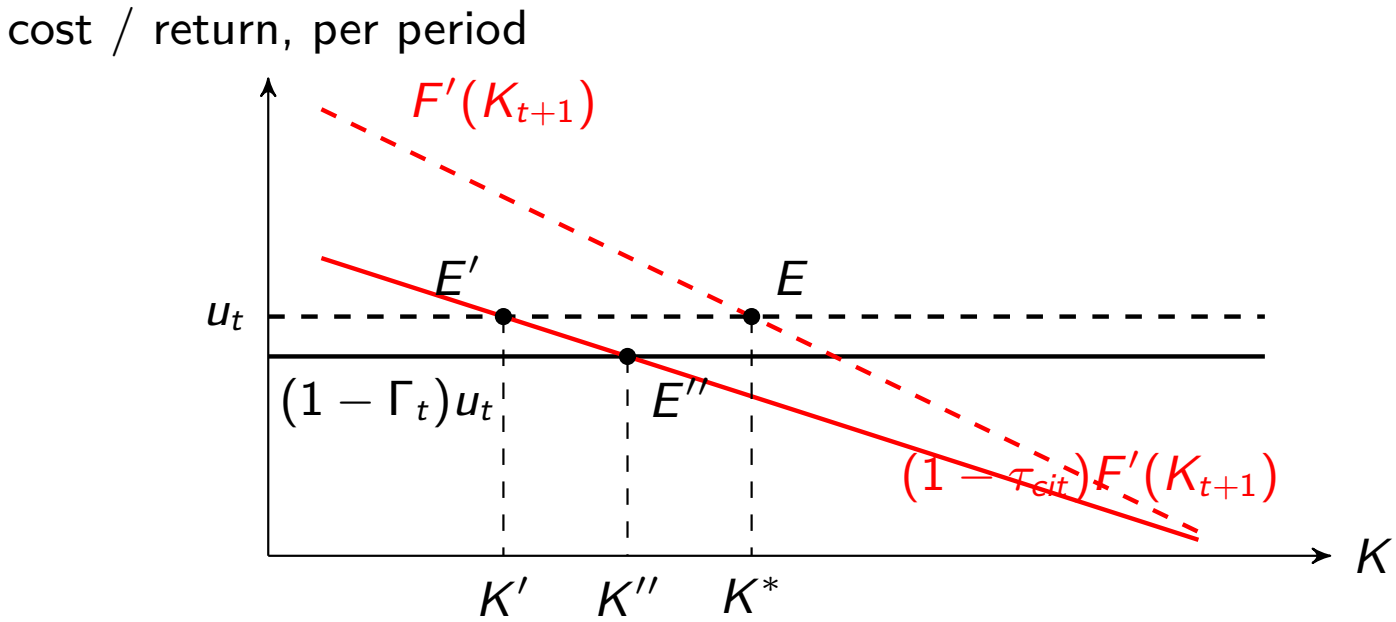
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- Under a typical CIT – deductions spread over years, financing costs not fully deductible:

$$\rho'(\tau_{cit}) > 0 \quad \Longrightarrow \quad \text{required return rises with } \tau_{cit}\text{, investment falls}$$

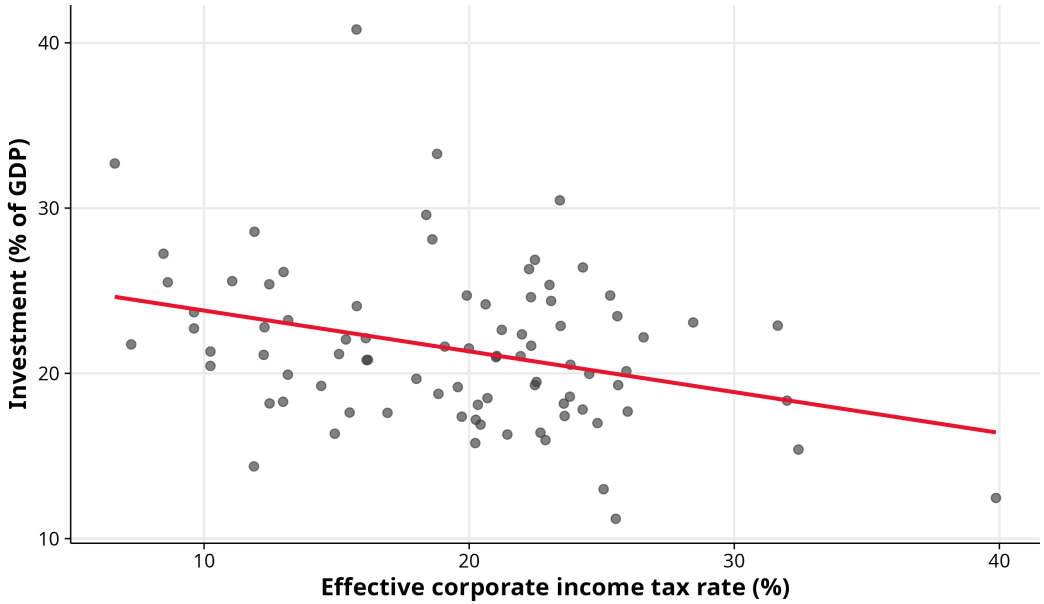
Effect of depreciation allowances on the investment decision, graphically



- Allowing *some* depreciation deduction ($\Gamma_t > 0$) lowers the effective cost line from u_t (dashed) to $(1-\Gamma_t)u_t$ (solid) – less severe than the no-deduction case, but still above the true resource cost unless expensing is full ($\Gamma_t = \tau_{cit}$)

Backup: the cash-flow-tax special case

Cross-country evidence: Djankov et al. (2010)



- A 10 p.p. increase in the effective CIT rate is associated with a 2.5 p.p. decrease in investment as a share of GDP (85 countries, 2004) – suggestive, not causal: a cross-country correlation, not a natural experiment.

Source: Djankov, Ganser, McLiesh, Ramalho & Shleifer (2010), *AEJ: Macroeconomics*. Own reproduction.

Backup: same pattern for FDI and business density

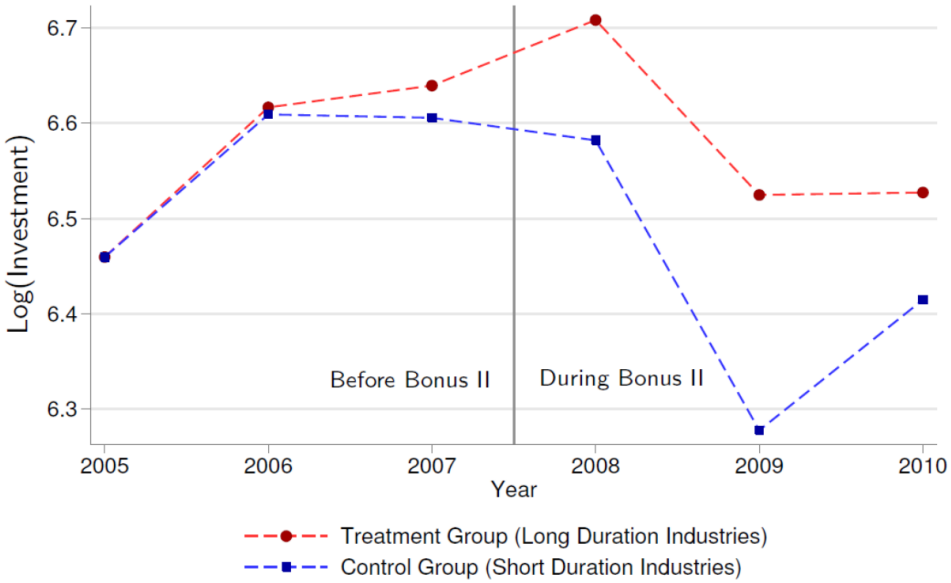
Zwick & Mahon (2017): research design in detail

- Does accelerated depreciation – the *timing* of tax deductions, not the CIT rate itself – actually change investment?

Zwick & Mahon (2017): research design in detail

- Does accelerated depreciation – the *timing* of tax deductions, not the CIT rate itself – actually change investment?
- Two U.S. "bonus depreciation" episodes (2002–03, then 2008–10) let firms write off investment faster, more so for long-duration assets than short-duration ones – a difference-in-differences between long- and short-duration industries isolates the policy's effect. Data: U.S. corporate tax records, 1993–2010, 128,151 firms

A cleaner natural experiment: Zwick & Mahon (2017)



- investment rises +10% under Bonus I and +17% under Bonus II in the treated industries, concentrated among small, financially constrained firms compared to control group
- Accelerated depreciation raises Γ_t almost immediately – it is a direct, temporary cut in the user cost of capital

Source: Zwick & Mahon (2017), *AER*. Backup: the French case (Chouc & de Lachapelle)

A broader look at the investment-taxation literature

- A meta-analysis pooling 704 tax semi-elasticity estimates from the empirical FDI-taxation literature (extending de Mooij & Ederveen, 2003–2008)

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- A median semi-elasticity of 2.49 (in absolute value): FDI looks, on average, quite responsive to host-country tax rates
- Within-country quasi-experiments (Ohrn, 2018, U.S.; Maffini, Xing & Devereux, 2019, U.K.) point the same way – a lower cost of capital raises investment but part of the subsidy leaks upstream into higher equipment prices rather than more investment (Goolsbee, 1998; House & Shapiro, 2008; Chouc & De Lachappelle, 2026)

Take-away on CIT and investment

- Clean, exogenous variation in CIT is scarce – most evidence is cross-country correlation (Djankov) or policy-specific natural experiments (Zwick-Mahon)

Take-away on CIT and investment

- Clean, exogenous variation in CIT is scarce – most evidence is cross-country correlation (Djankov) or policy-specific natural experiments (Zwick-Mahon)
- What evidence exists points toward a negative effect of CIT on investment, operating through the user cost of capital

3. Does taxing payouts change investment?

Three ways to pay out profit, three tax treatments

- Dividend payments $\rightarrow$ dividend tax τ_{div}
- Share repurchases $\rightarrow$ capital gains tax τ_{cg}
- Retained earnings $\rightarrow$ capital gains tax only when eventually realised (deferral $\Rightarrow$ lower effective rate; in the U.S., gains unrealised at death escape CGT entirely)

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Combined investment condition, with f the share of after-tax profit paid as dividends:

$$\underbrace{(1-\tau_{cit})}_{\text{CIT layer}} \underbrace{\left[1-f\tau_{div}-(1-f)\tau_{cg}\right]}_{\substack{\text{payout layer: mixes} \\ \text{the two payout rates,} \\ \text{weighted by } f}} \underbrace{F'(K_{t+1})}_{\substack{\text{pre-tax marginal} \\ \text{product of capital}}} = \underbrace{\rho}_{\substack{\text{required return,} \\ \text{net of all tax}}}$$

Traditional ("old") view: dividend taxes deter investment

- Firms are cash-constrained; marginal investment is funded with fresh equity or risky debt (Harberger 1962/66; Feldstein 1970; Poterba & Summers 1985)

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- Dividend taxation then acts *exactly like* a second corporate tax:

$$(1 - \tau_{cit})(1 - \tau_{div})\, F'(K_{t+1}) = \rho$$

- Prediction: cutting τ_{div} should raise investment

The dividend puzzle

- Dividends are the most heavily taxed way to pay cash to owners: $\tau_{cg} < \tau_{div}$ almost everywhere, and deferral lowers the effective capital-gains rate further – in the U.S., gains unrealised at death escape tax altogether $\Rightarrow$ the old view predicts $f = 0$ (no dividends at all)

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- Yet a large share of firms *do* pay dividends (35% in the U.S., 40% in the U.K., 55% in France) – the dividend puzzle, a long-standing puzzle since Black (1976)
- Candidate explanations: signalling (paying dividends shows the firm has cash to spare)

The "new view": dividend taxes are irrelevant to investment

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- A change in τ_{div} scales *both sides* of the investment condition by the same factor and cancels out:

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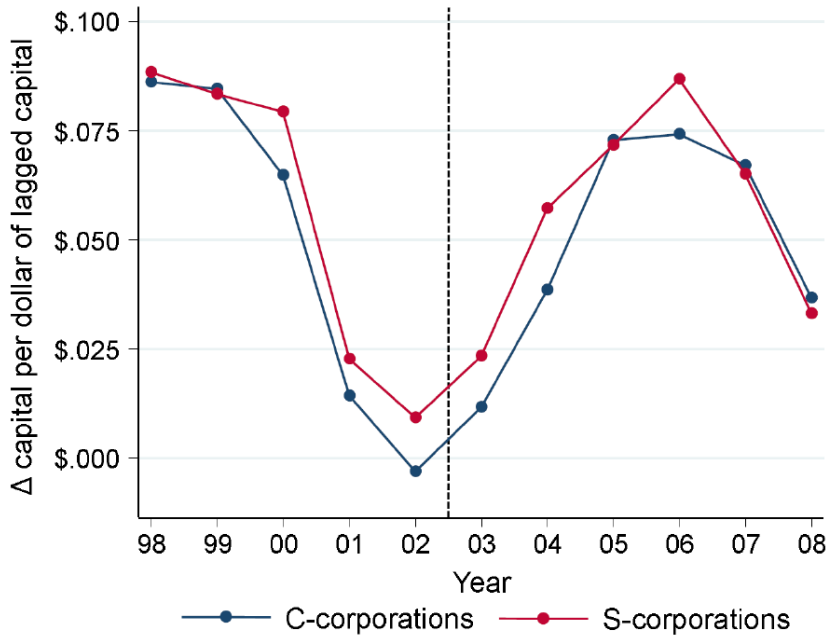
- Prediction: cutting τ_{div} raises dividends paid, but not investment

Testing the dividend tax-to-investment link ?

- Yagan uses the 2003 "Jobs and Growth Tax Relief Reconciliation Act", which cuts dividend taxes paid to C-corp shareholders (from 38.6% for the upper income bin to 15% max)
- **DiD**: C-corporations (pay CIT, then dividend tax or capital-gains tax on qualified buybacks) vs. S-corporations (same legal structure, but taxable income flows straight through to shareholders' own returns, taxed the same whether retained or distributed – unaffected by the 2003 cut)
- **Identification**: C- and S-corps obviously differ (C-corps are much larger) – identification only requires that both groups would have followed the *same trend* absent the reform, so what matters is whether treated and control firms are comparable on industry and size

Backup: are C- and S-corps comparable?

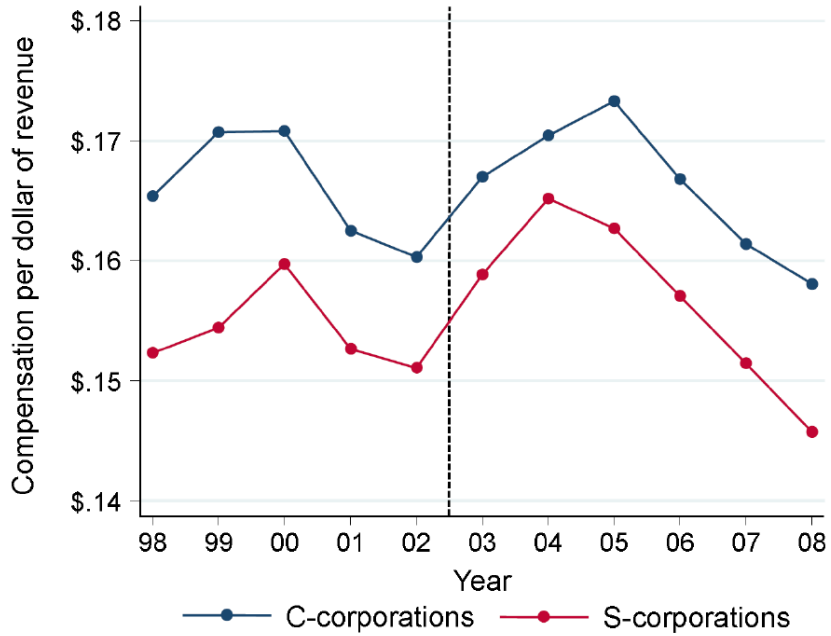
Yagan (2015): net investment, C-corps vs. S-corps



- No divergence on investment when the dividend tax falls only on C-corp shareholders

Source: Yagan (2015), *AER*, Fig. 2.B.

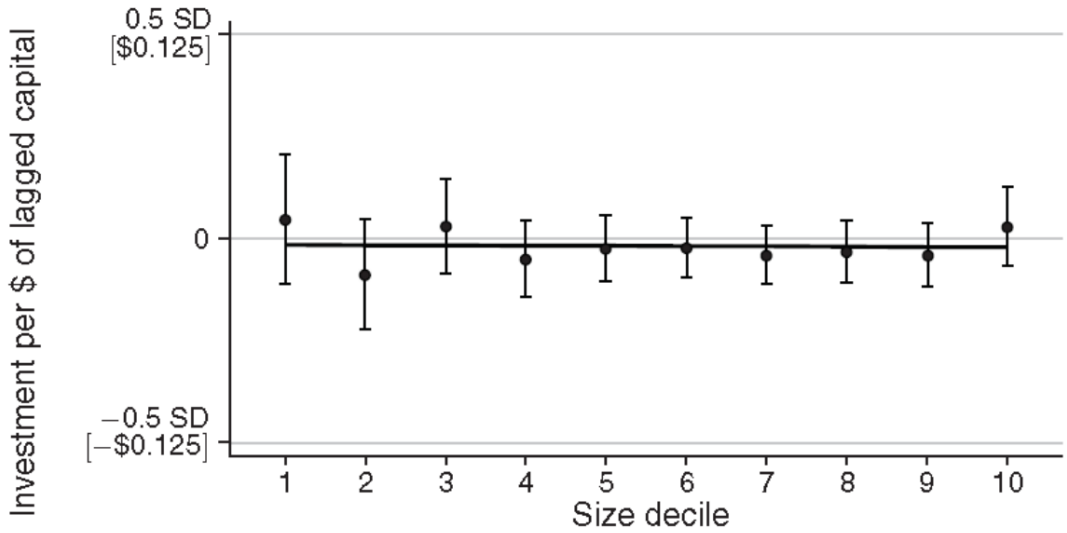
Yagan (2015): employee compensation, C-corps vs. S-corps



- Compensation per dollar of revenue moves in parallel too

Source: Yagan (2015), *AER*, Fig. 2.C.

Yagan (2015): the null effect holds across firm sizes



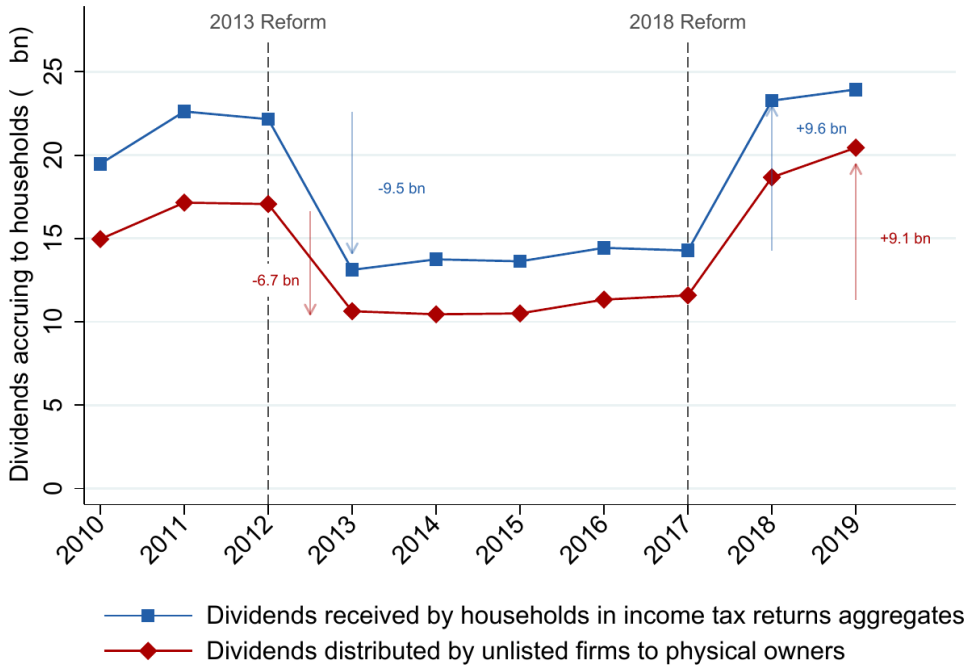
- The zero effect is holds for all firms

Source: Yagan (2015), *AER*, Fig. 3.A.

Yagan (2015): results and interpretation

- Net-of-dividend-tax investment elasticity: 0.00 (95% CI upper bound 0.08)
- Two readings: either the new view is right (the median U.S. firm is 22 years old, cash-rich, funds investment from retained earnings), or the traditional view is technically correct but the reform's low expected permanence (originally set to expire in 2009) blocked any real response

France: Bach, Bozio, Guillouzouic, Leroy & Malgouyres (2025)



- Two French reforms – the 2013 tax hike and the 2018 flat-tax cut on dividends
- Moved dividends paid sharply (-25% / $+38\%$; household-level elasticity $\approx$ 3–4, driven by owner-managers), but left investment unchanged

Old view vs. new view: is there a scientific consensus?

- What is settled: across very different countries and periods (U.S., Sweden, France, Greece), investment does not respond to dividend tax changes – the "old view" (Poterba & Summers, 1985) is essentially rejected in the data

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- What is not settled: the "new view" (King, 1977; Auerbach, 1979) predicts that dividends, like investment, should not react to a permanent tax change yet dividends do react
- Potential explanations: a temporary-tax arbitrage story (Korinek & Stiglitz, 2009); agency (Chetty & Saez, 2010); or a "new new view" in which firms retain cash as a low-tax saving vehicle, so dividend taxation reshuffles the payout channel without touching the cost of capital (Bach et al., 2024)

4. Fine-tuning: do tax incentives always work ?

Do tax incentives always work ?

- We have seen that tax incentives on capital seem to have an effect on the user cost of capital and on investment
- Other tax incentives aimed at fostering employment (payroll tax credit), competitiveness or green transition
- The effects found in the empirical literature are much more nuanced on their effectivness
- One (french) example with the CICE: (*Crédit d'impôt pour la compétitivité et l'emploi*) – a tax credit on the wage bill for salaries below 2.5× SMIC (4%→7%→6%, abolished 2019), ≈€18bn/year – one of France's largest tax expenditures, aimed at labour cost rather than profit directly

Where did the money go? Carbonnier, Malgouyres, Py & Urvoy (2022)

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- Same lesson as Fuest et al. in Session 1: statutory design and economic incidence diverge – here, even the intended beneficiaries of the incidence are not who actually gains
- No effect found on market shares on foreign markets (Malgouyres, Mayer, 2019)

5. Wrap-up

What we've learned today

- A tax on true economic profit is neutral on the firm's factor-choice and investment margins; a tax on production (one input, or gross output) is not

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- CIT plausibly lowers investment through the user cost of capital, though clean identification is scarce;
- Payout taxes mostly reshuffle who holds the cash, not how much gets invested
- Not all tax credits have intended effects (e.g. CICE) or have effects that can't be measured

Bridge to Session 3

If capital is internationally mobile, what happens to a government's ability to tax it at all?

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If capital is internationally mobile, what happens to a government's ability to tax it at all?

- Today assumed a closed economy: firms choose K, taxes shift the user cost, full stop
- But firms can also choose where to locate that capital – across borders, not just across time
- Session 3: capital mobility, profit shifting, and what remains of a government's room for manoeuvre

Lecture 3

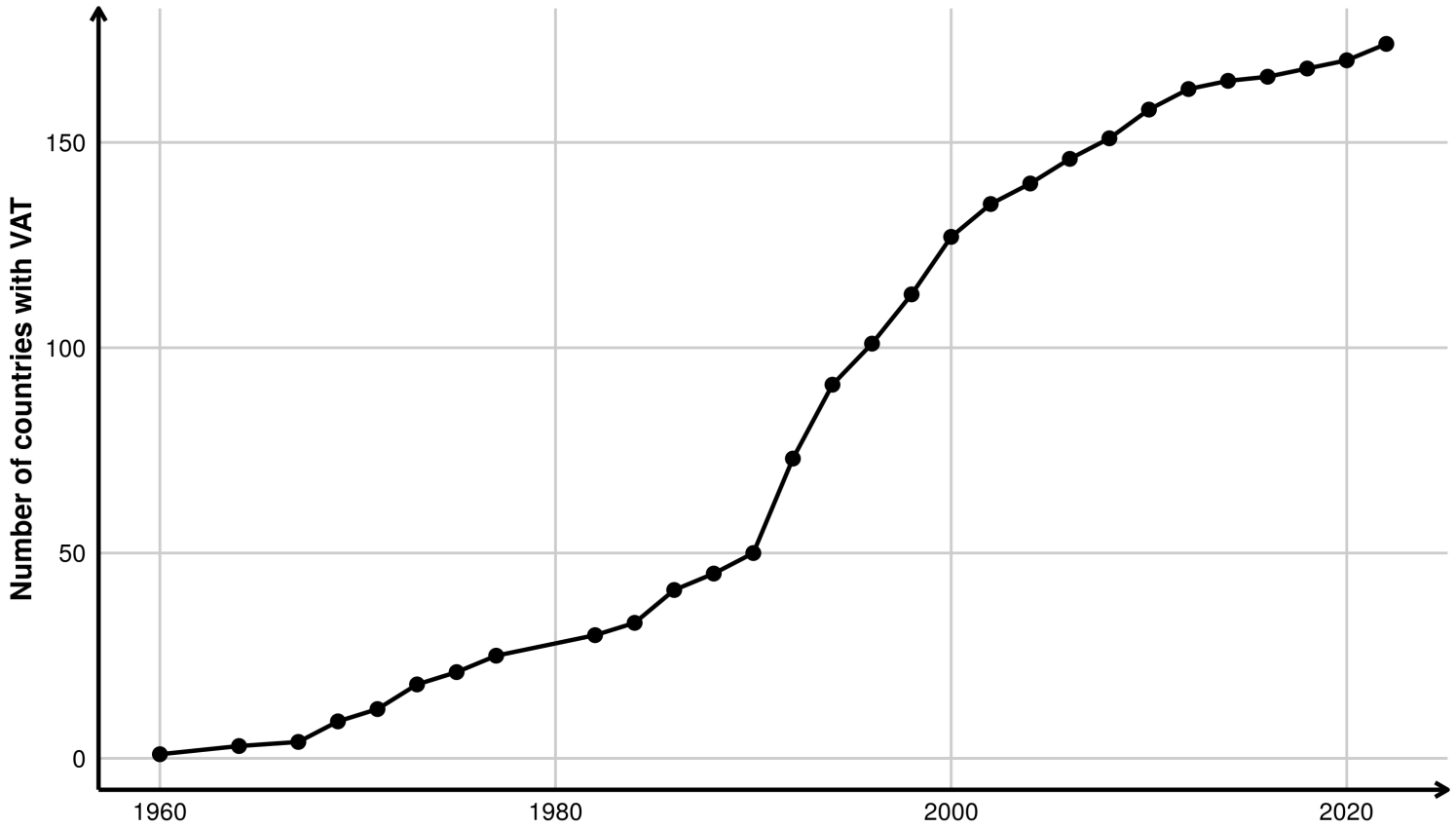
Taxation and the globalization of capital

Today's roadmap

11. Globalization and taxation: a few facts
    - 5 Facts
    - Quantification of the offshore world
12. Optimal tax theory
    - The Laffer curve
    - Adding redistributive preferences
    - The Mirrlees model
    - Application: the optimal CIT
13. The mobility of personal tax base - empirics and mechanisms
14. The mobility of corporate tax base - empirics and mechanisms
    - Tax avoidance: from micro-strategy to macro-consequences
      - MNEs' Tax Avoidance Explained
      - Profit Shifting Quantification

1. Globalization and taxation: a few facts

Fact #1: The rise of consumption tax



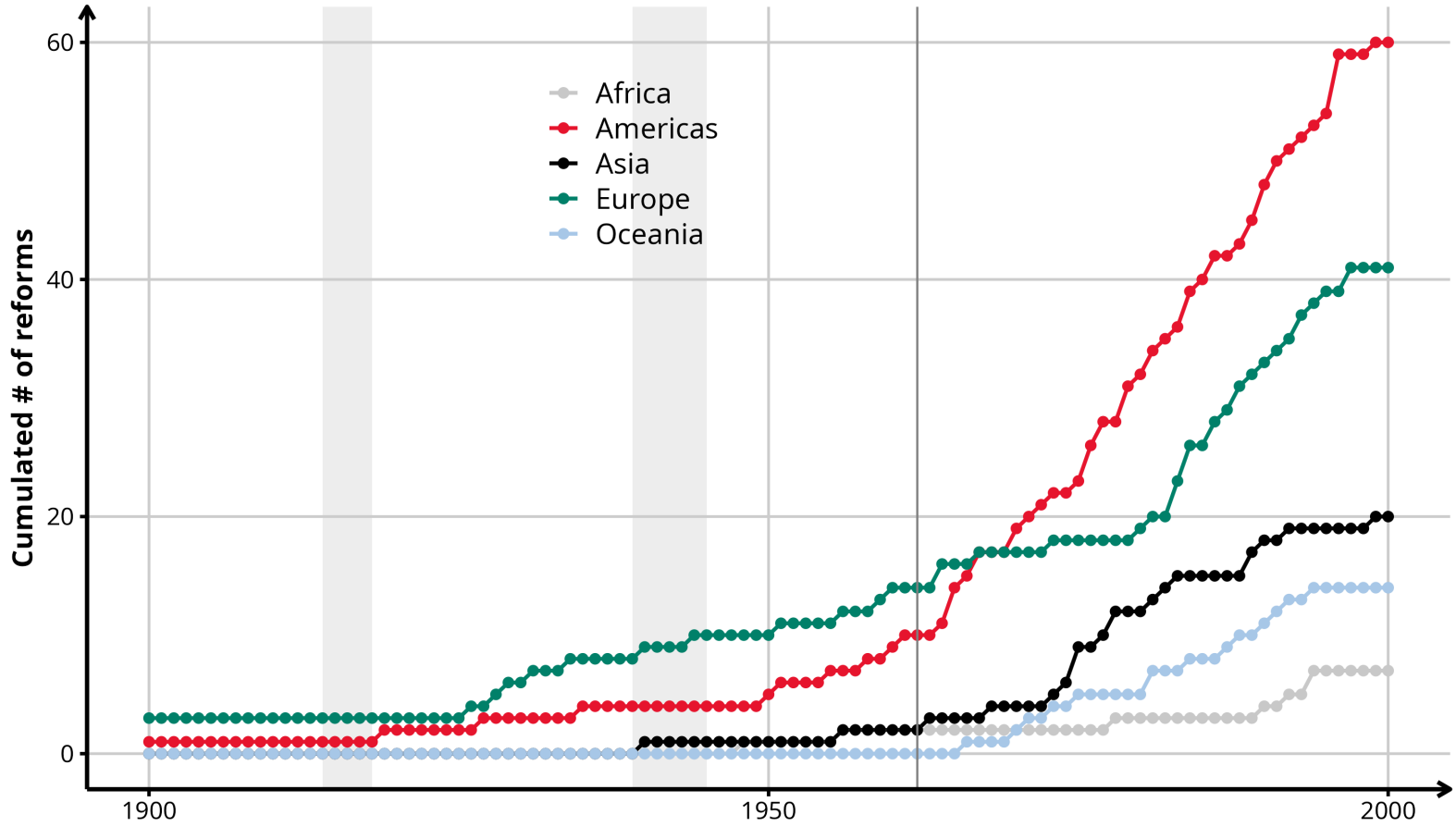
Source: OECD

Fact #2: The decrease of tax on capital



Source: Egger et al.

