Income and Wealth Inequality

FMM Summer School
July 27, 2022

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Overview

1. Empirics
   a. Functional income distribution
   b. Personal income distribution (incl. differential saving rates)
   c. Wealth distribution (incl. differential rates of return)
   d. Carbon footprints (incl. differential rates of emissions)
2. Post-Keynesian Theory
   a. Overhead costs
   b. Wage-/profit led personal income distribution
   c. Wealth distribution model
   d. Post Keynesian theory + ecological economics

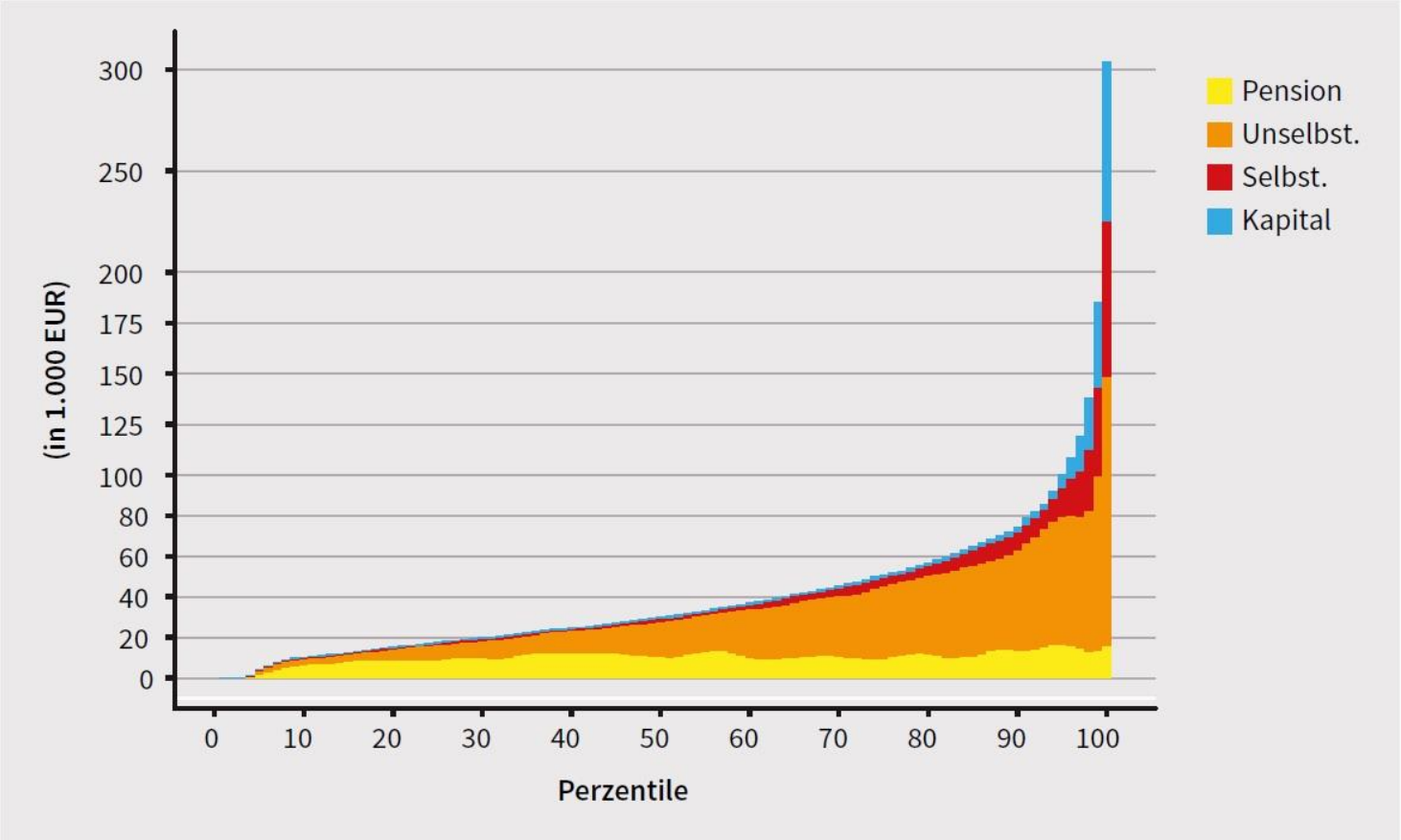
Empirics

Saving rates

- Differential saving rates (by income): core Post-Keynesian assumption
- Calculate empirically (at least) in 3 ways:
  - Savings out of profits are (relatively) higher than savings out of work income ?
  - Savings of capitalists are (relatively) higher than of workers, ?
    if the former receive mainly profit income, and ✓
    if the latter receive mainly work income ✓
  - Savings from high incomes are (relatively) higher than from low incomes,
    if high incomes have a larger share of profit income, and
    if lower incomes have a higher share of work income

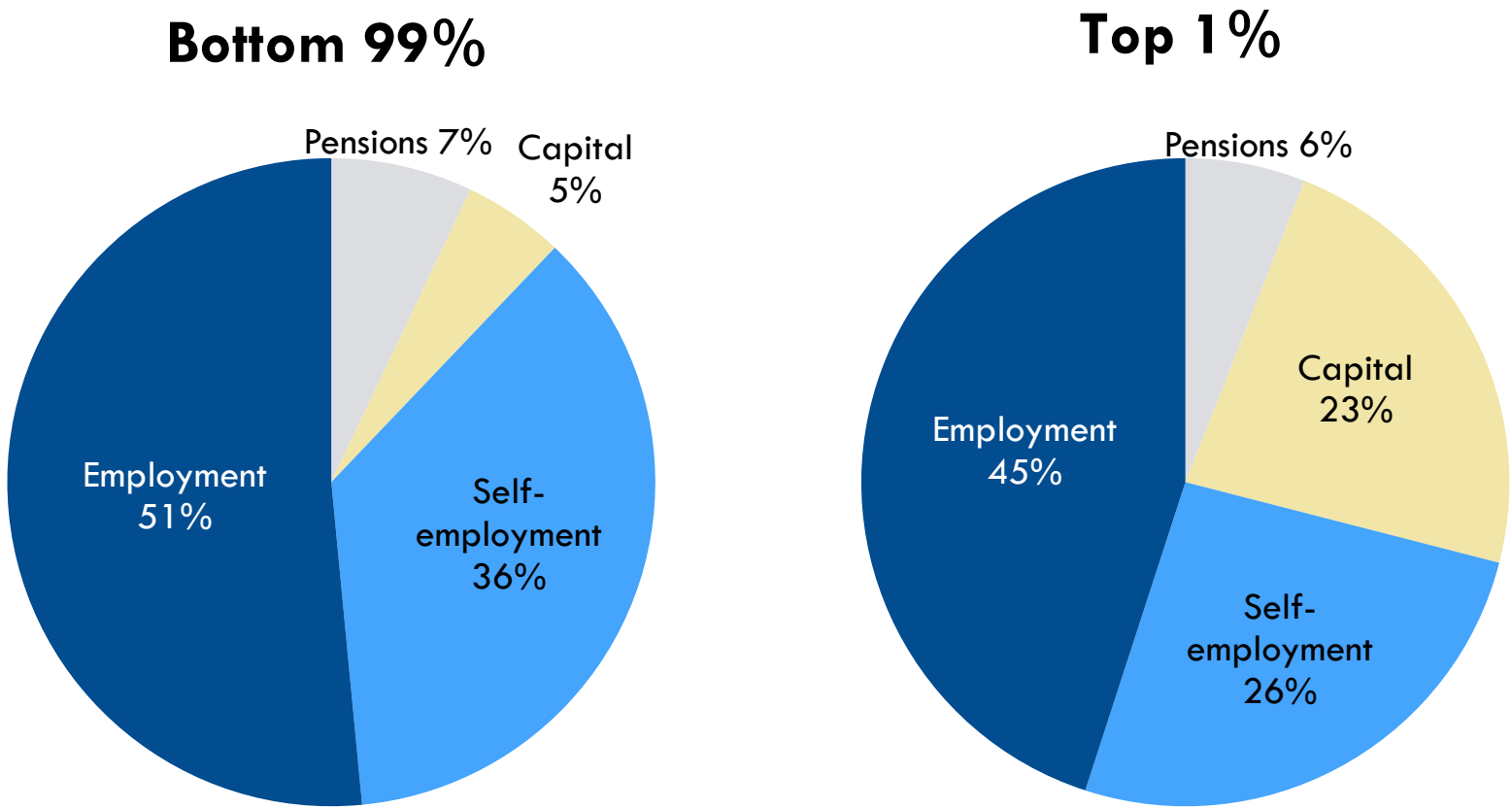
Classes!

Income type by income level (Austria 2010)



Source: Altzinger, Humer, Moser (2016); data: HFCS 2010

Functional income distribution by income level (Austria 2010)



Source: Altzinger, Humer, Moser (2016); data: HFCS 2010

Saving rates

- Differential saving rates (by income): core Post-Keynesian assumption
- Empirically (at least) 3 ways:
  - Savings out of profits are (relatively) higher than savings out of work income ?
  - Savings of capitalists are (relatively) higher than of workers, ?
    if the former receive mainly profit income, and ✓
    if the latter receive mainly work income ✓
  - Savings from high incomes are (relatively) higher than from low incomes, ✓
    if high incomes have a larger share of profit income, and ✓
    if lower incomes have a higher share of work income ✓

Calculation of saving rates: macro vs. micro data

- Macro data with some distributional information (standard calculation):

$$\mathbf{s_{decile}} = 1 - \frac{\sum_1^n \boldsymbol{C_{decile}}}{\sum_1^n \boldsymbol{Y_{decile}}}$$

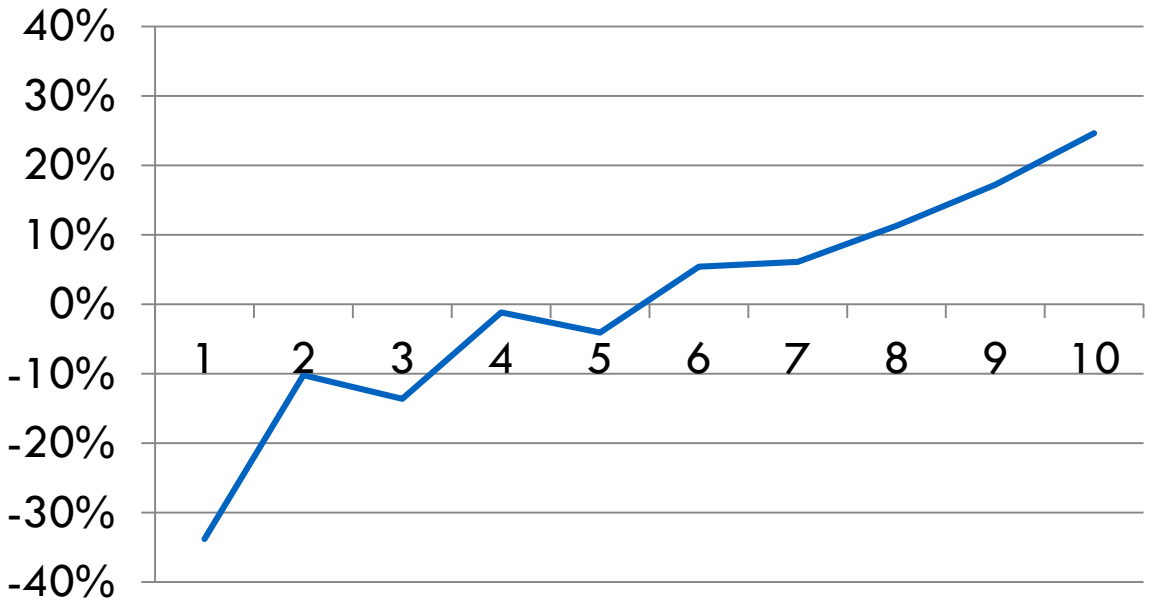
  - Properties: - Upward sloping
    - Bottom 40-60% have negative saving rates
  - Problem: Macroeconomic stability

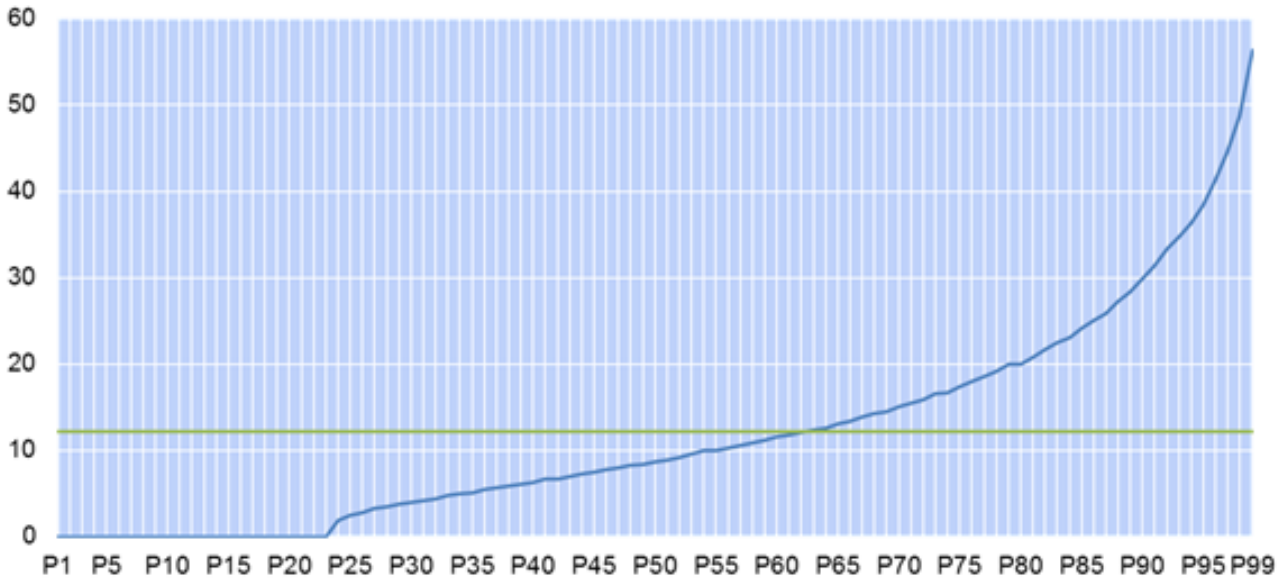
- Micro data:

$$\mathbf{s_{decile}} = \frac{\sum_1^n \mathbf{1} - \frac{\boldsymbol{C_{household}}}{\boldsymbol{Y_{household}}}}{\boldsymbol{n}}$$

  - Bottom 20% have negative saving rates

Saving rates from macro data (left) and micro data (right)



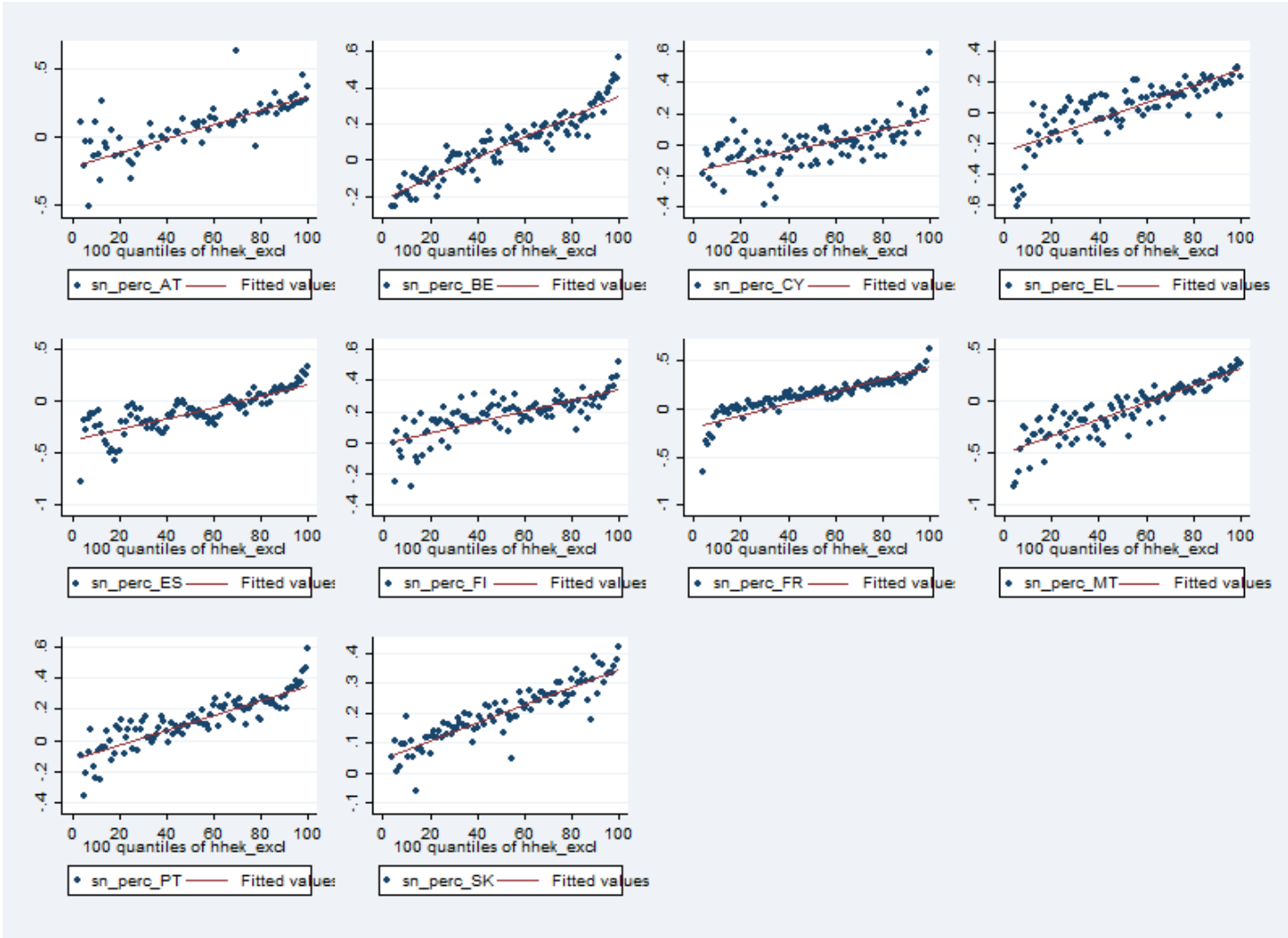


Net income percentiles

Source: Miriam Rehm; data: Consumption Survey 2009/10

Source: Fessler/Schürz (2018); data: HFCS 2014

Saving rates for Europe



Source: Ederer/Rehm (2019), data: EHBS 2010

Wealth distribution

Wealth distribution

- Only recently (somewhat) standardised definition
- Data quality much more problematic compared to income
- Much more unequally distributed than income
- Yet, conceptually critical

Data sources for wealth

- Tax data (e.g. wealth taxes, inheritance taxes)
  - Advantages: Often long time horizons, broad coverage
  - Disadvantages: Tax base and deductibles, tax avoidance and evasion
- Surveys (e.g. SCF for US, HFCS for EU)
  - Advantages: Socioeconomic information
  - Disadvantages: Voluntary participation, underreporting

Wealth: Definition

Non-financial (real) assets	Liabilities
Owner-occupied housing, other real estate	Mortgages
Consumer durables	Other investment loans
Vehicles	Consumer durable loans
Intellectual property	Education loans
Financial assets	
Currency and deposits	
Bonds and other debt securities	
Equity in own unincorporated enterprises	
Shares	
Mutual funds and other investment funds	
Pension funds	

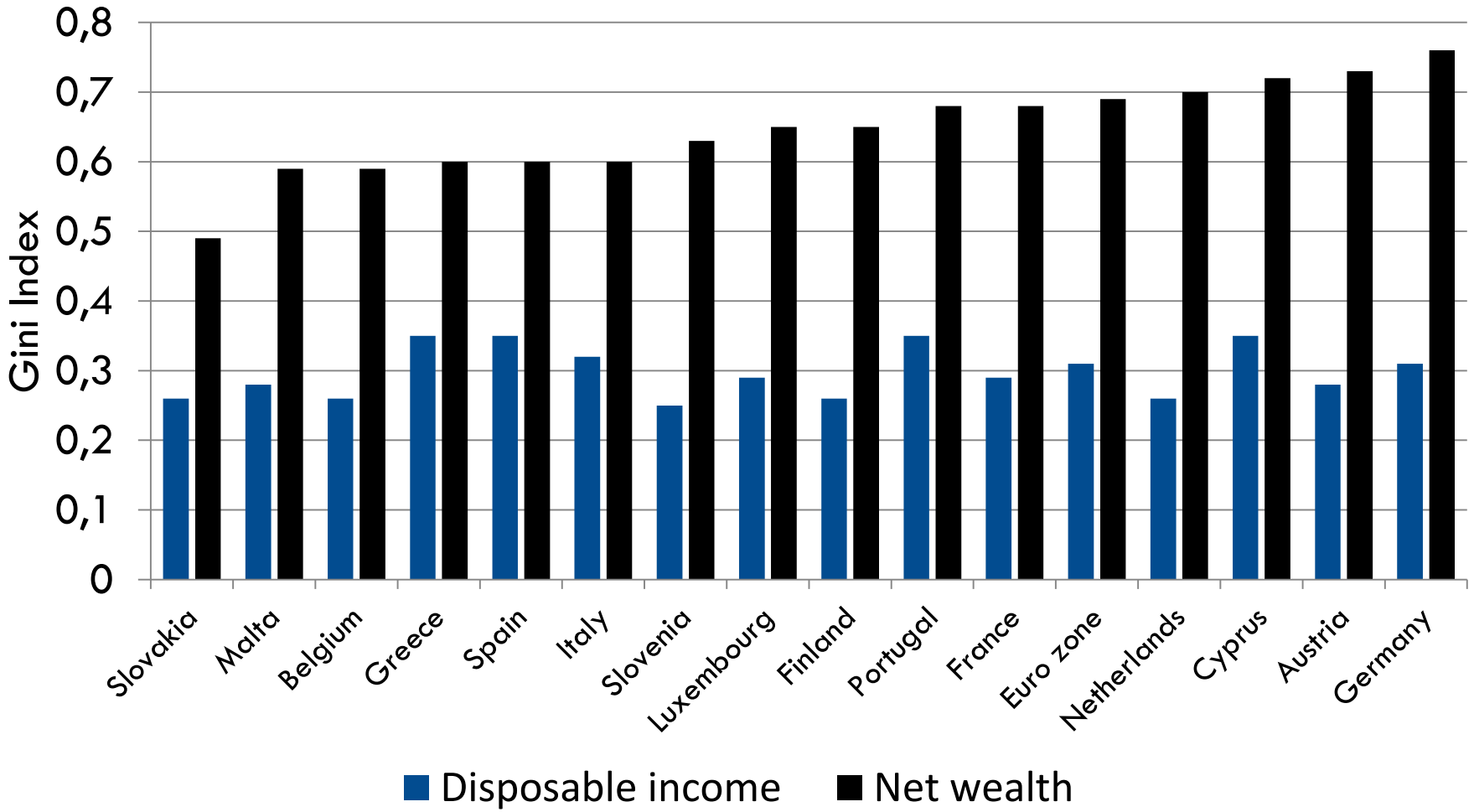
Source: OECD (2013)

Participation in Asset Classes in Europe

	Bottom half < 50%	Upper middle 51-80%	Wealthy 81-95%	Top 5%
Vehicles	62	85	91	91
Main residence	31	89	94	94
Other real estate	8	26	46	73
Self-employment business	5	15	21	44
Sight deposits	93	97	100	100
Money owed to the household	7	5	7	10
Share	2	6	18	33
Bonds	1	4	8	13
Mutual funds	4	10	22	33
Other financial assets	3	6	12	17