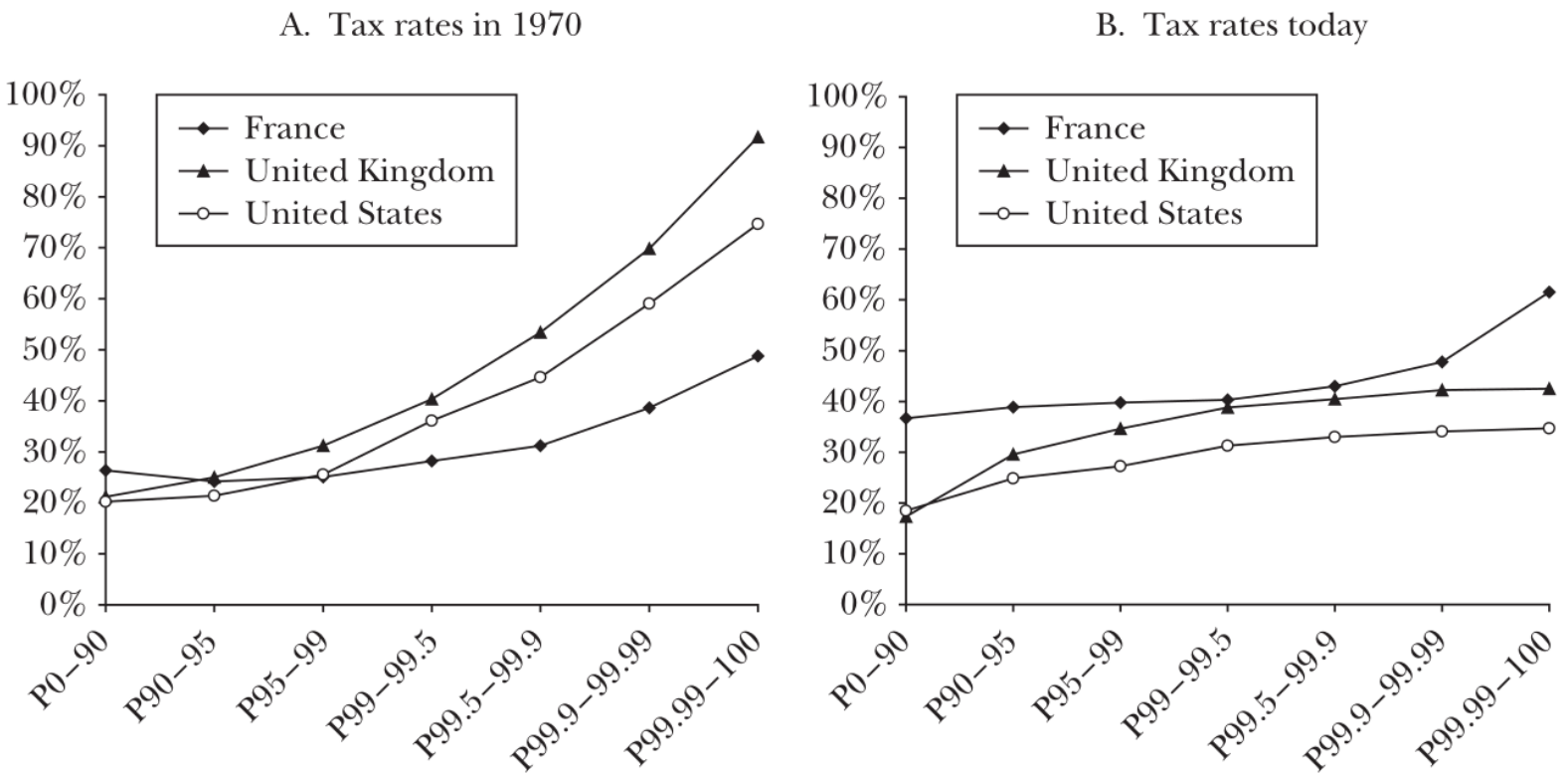
Fact #3: The rise of tax haven



Source: Laffitte

Fact #4: The slowdown of income tax progressivity

Tax Rates in France, the United Kingdom, and the United States in 1970 and Today



Source: Piketty & Saez, today=2005

Fact #5: The rise of profit shifting



Source: Wier & Zucman

Measuring the offshore world (1/3)

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- Lane & Milesi-Ferretti (2007) show that the world's net foreign asset position is negative. Measured liabilities exceed measured assets at the global level.
- 50/50: Portfolio equity holdings and debt securities
- Comparing liabilities reported by destination countries to assets claimed by investor countries points to a few hubs: in 2004, Ireland reported $614bn in portfolio equity liabilities but only $210bn was claimed as assets elsewhere; Luxembourg $1436bn vs. $820bn; the United States $2123bn vs. $1484bn

Measuring the offshore world (2/3)

- At the global level, liabilities tend to exceed assets: the world as a whole is a net debtor

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- Combining the Swiss National Bank's own data on foreign securities in custody with the same portfolio anomalies as Lane & Milesi-Ferretti: a \$4.5tn global portfolio gap (2008) plus \$1.4tn in unrecorded bank deposits = \$5.9tn, or 8% of world household financial wealth

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- Next week (Session 4): look at governments' reactions to this situation

2. Optimal tax theory

Key ingredients

- Behavioral reactions to taxes (Dupuit (1850) /Laffer (1970))

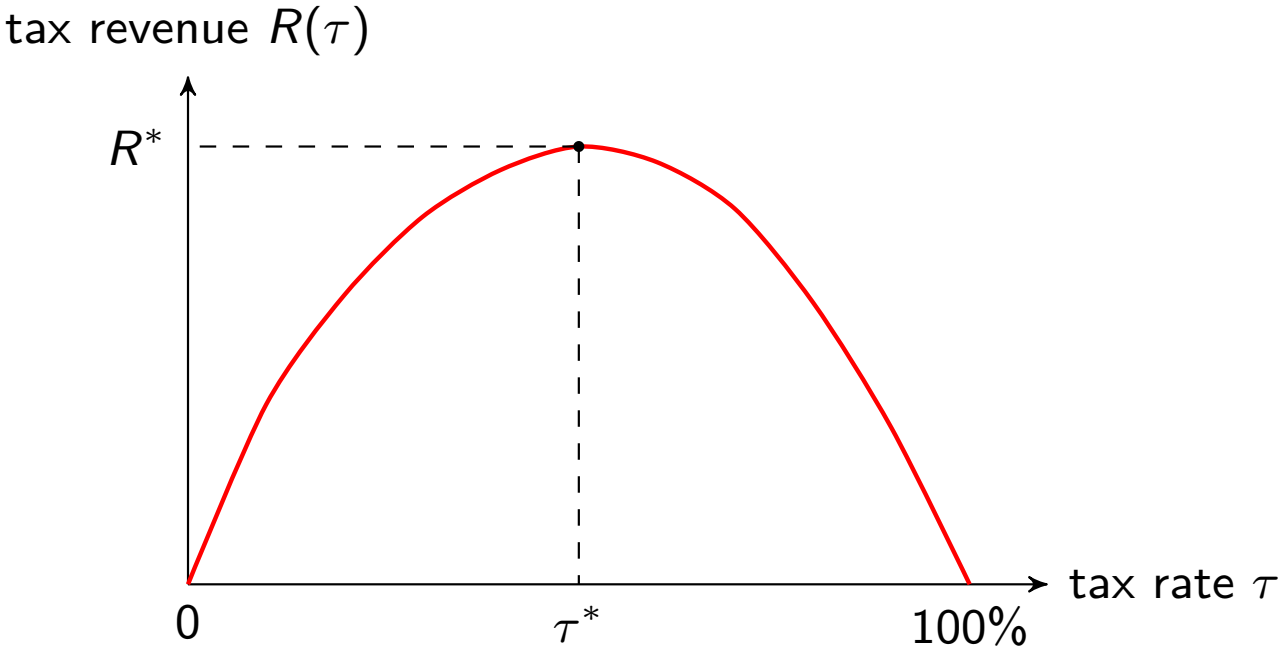
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- Behavioral reactions to taxes + redistributive preferences + non-linear, progressive taxes (Mirrlees (1971); Saez (2001))

Optimal linear taxation: the Laffer curve



- $R(\tau)$: tax revenue collected at tax rate τ. Raising τ has two effects on it: a mechanical increase (more is collected on unchanged earnings) and a behavioral response (e.g migration)
- This is a simple version of a more sophisticated policy question

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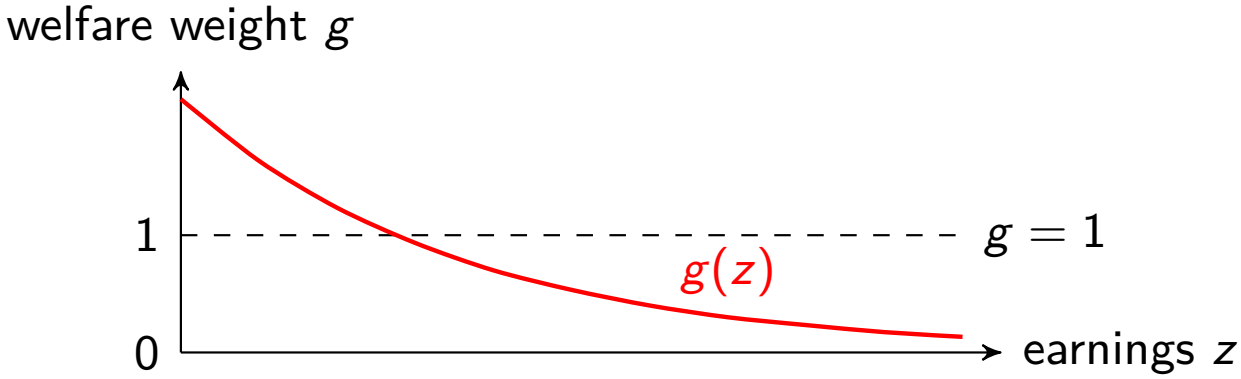
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- The revenue-maximising rate solves $R'(\tau) = 0$:

$$\underbrace{Z}_{\text{mechanical gain}} \quad \underbrace{-\tau^* \frac{dZ}{d(1-\tau)}}_{\text{behavioral loss}} = 0 \implies \tau^* = \underbrace{\frac{1}{1+e}}_{\substack{\text{depends only on} \\ \text{the elasticity } e}}$$

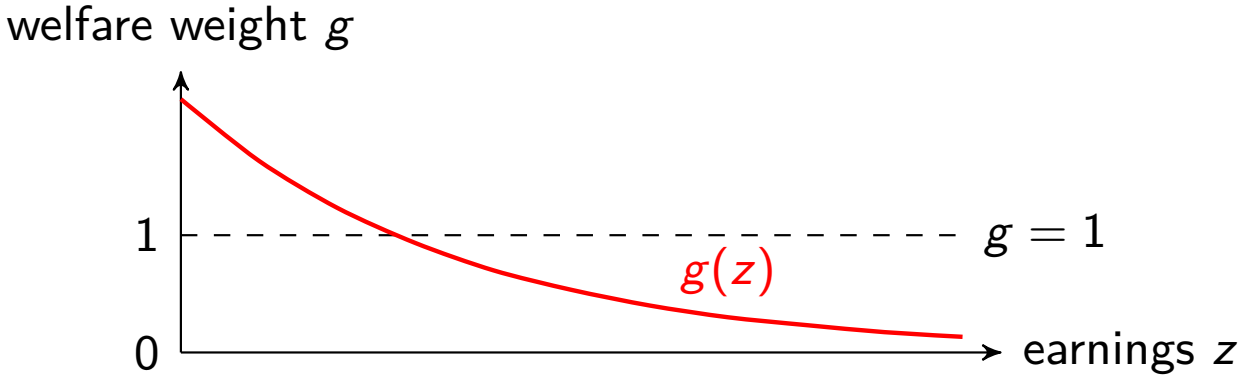
with $e = \underbrace{\frac{1-\tau}{Z} \frac{dZ}{d(1-\tau)}}_{\substack{\text{elasticity of aggregate earnings} \\ \text{to the net-of-tax rate}}}$

Adding redistributive preferences: welfare weights



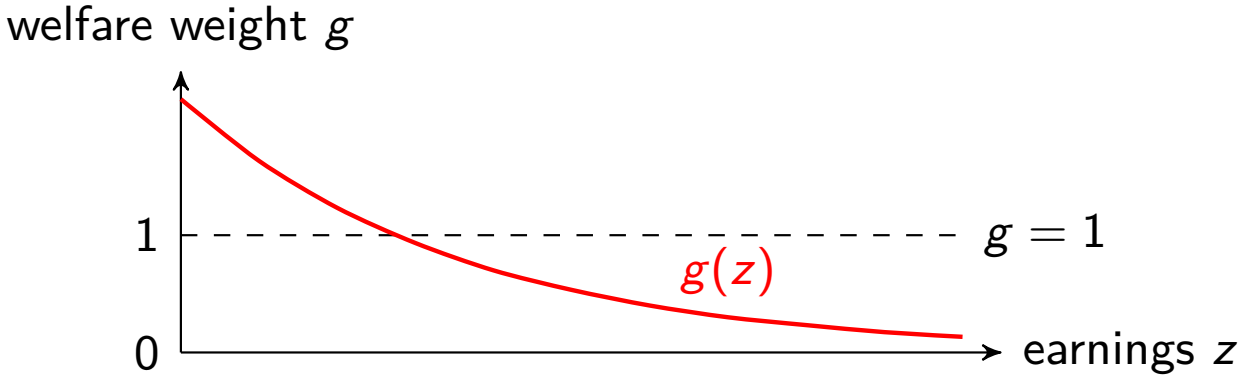
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- Polar cases: $g = 1$ for everyone, no reason to redistribute and no reason to tax; $g = 0$ for the rich, their euros only count as revenue – back to the Laffer logic

The optimal linear tax with welfare weights

- Same linear tax as in the Laffer case – one rate τ and a lump-sum grant – but the government now values each euro with the weights g_i:

$$\tau^* = \frac{1-\bar{g}}{1-\bar{g}+\underbrace{e}_{\text{elasticity}}} \qquad \text{with} \qquad \bar{g} = \underbrace{\frac{\int g_i \, z_i \, dv(i)}{Z}}_{\substack{\text{average weight,} \\ \text{weighted by earnings}}}$$

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- τ^* rises with inequality: the more earnings go to people with low weights, the lower $\bar{g}$

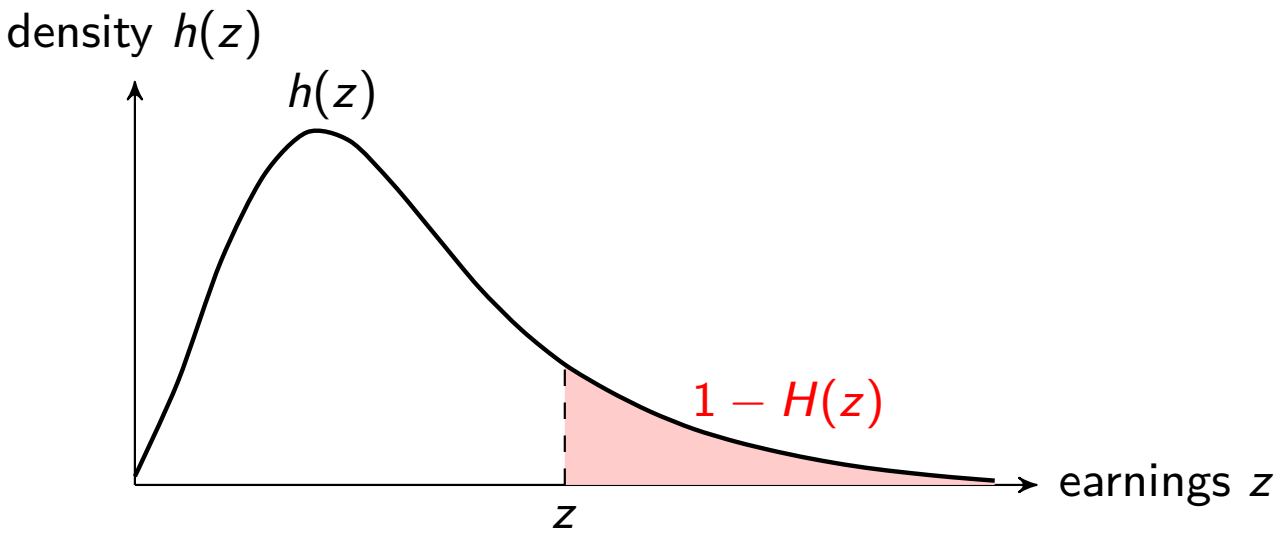
Mirrlees model

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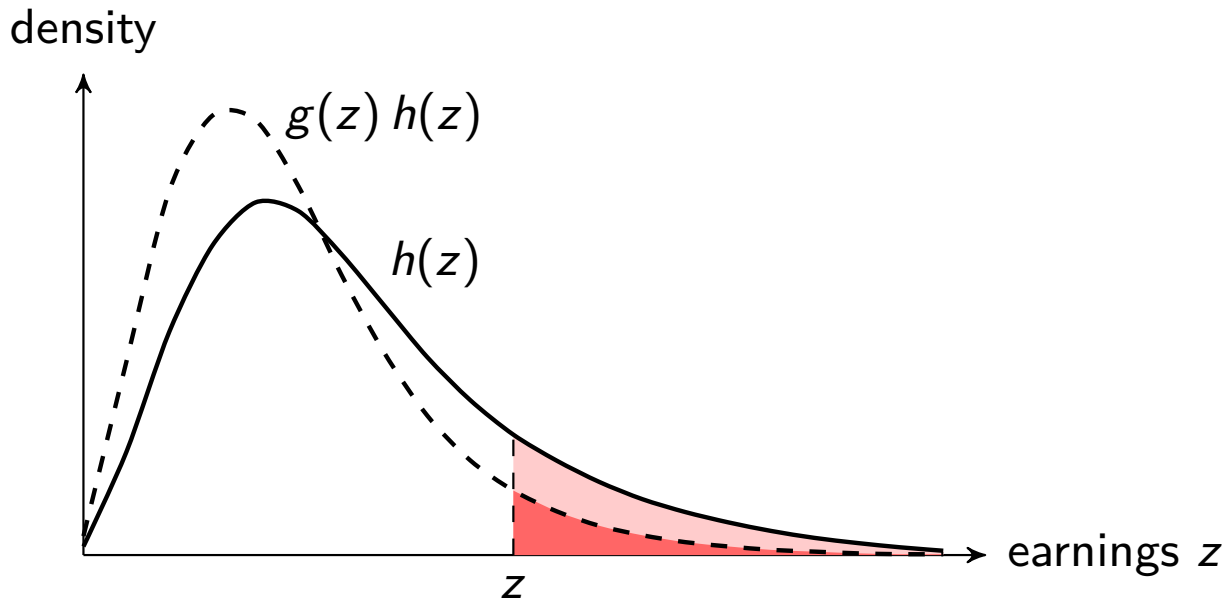
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- James Mirrlees (1971, *REStud*): Frames taxation as one integrated tax/benefit system, not separate "welfare" and "tax" schedules.
- $T(z)$: the net tax paid at earnings z – negative at the bottom of the distribution (net transfer), positive further up
- $T'(z)$: the marginal tax rate at earnings z (the slope of T), which can now vary with z

The earnings distribution, graphically



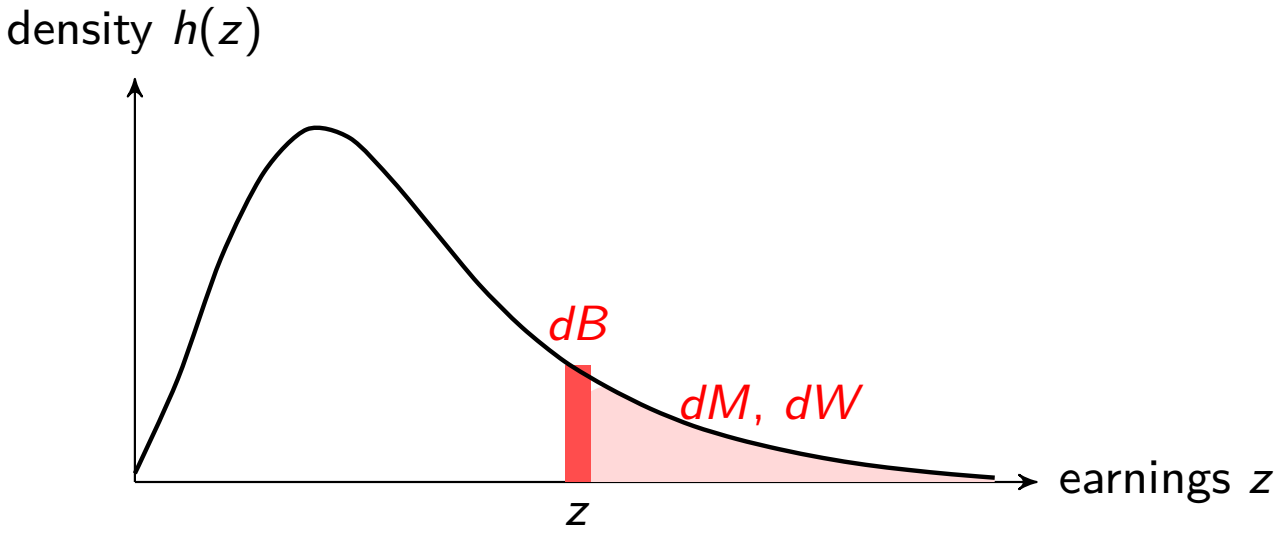
- $h(z)$ is the density of taxpayers at each earnings level; $H(z)$ is the share earning less than z
- The shaded area, $1 - H(z)$, is the mass of taxpayers earning more than z – everyone whose tax bill rises when the marginal rate increases at z

The welfare-weighted distribution, graphically



- Weighting each taxpayer by $g(z)$ inflates the bottom of the distribution and shrinks the top
- $G(z)$: the average weight of taxpayers above z – the dark area over the light area. Taking €1 from them costs society only $G(z)$ euros, and $G(z)$ falls as z rises

The tax perturbation, graphically



Raise the marginal tax rate by $d\tau$ on a thin band of earnings just above z:

- dB, behavioral effect: taxpayers in the band face a higher marginal rate and earn less
- dM, mechanical effect: everyone above the band pays more tax, without changing behavior
- dW, welfare effect: the euros taken from them were worth $G(z)$ each to society

Putting the three effects together

At the optimal marginal rate at z, a small tax increase leaves social welfare unchanged:

$$\underbrace{(1 - H(z))}_{dM} - \underbrace{G(z)\,(1 - H(z))}_{dW} - \underbrace{e\, z\, h(z)\, \frac{T'(z)}{1 - T'(z)}}_{dB} = 0$$

dM: everyone above z pays more

dW: what these euros were worth to society

dB: revenue lost as earners at z earn less

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dB: revenue lost as earners at z earn less

- The marginal rate at z should be high when:
  - many taxpayers earn more than z compared with those at z – large $1 - H(z)$ relative to $z\, h(z)$
  - taxpayers at z react little – low elasticity e
  - society puts little weight on the euros of those above z – low $G(z)$

Putting the three effects together

At the optimal marginal rate at z, a small tax increase leaves social welfare unchanged:

$$\underbrace{(1 - H(z))}_{dM\text{: everyone above } z \text{ pays more}} - \underbrace{G(z)\,(1 - H(z))}_{dW\text{: what these euros were worth to society}} - \underbrace{e\, z\, h(z)\, \frac{T'(z)}{1 - T'(z)}}_{dB\text{: revenue lost as earners at } z \text{ earn less}} = 0$$

- The marginal rate at z should be high when:
  - many taxpayers earn more than z compared with those at z – large $1 - H(z)$ relative to $z\, h(z)$
  - taxpayers at z react little – low elasticity e
  - society puts little weight on the euros of those above z – low $G(z)$
- With $G(z) = 0$, the welfare effect disappears: only the mechanical and behavioral effects remain, i.e. the Laffer trade-off, applied at each earnings level

Source: Saez (2001); Piketty & Saez (2013)

Laffer vs. Mirrlees

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- Maximises revenue $R(\tau)$

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Optimal CIT: who bears the tax?

- Swonder & Vergara (2026): a firm owner hires workers and invests; profits are taxed at rate t with capital costs only partly deductible (so the CIT distorts investment);

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- Swonder & Vergara (2026): a firm owner hires workers and invests; profits are taxed at rate t with capital costs only partly deductible (so the CIT distorts investment);
- Incidence of a small CIT increase dt (envelope theorem), for a mechanical revenue gain $\pi\, dt$:

$$\underbrace{dU^K = -(1 - a\, e_w)\, \pi\, dt}_{\text{owners: mechanical loss, partly offset by lower wages}} \qquad \underbrace{L\, dw = -\frac{a\, e_w}{1 - t}\, \pi\, dt}_{\text{workers: lower wages}}$$

where e_w is the elasticity of wages to $1 - t$ (a lower CIT raises investment, labor demand and wages) and $a = wL/\pi$ the wage bill relative to taxable profits: the larger $a\, e_w$, the more of the CIT is borne by workers

Source: Swonder & Vergara (2026), "A Sufficient Statistics Approach to Optimal Corporate Taxes", NBER WP 34517

Optimal CIT: a sufficient-statistics formula

- The optimal CIT rate weighs these two incidence terms against revenue:

$$t^* = \frac{\underbrace{(1 - g_K)}_{\substack{\text{equity gain from} \\ \text{taxing owners}}} - \underbrace{a\, e_w\, (g_L - g_K)}_{\substack{\text{equity loss from} \\ \text{lower wages}}}}{\underbrace{1 - g_K\,(1 - a\, e_w)}_{\substack{\text{revenue net of} \\ \text{owners' welfare loss}}} + \underbrace{e_\pi}_{\substack{\text{efficiency} \\ \text{cost}}}}$$

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- g_K, g_L: welfare weights of firm owners and of employed workers – the g_i of the optimal linear tax
  - $g_K = 0$: a euro left to owners has no social value, so taxing them is pure gain; $g_K = 1$: a euro to owners is worth a euro of public funds, so no redistributive motive to tax them
  - $g_L = 0$: wage losses of employed workers do not count; $g_L = 1$: a euro of wages is worth a euro of public funds, so workers' wage losses weigh fully against the CIT
- e_π: elasticity of taxable profits to the net-of-tax rate $1 - t$

Source: Swonder & Vergara (2026), "A Sufficient Statistics Approach to Optimal Corporate Taxes", NBER WP 34517, Proposition 1

Optimal CIT: intuition

- Same structure as the optimal linear tax: with no wage effect ($e_w = 0$),

$$t^* = \frac{1 - g_K}{1 - g_K + e_\pi} \qquad \text{vs.} \qquad \tau^* = \frac{1 - \bar{g}}{1 - \bar{g} + e}$$

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- t^* falls when owners get more weight: with $g_K = g_L = 1$ (no taste for redistribution), $t^* = 0$ – the CIT only distorts production; with $g_K = 0$, $t^* = (1 - g_L\, a\, e_w)/(1 + e_\pi)$, a Laffer rate lowered by the wage effect

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- t^* falls with e_w when $g_L > g_K$: part of the CIT is borne by workers through lower wages
- e_π is the only efficiency term: lower investment, lower employment, profit shifting or capital flight all show up in it – for a single country, the formula does not need to know why taxable profits fall

Back to the 5 facts

- Evolution of tax rates applied on different part of population can be interpreted as equilibirum rates revealing:
  1. Tax revenue needs (public good provisions, State size...)
  2. Increased elasticities of tax payers (globlization, capital mobility)
  3. Redistribution preferences (political trend)
- Hard to quantify the relative contributions of these three channels
- #2 is a limitation to policy space and affects #1 and #3
- Important to understand the elasticity of the tax base to maintain policy objective #1 and #3

3. The mobility of personal tax base - empirics and mechanisms

Jakobsen et al. (2024): the Swedish wealth tax repeal

- Until 2006: 1.5% marginal rate above a threshold – about 0.5% of net wealth for the top 2%, half of their capital taxes
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- Similar results in the UK and in France: migration responds to taxes, but the flows are small UK France
- Limited external validity over time: the reform predates the automatic exchange of bank information (2014–2017), which changed how the wealthy can escape taxes on foreign assets

Source: Jakobsen, Kleven, Kolsrud, Landais & Muñoz (2024)

FATCA and the Common Reporting Standard

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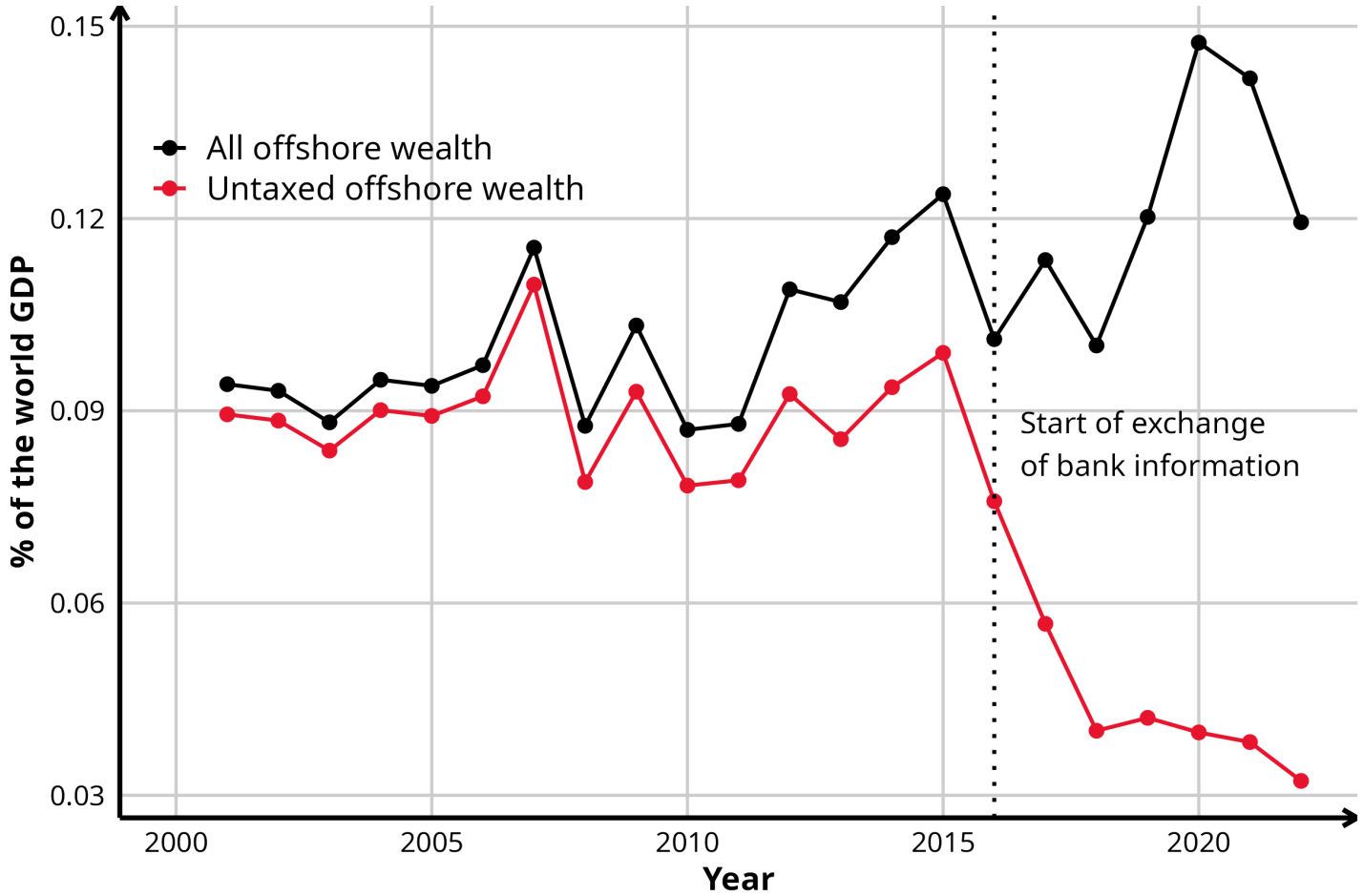
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- Remaining gaps: the U.S. is not part of the CRS; real estate, unlisted shares and precious metals are not covered; some banks do not report; golden passports

Personal Tax Avoidance



Source: Global Tax Evasion Report

- Elasticity of wealthy individuals to tax likely to decrease

Untaxed offshore wealth: data and method

- All offshore wealth (black): households' securities and deposits held abroad, Zucman (2013) method updated to 2022 – world portfolio liabilities minus assets, Swiss National Bank and BIS data. $12tn, 12% of world GDP in 2022

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- Untaxed share (red, central scenario), with reported wealth assumed fully taxed:

$$\underbrace{30\%}_{\substack{\text{not reported}\\ \text{through the CRS}}} \times \underbrace{90\%}_{\substack{\text{pre-CRS}\\ \text{evasion rate}}} = \underbrace{27\%}_{\substack{\text{of offshore}\\ \text{wealth}}} \approx \underbrace{3.2\%}_{\substack{\text{of world}\\ \text{GDP}}}$$

- Low-end: 15% (50% evasion on unreported); high-end: 37% (plus 10% on reported)

Source: EU Tax Observatory, Global Tax Evasion Report 2024 Faye, Godar & Zucman (2023)

Personal vs. Corporate Tax Avoidance ?