Source: own calculations; data: HFCS 2017

Wealth distribution: Inequality in the Euro area



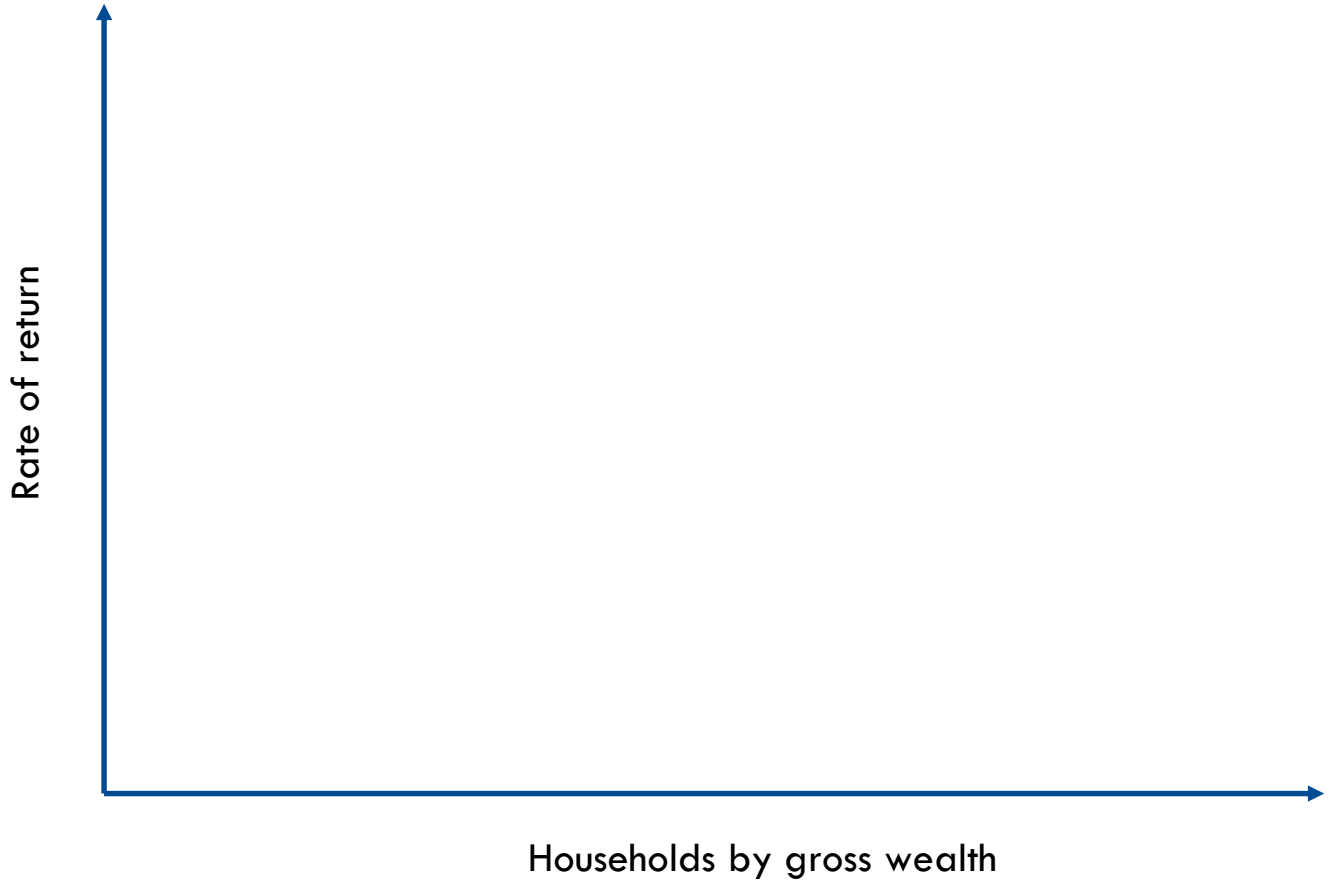
Source: own calcuations, data: HFCS 2014, Eurostat

Differential rates of return

- Workers‘ interest rates lower than capitalists‘ profit rates:

  Theoretical debate in the PK literature: Kahn 1959, Laing 1969, Harcourt 1972, Moore 1974, Pasinetti 1974, 1983, Fazi and Salvadori 1981
- Like differential saving rates:
  - Mixed income: capital income of workers lower than capitalists‘
  - Explosive feedback in wealth inequality
  - Stability of a growth regime?
- Check empirically: Combine return data from Jordà ea. (2018) with HFCS asset categories

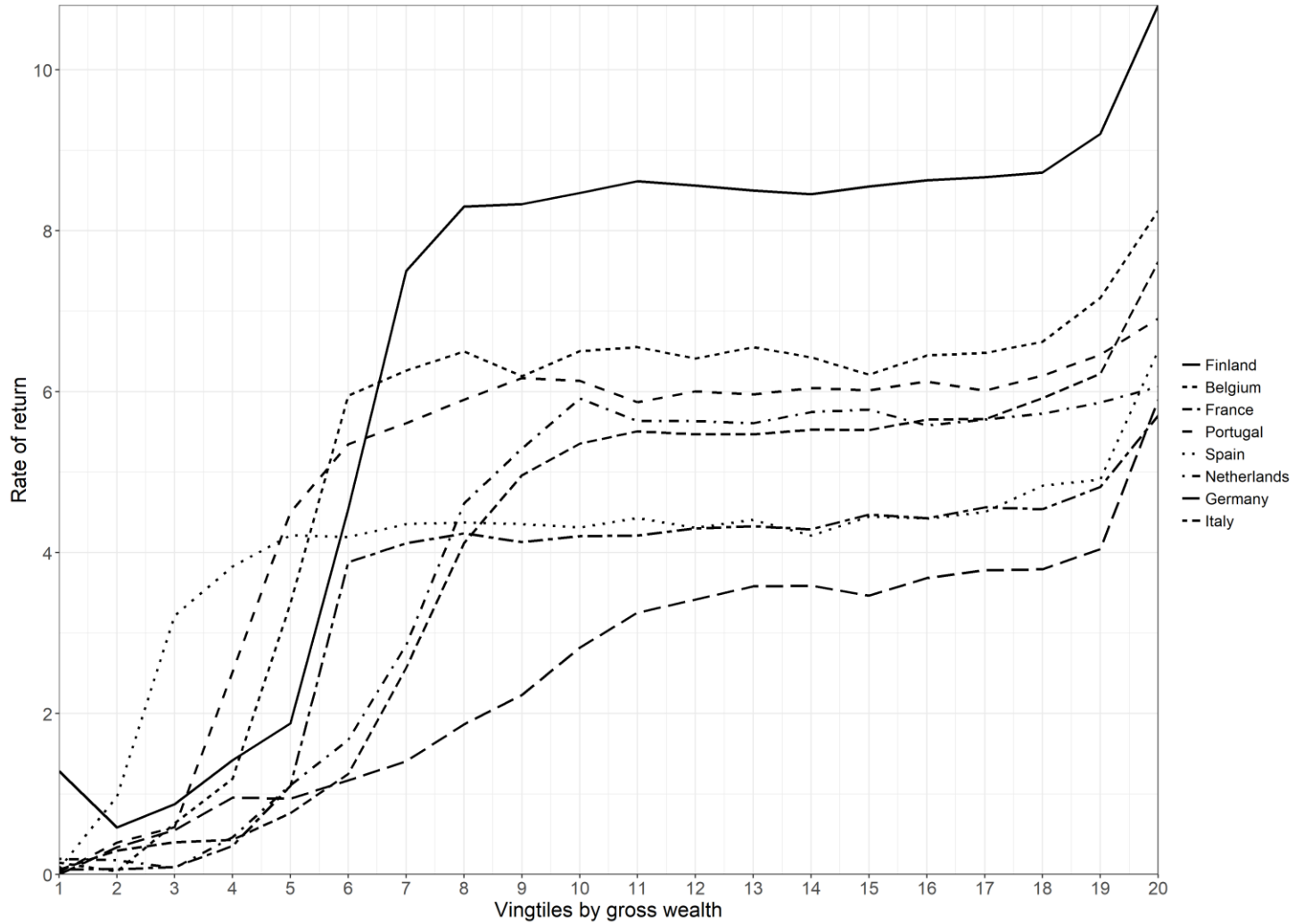
Draw rates of return by wealth:



Differential saving rates: Findings

- 3 wealth groups:
  - 30% asset-poor – average saving rate 2.4%
  - 65% middle-class homeowners – average saving rate 5.7%
  - 5% capitalists – average saving rate 7.2%
- Collapse asset-poor and middle-class homeowners into 95% ‚workers': avg. saving rate 5.6%

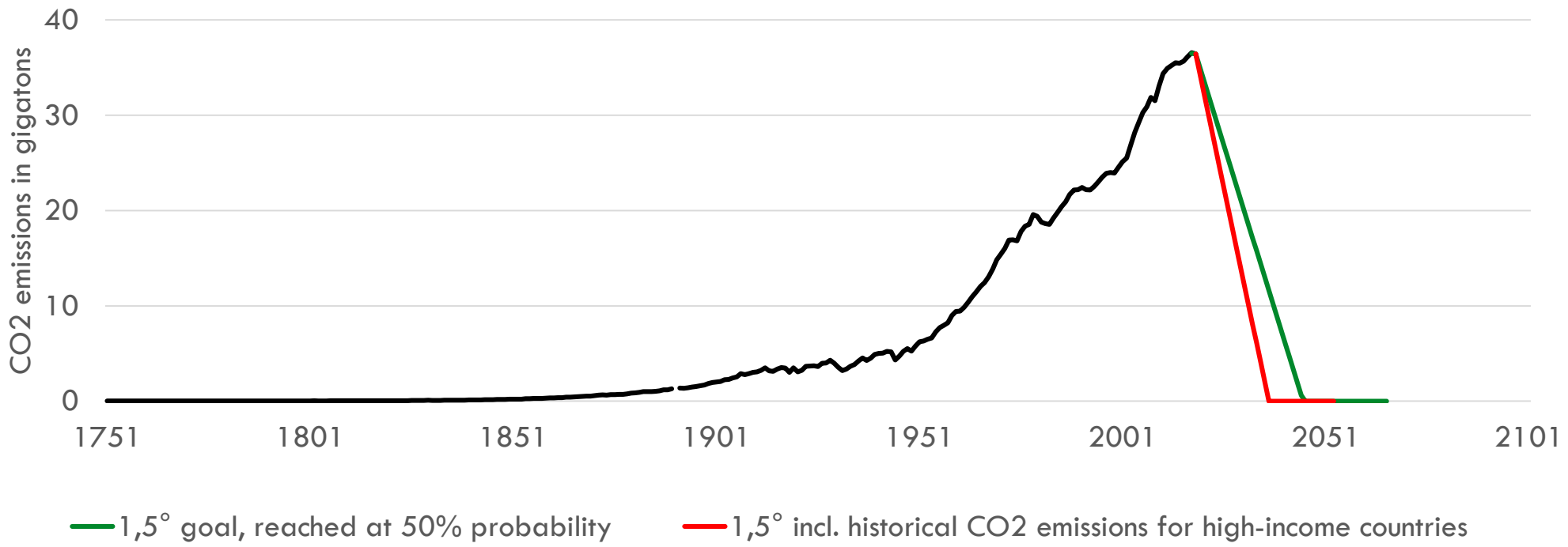
Differential rates of return across wealth vingtiles (continental Europe)



Source: Ederer, Mayerhofer, Rehm (2019), data: HFCS 2014

Excursion:
Distribution of carbon footprints

Required speed of decarbonization: CO_2 Reduction Path for 1.5 Degrees of Global Warming

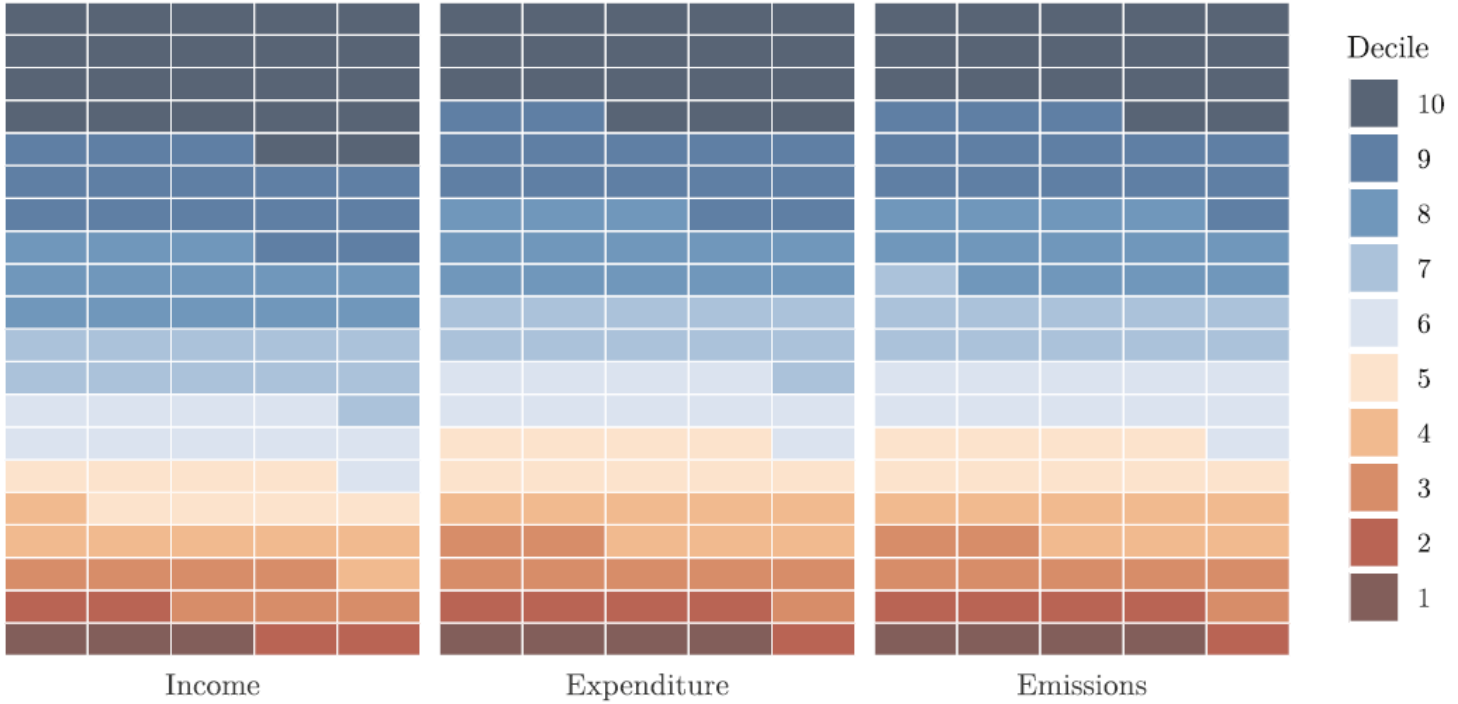


- Yearly CO_2 reduction of 10-12%
- Taking their historical emissions into account, high-income countries need to reach net zero emissions of CO_2 by 2037 (Anderson ea. 2020)

Sources: OWID 2021, IPCC 2021

Differential rates of emission

- Carbon intensity: Groups with lower income have higher relative CO_2 emissions
- E.g. Austria 2010: Top 10% of income receives 22% of total disposable income, generates 18% of expenditures, and emits 17% of emissions.