- Common Reporting Standards also provide researchers with new data on the offshore world
- Evidence from Denmark (Boas et al.) where CRS data revealed that:
  - Offshore wealth accounts for 15% of GDP
  - Personal offshore wealth $\approx$ 5% of GDP
  - Firms (other than personal holdings) $\approx$ 5% of GDP
  - Hard to trace back $\approx$ 5% of GDP

Boas et al. (2024): what the CRS data look like

- All CRS reports received by Denmark, 2016–2019: balance and income of each foreign account owned by a Danish resident, directly or through a company
- Matched to tax returns, wealth registers and cross-border bank transfers (tax ID, name, birth date, address)

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	All accounts	In tax havens
Households, directly	2.3	1.1
Households, through holding companies	2.0	1.6
Firms other than holdings	4.8	2.6
Charities and non-residents	1.1	1.0
Unmatched (no ID)	4.6	0.4
Total	14.8	6.7

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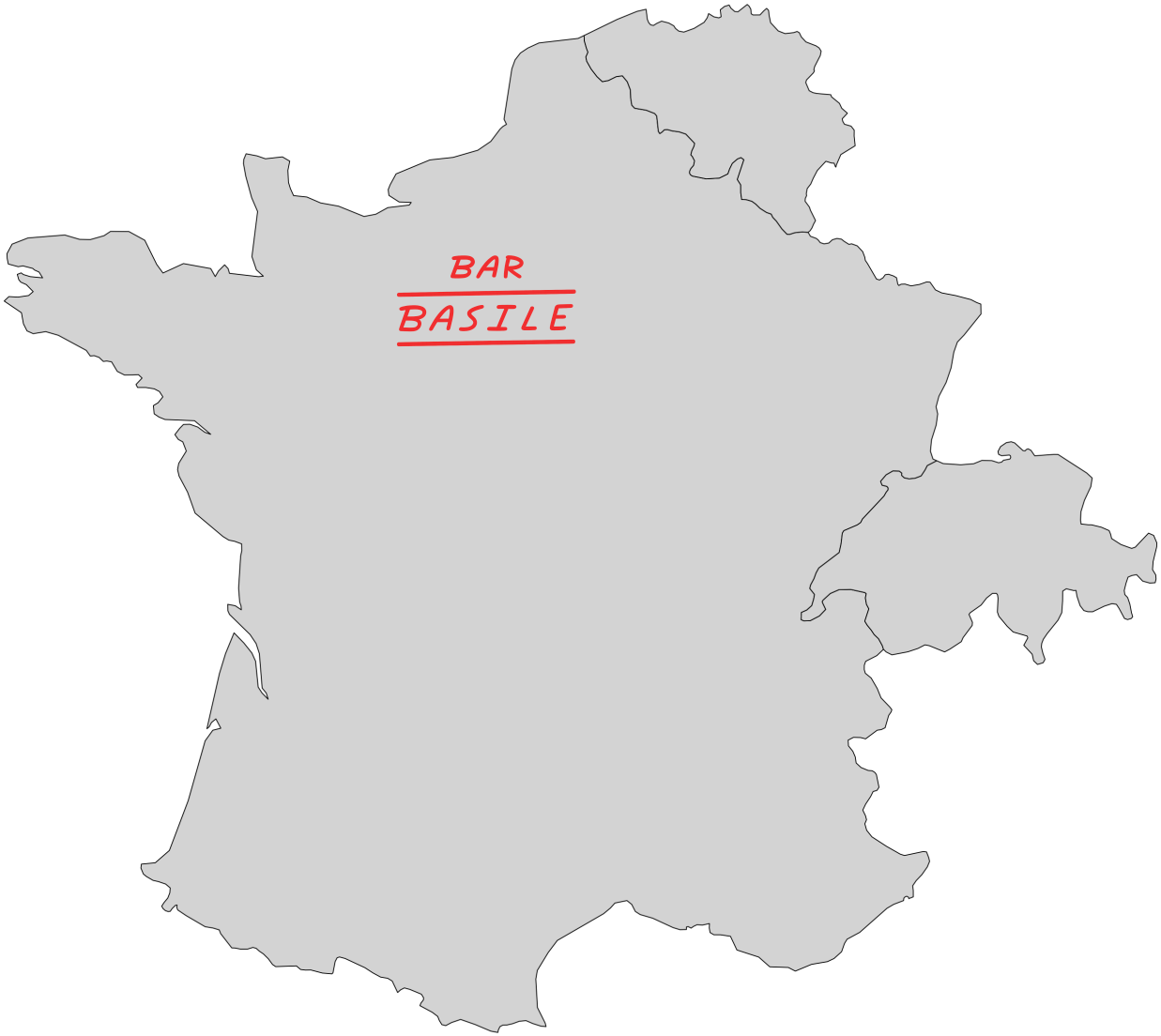
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- Coverage test: an account used for transfers in t and $t+1$ exists in t, yet close to 30% of them get no CRS report

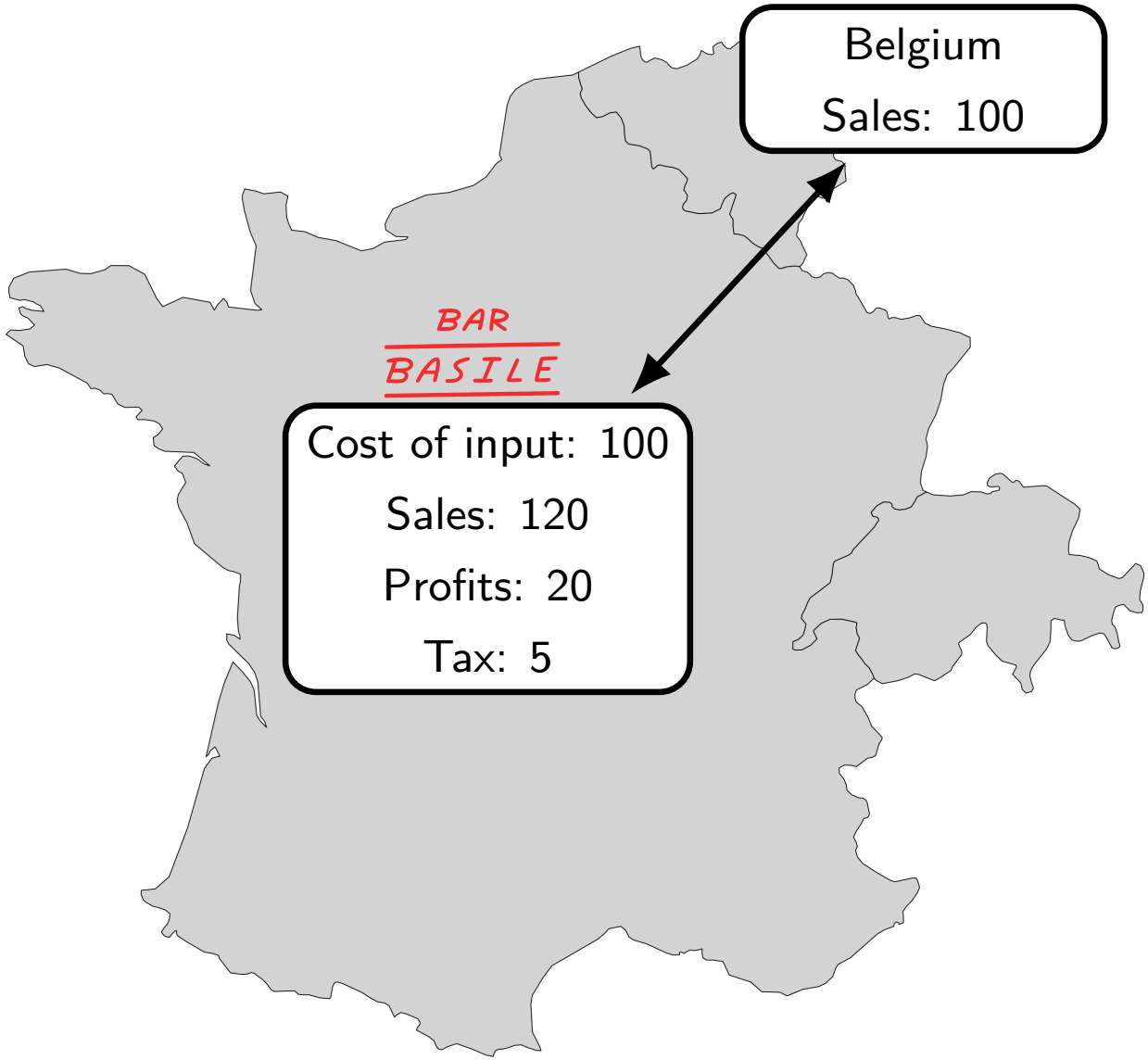
Source: Boas, Johannesen, Kreiner, Larsen & Zucman (2024)

4. The mobility of corporate tax base - empirics and mechanisms

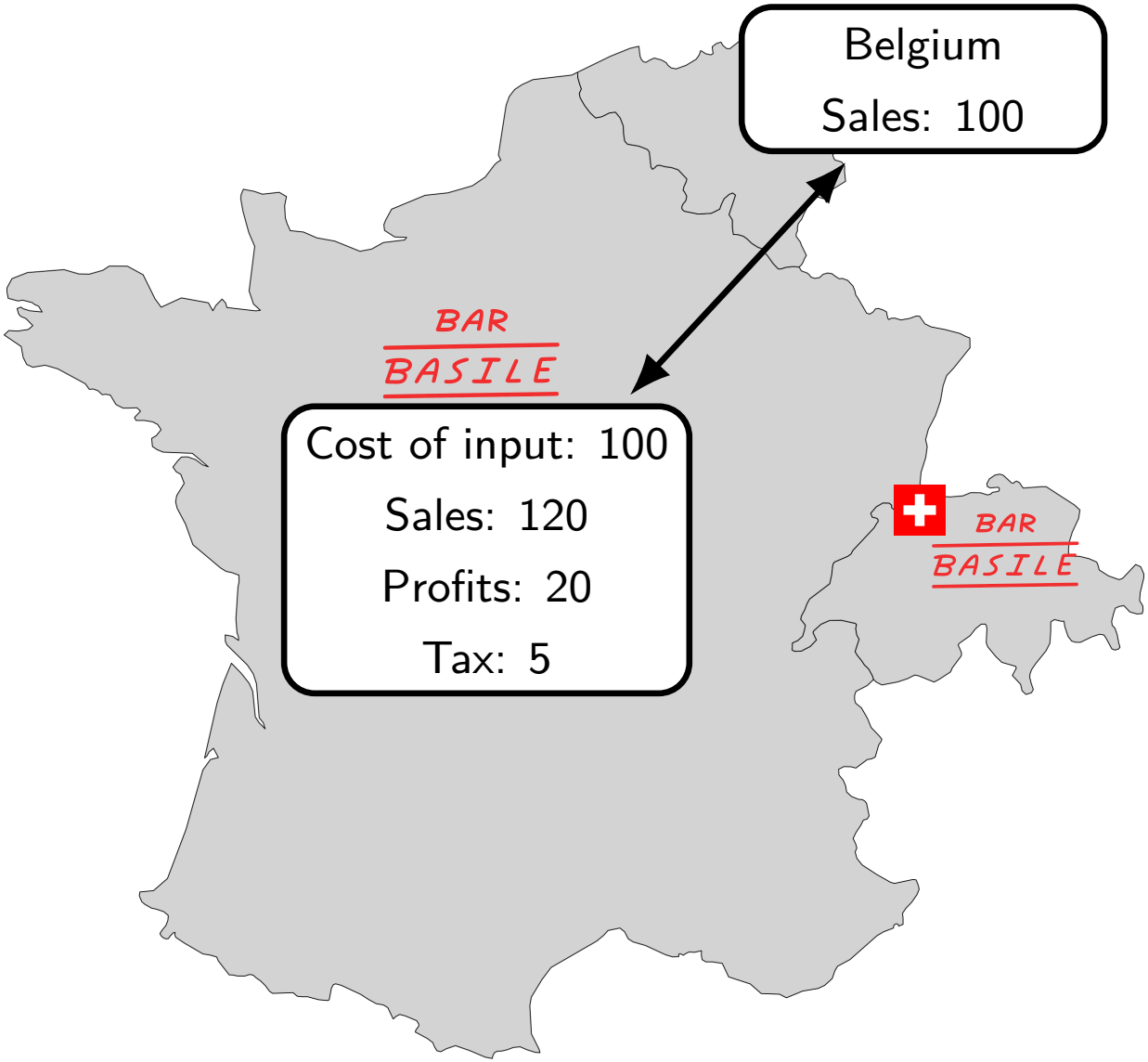
MNEs' Tax Avoidance Explained



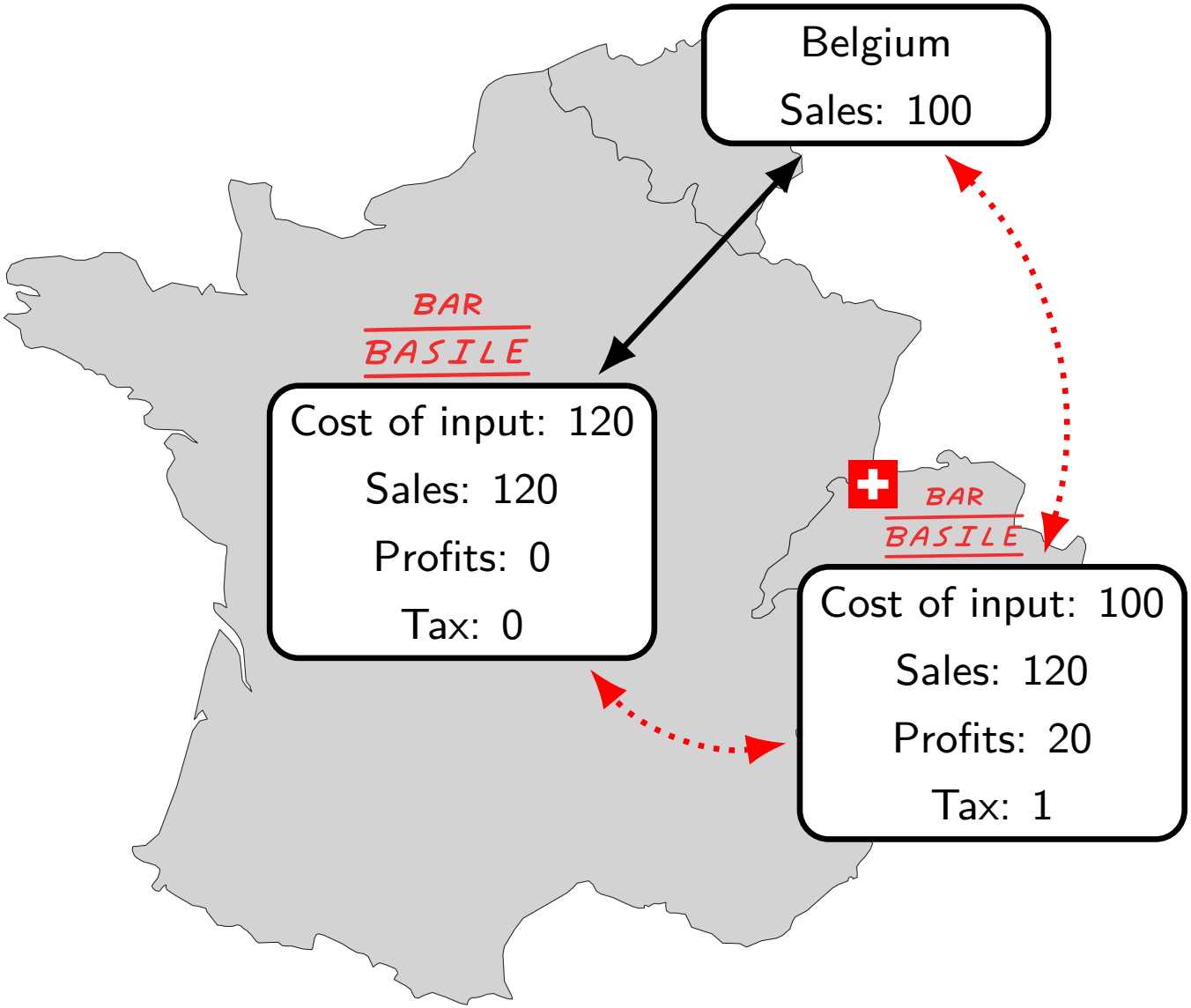
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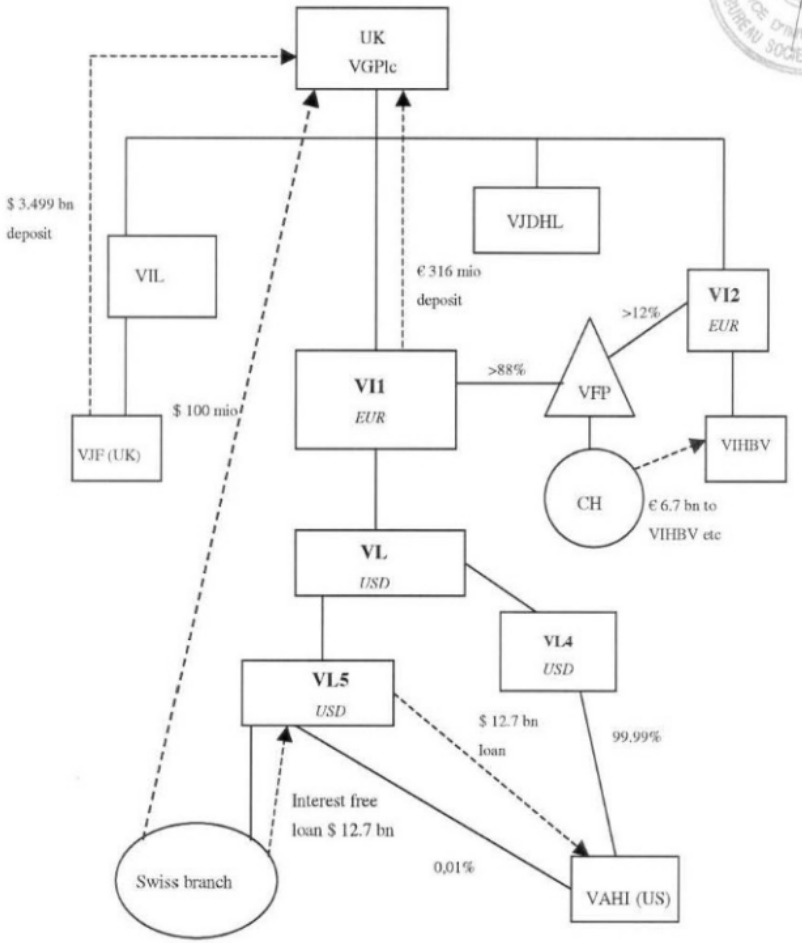
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PRICEWATERHOUSECOOPERS

Enclosure 2: Structure as at 31 March 2006



Profit Shifting Quantification (1/2)

Let's define Y the corporate output, produced by combining labor L and capital K. Y is then split between workers wL (wages) and owners of capital rK. Thus:

$$Y = F(K, L) = rK + wL$$

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Profitability (π):

$$\pi = \frac{\Pi}{wL} = (1 - p)\frac{\alpha}{1 - \alpha}$$

where $\alpha = \frac{rK}{Y}$ the capital share

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Within tax havens, the difference in profitability between foreign π_f and local π_l is explained by inward profit shifting from foreign firms:

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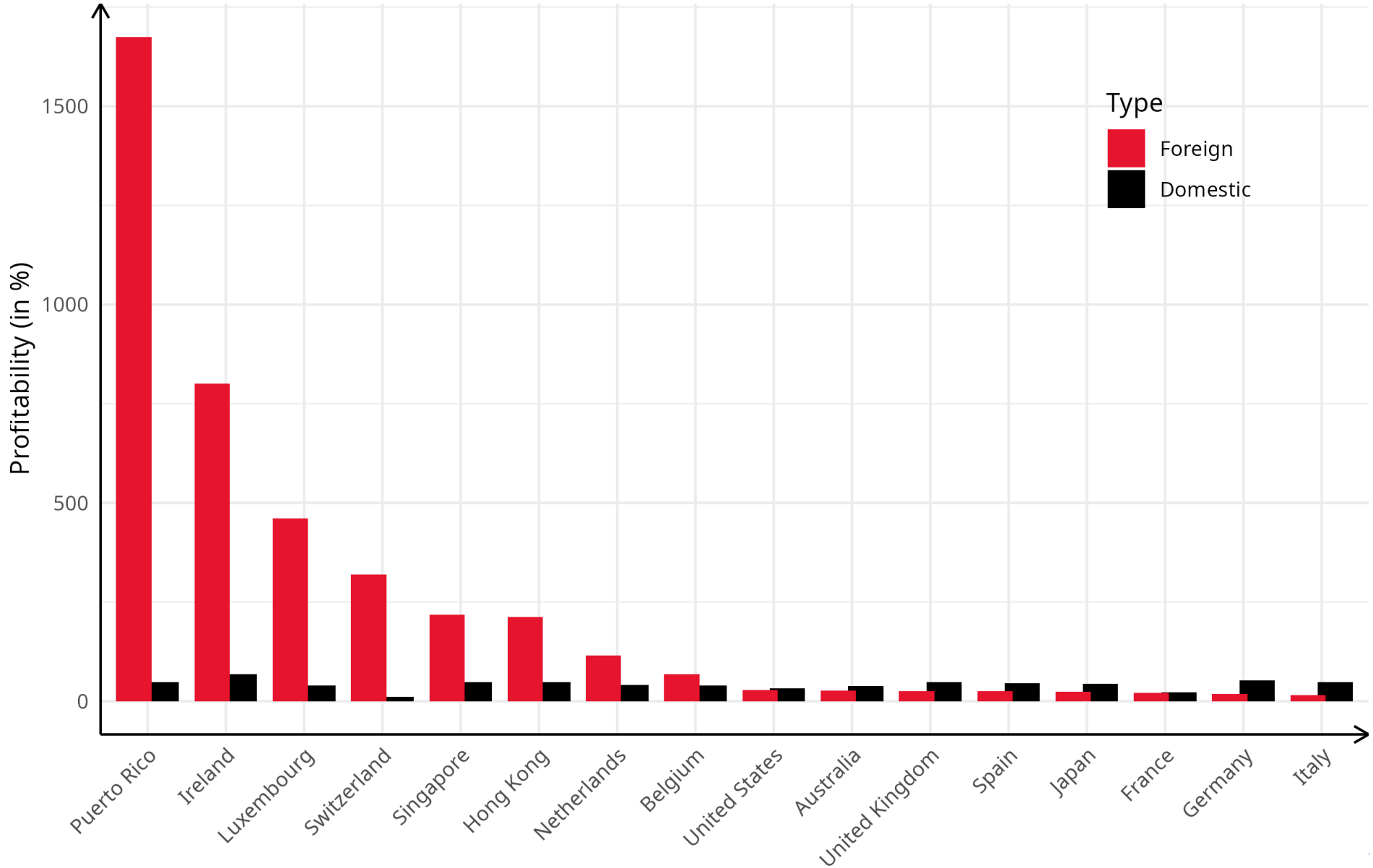
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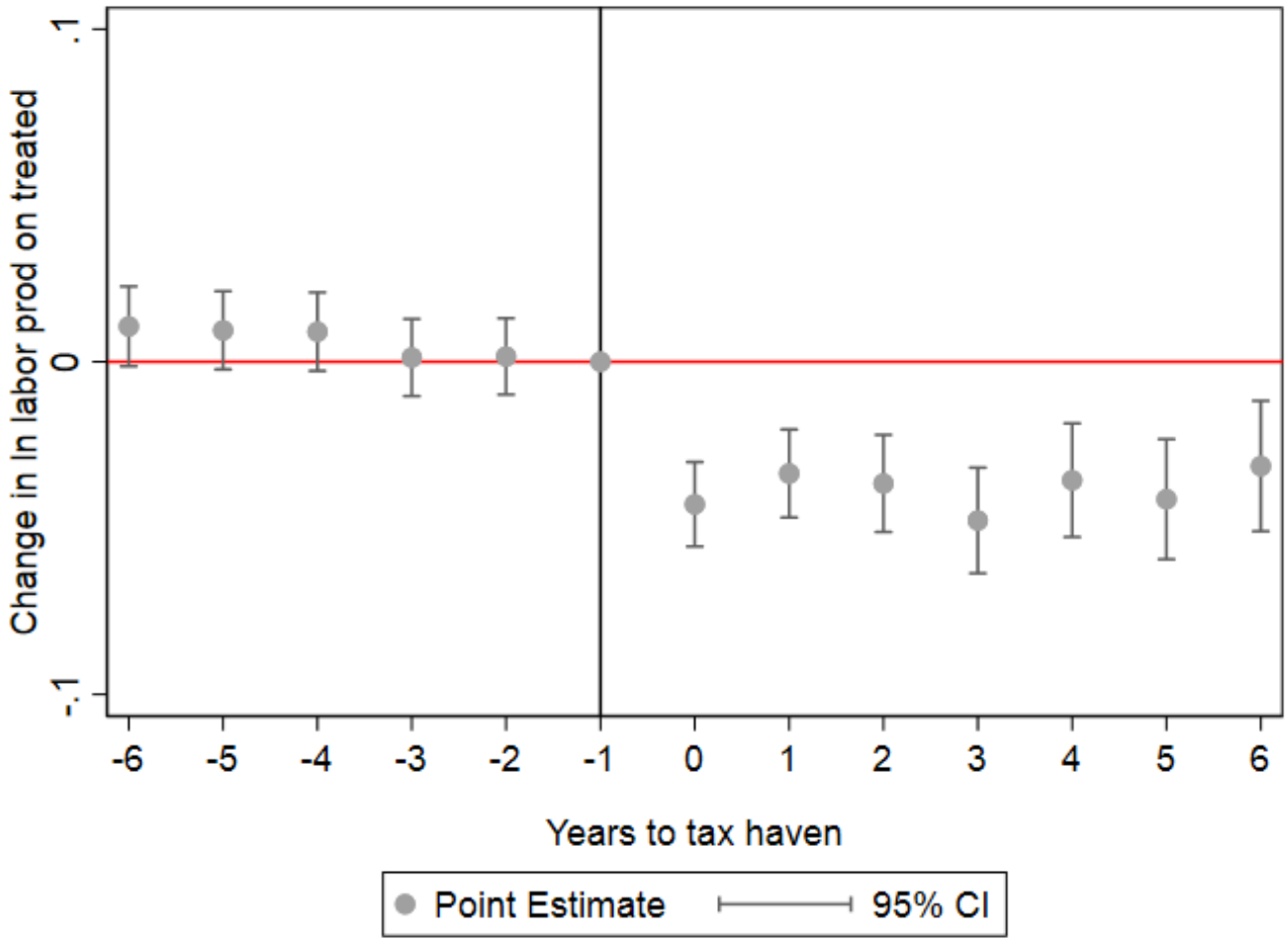
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36% of MNEs foreign profits is shifted to tax havens

Profitability in Foreign vs. Local Firms



Causal effect of tax haven on measured productivity



Source: Delpeuch et al. (2023)

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- Personal tax base: tax-induced migration exists but is small (Sweden, UK, France); hiding wealth offshore mattered more, and has been curbed by FATCA and the CRS since 2017

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- mobile tax bases are taxed less, immobile ones more
- The offshore world can be measured from the anomalies of international statistics: world portfolio liabilities exceed assets, which points to about 8% of household financial wealth held offshore
- Optimal tax theory: the elasticity of the tax base sets the revenue-maximising rate, $\tau^* = 1/(1+e)$; redistributive preferences give $\tau^* = (1-\bar{g})/(1-\bar{g}+e)$
- Optimal CIT: the rate trades off taxing owners against wage losses for workers; all efficiency costs (lower investment, profit shifting, capital flight) show up in one elasticity of taxable profits
- Personal tax base: tax-induced migration exists but is small (Sweden, UK, France); hiding wealth offshore mattered more, and has been curbed by FATCA and the CRS since 2017
- Corporate tax base: MNEs shift profits through transfer prices – about 36% of MNEs' foreign profits end up in tax havens which also distorts measured productivity

Lecture 4

International tax competition

From taxpayers' mobility to government reaction

- Last week, we saw how firms and individuals shifts income across broders for tax reasons
- We also saw that this was the reasons why more mobile tax payers face lower tax rates
- But how exactly do government adjust their tax rates given (i) their tax payers' mobility AND (ii) their anticipation of others' governement tax adjustments ?

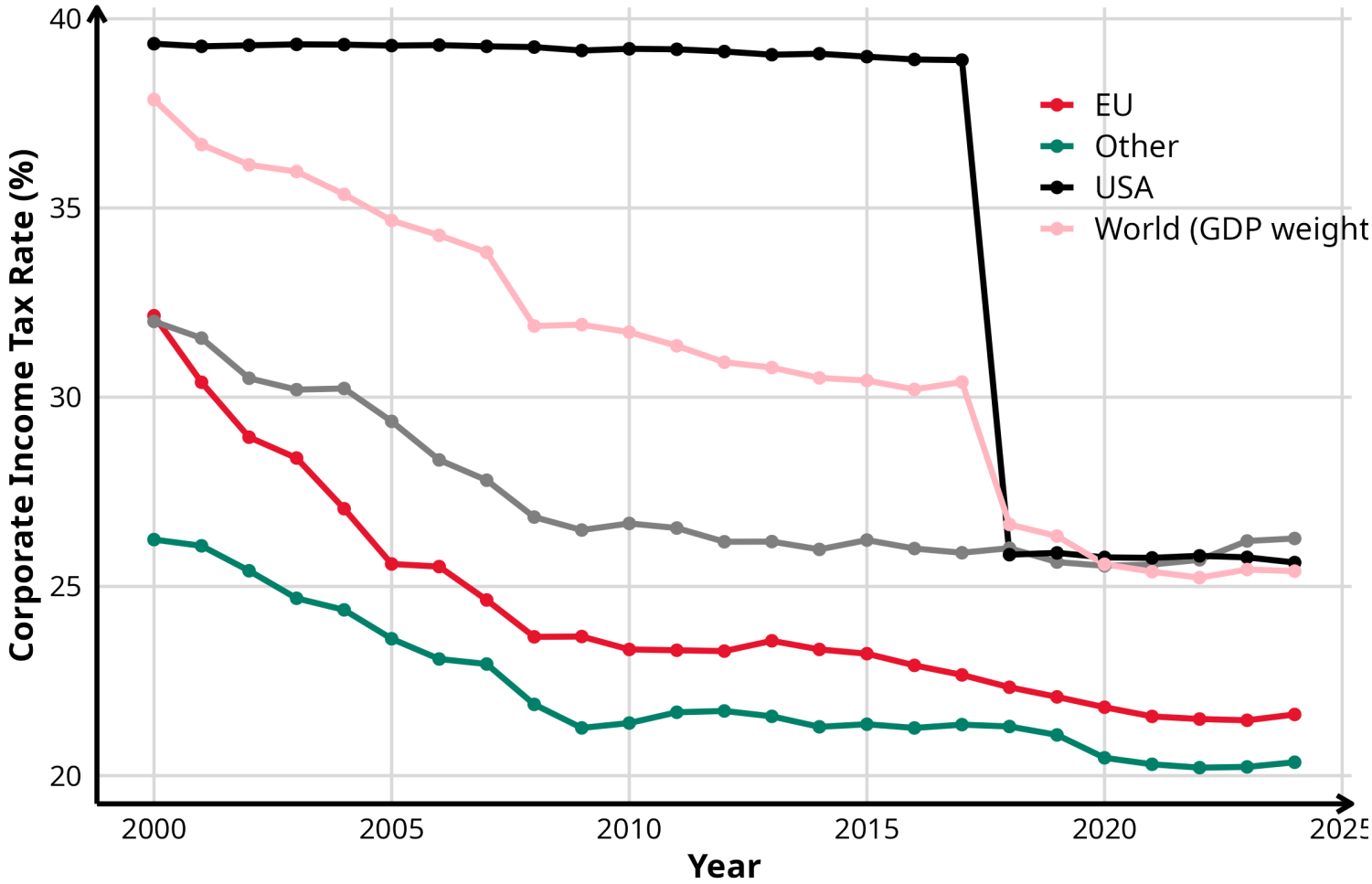
Roadmap for today

15. The collective action issue of international taxation
    - Back to the facts
    - The prisoner's dilema applied to tax
      - N-countries model

16. Empirical validations
    - Capital vs. Profits Competition
    - Profits or Capital ?

1. The collective action issue of international taxation

Fact #6: Race-to-the-bottom of CIT rates



Source: OECD-Corporate Tax Statistics

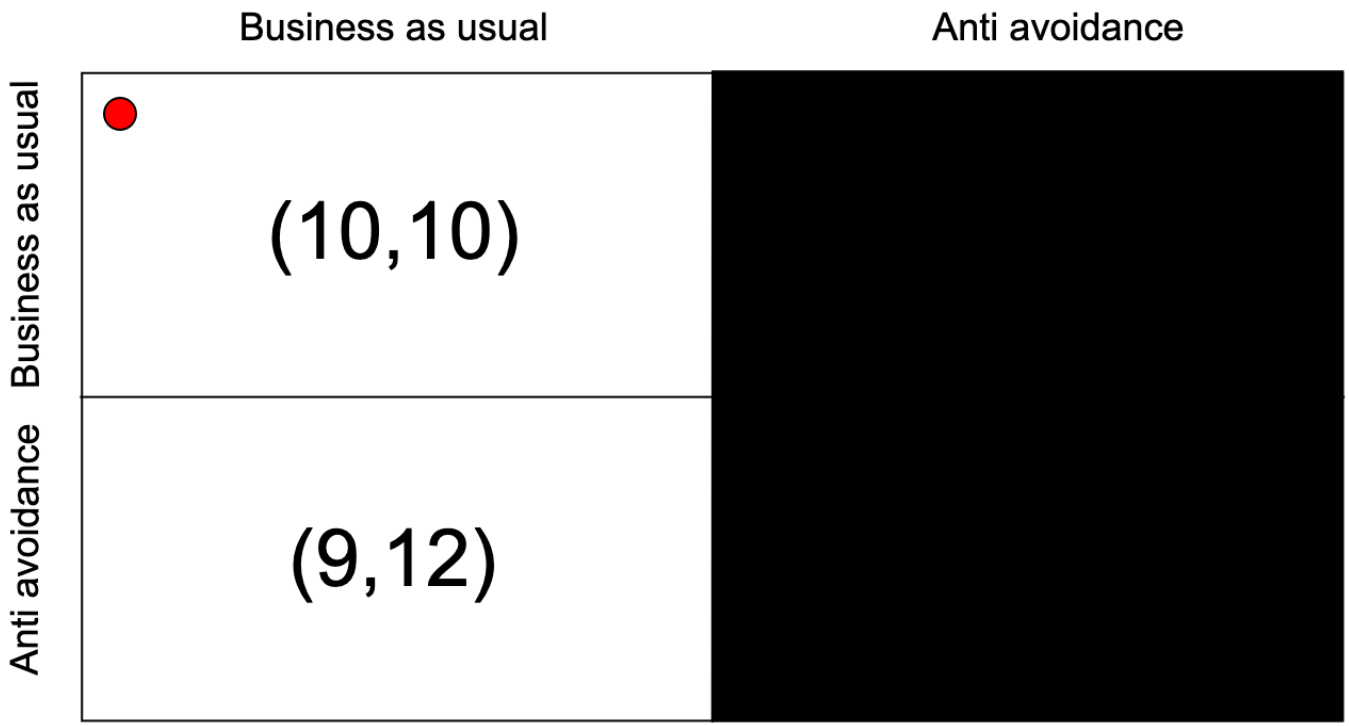
Regulating international tax competition?