Source: Theine et al. 2022

Absolute emissions and shares in total emissions

- High-income countries (internatl.) and high-income households (intra-natl.) have higher absolute energy use (Wiedmann et al., 2020; Oswald et al., 2020) and emit more as a share in total emissions relative to their population share

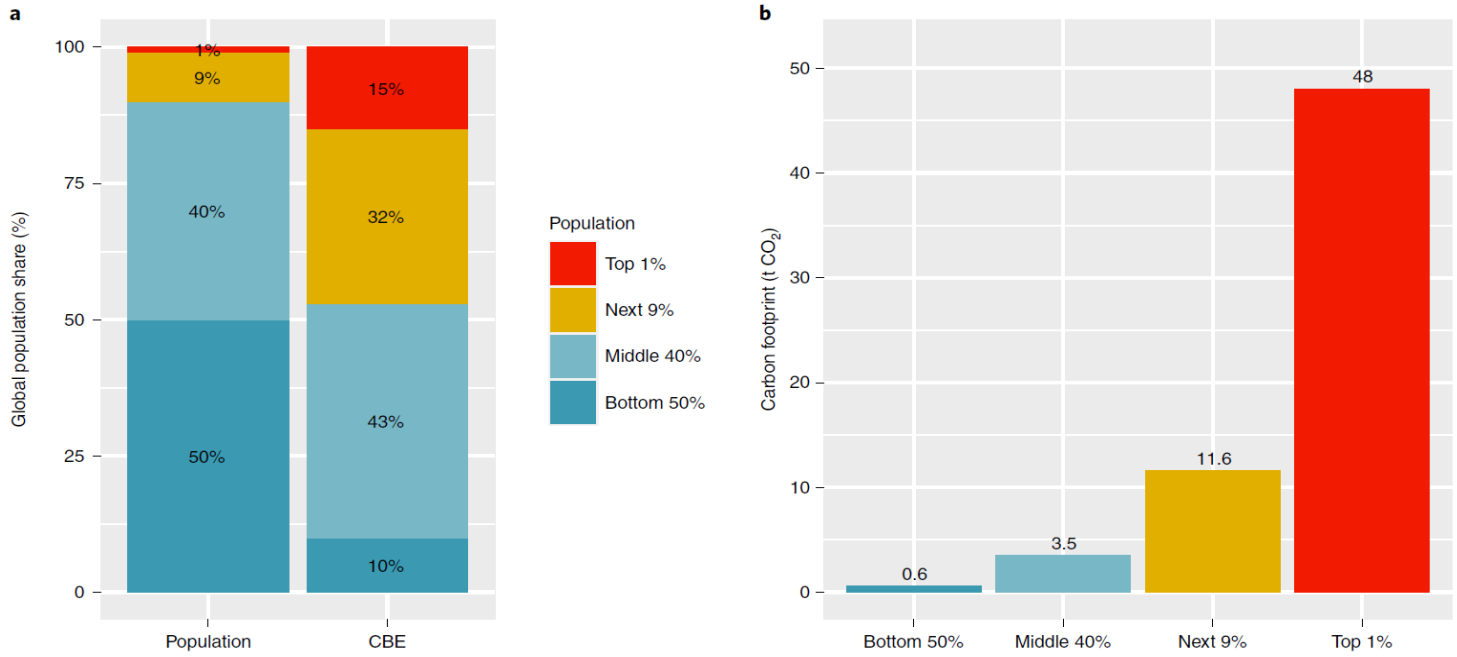
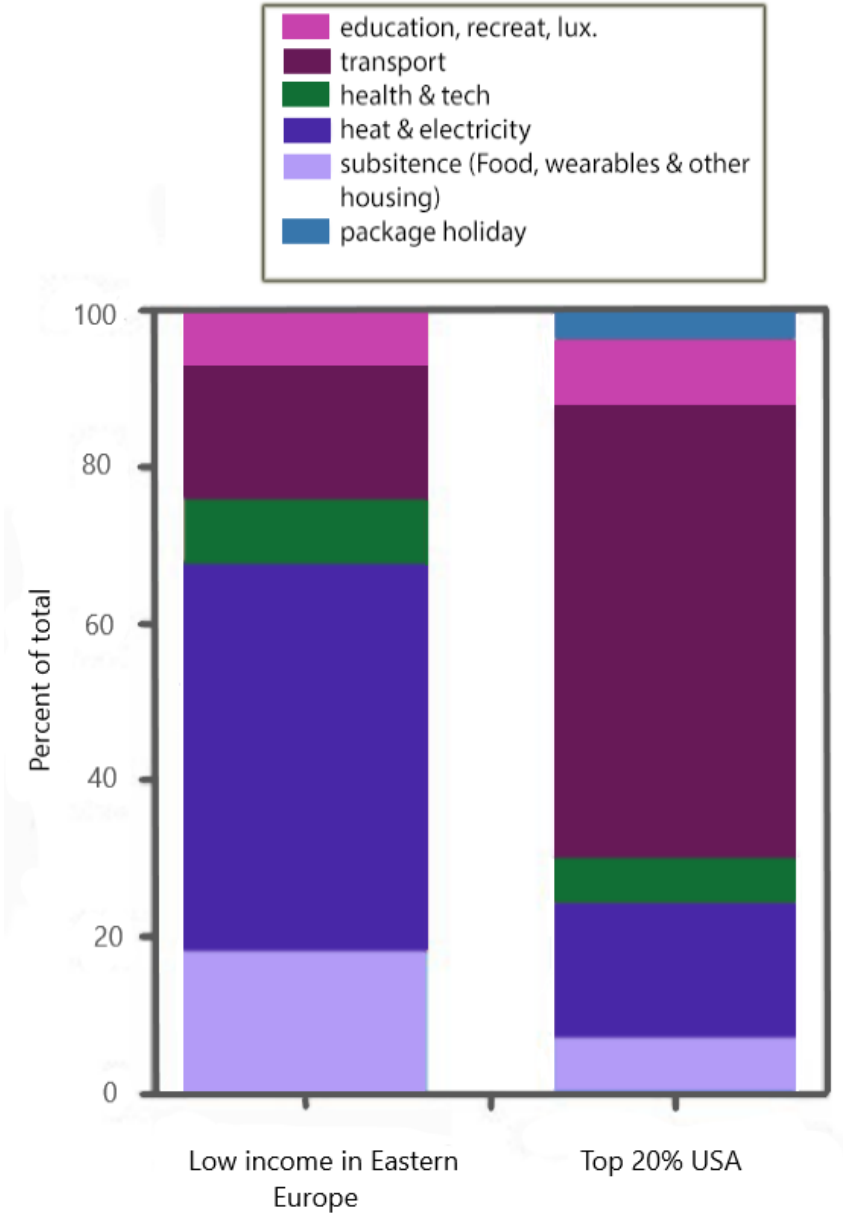


Fig. 3 | Global distribution of carbon emissions and carbon footprints. a, Global population shares (left) and corresponding shares of total global carbon emissions (CBE, right). **b**, Average carbon footprints of the top 1%, top 10%, middle 40% and bottom 50% of the global population.

Source: Bruckner et al. 2022

Dynamics

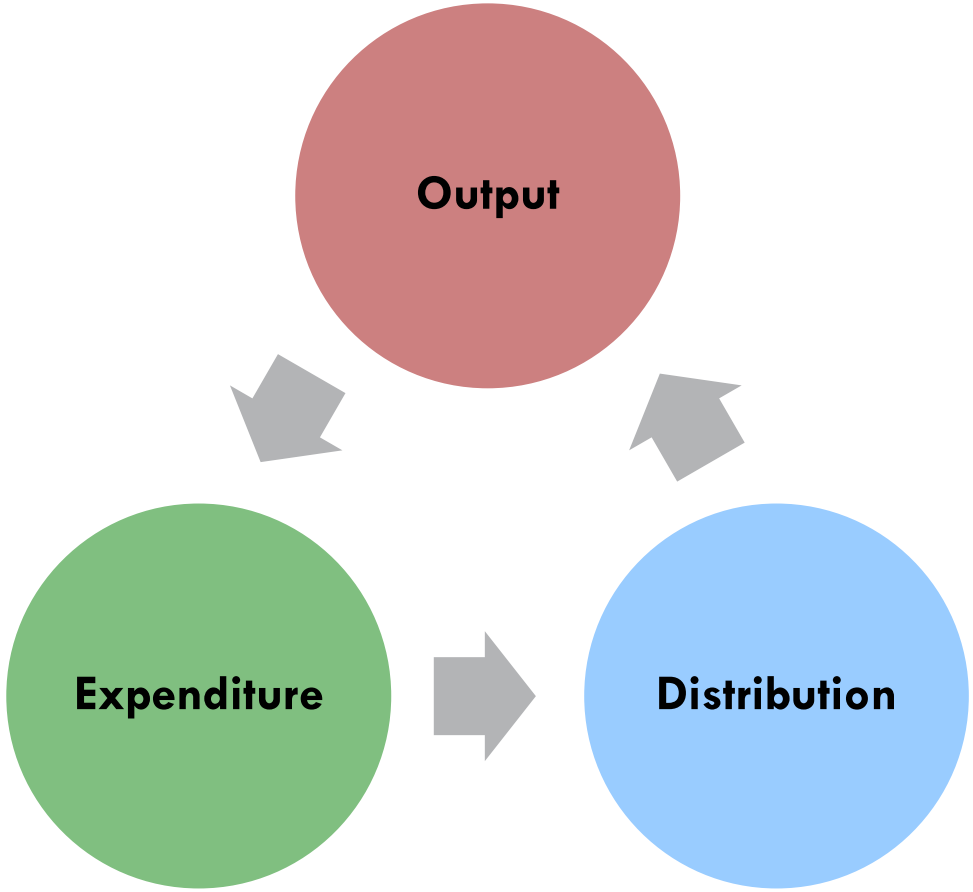
- High-income groups emit disproportionally for „luxuries“ (esp. unequally distributed: package holidays)
- Low-income groups emit mainly for heating and electricity (Oswald et al. 2020)
- Since luxuries are more difficult to abate, but heating relatively easy, lower inequality makes it easier to decarbonize (Oswald ea. 2021)



Source: Oswald ea. 2021

Post Keynesian framework for CO2 reduction? National accounts

- GDP:
  - Production
  - Consumption
  - Distribution
- Elasticities:
  - Decarbonization/decoupling
  - Net negative emissions (carbon capture + storage)
- No golden bullet: we need all 5



Theory

Wealth distribution model

Wealth distribution models

- Long history of theory of wealth models: Pasinetti 1962, Dutt 1990, Palley 2012
- Neo-Kaleckian model of personal income and wealth distribution:
  - Mixed income (profit income for workers, work income for capitalists)
  - Endogenous wealth distribution
  - Calculate parameters from household data
  - Compare model solution with empirical data