	Business as usual	Anti avoidance
Business as usual	(10,10)	(12,9)
Anti avoidance	(9,12)	(11,11)

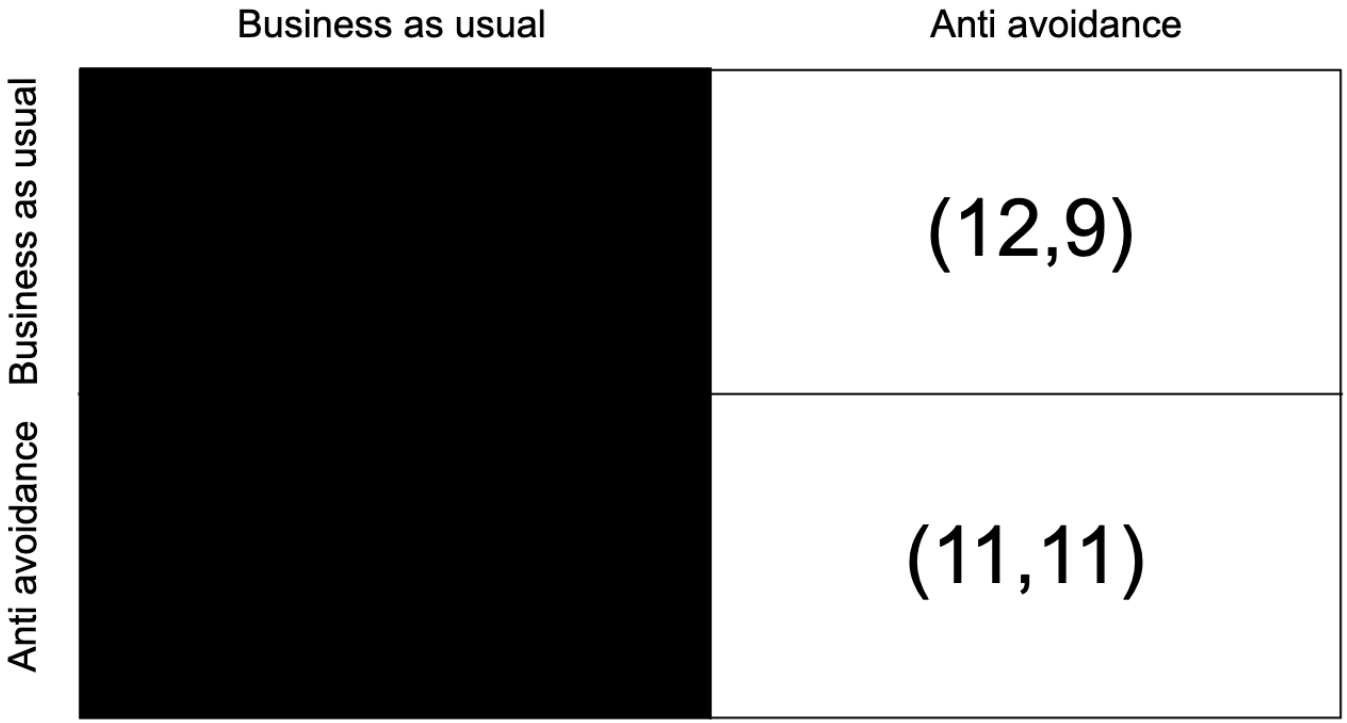
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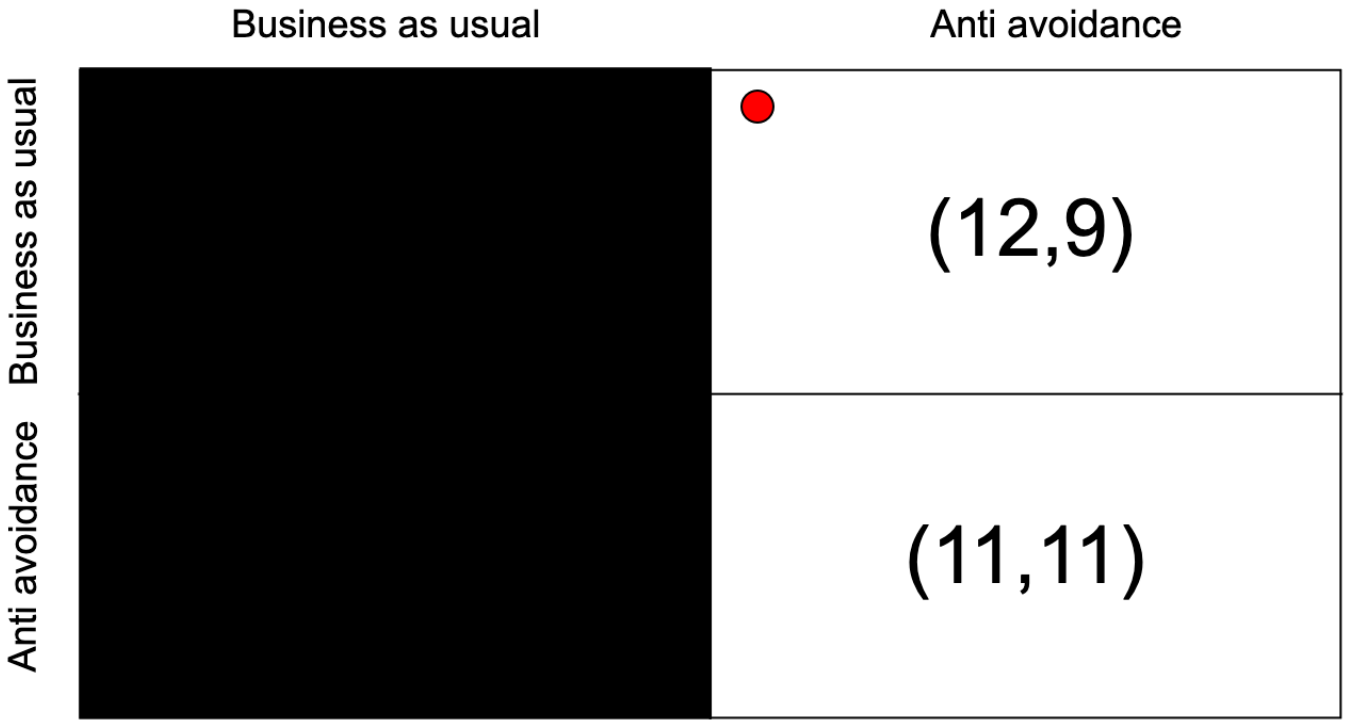
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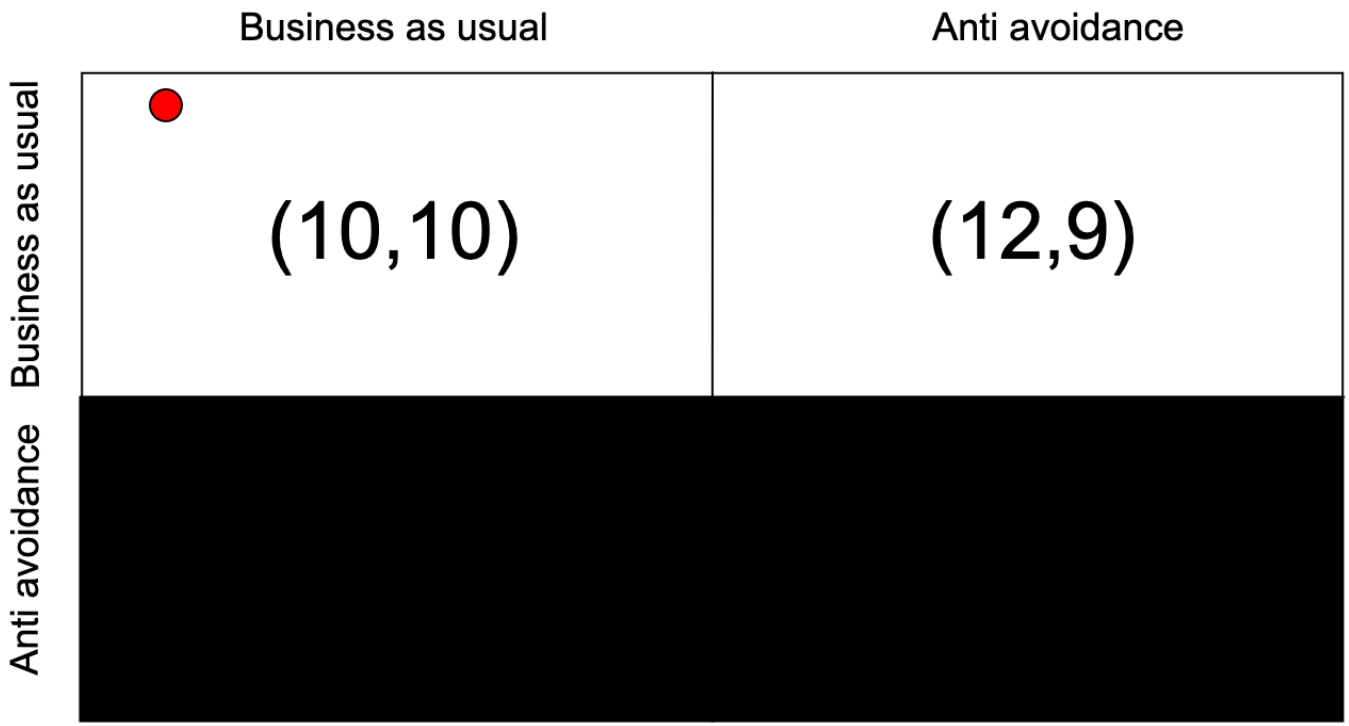
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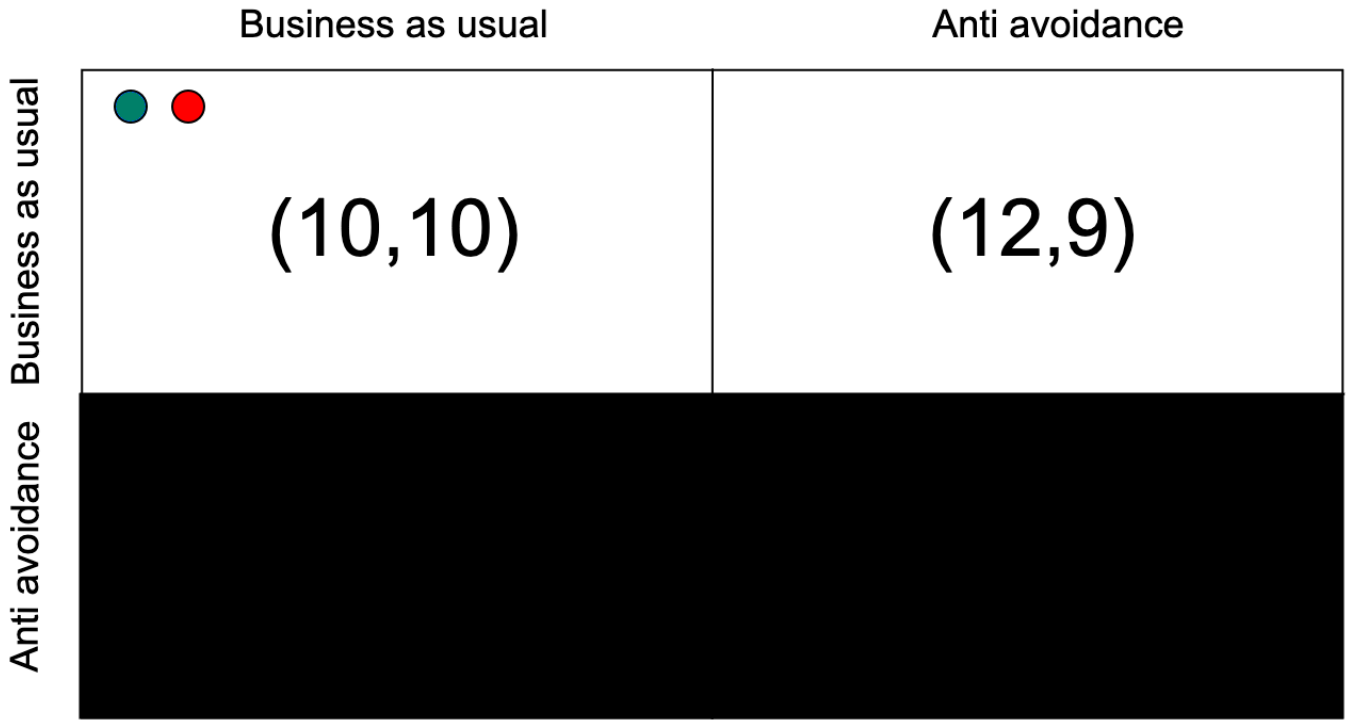
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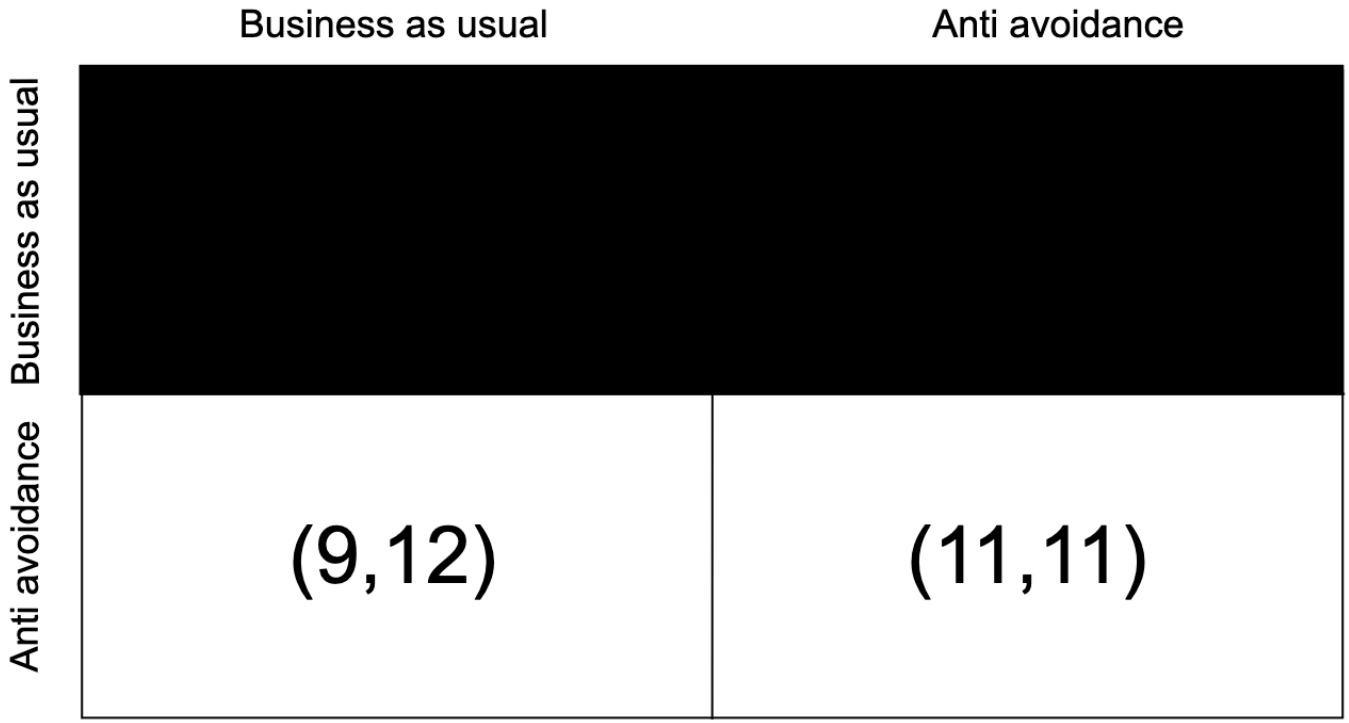
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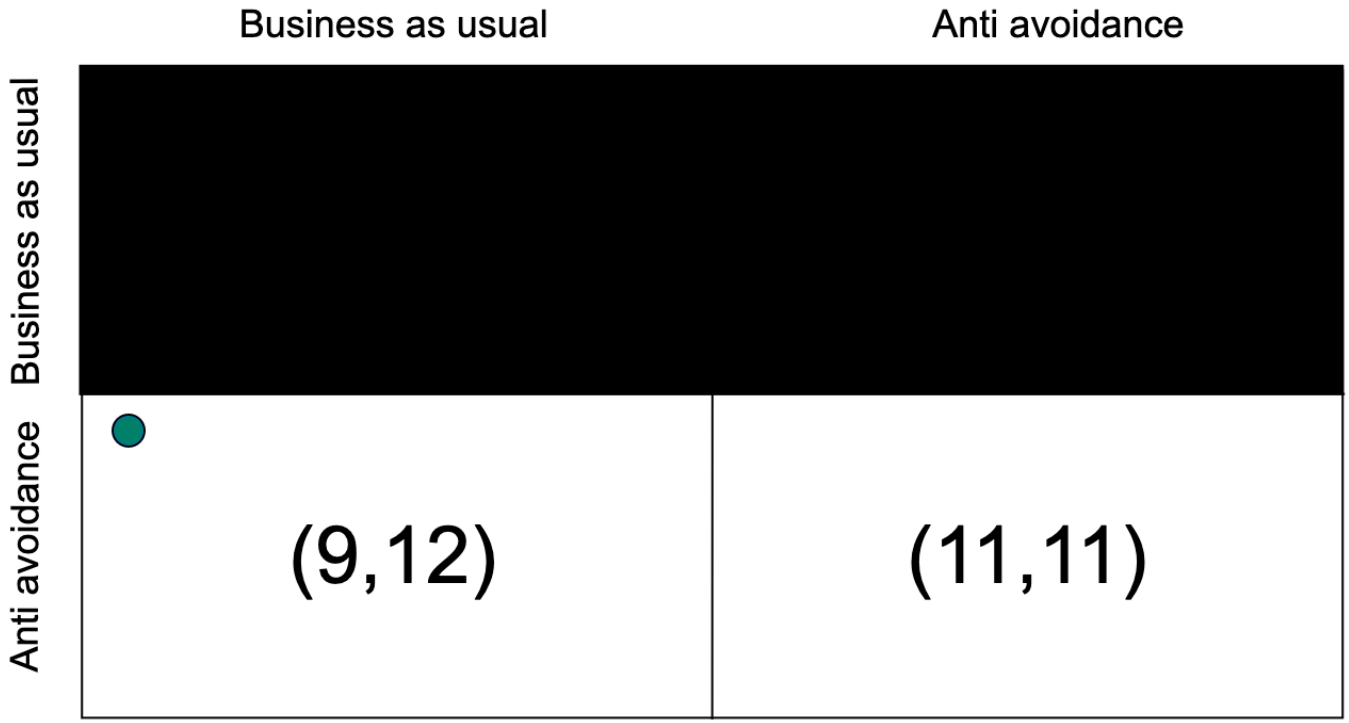
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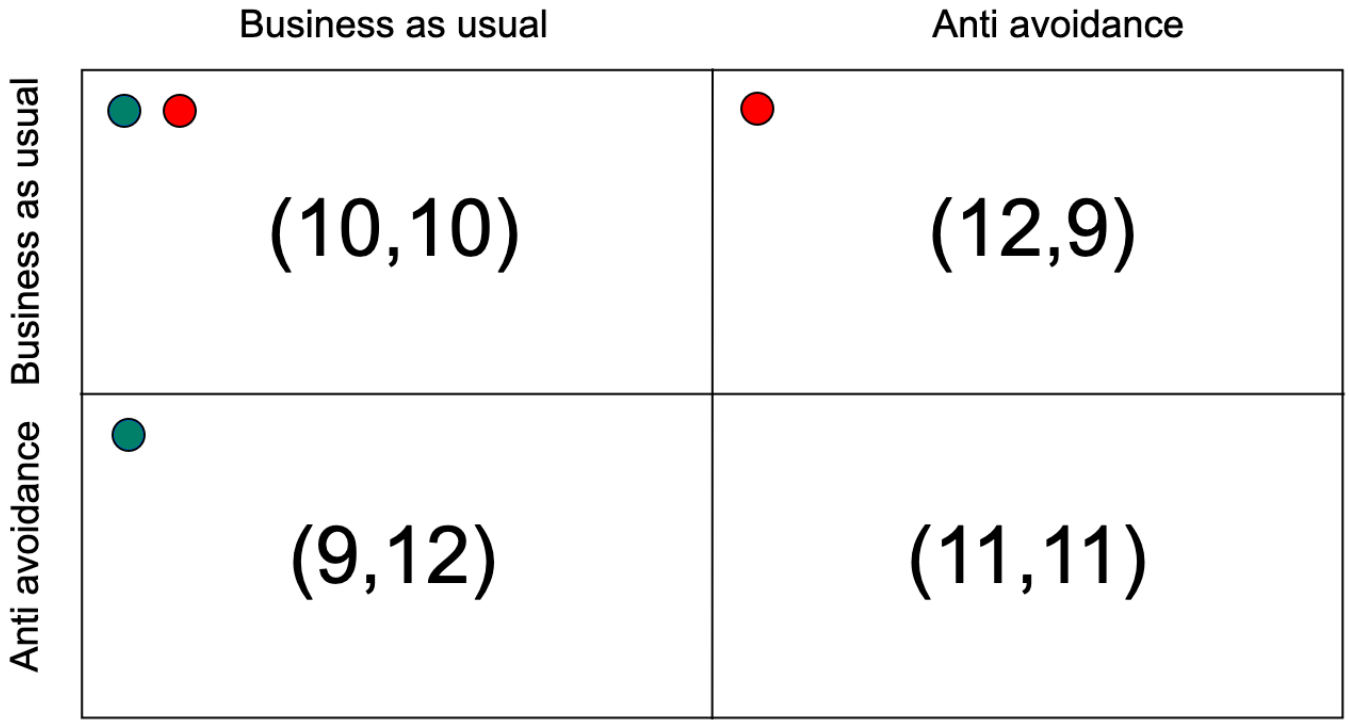
Regulating international tax competition?



Regulating international tax competition?



Regulating international tax competition?



Zodrow & Mieszkowski - Set-up

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- Core model of international tax competition.
- Countries tax capital on a source basis.
- Capital is perfectly mobile; governments compete via tax rates.

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  - n countries, indexed by $i = 1, \ldots, n$.
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Arbitrage condition - same after-tax rate of return on capital:

$$f_i'(k_i) - t_i = \rho \quad \forall i$$

Capital Market Equilibrium

- World capital-labor ratio fixed: $\bar{k}$.
- Market clearing:

$$\sum_{i=1}^{n} \sigma_i k_i = \bar{k},$$

  where σ_i is country i's population share $\left(\frac{L_i}{L_{\text{world}}} \right)$.

- (k_i, ρ) jointly determined by $\{t_i\}$.

International allocation of capital

1. Equalized net return: $f_i'(k_i) - t_i = \rho$.
2. Market clearing: $\sum_i \sigma_i k_i = \bar{k}$.

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We start from the arbitrage conditions:

$$f_i'(k_i) - t_i = \rho, \quad i = 1, \ldots, n$$

Comparing i and n:

$$(f_i'(k_i) - t_i) - (f_n'(k_n) - t_n) = \rho - \rho = 0 \quad i = 1, \ldots, n-1.$$

$$\Rightarrow f_i'(k_i) - f_n'(k_n) = t_i - t_n \quad i = 1, \ldots, n-1.$$

Differences in the marginal rate of return to capital between two countries are related to tax differentials

Tax change in country j (1/2)

Country j changes its tax rate t_j:

- Direct effect: changes all the tax differential with respect to t_j $(dk_i - dk_j)$
- Indirect effect: changes the capital allocation and therefore the marginal rate of capital in all countries $(\partial k_i / \partial t_j)$

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From the link between marginal rate of return to capital and tax differential that, we get that:

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Add the market clearing condition: $\sum_{i=1}^{n} \sigma_i \, dk_i = 0$.

Tax change in country j (2/2)

The system with (n-1) equation and (n-1) unknowns $(dk_1, \ldots, dk_{n-1})$, can be written as:

$$(A + \sigma_n f_n'' \, \iota\alpha') \, dk = (dt_1 - dt_n, \ldots, dt_{n-1} - dt_n)'.$$

$$\underbrace{\begin{bmatrix} f_1'' & 0 & \cdots & 0 \\ 0 & f_2'' & \cdots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \cdots & f_{n-1}'' \end{bmatrix}}_{A} + \sigma_n f_n'' \underbrace{\begin{bmatrix} 1 \\ 1 \\ \vdots \\ 1 \end{bmatrix}}_{\iota} \underbrace{\begin{bmatrix} \frac{\sigma_1}{\sigma_n} & \frac{\sigma_2}{\sigma_n} & \cdots & \frac{\sigma_{n-1}}{\sigma_n} \end{bmatrix}}_{\alpha'}$$

- A: diagonal matrix of own curvature effects. Interpretation
- $\sigma_n f_n'' \iota\alpha'$: rank–1 correction from world capital constraint. All movement of capital must be reflected by a change elsewhere.

Capital elasticity to tax rates

At the end of the day, the ZW model allows for an overall elasticity of capital to tax rate:

1. Differentiate w.r.t. t_j and solve for $\partial k_i / \partial t_j$.
2. Define $\zeta_j \equiv \sigma_j / f_j'' < 0$.

$$\frac{\partial k_i}{\partial t_j} = \begin{cases} \frac{1}{f_i''}\left(\frac{\sum_{s \neq i} \zeta_s}{\sum_{s=1}^{n} \zeta_s}\right) < 0, & i = j \\ -\frac{1}{\sigma_i}\left(\frac{\zeta_i \zeta_j}{\sum_{s=1}^{n} \zeta_s}\right) > 0, & i \neq j \end{cases}$$

- $t_j \uparrow \Rightarrow k_i \uparrow$
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- $t_j \uparrow \Rightarrow k_i \uparrow$
- $t_j \uparrow \Rightarrow k_j \downarrow$
- Governments' Welfare is not only a result of capital but also on tax receipts (e.g public good provision)
- One additional step is needed before fully bridging to the pay-off matrix

Capital elasticity to tax rates: intuition

- $|\zeta_s| = \sigma_s / |f_s''|$: country s's capacity to absorb capital (large if s is big or its returns fall slowly)

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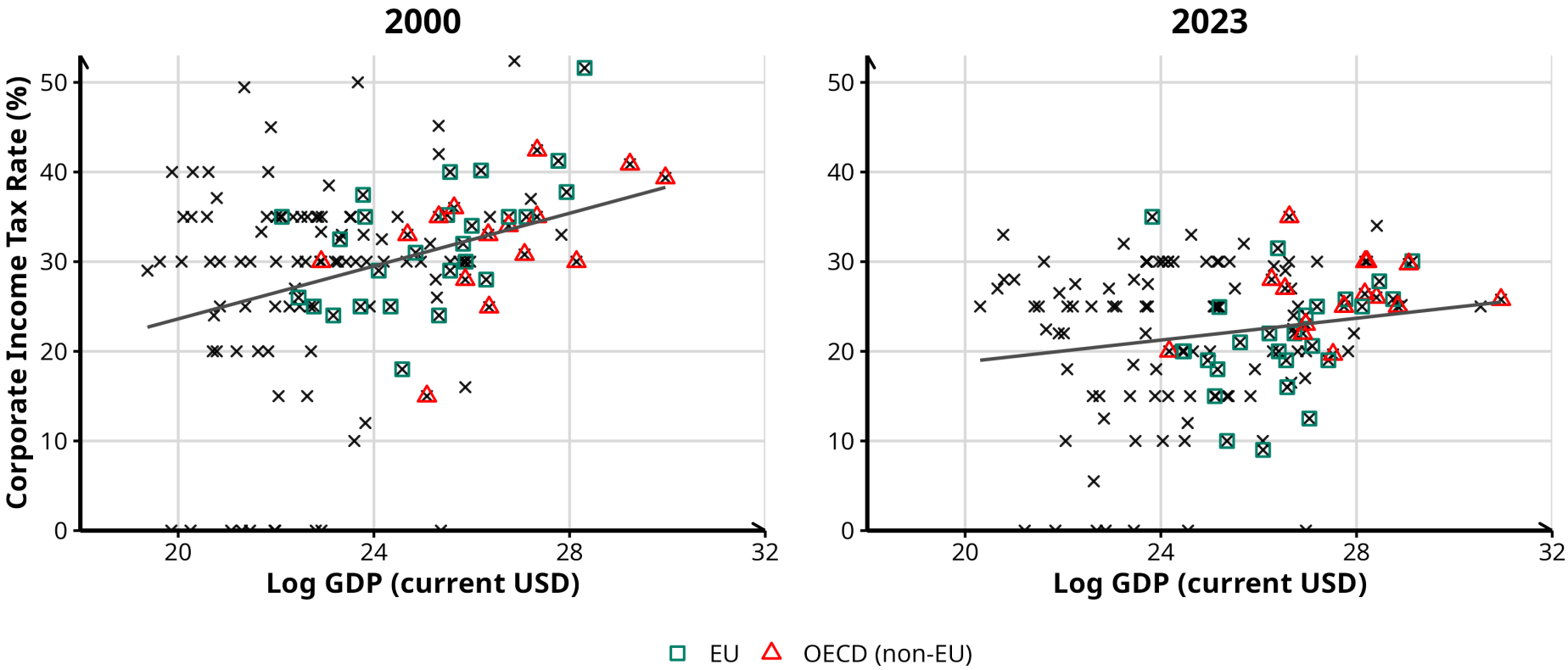
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  - Small country: full flight; large country: less elastic base $\Rightarrow$ higher tax

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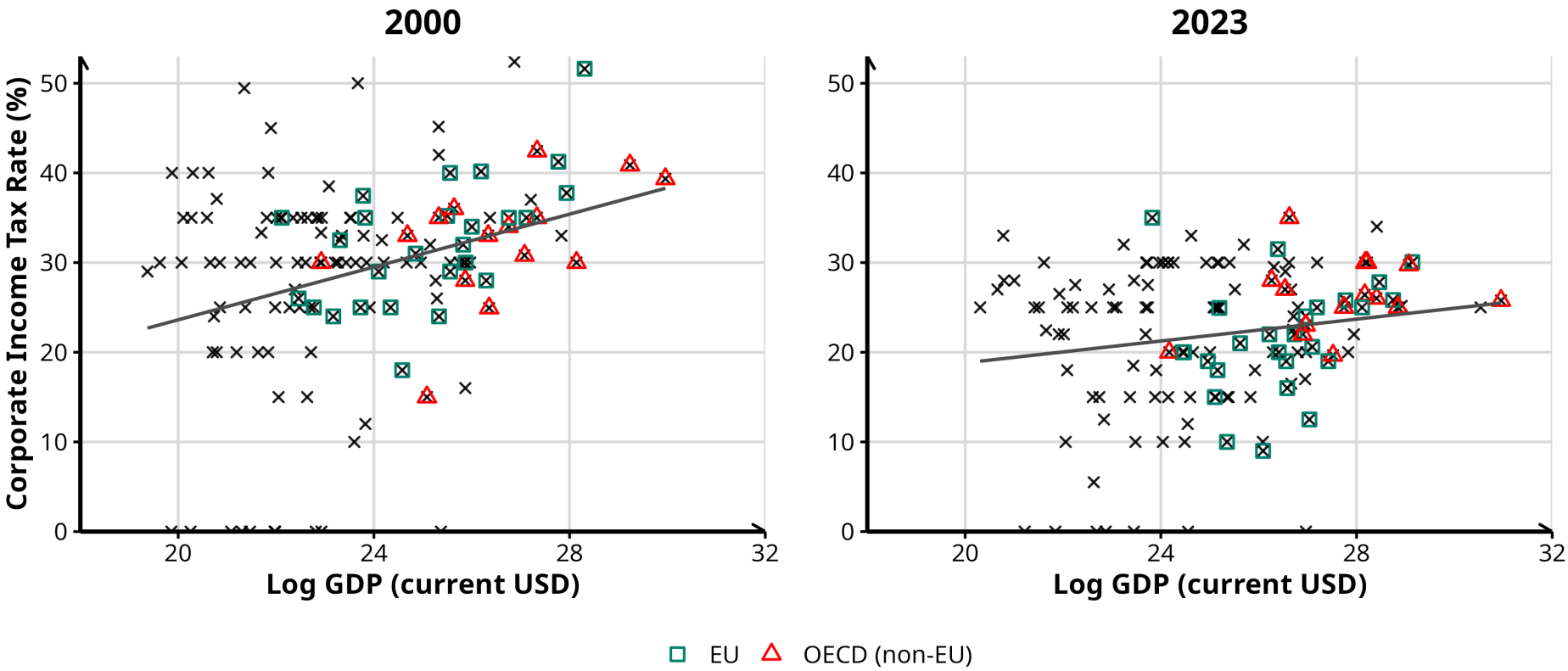
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  - Small country: full flight; large country: less elastic base $\Rightarrow$ higher tax
- Cross effect ($i \neq j$): $\dfrac{\partial k_i}{\partial t_j} = \underbrace{\dfrac{1}{|f_i''|}}_{\substack{\text{absorption}\\ \text{by } i}} \times \underbrace{\dfrac{|\zeta_j|}{\sum_s |\zeta_s|}}_{\text{fall in } \rho} > 0$
  - Fiscal externality: j widens the others' tax base but ignores it $\Rightarrow$ taxes too low at the Nash equilibrium

Country size and tax rates



Source: OECD-Corporate Tax Statistics and WDI

Country size and tax rates



Source: OECD-Corporate Tax Statistics and WDI

- Bigger countries tend to exhibit higher CIT rates
- Multiple equilibria: countries are not competing with all countries
- Gravity patterns in tax competition

Government Objective and Welfare

Representative consumer in country i:

$$W_i = \underbrace{f_i(k_i) - f_i'(k_i)k_i}_{\substack{\text{output} \\ \text{net of capital's pay}}} \quad \underbrace{+ \rho \bar{k}_i}_{\substack{\text{return on} \\ \text{owned capital}}} \quad \underbrace{+ G_i(t_i k_i)}_{\substack{\text{public good} \\ \text{from tax revenue}}}$$

- Private income: rents from immobile factors + returns to owned capital.
- Public good: financed by tax revenue $t_i k_i$.
- Tradeoff: distortions vs. revenue for public goods.

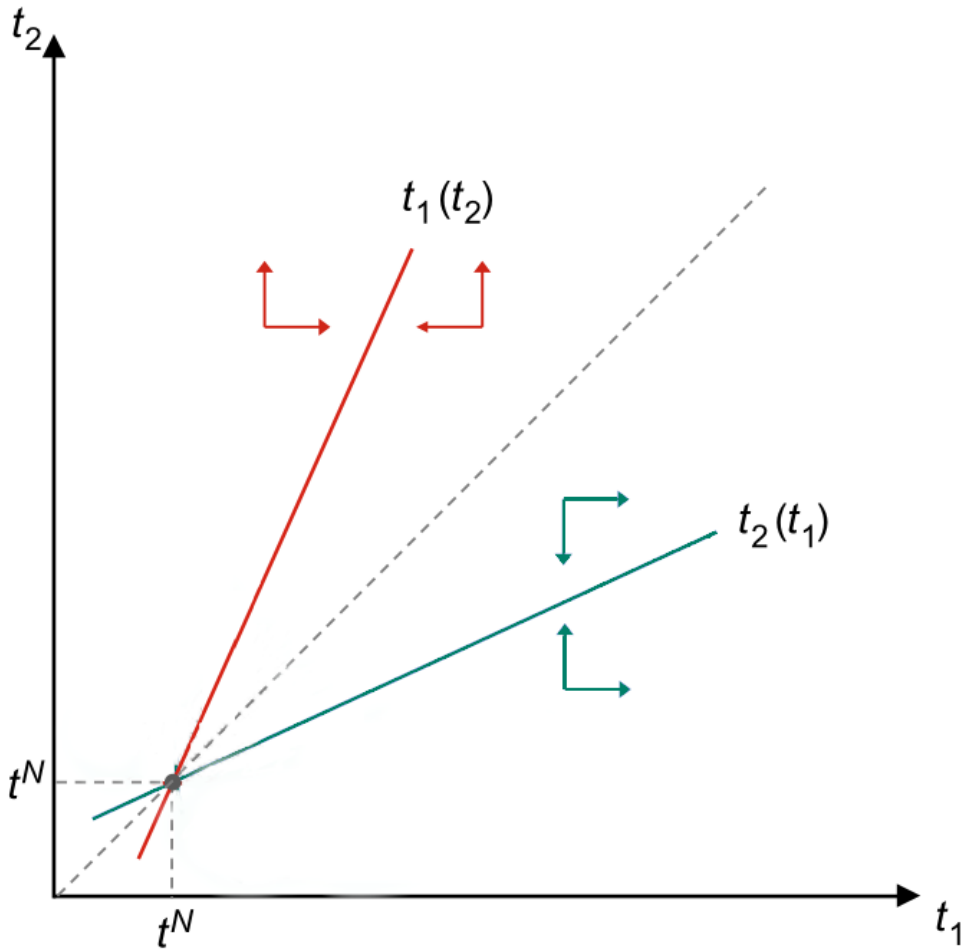
Optimal Tax Choice

Government chooses t_i to maximize W_i (derivation details).

$$\frac{\partial W_i}{\partial t_i} = \underbrace{-f_i''(k_i)k_i\frac{\partial k_i}{\partial t_i}}_{\text{wage loss from capital flight}} + \underbrace{G_i'(t_i k_i)}_{\text{value of public funds}} \left(\underbrace{k_i}_{\text{mechanical revenue}} + \underbrace{t_i\frac{\partial k_i}{\partial t_i}}_{\text{base erosion}} \right) + \underbrace{\frac{\partial \rho}{\partial t_i}\bar{k}_i}_{\text{world return effect}} = 0$$

- Defines country i's best response $t_i(t_{-i})$:
  - **strategic complements**: $\frac{\partial^2 W_i}{\partial t_i \partial t_j} > 0$ country i's best response to a higher tax rate in country j is to raise its own tax rate
  - **strategic substitutes**: $\frac{\partial^2 W_i}{\partial t_i \partial t_j} < 0$ country i's best response to a higher tax rate in country j is to lower its own tax rate

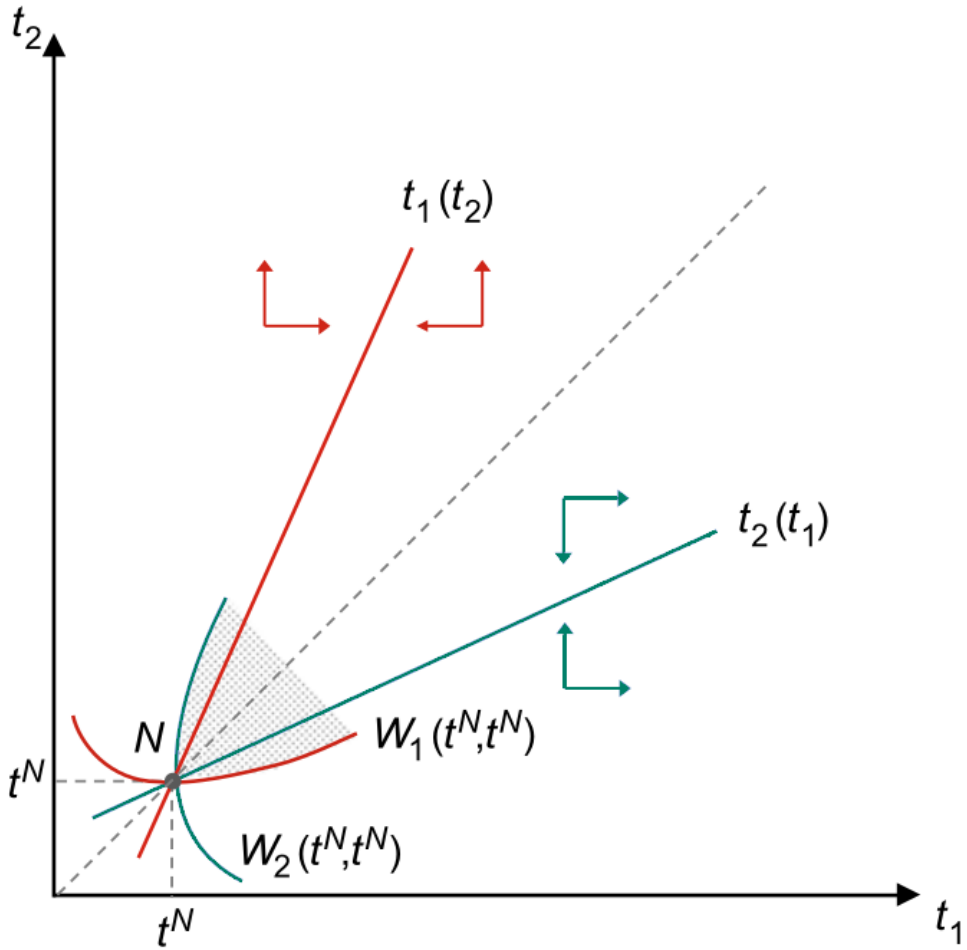
Governments' reaction functions



Source: Keen and Konrad

- Are t_1 and t_2 strategic complement or substitute ? Substitutes case

Nash equilibrium



Source: Keen and Konrad

- Slope of welfare functions is null at equilibirum
- Tax rates are mutually compatible $\rightarrow$ equilibrium

Equilibrium and Inefficiency

- Nash equilibrium: $(t_1^N, \ldots, t_n^N)$.
- Symmetric case:
  - Equal tax rates $t_i = t$.
  - Efficient allocation of capital (no production distortion).
  - But: $t^N < t^{FB}$ (first-best).
- Result: under-provision of public goods, inefficiently low taxes.
- Classic "race to the bottom" in tax competition.

2. Empirical validations

Do Countries Compete over Tax Rates ? (1/3)

- Estimate how statutory corporate tax rates (τ) respond to other countries' tax policies
- Simplifying assumption: every country i responds in the same way to the weighted average tax rates $\bar{\tau}$, of other countries in the sample.

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- Simplifying assumption: every country i responds in the same way to the weighted average tax rates $\bar{\tau}$, of other countries in the sample.

$$\tau_{i,t} = \underbrace{\beta_1}_{\substack{\text{reaction} \\ \text{slope}}} \underbrace{\bar{\tau}_{i,t}}_{\substack{\text{others'} \\ \text{stat. rates}}} + \gamma_1 \underbrace{\bar{z}_{i,t}}_{\substack{\text{others'} \\ \text{EMTRs}}} + \underbrace{\eta_1' X_{i,t}}_{\substack{\text{domestic} \\ \text{controls}}} + \underbrace{\mu_{1i}}_{\substack{\text{country} \\ \text{FE}}} + \underbrace{\theta_{1i}\, t}_{\substack{\text{country} \\ \text{trend}}} + \varepsilon_{1it}$$

where,

- $\bar{\tau}_{i,t}$ and $\bar{z}_{i,t}$: weighted averages of other countries' statutory rates and EMTRs (uniform, GDP or FDI weights).
- Theoretical expectations: $\beta_1, \gamma_1 > 0$
- "Own-tax" effects are stronger than "cross-tax" effects.

Econometric challenges:

- Endogeneity of $\bar{\tau}_{i,t}$ (simultaneous tax setting).
- Serial correlation and limited time variation.
- Common shocks: time dummies cannot be separated from $\bar{\tau}_{i,t}$, hence country-specific trends

Do Countries Compete over Tax Rates ? (2/3)

Identification strategy:

- Instrumental variables: $\bar{\tau}_{i,t}$ is instrumented by the weighted averages of the other countries' controls $\bar{x}_{i,t}$ (GDP, openness, public spending, politics, demographics): they move others' tax rates but should not affect country i's rate directly
- Threat: common shocks (recessions, the 1980s tax-reform wave) move everyone's taxes and controls at once and create a spurious β_1 – partly absorbed by country FE and country-specific trends
- Capital controls test: common intellectual trends would also generate $\beta_1 > 0$, even between closed economies; tax competition requires mobile bases $\Rightarrow$ interaction should exist only between countries without capital controls. It does: $\beta_1 \approx 0.6$ (significant) between open economies, never significant otherwise

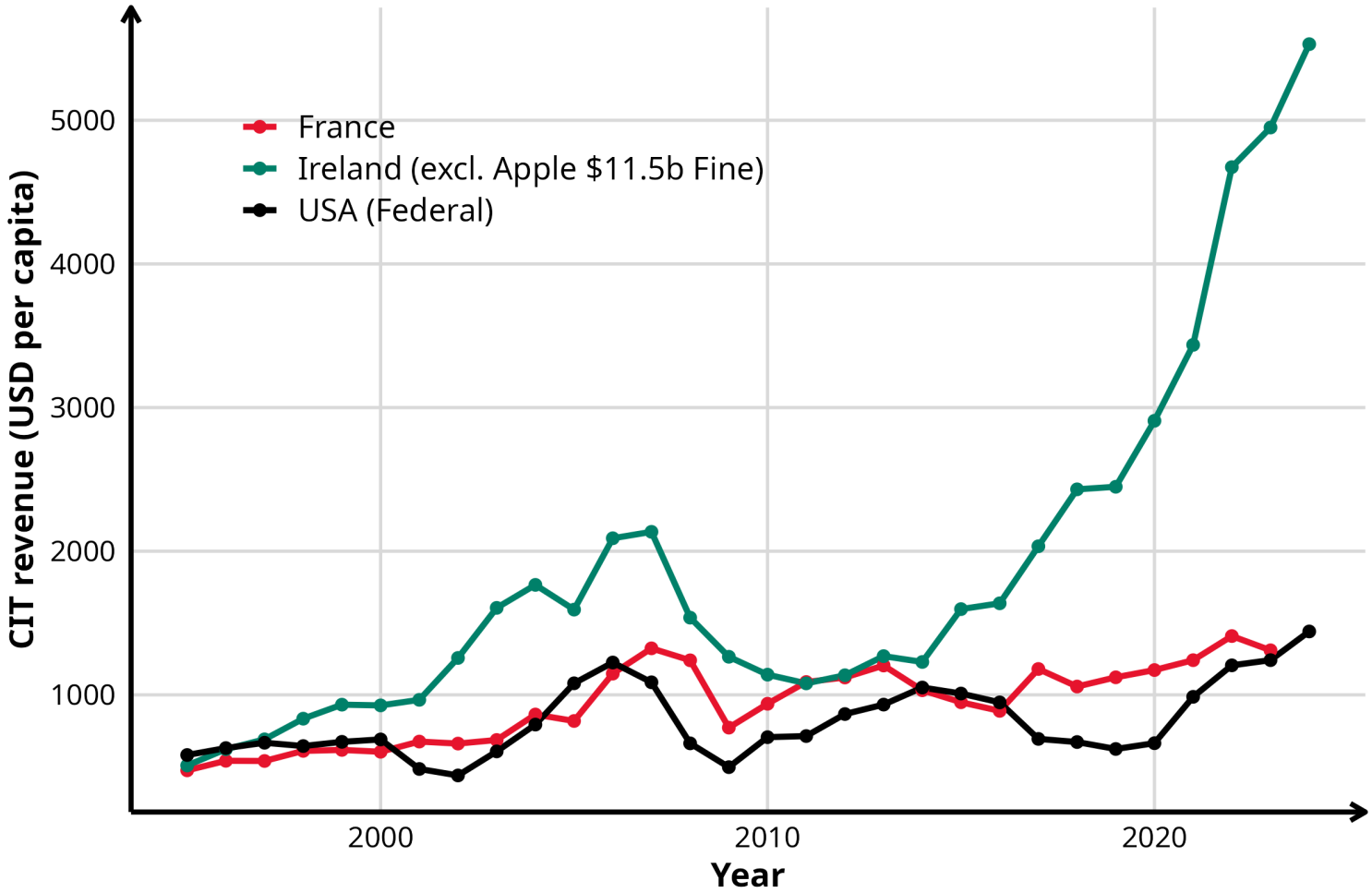
Main empirical findings:

- Strong strategic interaction in statutory tax rates: $\beta_1 \approx 0.3$–$0.7 \Rightarrow$ a 1 p.p. cut abroad lowers domestic τ by 0.3–0.7 p.p.
- Weak or no interaction in EMTRs.
- The observed fall in statutory tax rates (46% $\rightarrow$ 36%) is fully explained by intensified competition after capital control liberalization.

Do Countries Compete over Tax Rates (3/3)

- CIT rate is a way to attract profits but profits can move without capital (profit shifting, cf: Lecture 3)
- More targeted instruments can foster real investment, such as deduction of amortization (cf: Lecture 2)
- Countries can have several tools: CIT affect profits (and investment) while tax incentives can be targeted at attracting capital
- Devereux et al. also test the competition with respect to effective marginal tax rate and don't find cross-country complementarity in EMTR (less competition)
- Countries compete over profits but a lot less so over real captial

From tax competition to harmful BEPS



Source: Ducept

"Good" and "bad" tax competition ?

- While under taxation of paper profits and rents only bring about losses, taxes on "productive profits" increase the cost of capital
- Narrative behind the inclusion of a substance carve-out in Pillar 2 (see next week)
- Taxing profits is key for public finance but attracting capital is important for growth
- Not all part of the production process caries the same economic substance (jobs, assets, economic spillovers...)
- Need to look at the heterogeneity of the tax elasticity by business function

Two tax elasticities, two literatures

- Real activity: how investment, FDI, capital or employment respond to taxes. Cf Lecture 3, semi-elasticity around 1.

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- The two elasticities differ in size: the elasticity of paper profits is about three times that of the real tax base (Ferrari, Laffitte, Parenti & Toubal, 2026)
- But they are not independent: the way a firm can escape the tax on its profits changes how much its real activity needs to move

Linked elasticities: profit shifting shields real activity

- An MNE invests in a country with tax rate t and can book a share s of the profits in a tax haven taxed at t_h. The tax rate that matters for investment is

$$t_{\text{eff}} = \underbrace{(1-s)\,t}_{\substack{\text{profits taxed} \\ \text{where the capital is}}} + \underbrace{s\,t_h}_{\substack{\text{profits shifted} \\ \text{to the haven}}} \quad \Longrightarrow \quad \frac{\partial t_{\text{eff}}}{\partial t} = 1 - s$$

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- The more profits are shifted, the less a change in t affects the cost of capital: high elasticity of profits $\Rightarrow$ low elasticity of real activity
- Suárez Serrato (2018): the repeal of Section 936 (1996–2006) closed a Puerto Rico tax haven for U.S. multinationals. Their effective tax rate rose by 4.65–6pp, and they cut U.S. investment (about -23%) and domestic employment, with spillovers to local labor markets

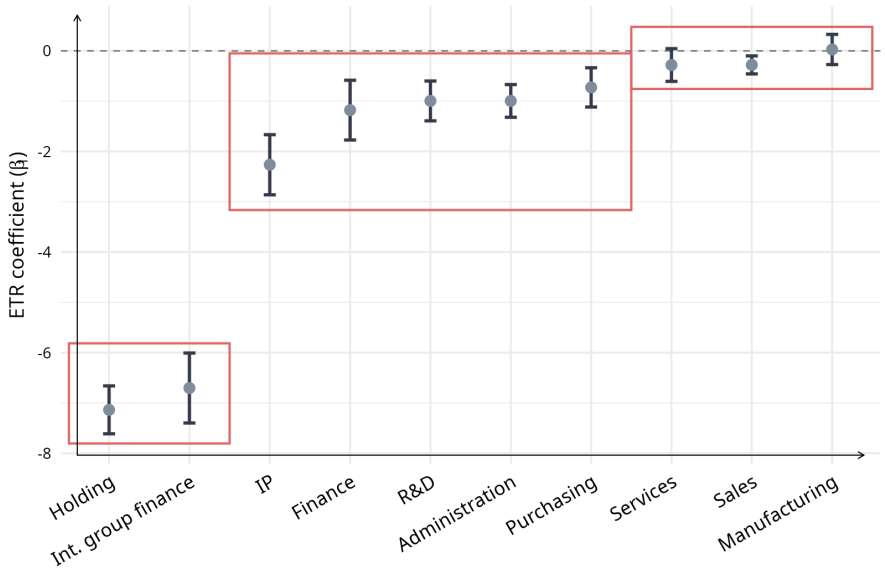
Linked elasticities: a policy trade-off

- Fighting profit shifting lowers the elasticity of profits but raises the elasticity of capital:

Linked elasticities: a policy trade-off

- Fighting profit shifting lowers the elasticity of profits but raises the elasticity of capital:
- The effect on equilibrium tax rates is ambiguous, and lax enforcement can raise tax rates and welfare by favoring investment (Mongrain, Oh & van Ypersele, 2023)

Beyond "real" vs. "paper": three tiers of business functions



- Semi-elasticity of the number of entities performing each function to the host country's ETR, within MNE
- Holding, internal group finance: ≈ -7; IP, finance, R&D, administration, purchasing: -1 to -2; services, sales, manufacturing: ≈ 0
- Intermediate functions also carry jobs and investments

Cooperation

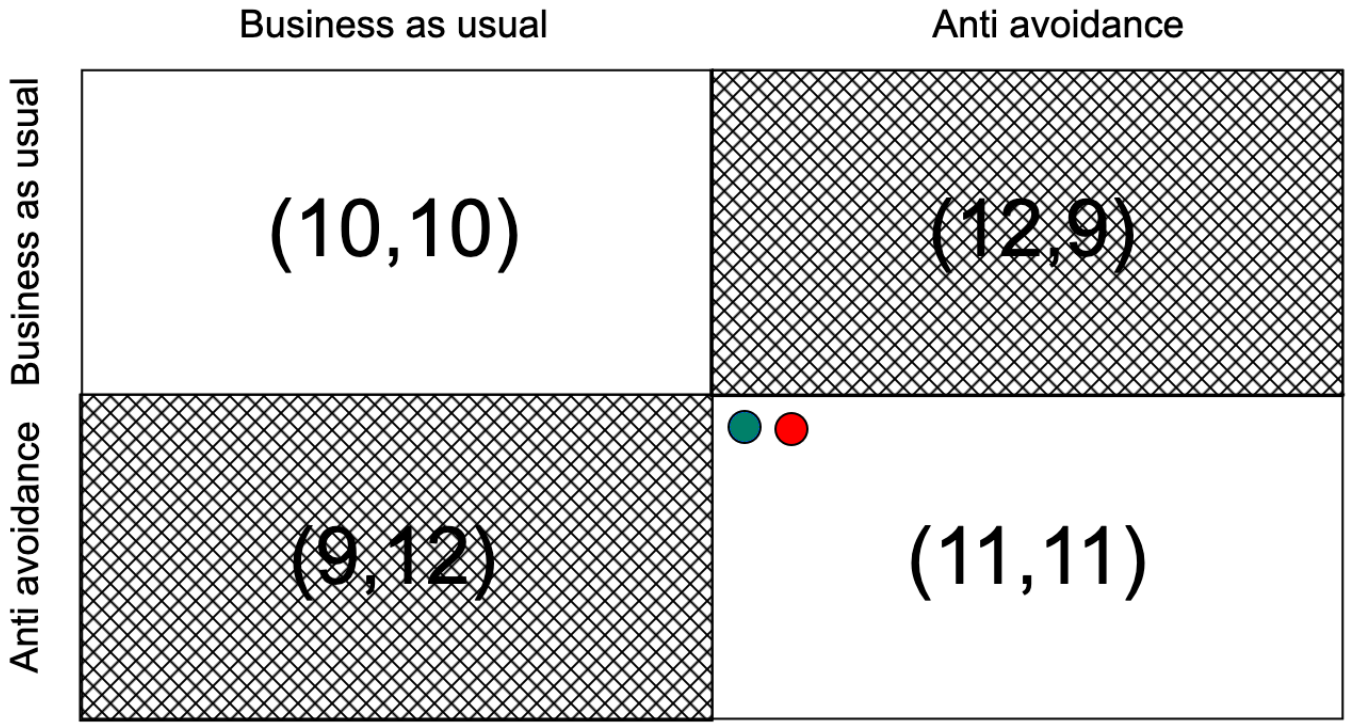
The Nash equilibrium is sub-optimal. What happens when we introduce a cooperation device ?

- Global cooperation prevents free-riding and moves the Nash equilibrium to the social optimum.

Cooperation

The Nash equilibrium is sub-optimal. What happens when we introduce a cooperation device ?

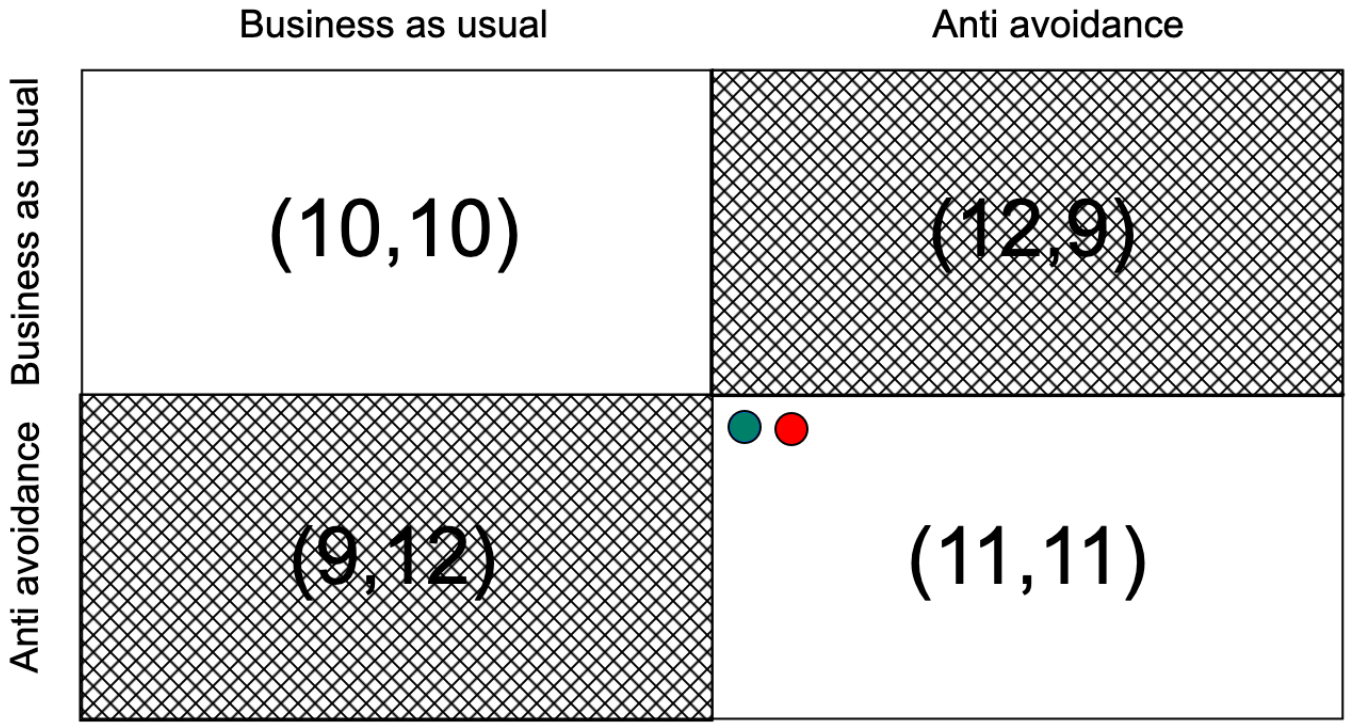
- Global implementation and cooperation prevent free-riding.



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Lecture 4, in brief

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- Good and bad tax competition: paper profits are about three times more elastic than real activity; holding and finance functions move with taxes, manufacturing and sales do not
- Cooperation would move countries to the social optimum, but it is not a Nash equilibrium: someone has to organise it

Oral debriefing

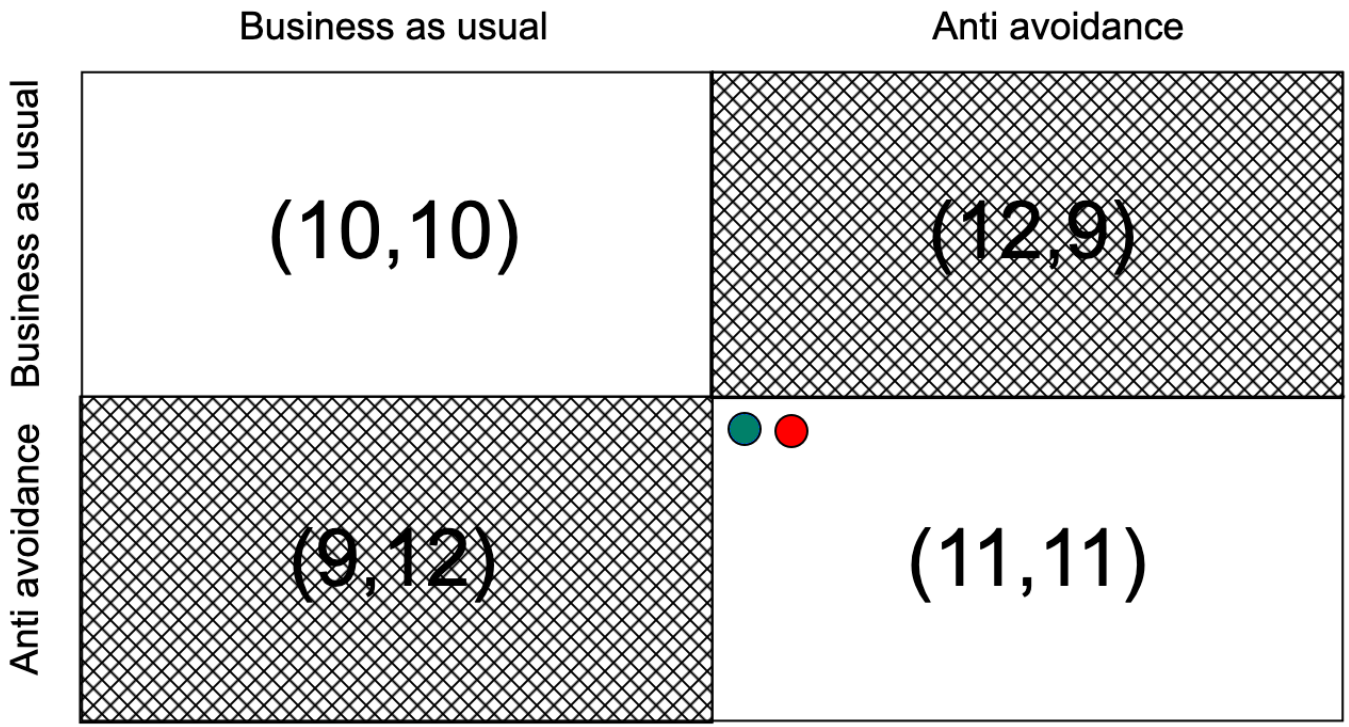
Should we even fight profit shifting ?

Lecture 5

Towards alternative forms of taxation?

1. International Taxation at the Cross-Road

Social optimum vs. private optima



The limited governance of international taxation (1/2)

Domain	Public Health	Climate	Digital	Trade	Macro & Finance	Migration	Competition	Banking Regulation	Taxation
Common problem identification									
Shared expertise source									
Results evaluation and adaptation									
Consensus on action principles									
Transparent reporting mechanisms									
Trusted institutions									

Table: Evaluation of coordination: Black = Deficient, Gray = Intermediate, White = Satisfactory,source: Pisani-Ferry & Papaconstantinou

The limited governance of international taxation (2/2)

Domain	Taxation
Common problem identification	Lectures 1–4
Shared expertise source	G20/OECD
Results evaluation and adaptation	BEPS 1.0
Consensus on action principles	The 2-Pillar Solution
Transparent reporting mechanisms	Transparency
Trusted institutions	OECD vs. UN

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The common problem, as identified in Lectures 1–4

Back to main

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- Lecture 4: CIT rates are strategic complements, so a cut in one country is followed by cuts elsewhere – a race to the bottom, mostly over paper profits (details)
- CIT and PIT should be complements within a country, yet a country acting alone loses part of its base: coordination is needed, but it is not a Nash equilibrium

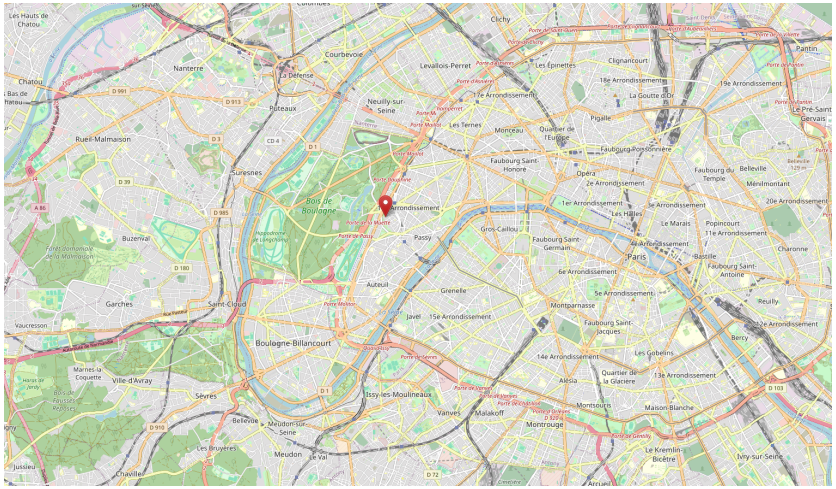
Institutional background

Back to main

- **2012** – G20 requests OECD to address Base Erosion and Profit Shifting.
- **2013** – Action Plan on BEPS (15 Actions) released.
- **2015** – OECD/G20 publish final BEPS reports.
- **2016** – Inclusive Framework established for global cooperation.
- **2021** – BEPS 2.0 agreement: Pillar One & Pillar Two framework.
- **2024 → onward** – Implementation of the GMT

International Negotiations at the OECD

Back to main





- The OECD was mandated by the G20 in 2013 to conduct international negotiations around Base Erosion and Profit Shifting (BEPS) in an inclusive framework format (= with non-OECD countries)
- Around 150 tax lawyers (and a few economists) helping 154 countries designing a new tax system

2012-2015: BEPS 1.0 Negotiations

Back to main

Coherence	Substance	Transparency / Certainty
Action 2: Neutralising the effects of hybrid mismatch arrangements	**Action 6:** Prevention of Tax Treaty Abuse Minimum Standard – developing model treaty provisions to prevent abuse.	**Action 11:** Measuring and Monitoring BEPS – analysing data on the economic and fiscal effects of tax avoidance.
Action 3: Controlled Foreign Companies – reducing incentives to shift income from markets into low-tax countries.	**Action 7:** Permanent establishment status – preventing artificial avoidance of PE status.	**Action 12:** Mandatory Disclosure Rules – requiring disclosure of aggressive tax planning arrangements.
Action 4: Limitation on Interest Deductions – linking an entity's net interest deductions to its economic activity.	**Actions 8–10:** Transfer Pricing – guidance on aligning profits with value creation (intangibles, risks, and capital).	**Action 13:** Country-by-Country Reporting – ensuring MNEs report annually for each tax jurisdiction.
Action 5: Harmful tax practices – countering harmful preferential regimes and improving transparency.		**Action 14:** Mutual Agreement Procedure – making dispute resolution between jurisdictions more timely and effective.
Cross-Cutting Actions		
Action 1: Digital Economy – addressing the tax challenges of digitalisation. **Action 15:** Multilateral Instrument – implementing BEPS-related treaty recommendations to fix vulnerabilities.		

Source: OECD

Did BEPS 1.0 work ?

Back to main

High-level indicators:

Did BEPS 1.0 work ? Back to main

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- Wide participation of countries

Did BEPS 1.0 work ? Back to main

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Did BEPS 1.0 work ? Back to main

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Clear shortcomings:

- No direct treatement of tax rates
- Intangible economy

2018-?: BEPS 2.0 Negotiations

Back to main

- BEPS 1.0 was falling short on digitization

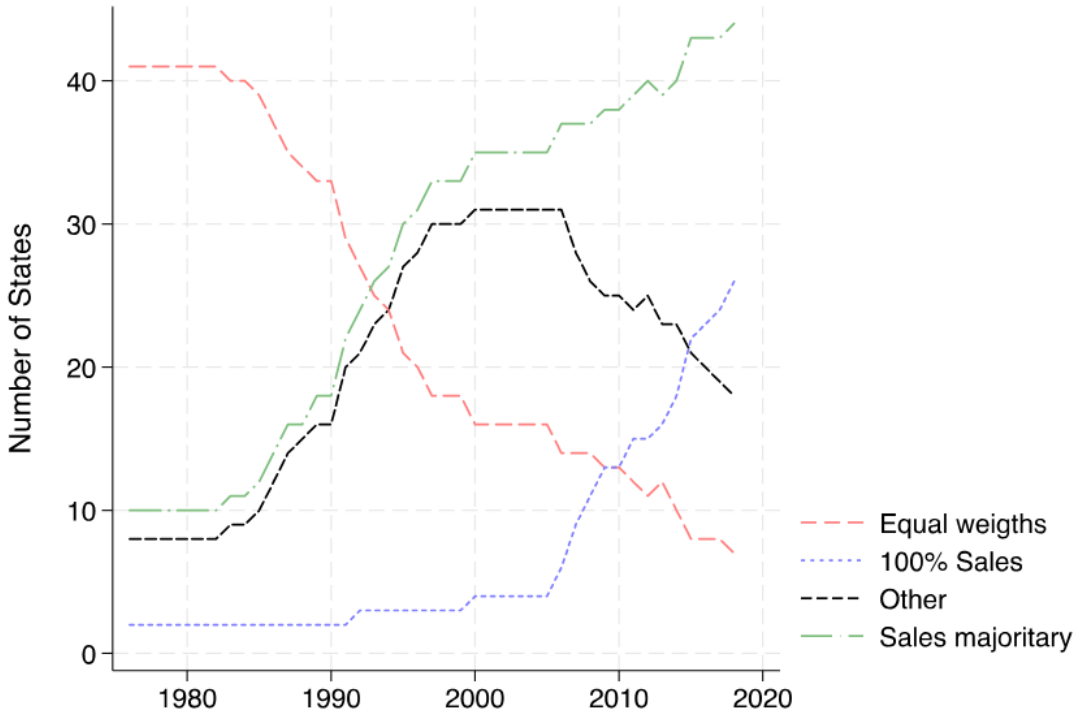
2018-?: BEPS 2.0 Negotiations

Back to main

- BEPS 1.0 was falling short on digitization
- Two-Pillars solutions based on two observations:
  1. Issue with tax base definition $\Rightarrow$ Pilar 1 aims at thinking of profit globally and allocate them according to the share of sales made in each country.
  2. Issue with the tax rates $\Rightarrow$ Pilar 2 seeks at setting a Global Minimum Tax at 15%.
- Agreement in 2021 to work on a 2-Pillar Solution

Apportionment Taxation

Back to main



Source: Delpeuch & Laffitte, 2019

- How to choose the right formula ?
- Is there an incidence on factors' remuneration ?