The model

- Income is divided between wages and profits (profit share π);
  wage income is divided between workers and capitalists/managers (α);
  differential saving rates (s_w, s_r) and differential rates of return (γ_w, γ_r)
  (wealth shares held in profit-generating assets)

$$Y_w = (1-\alpha)W + \frac{\gamma_w(1-z)}{\gamma_w(1-z)+\gamma_r z}R, \qquad Y_r = \alpha W + \frac{\gamma_r z}{\gamma_{w(1-z)}+\gamma_r z}R$$

- Workers and capitalists consume and save out of their income

$$C = (1-s_w)Y_w + (1-s_r)Y_r$$

- The wealth distribution (share of capitalists z) is $z = {}^{V_r}/_{V}$

Solution (long run)

- Basic version: $z^* = \frac{s_r\pi - s_w}{(s_r - s_w)\pi}$

  (no mixed income, no differential returns)

- Full version: 6 parameters (saving rates s_w, s_r, profit share π, share in labour income α, profit generating wealth share γ_w, γ_r) define wealth distribution in equilibrium

Full solution

$$z^{**} = \frac{-D \pm \sqrt{D^2 - 4CE}}{2C}$$

$$C = -[s_w(1-\alpha) + s_r\alpha](1-\pi)(\gamma_r - \gamma_w) - (s_r\gamma_r - s_w\gamma_w)\pi$$

$$D = s_r\alpha(1-\pi)(\gamma_r - \gamma_w) + s_r\gamma_r\pi - [s_w(1-\alpha) + s_r\alpha](1-\pi)\gamma_w - s_w\gamma_w\pi$$

$$E = s_r\alpha(1-\pi)\gamma_w$$

Transaction flow matrix

	Households		Firms			
	Workers	Capitalists	Current	Capital	Banks	Total
Consumption	$-C_w$	$-C_r$	$+C$			0
Investment			$+I$	$-I$		0
Wages	$+W_w$	$+W_r$	$-W$			0
Profits	$+R_w$	$+R_r$	$-R$			0
Equity	$-\gamma_w \Delta V_w$	$-\gamma_r \Delta V_r$		$+\Delta E$		0
Deposits	$-(1-\gamma_w)\Delta V_w$	$-(1-\gamma_w)\Delta V_w$			$+\Delta D$	0
Loans				$+\Delta L$	$-\Delta L$	0
Total	0	0	0	0	0	0

Source: Ederer, Rehm (2019)

Data

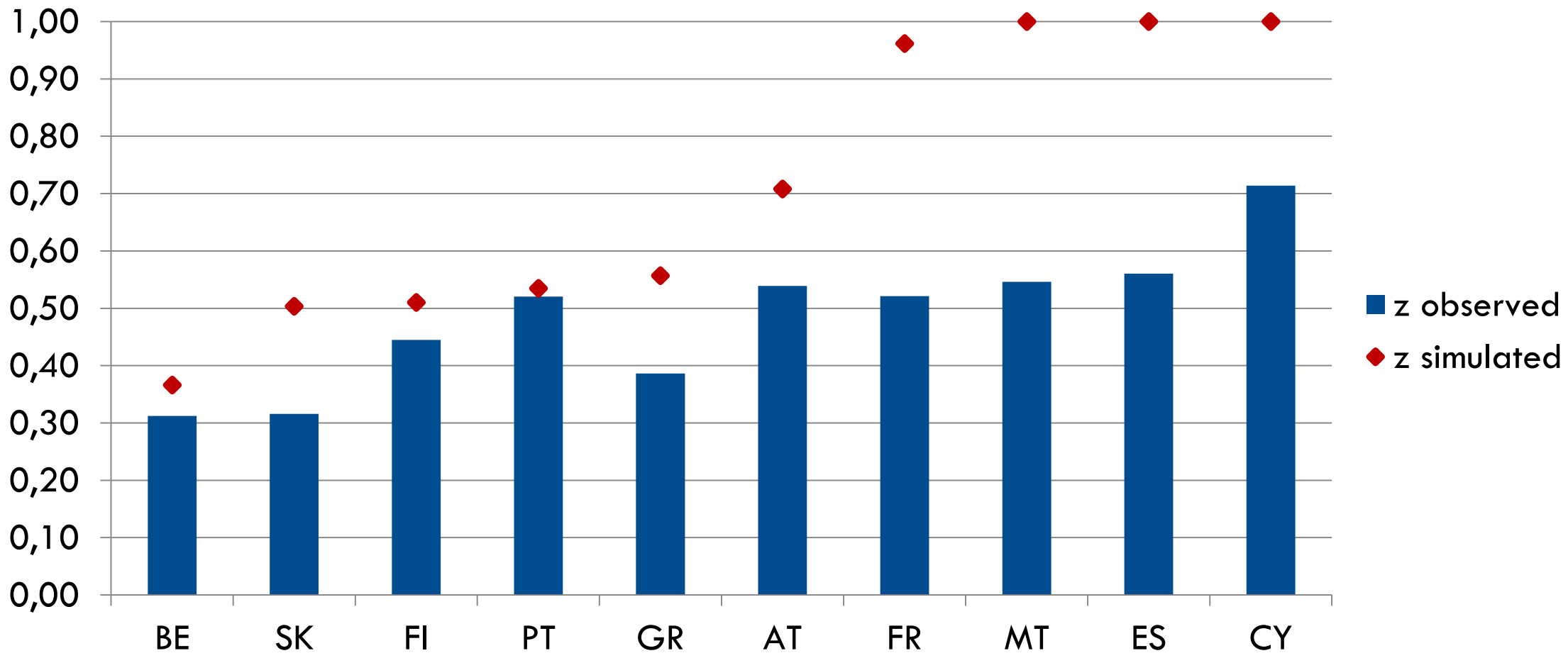
- Household Finance and Consumption Survey (HFCS)
- Capitalists defined following Rehm, Naqvi, Hofmann (2017):
  - Top 1 percent wealth owners
  - Medium and large business owners (> 5 employees)
  - Capital income higher than average work income
- Workers: employment status

Empirical values of model parameters

	s_w	s_r	π	α	γ_w	γ_r
Austria	0.05	0.23	0.38	0.07	0.40	0.92
Belgium	0.10	0.29	0.34	0.02	0.59	0.85
Cyprus	0.00	0.10	0.37	0.18	0.81	0.96
Spain	0.00	0.07	0.41	0.10	0.53	0.90
Finland	0.12	0.39	0.37	0.02	0.55	0.93
France	0.01	0.29	0.37	0.05	0.57	0.97
Greece	0.05	0.13	0.34	0.05	0.25	0.90
Malta	0.00	0.26	0.46	0.03	0.59	0.98
Portugal	0.13	0.33	0.41	0.04	0.42	0.90
Slovakia	0.18	0.30	0.44	0.05	0.20	0.83

Note: Columns refer to (1) saving rate of workers, (2) saving rate of capitalists, (3) profit share, (4) share of capitalists in the wage bill, (5) share of workers' wealth held in profit-generating assets, (6) share of capitalists' wealth held in profit-generating assets
Source: Ederer, Rehm (2019); Data: HFCS 2010, EHBS 2010

Empirical and model share of capitalists in total wealth



Source: Ederer, Rehm (2019), data: HFCS 2010, EHBS 2010

Conclusion

- Post-Keynesians have a head start on the mainstream in linking the functional and the personal income distribution
- Yet, the personal income distribution is under-researched compared to the functional distribution in Post-Keynesian economics
  - Empirically, both have become more unequal/less favourable to workers
- The wealth distribution has received even less attention
  - It is key both theoretically (foundation of classes) and
  - Empirically much more unequal than the income distribution
- Climate change is the next big distributional challenge

Thank you!

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Study Questions

1. What are key stylized facts of the distribution of income and wealth?
2. Is the current level of inequality in income and wealth a problem? If so, which policy measures could effectively curb inequality?
3. How can the focus on growth in the wage-/profit-led literature be squared with the ecological need to limit growth?

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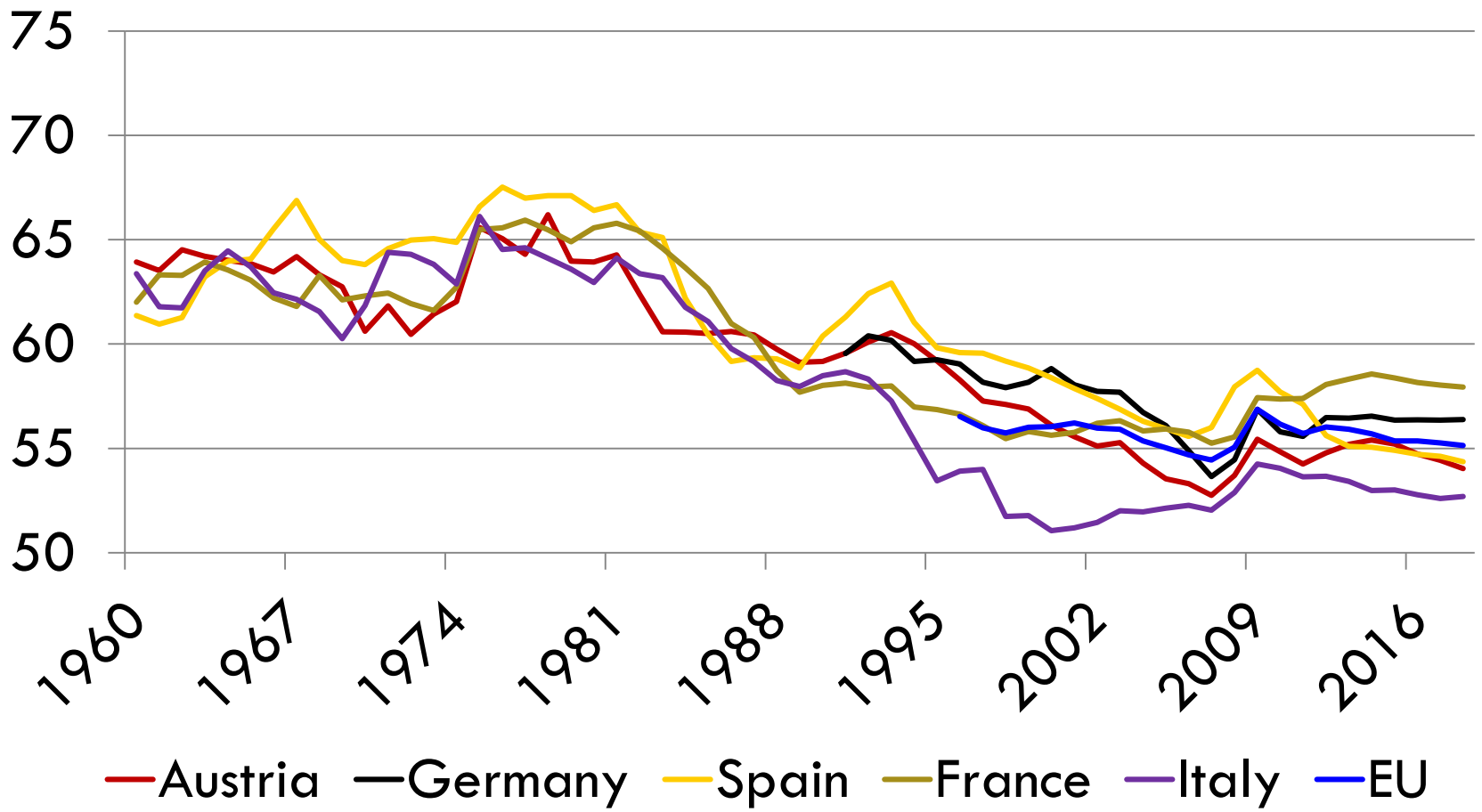
Appendix