G20/OECD Pillar 1

Back to main

- Global apportionment system based on final sales !

G20/OECD Pillar 1 Back to main

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G20/OECD Pillar 1 Back to main

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G20/OECD Pillar 1 Back to main

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G20/OECD Pillar 1

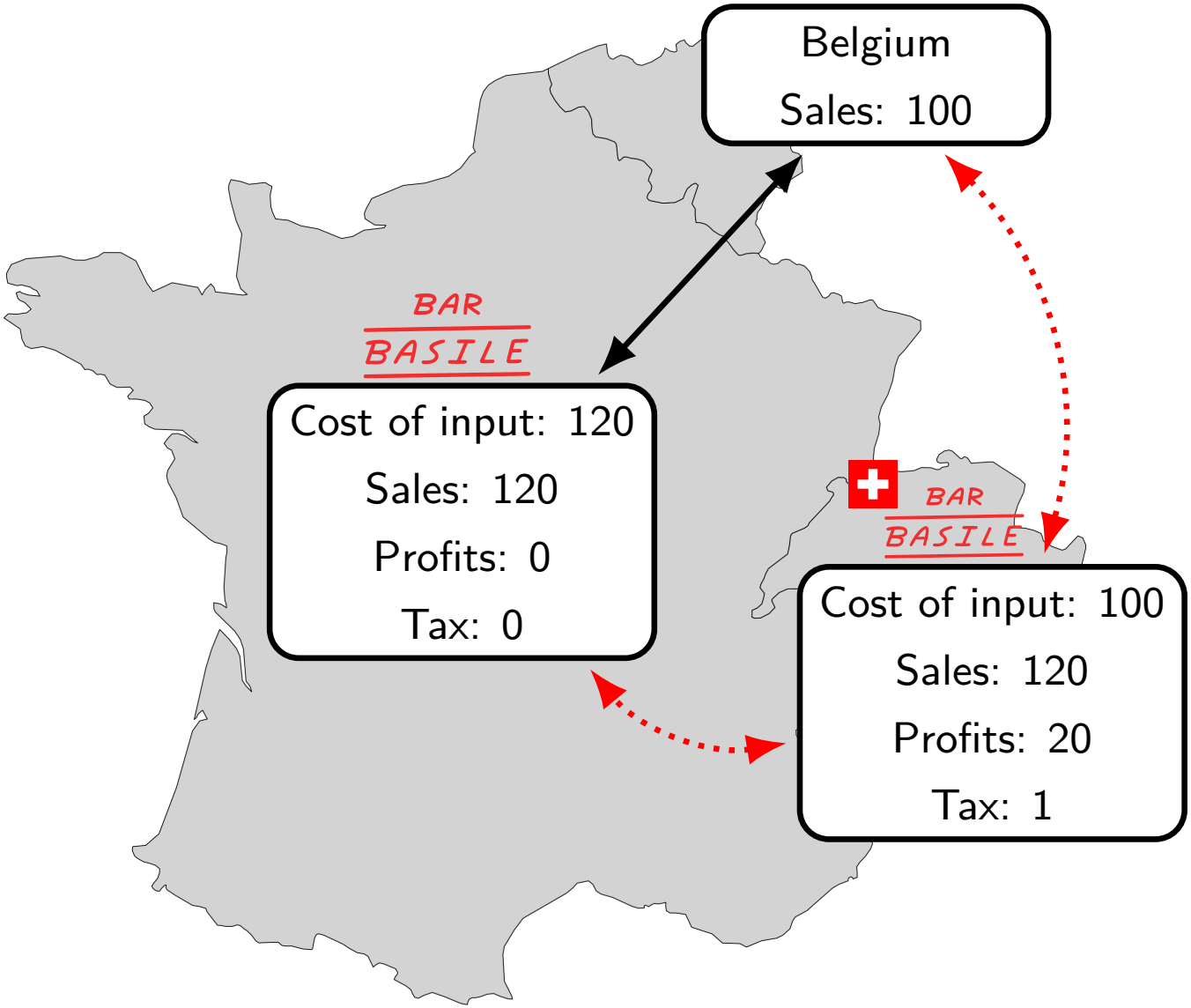
Back to main

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$$\text{Amout A} = \underbrace{\boxed{\text{Global residual profit in scope}} \times \boxed{\text{Reallocation percentage}}}_{\text{Global numbers common to all jurisdictions}} \times \boxed{\text{Jurisdiction A share of Amount A}} \times \underbrace{\boxed{\text{Tax rate applied by Jurisdiction A on received profit}} - \boxed{\text{Share of Jurisdiction A eliminated Amount A}} \times \boxed{\text{Rate of double-tax relief in Jurisdiction A}}}_{\text{Jurisdiction-specific numbers}}$$

Back to Basile's bar: profit shifting

Back to main

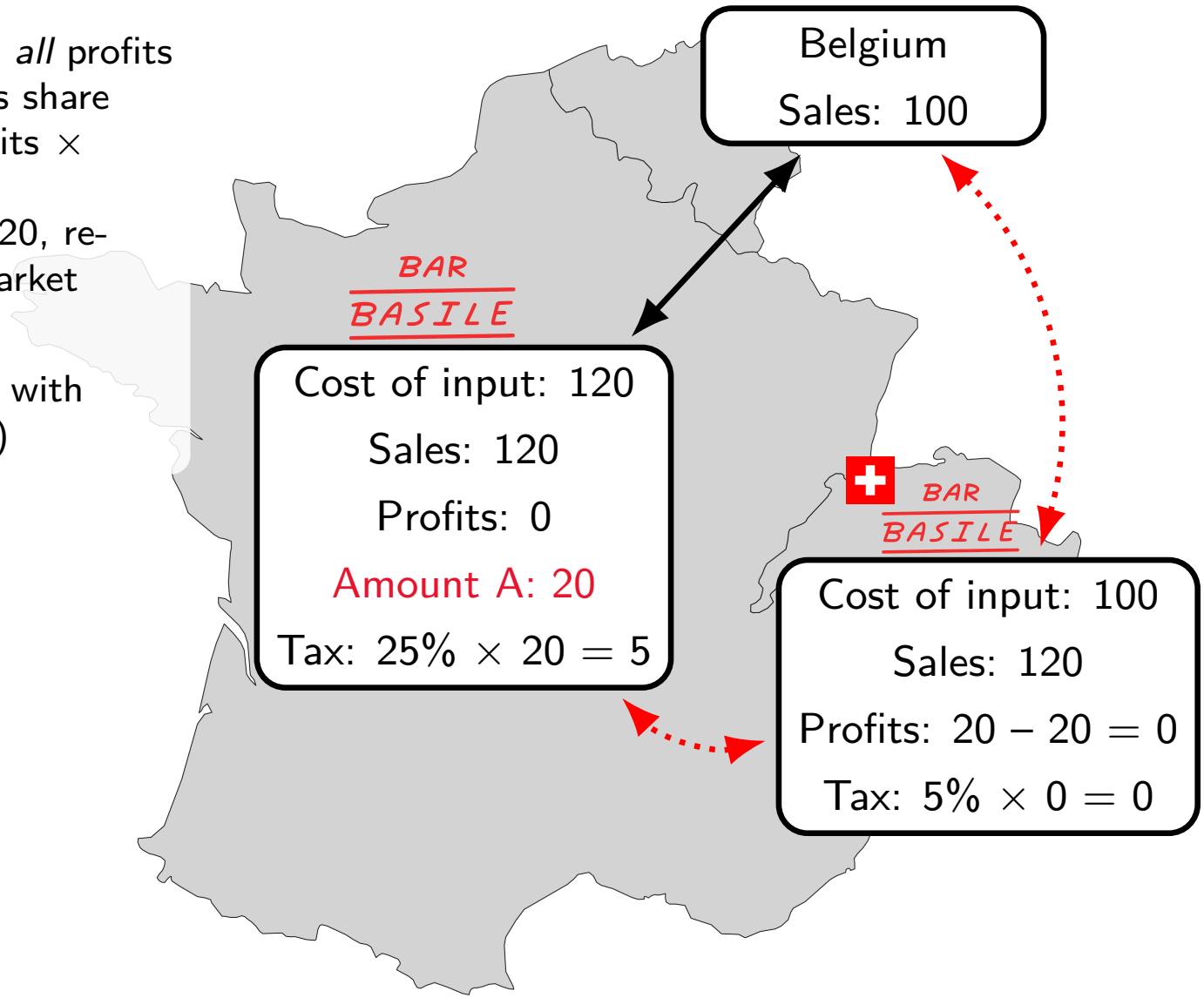


Basile's bar under Pillar 1

Back to main

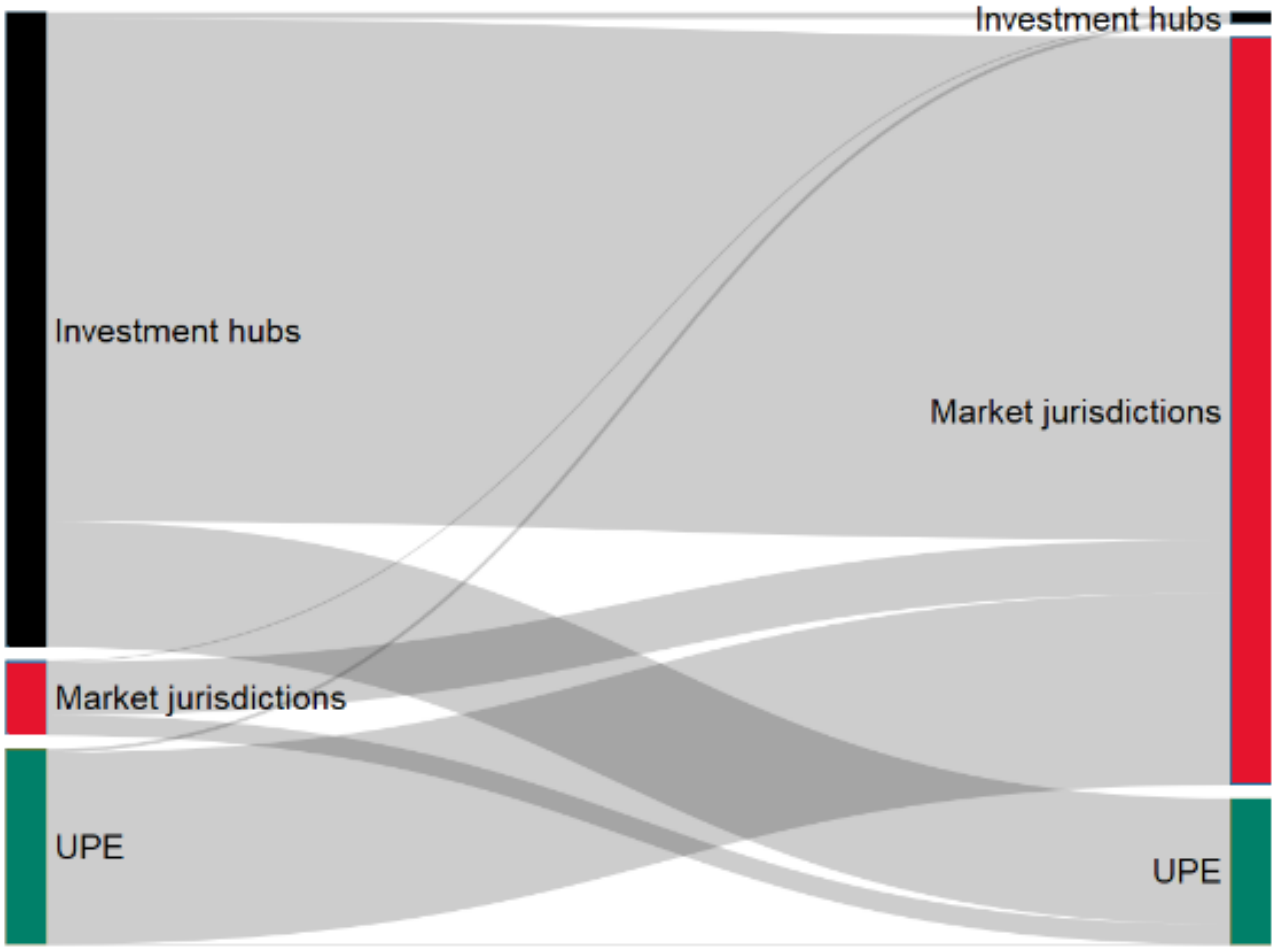
Simplified Pillar 1: *all* profits reallocated by sales share
Amount A = Profits × Sales share$_{FR}$ = 20 × 100% = 20, reallocated to the market (France)

Total tax: 5 (vs. 1 with shifting, 5 without)



Pillar 1: Relocation of Taxing Rights

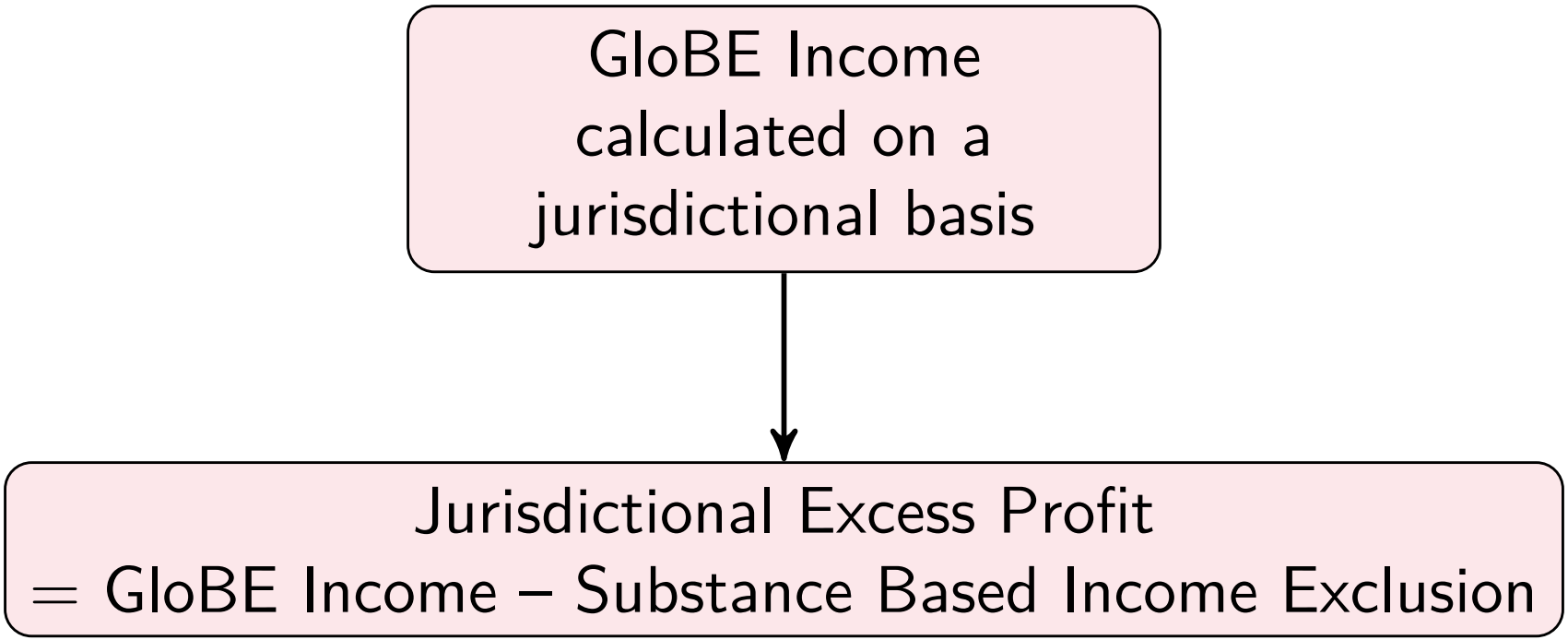
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Source: Delpeuch et al. 2023

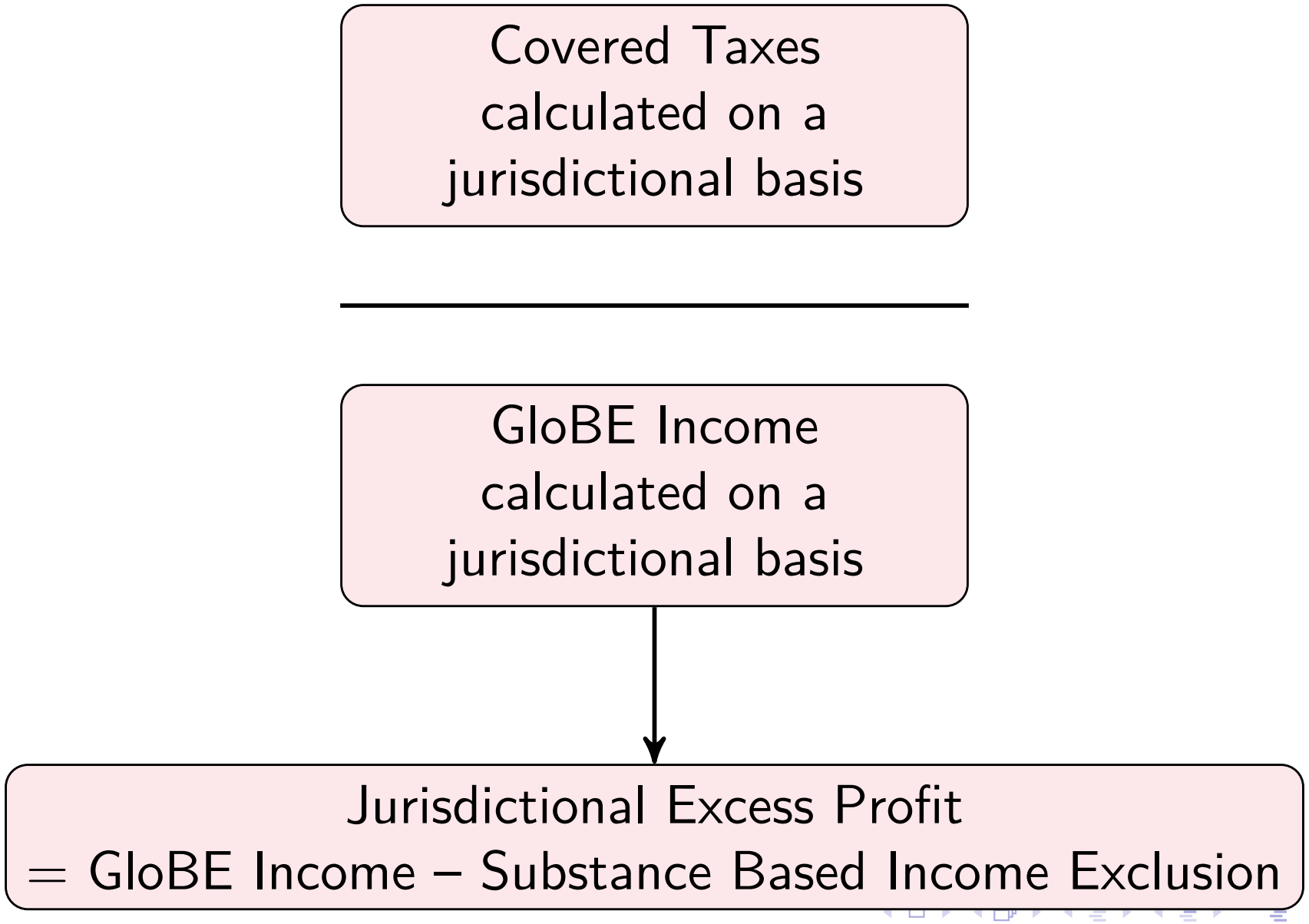
Jurisdictional Top-up Tax Breakdown

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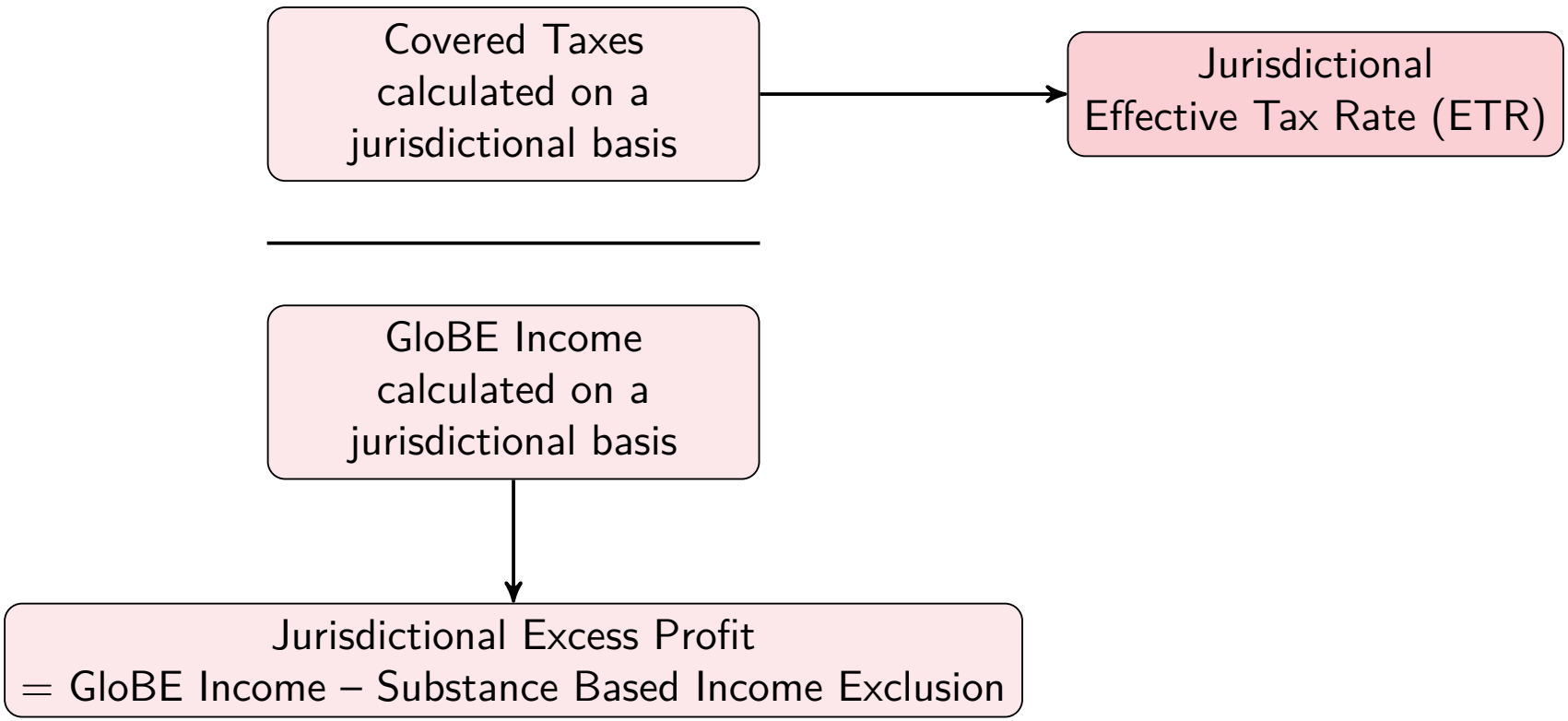
Jurisdictional Top-up Tax Breakdown

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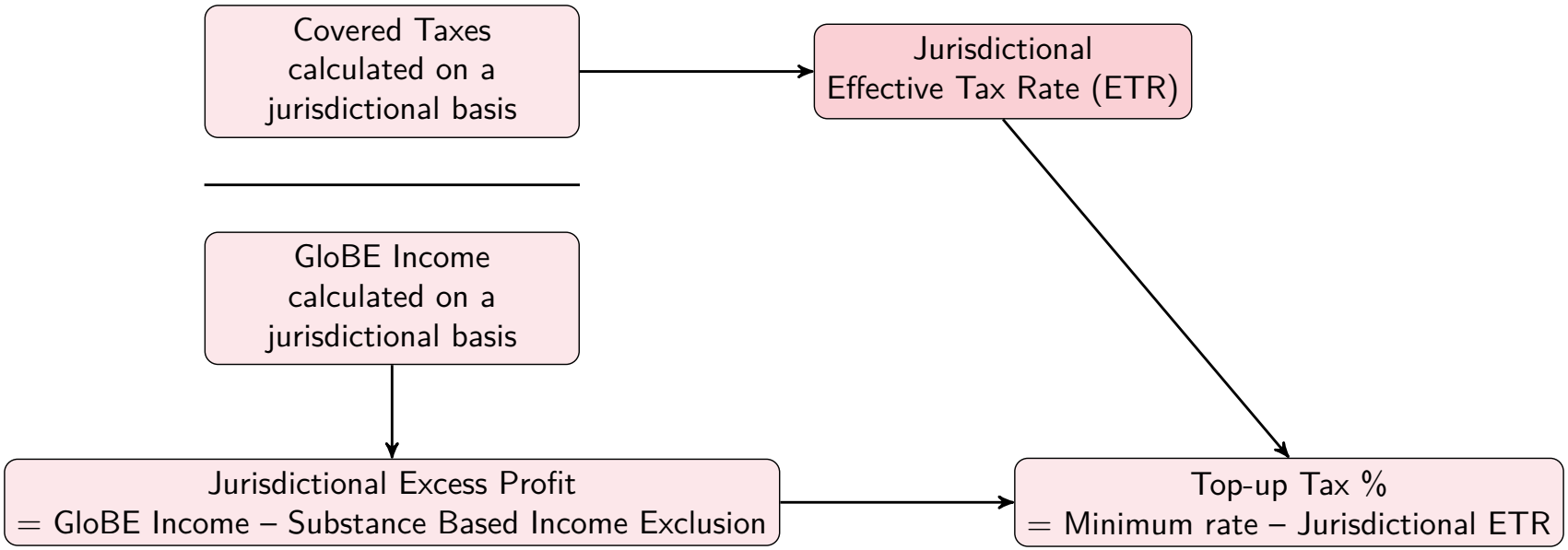
Jurisdictional Top-up Tax Breakdown

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Jurisdictional Top-up Tax Breakdown

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Pillar 2: GMT's priority order

Back to main

- The country of the affiliate shoots first. If the the top-up tax is not collected locally...

Pillar 2: GMT's priority order

Back to main

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Pillar 2: GMT's priority order

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Pillar 2: GMT's priority order

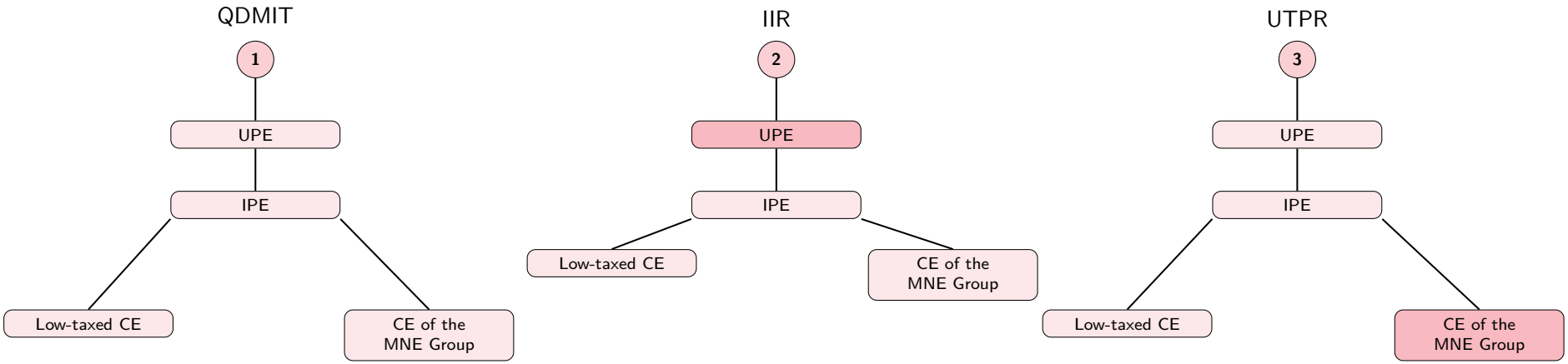
Back to main

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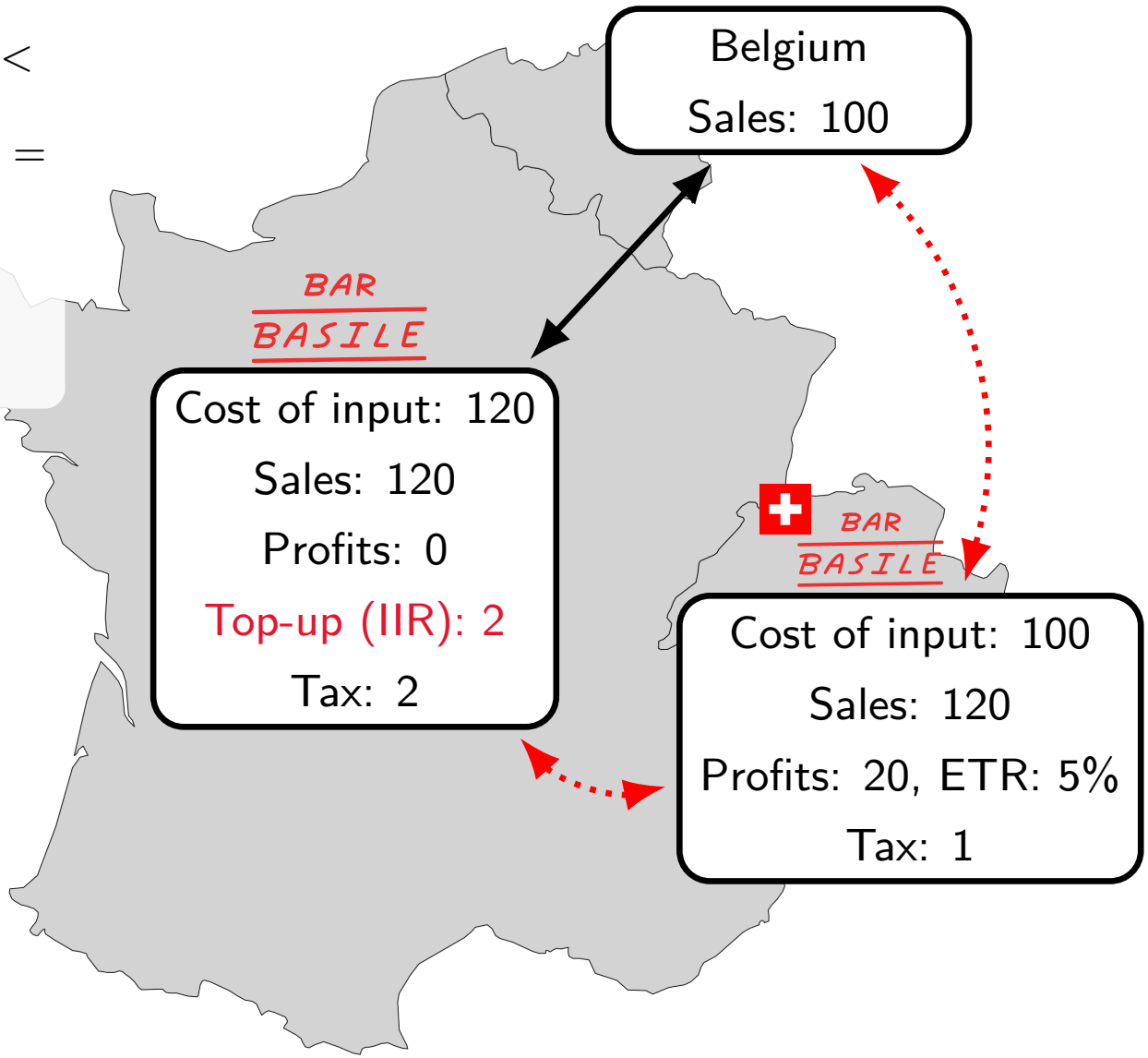


Basile's bar under Pillar 2

Back to main

Swiss ETR $= 1/20 = 5\% <$ 15%
Top-up $= (15\% - 5\%) \times 20 =$ 2

Switzerland does nothing: France, the HQ country, collects the top-up (IIR)

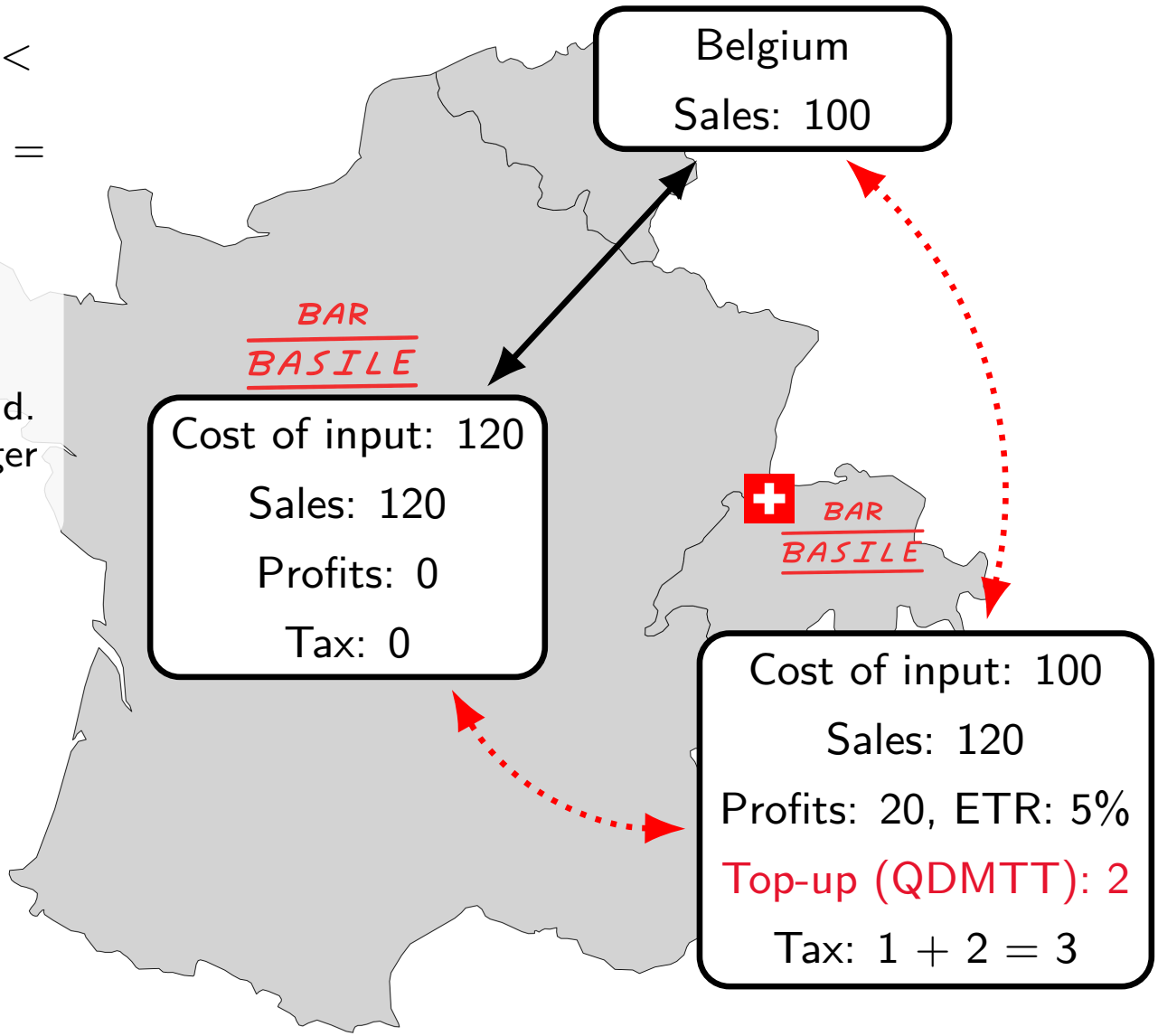


Basile's bar under Pillar 2

Back to main

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Switzerland shoots first (QDMTT, in force since 2024): same total tax, 3, but collected in Switzerland. Taxing below 15% no longer pays