Functional distribution

Functional income distribution

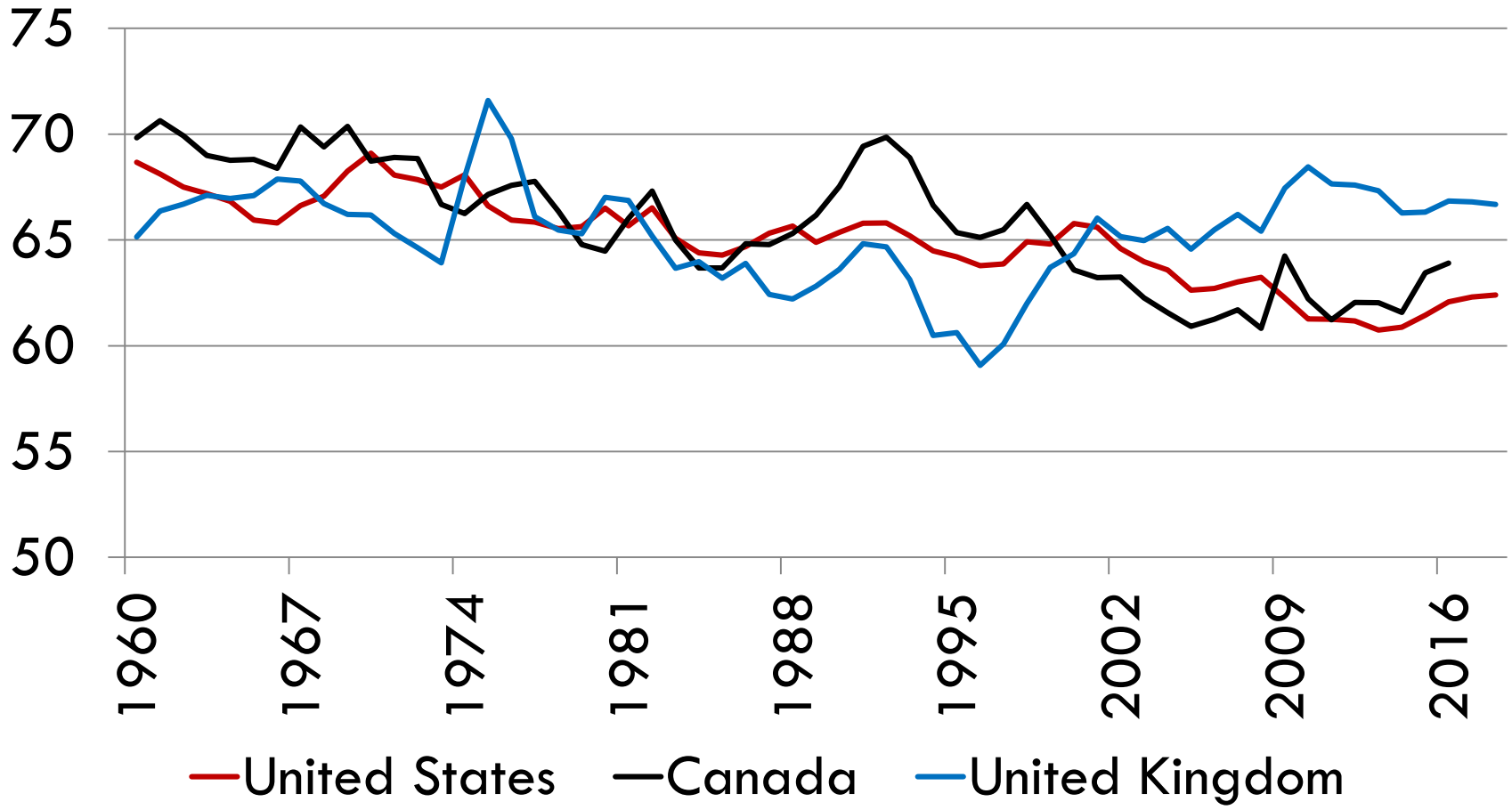
- Thoroughly researched by Post-Keynesian economics (e.g. Stock-hammer/Onaran 2008, Lavoie 2009, Onaran/Galanis 2012, Hein 2015 …)
- Secular falling trend in many countries, with cyclical elements
- Contradicts Kaldor‘s 1st „remarkable historical consistency“
- Not a focus in much of neoclassical theory

Functional income distribution:
Adjusted wage share in continental Europe



Source: European Commission, AMECO-DB

Adjusted wage share in Anglo-Saxon countries



Source: European Commission, AMECO-DB

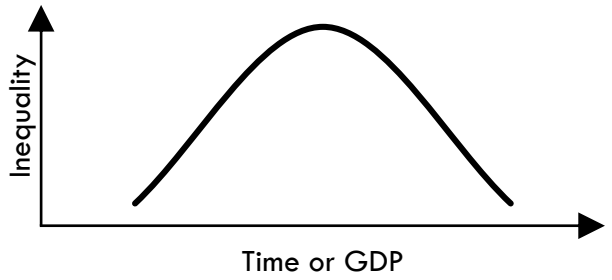
Personal distribution

Personal income distribution

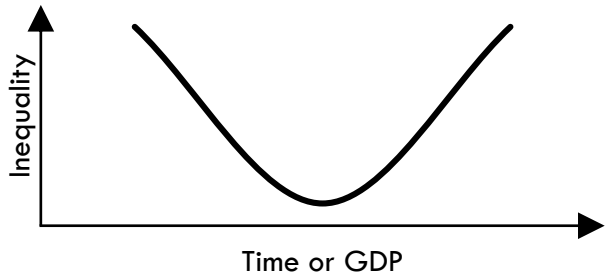
- Surge in interest in mainstream economics
- Long-run inequality: u or wave?
- Income concentration at the top: rising?
- Income composition at the top: are classes still relevant?

Personal income inequality: Historical perspective

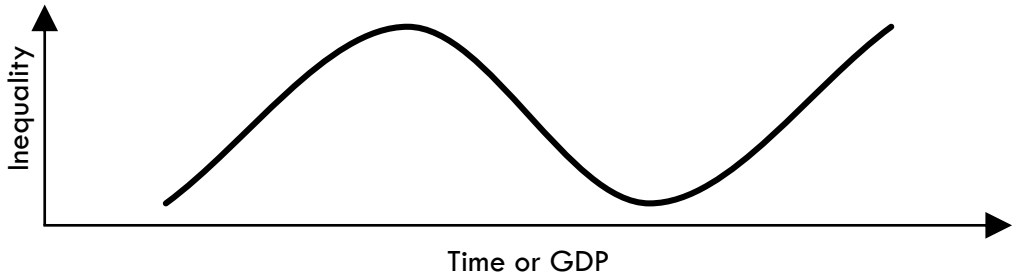
Kuznets



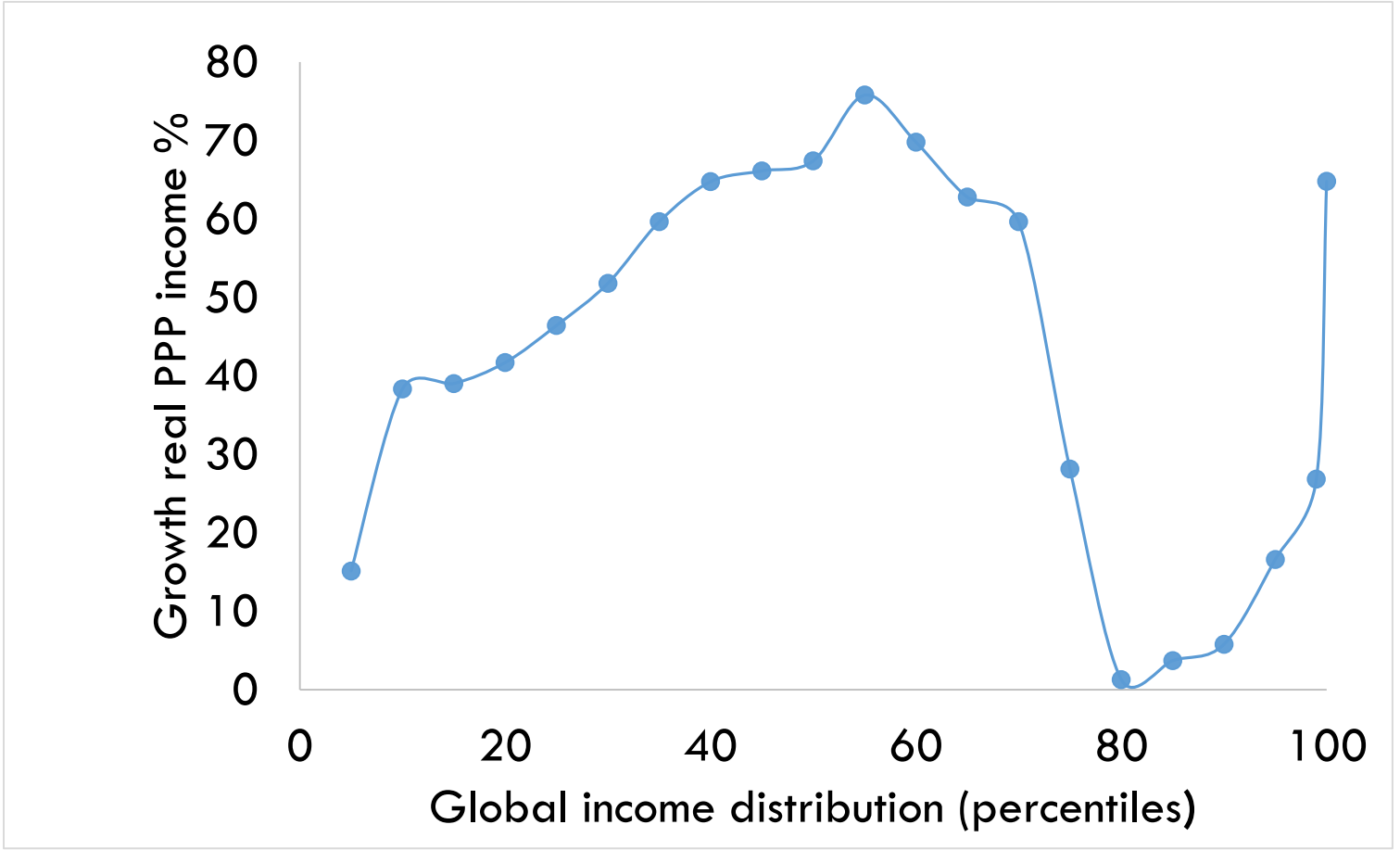
Piketty



Milanovic

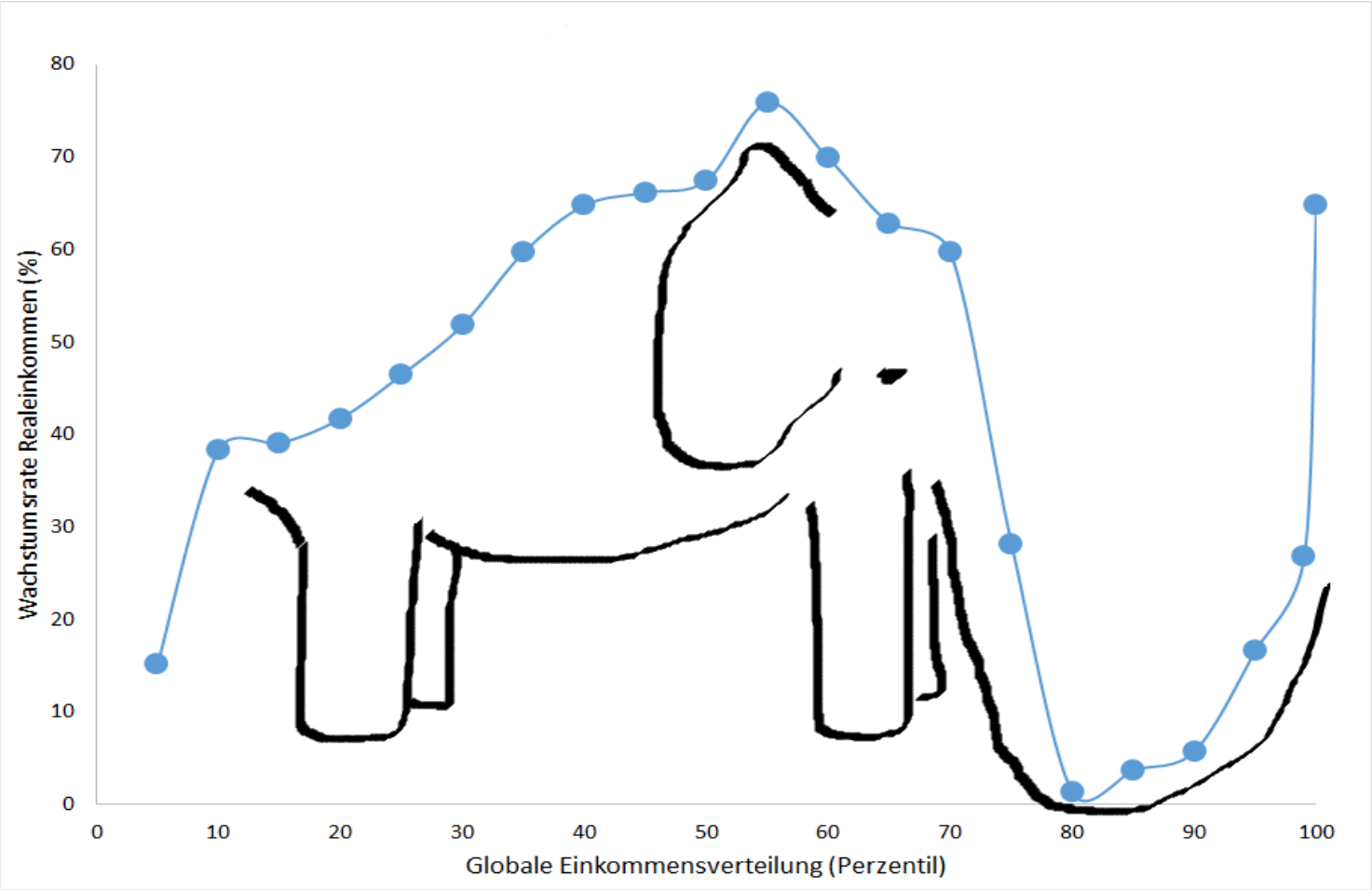


Personal income inequality (1): Global relative gains (1980-2008)