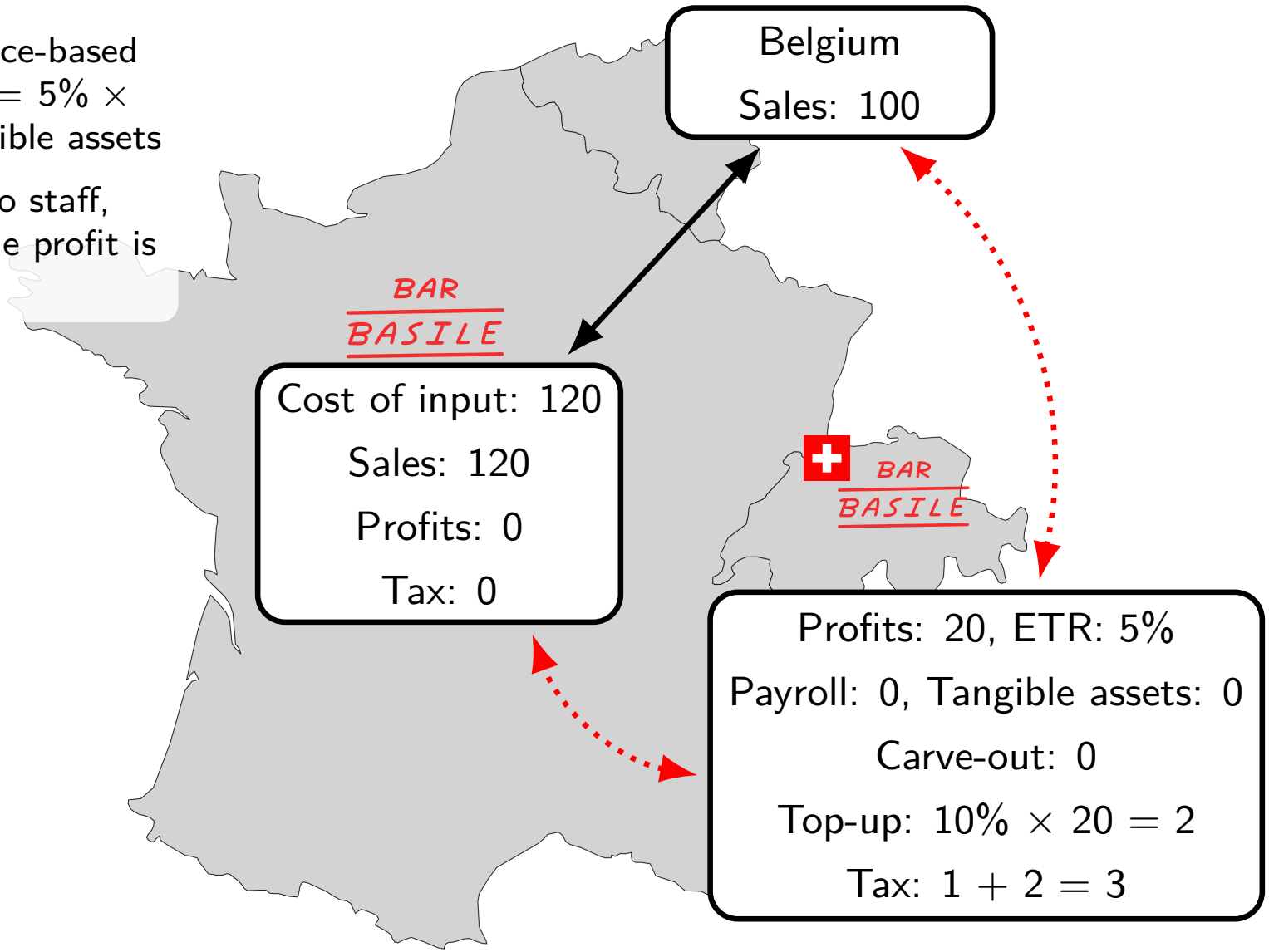


Basile's bar under Pillar 2: the carve-out

Back to main

Carve-out (substance-based income exclusion) $= 5\% \times$ payroll $+ 5\% \times$ tangible assets

A letterbox hub: no staff, no assets, the whole profit is topped up

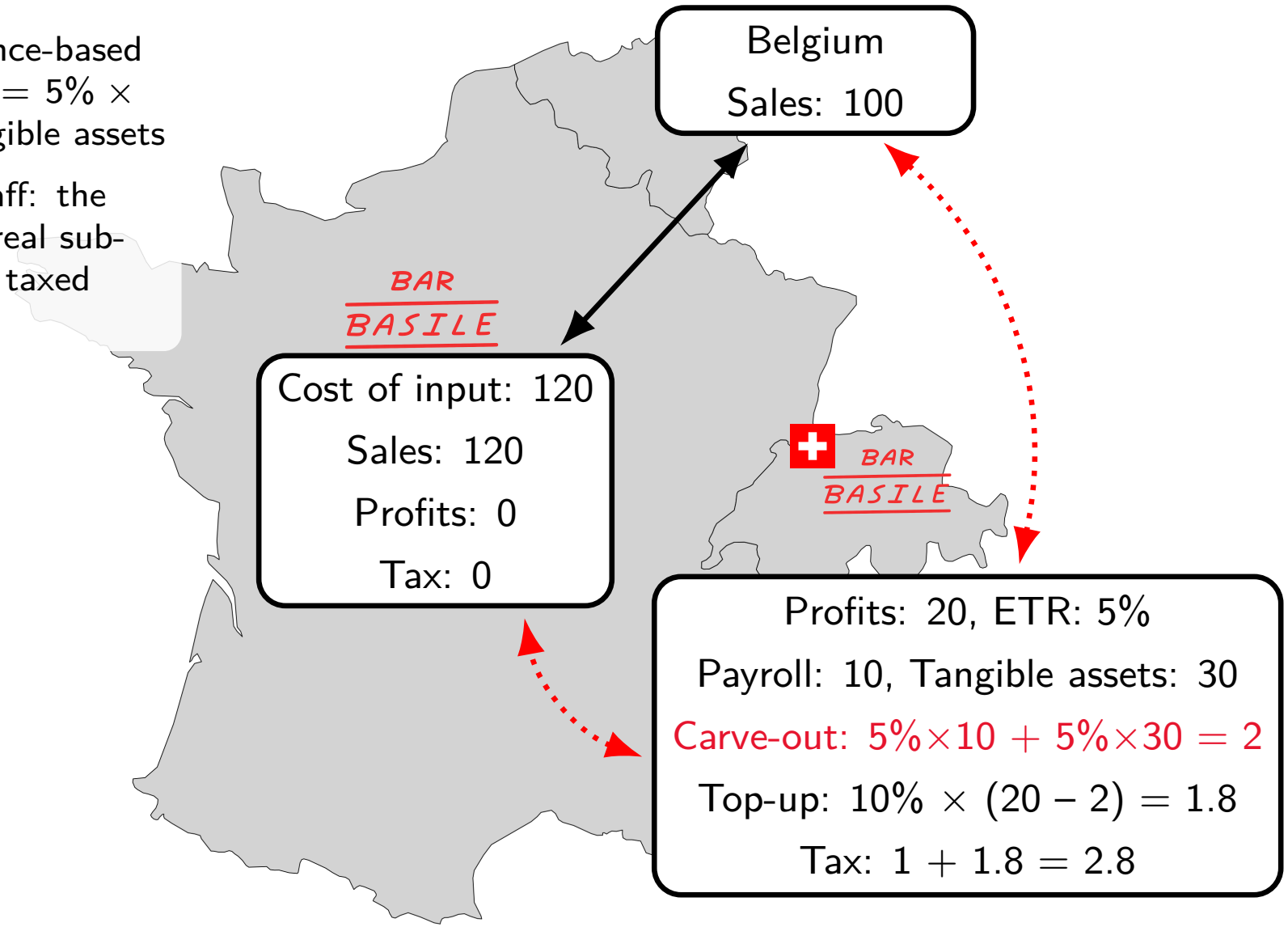


Basile's bar under Pillar 2: the carve-out

Back to main

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Same hub with staff: the routine return on real substance can still be taxed below 15%



The carve-out: tolerating "good" tax competition

Back to main

- Lecture 4: under-taxing paper profits only brings losses, taxing productive profits raises the cost of capital
  - The carve-out (5% of payroll + 5% of tangible assets; 10% and 8% in 2023, phased down) keeps the routine return on jobs and equipment out of the minimum tax
  - Competition for real capital remains possible, not for paper profits: holdings and internal finance bear the full top-up

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- Competition moves from rates to targeted incentives – not all of them work (CICE) (details)

Economic diplomacy: theory...and practice

Back to main

- Pillar 1 works as a multilateral tax convention. Hard to reach full consensus

Economic diplomacy: theory...and practice

Back to main

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- Pillar 2 is more robust to non-participation of country due to back-stops (IIR, UTPR)

Economic diplomacy: theory...and practice

Back to main

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- Pillar 2 is more robust to non-participation of country due to back-stops (IIR, UTPR)
- Yet...



:tober 20, 2025
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ECONOMY • WORLD ECONOMY

Donald Trump wrecks global minimum tax on multinationals

The US president has instructed his Secretary of the Treasury Scott Bessent to organize the withdrawal of the United States from the global tax agreement negotiated by the Organization for Economic Cooperation and Development.

By Anne Michel

Published on February 2, 2025, at 3:01 am (Paris), updated on February 2, 2025, at 6:00 pm · 4 min read · Lire en français

Source: Le Monde

Transparency

Back to main

Transparency shocks:

- The ICIJ's Offshore Leaks Database covers 810 000+ offshore entities (companies, trusts, foundations) across 200+ jurisdictions.
  - 2013: "Offshore Leaks" – first major set of data.
  - 2014: Lux Leaks: Luxembourg's tax rulings
  - 2016: Panama Papers – 11.5 million documents, 214 000+ entities
  - 2017/18: Paradise Papers – 13.4 m files, further offshore networks exposed
  - 2021: Pandora Papers – biggest to date

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Institutional reforms on transparency;

- Longstanding fight from the Civil Society
- Action 13 & 14: Country-by-Country reporting and Mutual Agreement Procedure
- Common Reporting Standard (cf: lecture 3)
- Many critics about the opacity of the OECD negotiation process

UN Framework Convention on International Tax Cooperation (1/2)

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- Pushed by the Africa Group: UNGA resolution in 2023, terms of reference adopted in Aug. 2024 by vote (110 for, 8 against incl. the US and the UK, 44 abstentions incl. the EU)
- Led by an Intergovernmental Negotiating Committee (INC), open to all UN members, consensus sought but votes possible; sessions in New York and Nairobi
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- **Workstream I**: Framework Convention (Zero Draft, July 2026): fair allocation of taxing rights, high-net-worth individuals, illicit financial flows, harmful tax practices
- **Workstream II**: Protocol on cross-border services (incl. automated digital services), taxed at source
- **Workstream III**: Protocol on dispute prevention/resolution

UN Framework Convention on International Tax Cooperation (2/2)

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Next Steps:

- Aug. 2026: first negotiation on full draft texts (New York)
- 30 Nov.–10 Dec. 2026: sixth session (Nairobi), then three sessions in 2027
- 2027: final texts submitted to the UN General Assembly (adoption $\neq$ ratification)

UN Framework Convention on International Tax Cooperation (2/2)

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Challenges:

- The US left the talks in Feb. 2025 and vowed to oppose the outcome
- Double taxation if UN and OECD rules overlap?
- A framework convention sets principles: substance depends on protocols that each country may or may not sign (details)

The UN convention and the super-rich

Back to main

Draft Article 6, "High-net-worth individuals" (Zero Draft, 21 July 2026):

1. States shall cooperate to enhance measures to detect, deter and prevent tax avoidance and evasion by high-net-worth individuals
2. States shall share general information on the structures and techniques used by high-net-worth individuals to avoid and evade taxes
3. States shall explore coordinated approaches to ensuring effective taxation of high-net-worth individuals, while respecting each State's sovereign right to determine the design, structure and level of taxation

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- Close to the G20 Rio Declaration (July 2024): "with full respect to tax sovereignty", cooperate so that ultra-high-net-worth individuals are effectively taxed

Back to Lecture 1: why the super-rich need international rules

Back to main

- Lecture 1: effective tax rates fall at the very top because income stays in holdings and the CIT backstop stops at the border

Back to Lecture 1: why the super-rich need international rules

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  - At the global level, 2% on about 3,000 billionaires would raise $200–250bn a year (Zucman, report to the G20, 2024)

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- What a national tax cannot do alone, and what Article 6 could cover:
  - Information on all assets, not only financial accounts: the CRS (Lecture 3) misses real estate and art, and about 30% of accounts get no report
  - A global asset registry linking beneficial ownership to legal ownership (Tax Justice Network proposal)
  - Common rules on exit and residence, and a minimum standard like the GMT for MNEs

Back to Lecture 1: why the super-rich need international rules

Back to main

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  - Common rules on exit and residence, and a minimum standard like the GMT for MNEs
- The current draft only commits to "explore" coordinated approaches: the HNWI agenda depends on a future protocol

OECD vs. UN: two ways to organise cooperation

Back to main

	OECD / G20 Inclusive Framework	UN Framework Convention
Members	about 150 jurisdictions, agenda set by the G20 and the OECD	all 193 UN members (- US)
Decisions	consensus	vote if needed
Legal form	model rules transposed in domestic law, multilateral instrument	binding convention + optional protocols
Scope	MNEs (BEPS, Pillars 1 and 2), information exchange (CRS)	also HNWI, illicit financial flows, sustainable development
Taxing rights	mostly residence oriented; reallocation to markets (Pillar 1) stalled	source oriented (services, digital)
United States	shaped Pillar 2, then obtained a "side-by-side" carve-out (Jan. 2026)	left the talks (Feb. 2025)

Appendix – Back-up slides

1. Back-up slides – Lecture 1

(iii) Correcting the market: taxes versus regulation

Back

Market-based instruments

- Preserve individual choice
- Change incentives via relative prices
- Market determines the adjustment

Examples: carbon taxes, excise taxes, EU ETS

Regulatory instruments

- Restrict or eliminate choices
- Government specifies behaviour directly
- Formally, $t \to \infty$

Examples: bans (leaded gasoline...), mandatory efficiency standards

Market allocation $\longrightarrow$ EU ETS $\longrightarrow$ Carbon tax $\longrightarrow$ Very high tax $\longrightarrow$ Regulation / Ban

A €10 pack of cigarettes, decomposed

Back

Sold by an employee of a self-employed tobacco-shop owner – who is also the shop's owner-manager:

Flow	Amount	Market income (t)	DINA (comprehensive)
VAT	€1.7	– (in the price)	collective expenditure
Tobacco excise tax	€5.3	– (in the price)	collective expenditure
Manufacturing cost	€1.5	– (a cost, not income)	upstream firms' income
Wage, employee	€0.7	✓ labour income	✓ labour income
CIT paid by the shop	€0.2	– (invisible)	attributed to owner
Retained earnings	€0.25	– (invisible)	attributed to owner
Dividends to owner	€0.35	✓ capital income	✓ capital income

- Manufacturing cost = intermediate consumption (raw tobacco, production, packaging, marketing) paid to the manufacturer – real value added, just realized as someone else's income one step upstream, not traced here
- VAT + excise = **70% of the price** (roughly matches actual French tobacco taxation); "market income" sees only **€1.05** (≈10%) as anyone's income this year – the wage and the dividends actually paid out
- DINA allocates the **full €10**: VAT/excise → collective expenditure (allocation problem, previous slides); CIT + retained earnings → attributed back to the owner as comprehensive income (Section 3's retained-earnings logic)

Why the allocation convention is not innocuous

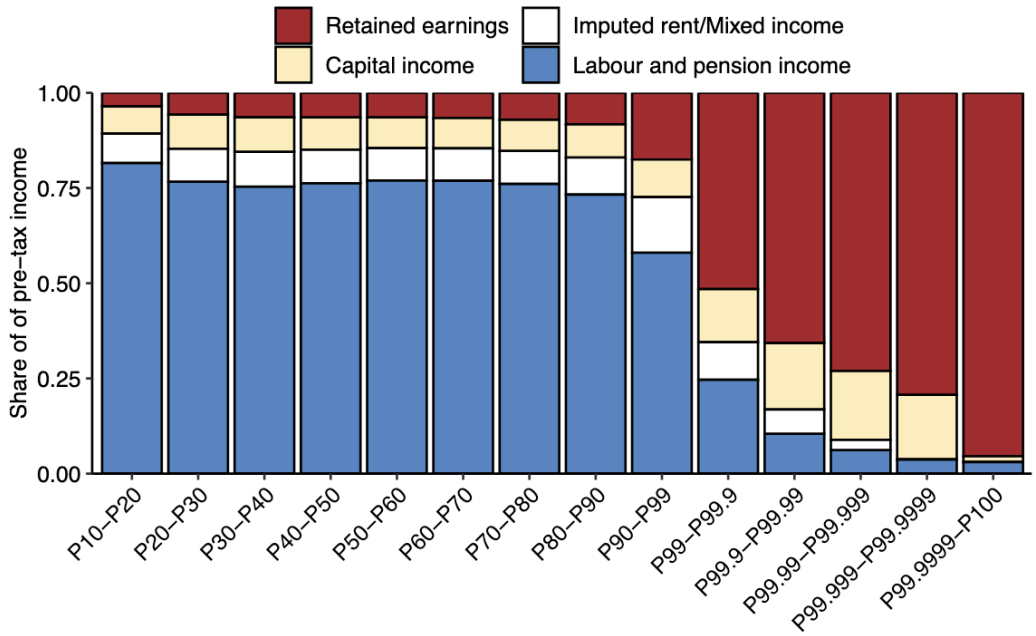
Back

- Choice of convention changes measured inequality and measured redistribution, not just the level of income
  - unequal access to public education (richer households use secondary/tertiary education more intensively)
  - unequal life expectancy $\Rightarrow$ unequal effective claims on pension and health spending
  - the value of policing, justice and property protection plausibly rises with wealth, not with the population

Wealth composition across the distribution: the Netherlands

Back

Figure 2: The composition of pre-tax national income

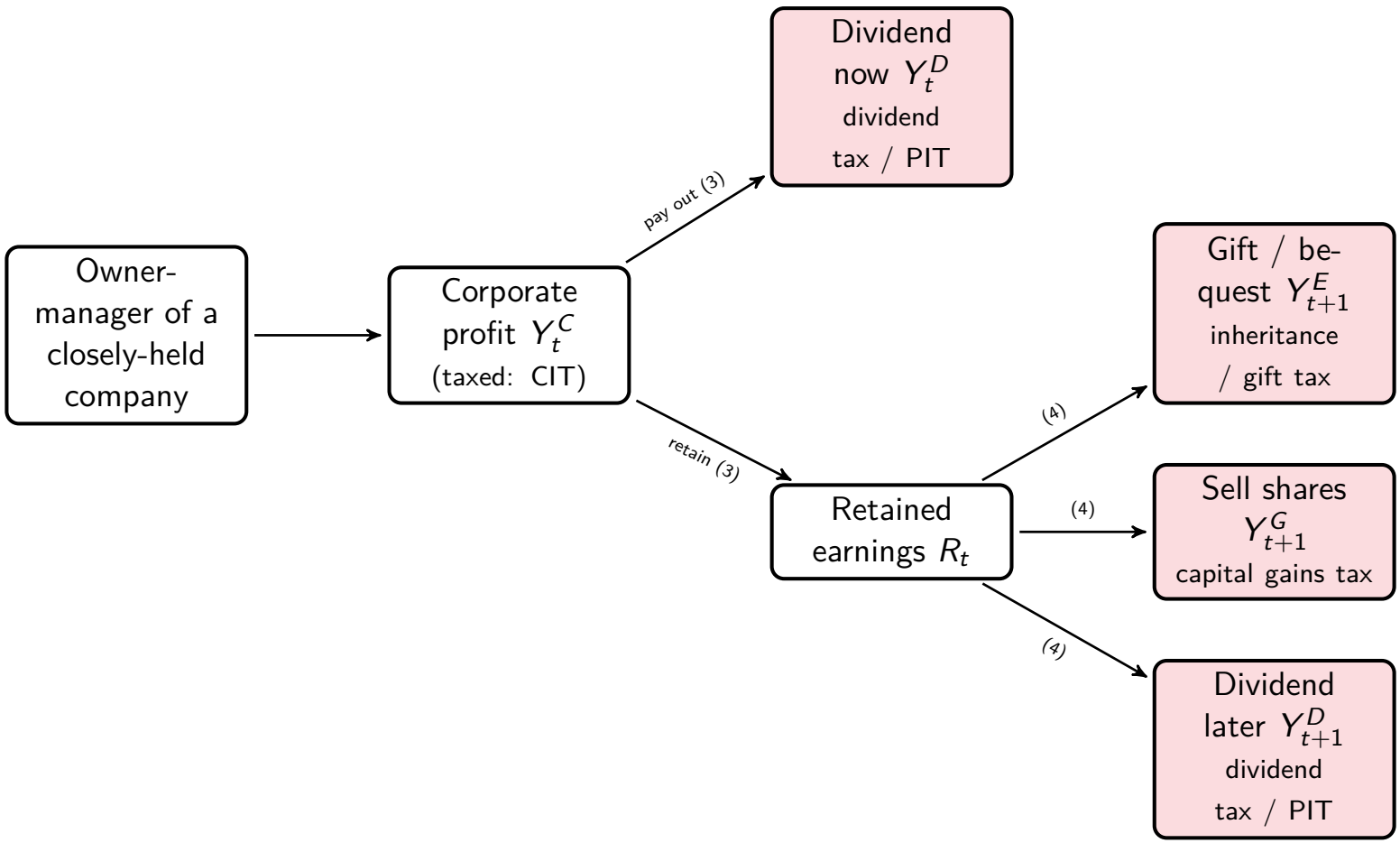


Source: Bruil et al. (2024)

Retained earnings go from negligible below P90 to **over 90%** of pretax income above P99.9999 – the same pattern documented for France on the previous slide.

How retained earnings eventually get taxed

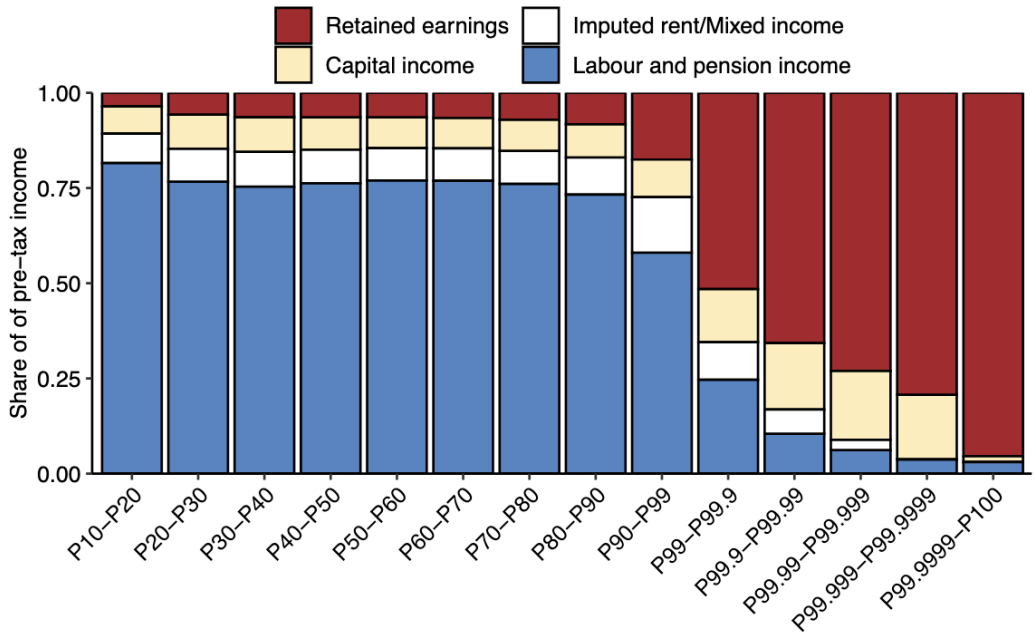
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Simplified from Zawisza, Perret, O'Reilly & Ramm (2024), OECD Taxation WP No. 70, Figure 5: retained profit (R_t) escapes PIT until it exits – as a gift/bequest, a share sale, or a delayed dividend – each taxed differently

Why does the ETR fall at the very top? (1/2)

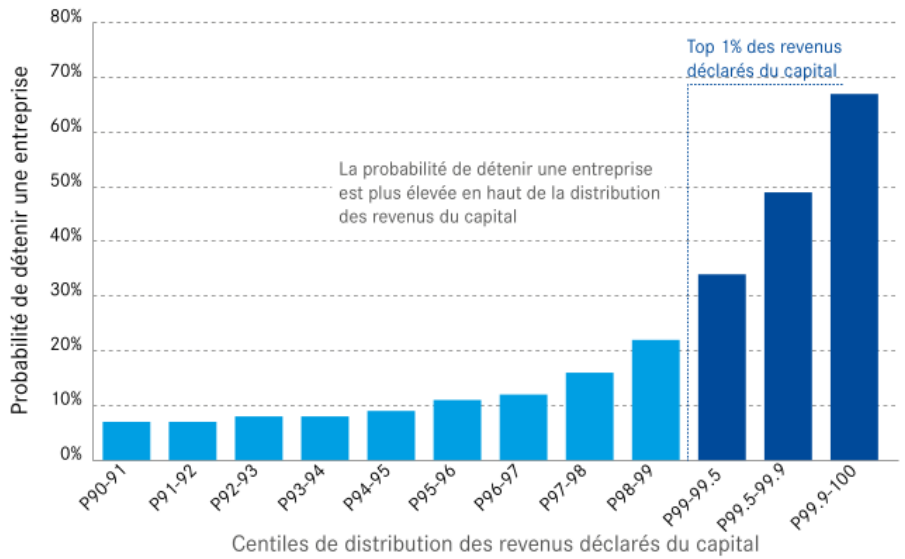
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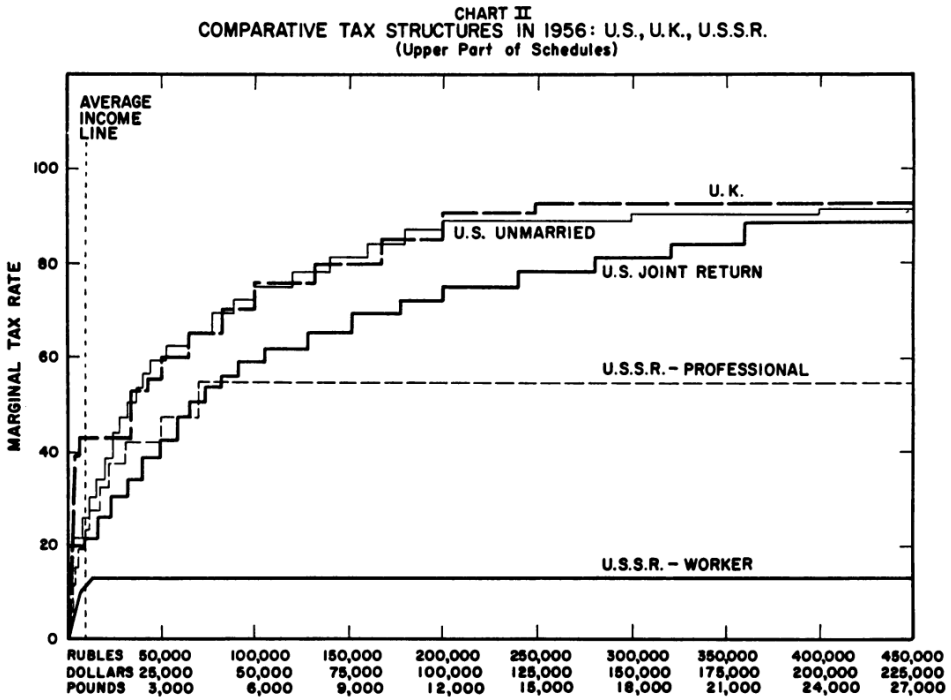
Why does the ETR fall at the very top? (2/2) Back



Source: CAE (2025)

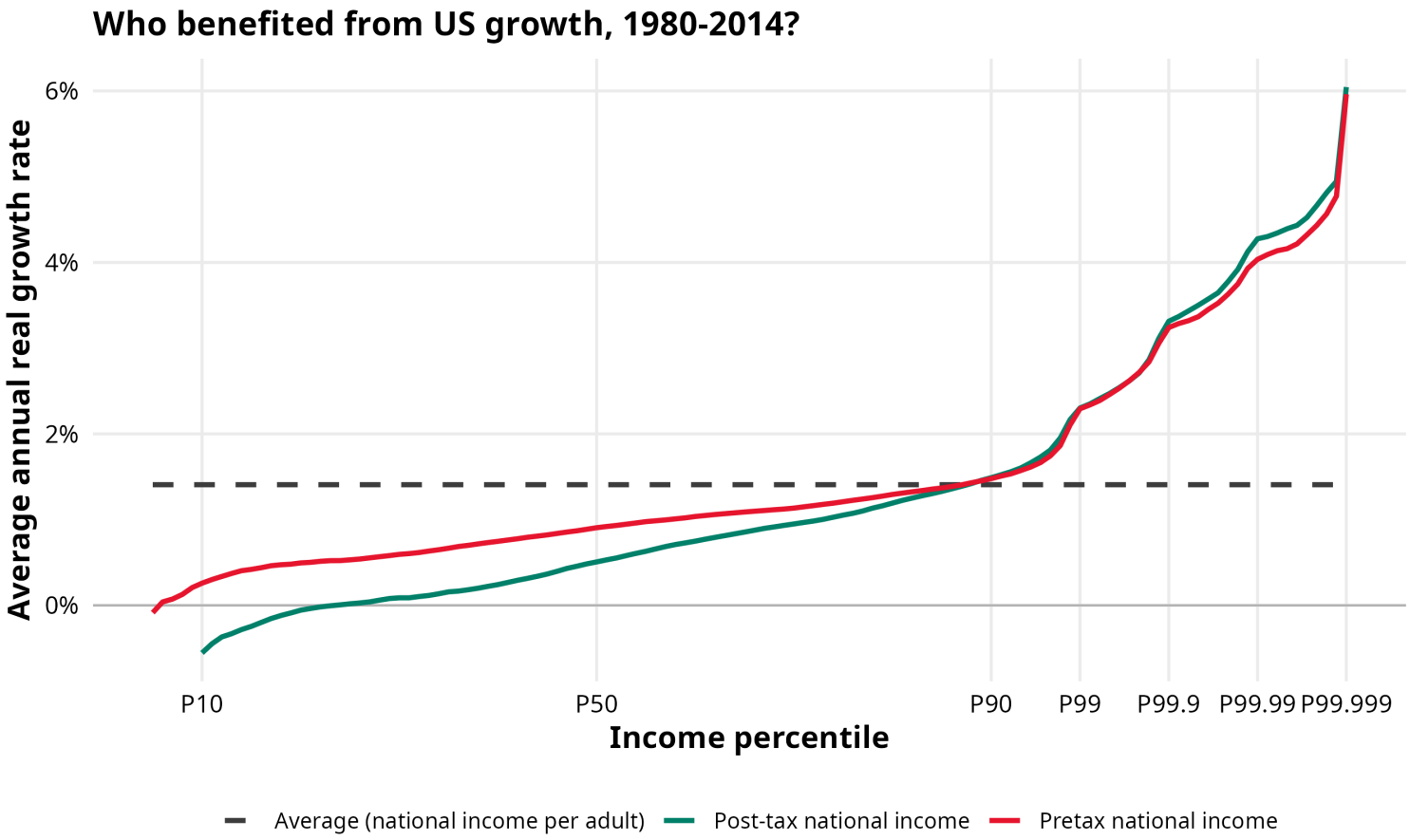
The probability of owning a business rises the same way as retained earnings do – so the corporate income tax (CIT) is, mechanically, what backstops taxation at the very top.