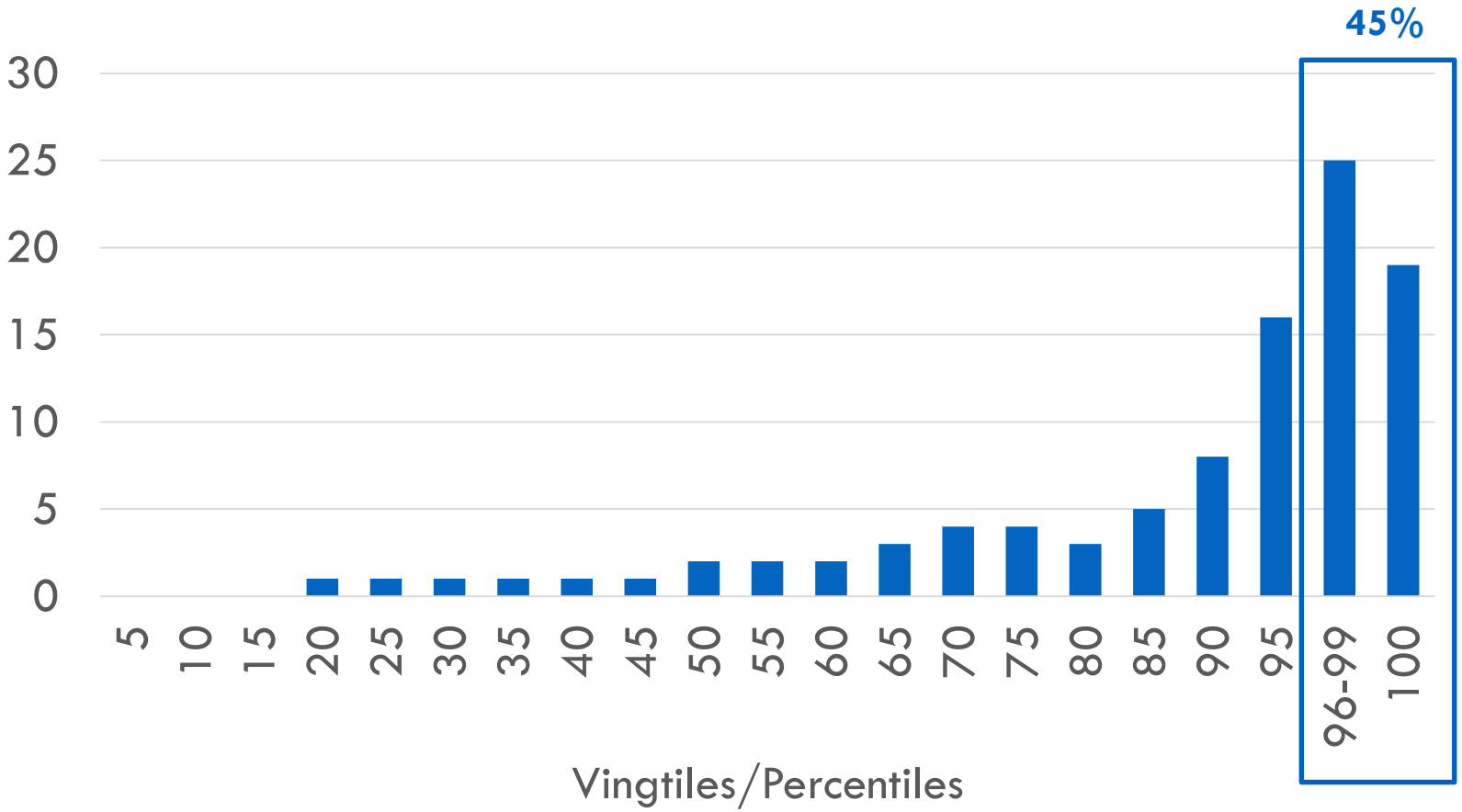
Source: Lakner, Milanovic (2016)

Personal income inequality (1): The elephant



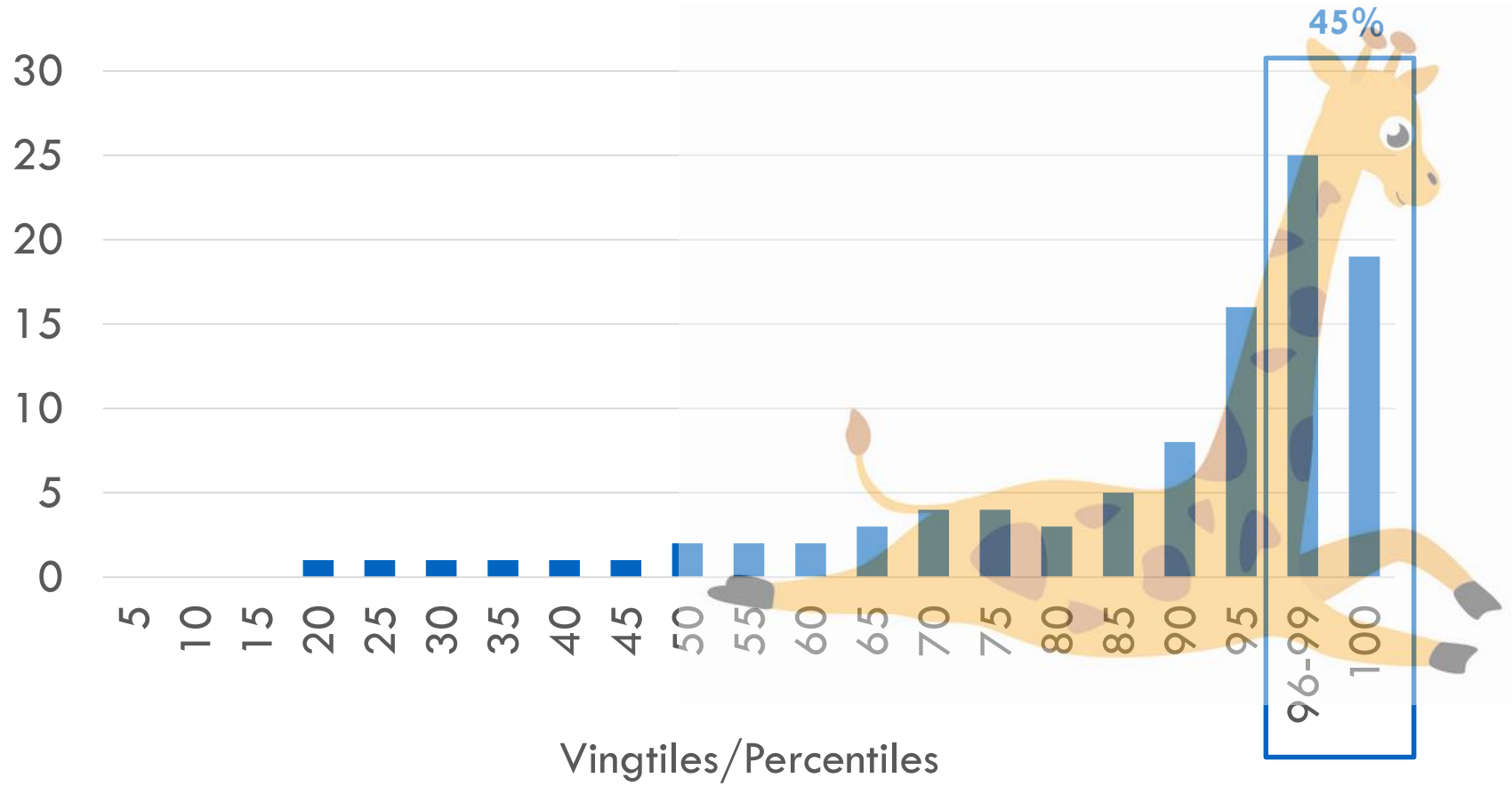
Source: Lakner, Milanovic (2016)

Personal income inequality (2): Global absolute gains



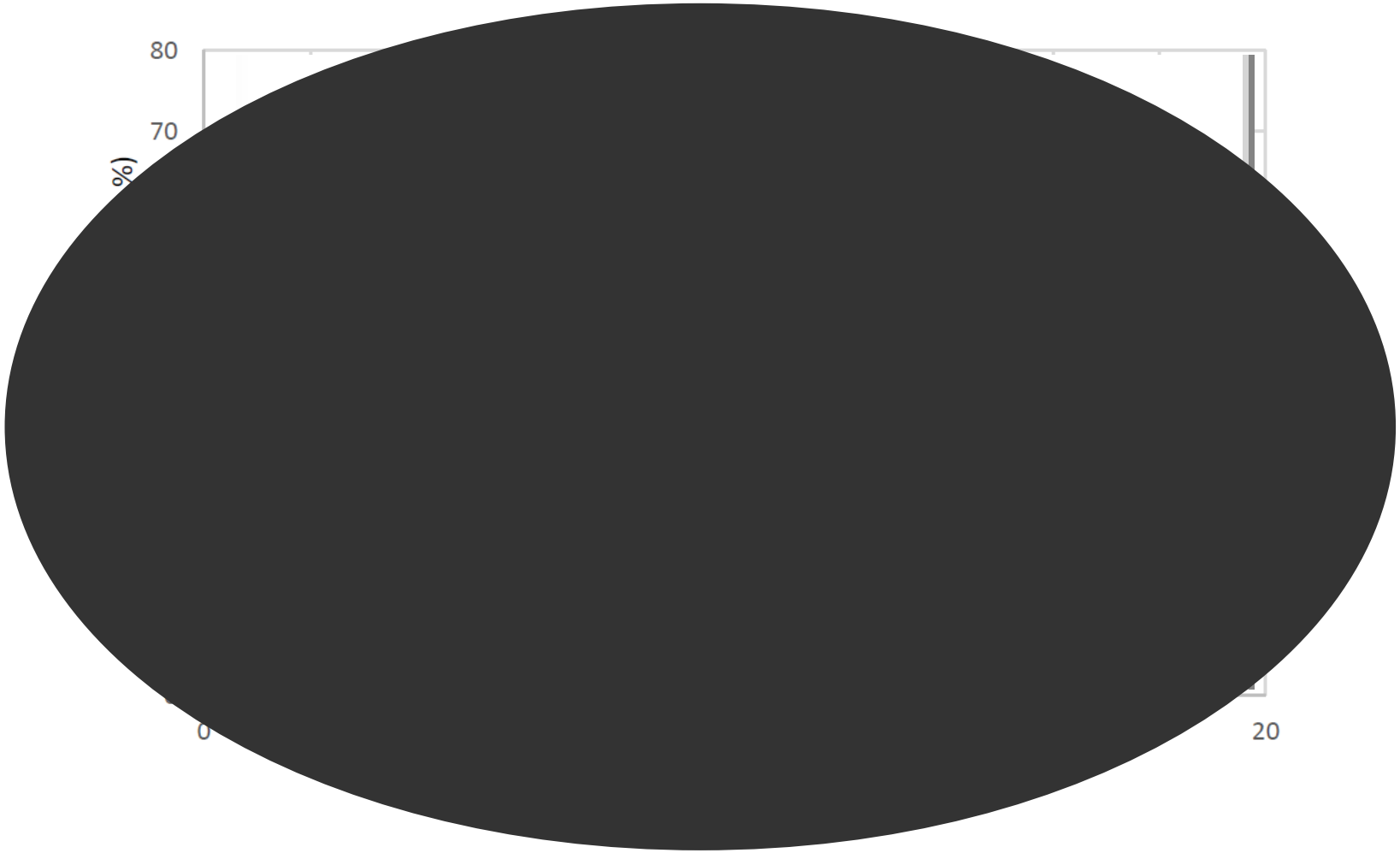
Source: Milanovic (2016)