Tax progressivity in the USSR (alternative view)



Source: Holzman (1958)

Who captured US growth, 1980–2014? Back



Source: Piketty, Saez & Zucman (2018); chart data extracted from the authors' own replication workbook (chart cache in `PSZ2018MainData.xlsx`, sheet F2a) and re-plotted with `Code/PSZ2018_growth_by_percentile.R` – not digitized, not estimated

References (1/5)

- André, M., Germain, J.-M. & Sicsic, M. (2023), *Approche élargie des inégalités et de la redistribution en France*, INSEE Document de travail No. 2023-07.
- Bach, L., Bozio, A., Chiocchetti, A., Guillouzouic, A. & Malgouyres, C. (2026), *Taxing Holding Companies*, CAE Deliberative Conference on the Taxation of Wealth and Capital, 19 June 2026 (data: French corporate tax files).
- Bach, L., Bozio, A., Guillouzouic, A. & Malgouyres, C. (2023, 2025), *Do Billionaires Pay Taxes?*
- Bach, L., Bozio, A., Guillouzouic, A. & Malgouyres, C. (2023), *Quels impôts les milliardaires paient-ils?*, Note IPP n°92.
- Bach, L., Bozio, A., Guillouzouic, A., Leroy, C. & Malgouyres, C. (2025), *Follow the Money! Why Dividends Overreact to Flat-Tax Reforms*.
- Blanchet, T., Chancel, L., Flores, I. & Morgan, M. et al. (2024), *Distributional National Accounts Guidelines*, World Inequality Lab.

References (2/5)

- Bozio, A. (2026), *Taxation of Business Income: Measurement and Policy*, CAE Deliberative Conference on the Taxation of Wealth and Capital, 19 June 2026.
- Bozio, A., Garbinti, B., Goupille-Lebret, J., Guillot, M. & Piketty, T. (2024), "Predistribution versus Redistribution: Evidence from France and the United States", *AEJ: Applied Economics*, 16(2).
- Bruil, A. et al. (2024), on retained earnings and top personal incomes (composition of pretax income by percentile).
- CAE – Conseil d'Analyse Économique (2025), *Fiscalité du capital: quels sont les effets de l'exil fiscal sur l'économie?*
- Delpeuch, S. (2026), *Il est venu le temps des holdings patrimoniales*, unpublished note.
- Dherbécourt, C., Fack, G., Landais, C. & Stantcheva, S. (2021), *Repenser l'héritage*, Note du CAE n°60; updated as Fack, G. (2026), *Inheritance Taxes*, CAE Deliberative Conference, 19 June 2026.

References (3/5)

- Diamond, P. (1965), "National Debt in a Neoclassical Growth Model", *American Economic Review*.
- EU Tax Observatory (2024), *Global Tax Evasion Report 2024*.
- Goupille-Lebret, J. (2026), *Behavioral Responses to Inheritance Tax*, CAE Deliberative Conference, 19 June 2026.
- Goupille-Lebret, J. & Infante, J. (2018), "Behavioral Responses to Inheritance Tax: Evidence from Notches in France", *Journal of Public Economics*.
- Holzman, F. (1958), personal income tax progressivity in the USSR, *cited in* `https://www.jstor.org/stable/41790717`.
- Hubbard, R. G. (1993), "Corporate Tax Integration: A View from the Treasury Department", *Journal of Economic Perspectives*.

References (4/5)

- Jakobsen, K., Jakobsen, K., Kleven, H. & Zucman, G. (2020), "Wealth Taxation and Wealth Accumulation: Theory and Evidence from Denmark", *Quarterly Journal of Economics*.
- Kopczuk, W. (2019), comment on Saez & Zucman, "Progressive Wealth Taxation", *Brookings Papers on Economic Activity*.
- Malinvaud, E. (1953), "Capital Accumulation and Efficient Allocation of Resources", *Econometrica*, `http://www.jstor.org/stable/1905538`.
- Mieszkowski, P. (1972), McLure, C. (1979) & Ballard, C. et al. (1985), early case for corporate/personal tax integration (cited in Bozio, CAE 2026).
- Phelps, E. (1961), "The Golden Rule of Accumulation: A Fable for Growthmen", *American Economic Review*.
- Piketty, T. (2025-26), *Public Economics*, Lecture 7, EHESS & Paris School of Economics.

References (5/5)

- Piketty, Saez & Zucman (2018), "Distributional National Accounts: Methods and Estimates for the United States", *QJE*; reproduction files: `https://gabriel-zucman.eu/usdina/`.
- Sen, A. (2009), *The Idea of Justice*, Harvard University Press.
- Seim, D. (2017), "Behavioral Responses to Wealth Taxes: Evidence from Sweden", *American Economic Journal: Economic Policy*.
- Støstad, M. N. & Cowell, F. (2024), "Inequality as an Externality: Consequences for Tax Design", *Journal of Public Economics*, `https://doi.org/10.1016/j.jpubeco.2024.105139`.
- World Inequality Database, `https://wid.world/codes-dictionary/`.
- Zawisza, T., Perret, S., O'Reilly, P. & Ramm, A. (2024), *Tax Arbitrage through Closely Held Businesses*, OECD Taxation Working Paper No. 70.
- Zucman, G. (2026), *A Minimum Effective Tax on Ultra-High-Net-Worth Individuals*, CAE Deliberative Conference on the Taxation of Wealth and Capital, 19 June 2026.

2. Back-up slides – Lecture 2

Backup: where do $F_L = w$ and $F_K = r$ come from?

A price-taking firm chooses (K, L) to maximise profit, output price normalised to 1:

$$\pi(K, L) = F(K, L) - wL - rK$$

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First-order conditions – set each partial derivative to zero:

$$\frac{\partial \pi}{\partial L} = F_L(K, L) - w = 0 \quad \Longrightarrow \quad F_L(K, L) = w$$

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$$\pi = F(K, L) - wL - rK = (F_K - r)K + (F_L - w)L = 0$$

– a competitive firm earns zero *economic* profit at its optimum; any payment above w and r is already handed to the factors themselves.

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Perfect competition, free entry: firms enter until economic profit is driven to zero (recall the previous backup slide). At zero profit, revenue covers cost exactly:

$$P \cdot Y = wL + rK$$

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Backup: the cash-flow-tax special case

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– identical to the no-tax condition: graphically, both curves on the previous slide collapse back onto their untaxed originals, $E'' \to E$

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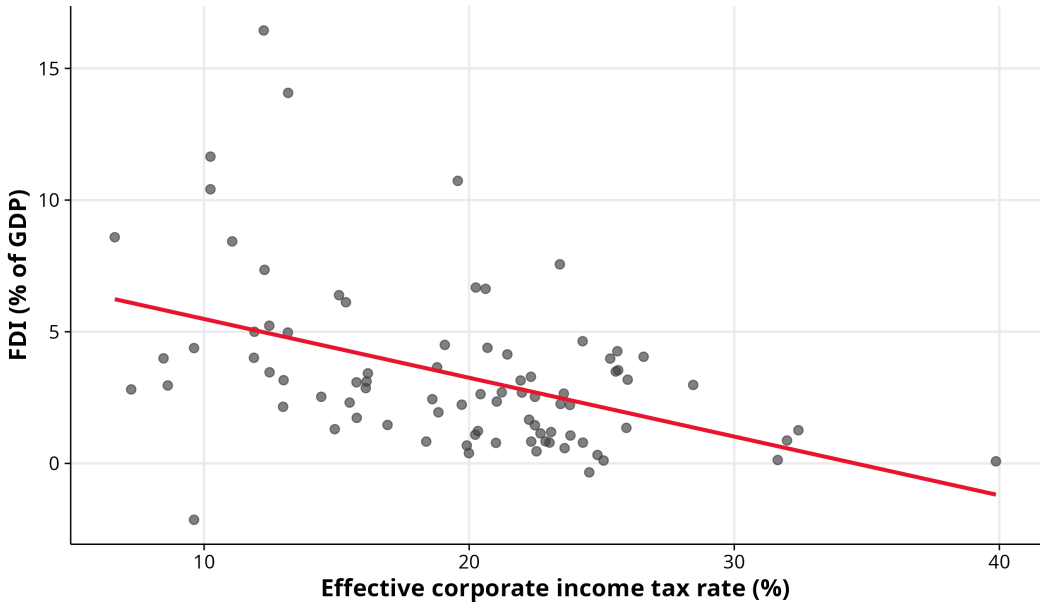
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- Full expensing turns CIT into a tax on pure profit – exactly the "economic rent" base from the typology section, applied here to the investment-timing margin

Back

Backup: Djankov et al. (2010) – FDI

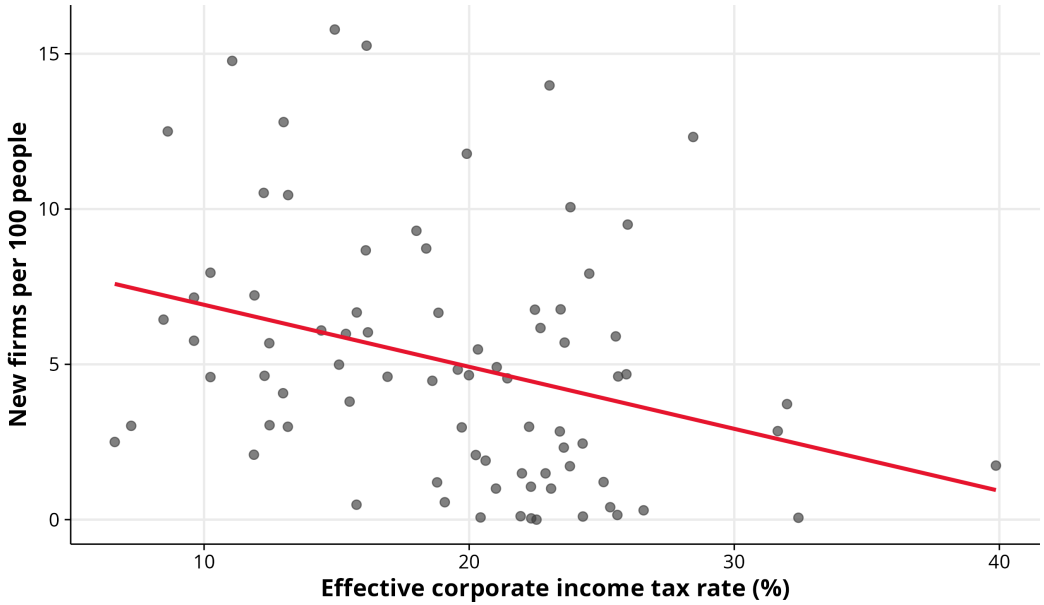


- Same sample (84 countries with FDI data): a 10 p.p. higher effective CIT rate is associated with 2.2 p.p. less FDI as a share of GDP – capital that can relocate reacts at least as strongly as domestic investment

Source: Djankov, Ganser, McLiesh, Ramalho & Shleifer (2010), *AEJ: Macroeconomics*. Own reproduction.

Next: business density

Backup: Djankov et al. (2010) – business density



- Same pattern on the extensive margin: a 10 p.p. higher effective CIT rate is associated with 2.0 fewer new firms registered per 100 people – entrepreneurship, not just incumbent investment

Source: Djankov, Ganser, McLiesh, Ramalho & Shleifer (2010), *AEJ: Macroeconomics*. Own reproduction.

Back to main slide

Backup: the French case – extra depreciation

- France's *"suramortissement"* (extra depreciation), 2015–2017: firms deduct an extra 40% of eligible industrial equipment's cost, linearly over its tax life – a direct cut in Γ_t, lowering the user cost of capital by ≈13% (fiscal cost ≈€2bn/year)

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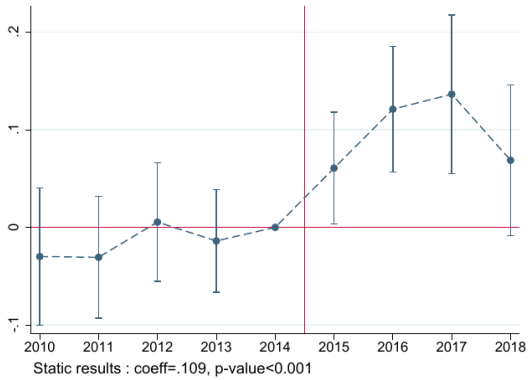


Figure: Logarithm of domestic sales

Next: results

Backup: the French case – results

- Eligible capital producers' domestic sales rise $+10.9\%$, but their prices also rise $+2.6\%$ – so the value-based estimate overstates the real quantity response: $\Delta \ln K = 10.9\% - 2.6\% = 8.3\%$, $\approx 30\%$ smaller

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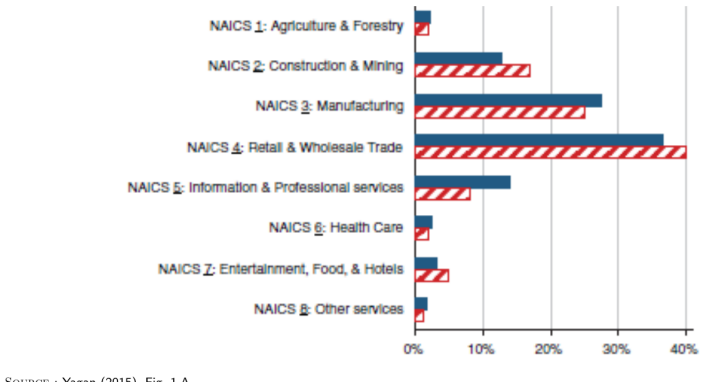
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- Incidence (Weyl & Fabinger, 2013, extended to a supply chain): capital producers capture at least 31% of the firm-level surplus – and within producers, the gains go to dividends and executive pay, not to average wages

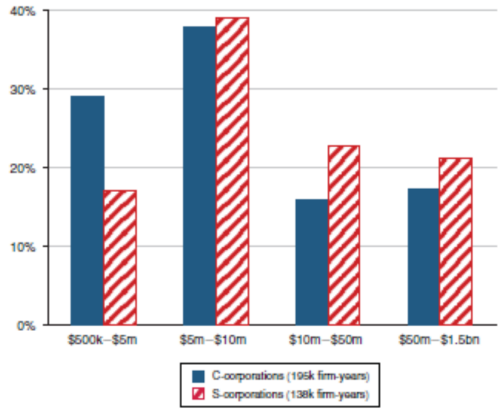
Source: Chouc & de Lachapelle (2026), "Investment Tax Incentives and the Price of Capital Goods", ITO Lunch Seminar.

Back to main slide

Backup: are C- and S-corps comparable?



by industry



by size

- Treated (S-corp) and control (C-corp) firms line up closely on both industry mix and size distribution – the comparability the identification assumption requires

Source: Yagan (2015), *AER*, Fig. 1.A–B. Back

References (1/2)

- Bozio, A. – *Lecture 12: Corporate Taxation*, teaching material (main source for this session)
- Domar, E. & Musgrave, R. (1944), "Proportional Income Taxation and Risk-Taking", *QJE* 58(3)
- Hall, R. & Jorgenson, D. (1967), "Tax Policy and Investment Behavior", *AER* 57(3)
- Auerbach, A. (2010), "Taxing Corporate Income", in Mirrlees et al. (eds), *Dimensions of Tax Design*
- Djankov, S., Ganser, T., McLiesh, C., Ramalho, R. & Shleifer, A. (2010), "The Effect of Corporate Taxes on Investment and Entrepreneurship", *AEJ: Macroeconomics* 2(3)
- Zwick, E. & Mahon, J. (2017), "Tax Policy and Heterogeneous Investment Behavior", *AER* 107(1)
- Chetty, R. & Saez, E. (2005), "Dividend Taxes and Corporate Behavior: Evidence from the 2003 Dividend Tax Cut", *QJE* 120(3)
- Yagan, D. (2015), "Capital Tax Reform and the Real Economy: The Effects of the 2003 Dividend Tax Cut", *AER* 105(12)

References (2/2)

- Alstadsæter, A., Jacob, M. & Michaely, R. (2017), "Do Dividend Taxes Affect Corporate Investment?", *Journal of Public Economics* 151
- Bach, L., Bozio, A., Guillouzouic, A., Leroy, C. & Malgouyres, C. (2025), dividend-taxation reforms in France (as presented in Bozio, *Lecture 12*)
- Fuest, C., Peichl, A. & Siegloch, S. (2018), "Do Higher Corporate Taxes Reduce Wages?", *AER* 108(2) – previously seen in Session 1
- Carbonnier, C., Malgouyres, C., Py, L. & Urvoy, C. (2022), "Who Benefits from Tax Incentives? The Heterogeneous Wage Incidence of a Tax Credit", *Journal of Public Economics*
- Baïz, A., Naboulet, A. & Tabarly, G. (2020), *Évaluation du CICE: synthèse des travaux d'approfondissement*, France Stratégie, Comité de suivi du CICE
- Chouc, P.-E. & de Lachapelle, L. (2026), "Investment Tax Incentives and the Price of Capital Goods: Consequences for Policy Effectiveness and Incidence", ITO Lunch Seminar working paper, CREST/ENSAE
- OECD (2026), *A Practical Guide to Investment Tax Incentives*, OECD Publishing, Paris

3. Back-up slides – Lecture 3

Balance of Payments (1/2): flows and stocks

(+ errors and omissions)

Current account	+	Capital account	=	Financial account
Goods and services: exports − imports Primary income (wages, interest, dividends): received − paid Secondary income: transfers		Capital transfers (debt forgiveness, sale of patents or land)		Net purchases of foreign assets − net new foreign liabilities FDI, portfolio, other investment, reserves

$IIP_t = IIP_{t-1} + FA_t +$ valuation changes

World: $\sum$ current accounts $= \sum IIP = 0$

International investment position
foreign assets − foreign liabilities

▸ Next: households' assets and liabilities

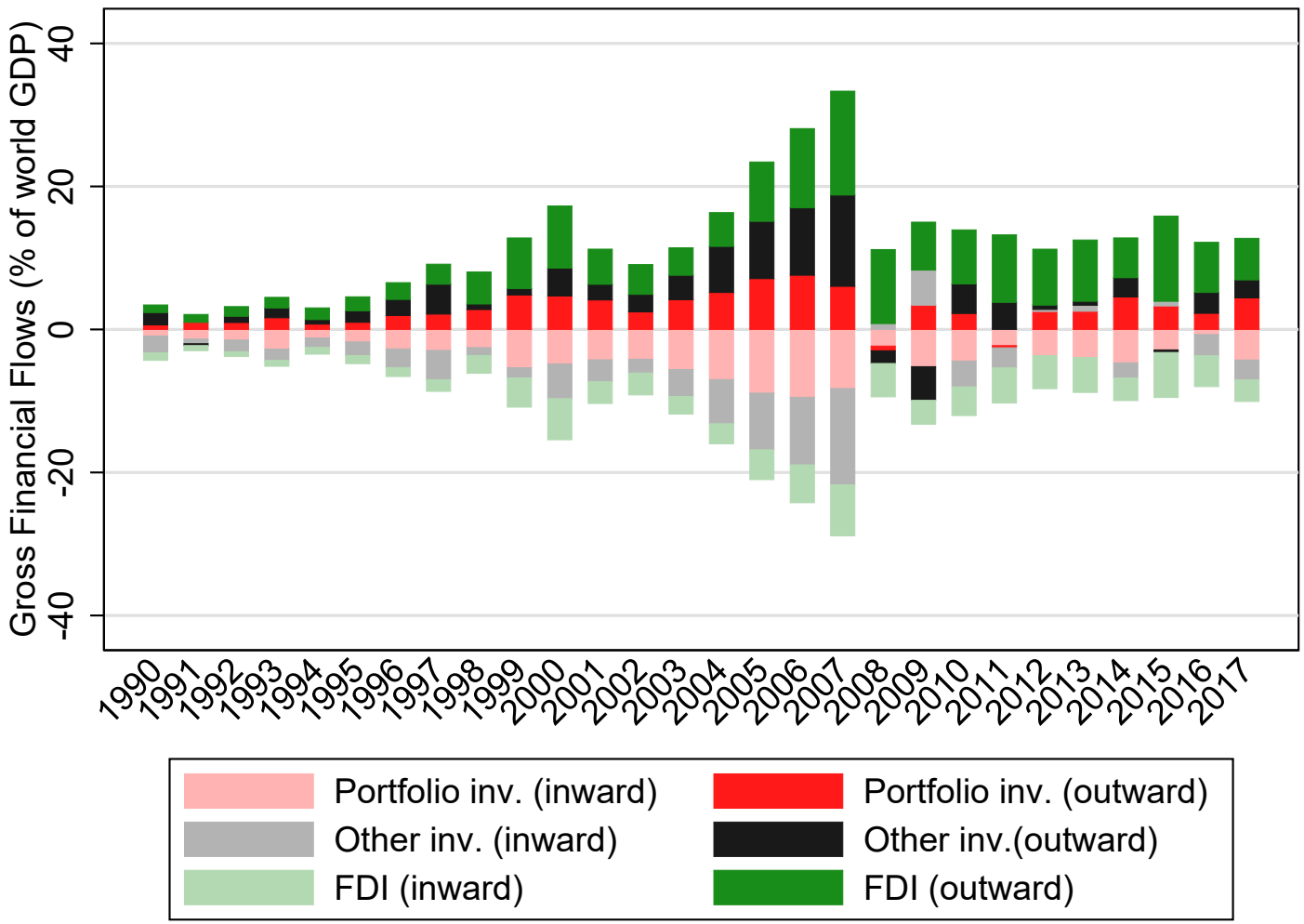
Balance of Payments (2/2): households

Balance sheet of a French resident	Recorded in the IIP as...
Assets	
Deposits in a French bank	domestic, outside the BOP
U.S. shares, via a French broker	France: foreign asset
Luxembourg fund shares, in custody in a Swiss bank	France: nothing – Switzerland: nothing Luxembourg: foreign liability
Liabilities	
Mortgage from a French bank	domestic, outside the BOP
Loan from a Belgian bank	France: foreign liability

Flows follow the same rules: buying the shares enters the financial account, their dividends enter primary income (current account). The unrecorded fund shares make world liabilities exceed world assets

Back

Financial flows



Source: Obsfelt

Back

Taxation and migration by the super-rich (UK)

- Advani, Burgherr & Summers, 2025, not yet published
- UK "non-dom" regime: foreign earnings kept abroad are UK-tax-exempt
- 2018 reform: 15-year UK residents lose this exemption – net-of-tax rate falls 19%
- Identification: DiD around the 15-year threshold, within a very high-income population (72% in the top 0.1%)
- Emigration rises temporarily (+6pp), then reverts – 4.9% leave overall, elasticity of just 0.26
- Stayers report +50% UK income/tax – foreign income now taxed, not new onshoring

Source: Advani, Burgherr & Summers (2025), "Taxation and Migration by the Super-Rich"

▸ Back

Tax emigration in France (CAE, 2025)

- Data: French income and wealth tax returns, 2010–2019, matched to firm ownership; top 1% of capital income (380,000 households)
- Low mobility: 0.2% of the top 1% leave France each year, against 0.38% for the whole population
- Difference-in-differences as in Jakobsen et al.: treated = top 1% with a high share of financial income, most hit by the 2013 tax increase and the 2017–2018 cuts (end of the wealth tax, flat tax); control = rest of the top 1%. Tax rate: +3.3pp, then −3.5pp
- 2013 tax increase: departure rate +0.04 to +0.09pp, i.e. net departures up 32% to 79%; 2017–2018 tax cut: departures 0 to −0.02pp, returns +0.01 to +0.04pp
- Long run: a 1pp higher tax rate drives out 0.02% to 0.23% of the top 1% – 0.3 to 3.8 times the Swedish estimate
- A departing owner (at least 10% of the shares) lowers the firm's value added by 24% after five years, but reallocation to other firms keeps the aggregate effect small: at most −0.05% of value added for a reform raising €4bn

Source: Bach, Bozio, Grimprel, Guillouzouic, Landais & Malgouyres (2025), CAE Focus 118

▸ Back

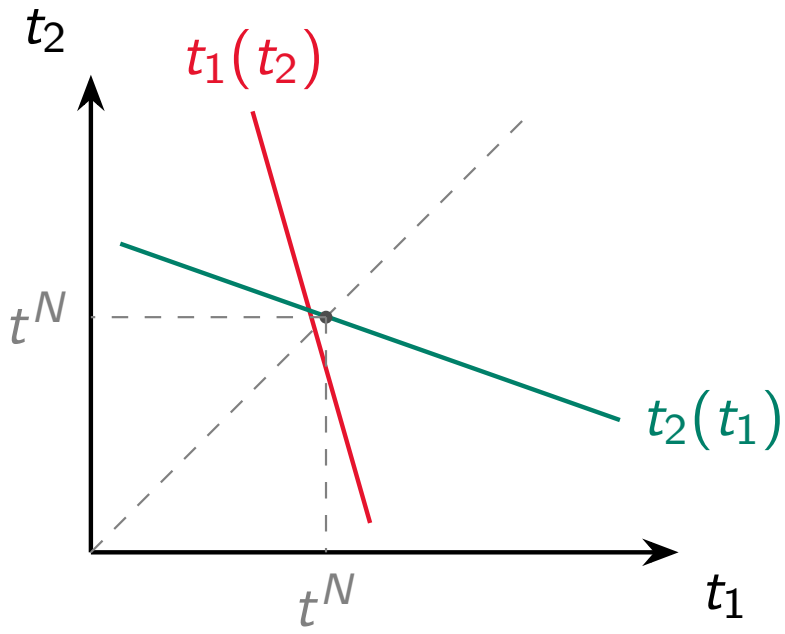
4. Back-up slides – Lecture 4

Interpreting $f''(k)$ Back

- $f'(k)$ = marginal product of the capital-labor ratio: how much output varies when one unit of capital per worker is added.
- $f''(k)$ = curvature: how fast the slope decreases as k rises (i.e. how fast the marginal product of capital reduces when capital is added
- Strongly negative $f''(k)$: MPK falls quickly $\Rightarrow$ capital reallocation has strong effects.
- Small $|f''(k)|$: MPK falls slowly $\Rightarrow$ capital is "less sensitive".

Reaction functions: strategic substitutes

Back



- Downward-sloping reaction functions: $\frac{\partial^2 W_i}{\partial t_i \partial t_j} < 0$, a higher t_j leads country i to cut t_i.
- Intuition: $t_j \uparrow \Rightarrow$ capital flows into $i \Rightarrow$ larger tax base $\Rightarrow i$ can finance its public good with a lower rate.
- Nash equilibrium still at the intersection, and still below the cooperative rates.

5. Back-up slides – Lecture 5

Sensitivity of the location of profits to tax (1/2)

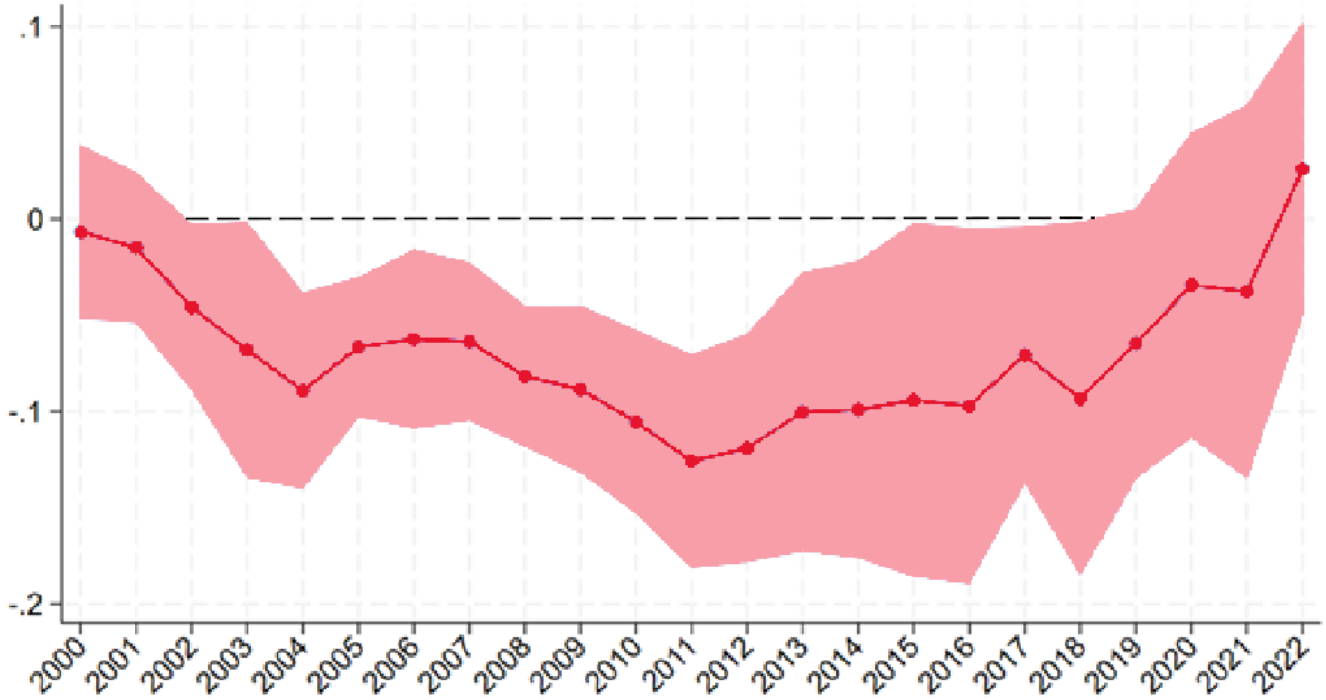
$$\text{Prof}_{fgcit} = \beta \left(STR_{ct} - STR_{gcit}^{groupavg} \right) + \gamma X_{fgcit} + \delta_t + \delta_i + \delta_c + \varepsilon_{fgcit} \quad (1)$$

where:

- Prof_{fgcit} is the unconsolidated ratio of profit before tax over total assets
- X_{fgcit} is a vector of determinants of real profitability
- $\left(STR_{ct} - STR_{gcit}^{groupavg} \right)$ is the difference between the STR in country c the unweighted average of the statutory tax rates in the countries where the MNE is represented

Back to: BEPS 1.0 Lectures 1–4

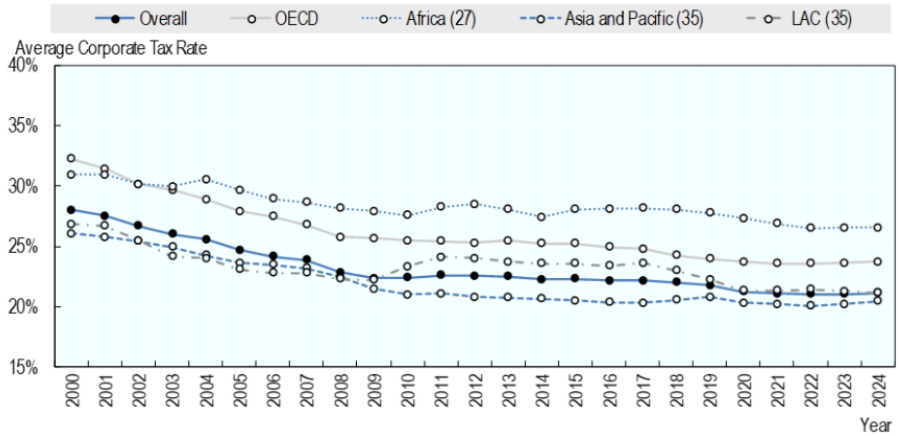
Sensitivity of the location of profits to tax (2/2)

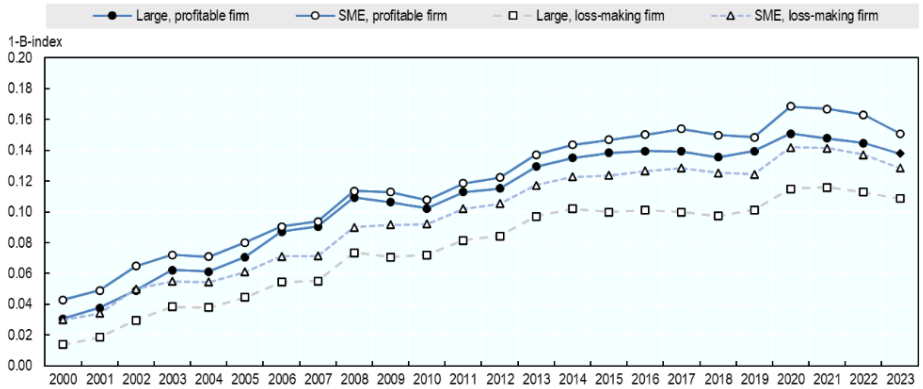


- Negative relationship between profitability and the CIT rate differential with other affiliates within the group
- U-shaped trend in profit elasticities over time since 2000

Back to: BEPS 1.0 Lectures 1–4

Races to the bottom ?





- STRs seem to stabilize
- Tax incentives targeting R&D expenditures are widespread and have become more generous over the last two decades, with recent data indicate a slow-down.

Back to: BEPS 1.0 Lectures 1–4 Carve-out

Framework convention vs. protocols

Back

- **Framework convention**: a binding treaty, but mostly empty – objectives, principles, institutions (Conference of the Parties, secretariat), procedure to adopt protocols. General obligations ("cooperate"), hardly enforceable
- **Protocol**: a separate treaty carrying the substantive rules. Each party to the convention decides whether to join; binds only the states that ratify it

	Framework convention	Protocol(s)
Ozone	Vienna Convention (1985): cooperation on research, no reduction target	Montreal Protocol (1987): CFC phase-out schedule, trade restrictions on non-parties; ratified by all UN members
Climate	UNFCCC (1992): stabilise greenhouse gases, yearly COPs	Kyoto Protocol (1997): binding cuts for developed countries, never ratified by the US; then Paris Agreement (2015)
Tax	UN Framework Convention (2027): taxing rights, HNWI, illicit flows	Protocol 1: cross-border services; Protocol 2: dispute prevention and resolution

- Montreal worked: precise obligations and sanctions on non-parties (like the UTPR for the GMT). Kyoto was weakened by the absence of the largest emitter

From text to binding rule: four steps

Back

Step	What happens	Legal effect
Adoption	Negotiators settle the text; for the UN tax convention, vote at the General Assembly (2027)	None for any individual state
Signature	A state's representative signs the text	Intention to be bound; must not defeat the treaty's purpose (Vienna Convention on the Law of Treaties, Art. 18); no duty to ratify
Ratification	Domestic approval (in France, a law passed by Parliament, Art. 53 of the Constitution), deposit with the UN Secretary-General	The state consents to be bound
Entry into force	The number of ratifications set by the treaty is reached	Binding, only among the states that ratified

- Each protocol goes through the same four steps, separately from the convention
- The US signed the Kyoto Protocol (1998) but never ratified it: it was never bound