Personal income inequality (2): The giraffe



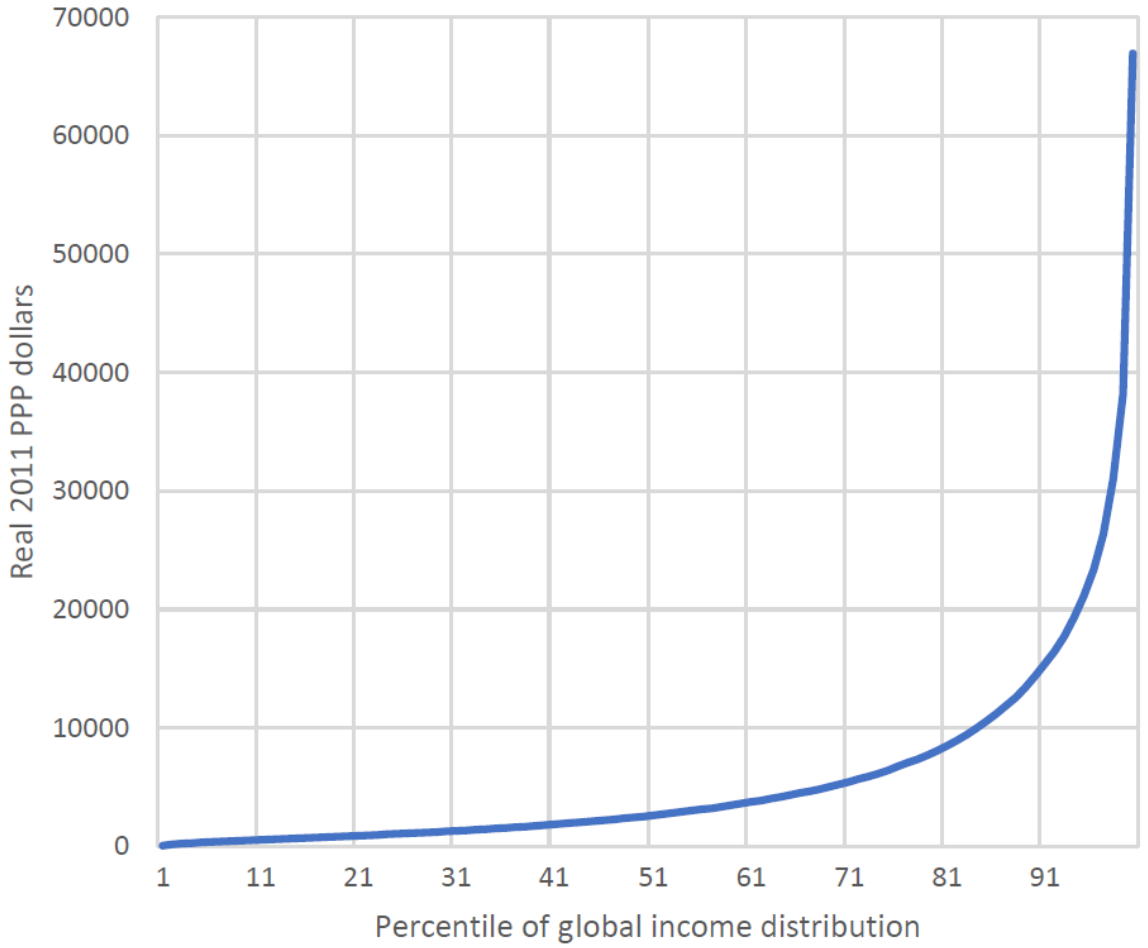
Source: Milanovic (2016)

Global personal income inequality (3): The diplodocus? (2013-2018)



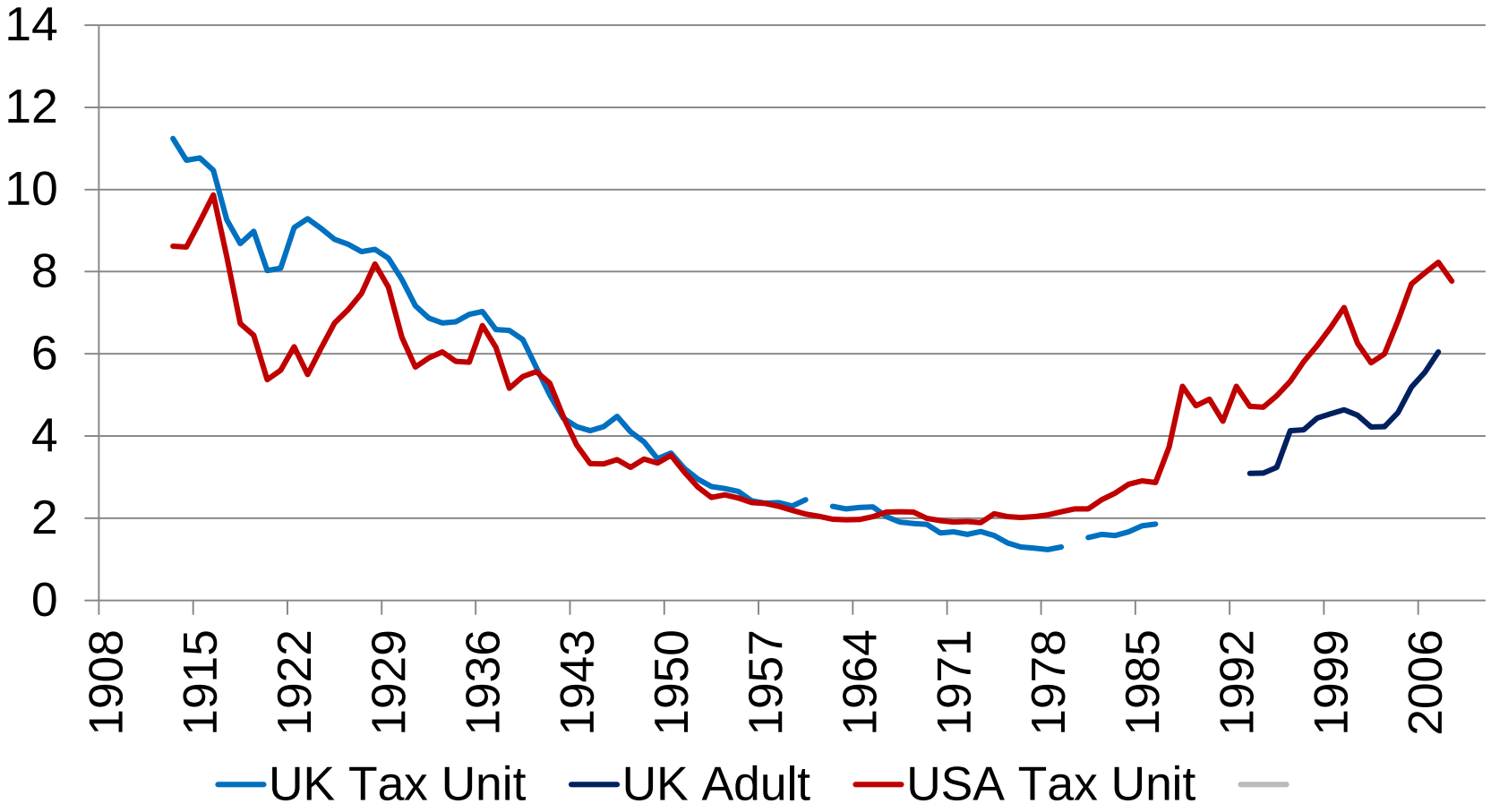
Source: Milanovic (2016)

Global personal income inequality (1): Absolute gains (2013-2018)



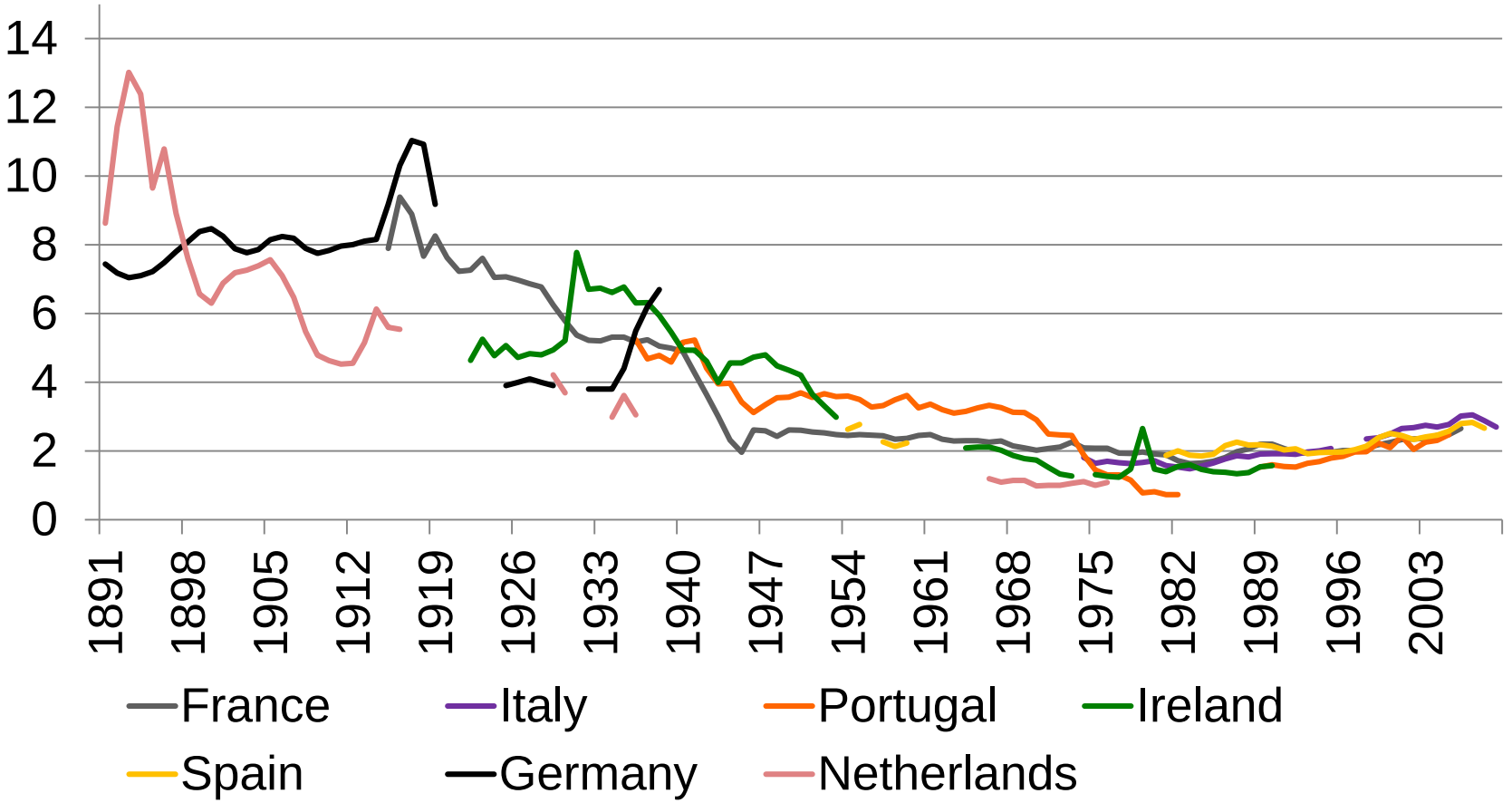
Source: Milanovic (2016)

Personal income distribution: Top 1% share in national income (UK, US 1908-2008)



Source: WWID, Alvaredo et al. (2012)

Top 1% share in national income (continental Europe 1891-2006)



Source: WWID, Alvaredo et al. (2012)

Classes

Classes

- Does the functional distribution still describe society well?
  - Managers (employees, but like capitalists)
  - Contingent workers (self-employed, but like workers)
- 7 classes:
  - 3 capitalist
  - Self-employed
  - 3 workers

Income distribution by class
(Darker = higher income share relative to population share)

	Löhne	Profite	Zinsen
Top 1%	1.3	9.8	23.5
Rentiers	0.8	5.4	37.5
UnternehmerInnen	0.4	10.5	2.2
Selbständige	0.2	7.1	1.0
Hochqual. Lohnabh.	1.5	0.4	0.6
Mittelqual. Lohnabh.	1.0	0.2	0.4
Geringqual. Lohnabh.	0.7	0.1	0.1

Source: Rehm, Naqvi, Hofmann (2016); data: HFCS 2010

Wealth distribution by class
(Darker = higher income share relative to population share)

	Reales Vermögen	Sicheres Finanzverm.	Riskantes Finanzverm.
Top 1%	19.6	18.0	37.2
Rentiers	3.8	10.1	13.0
UnternehmerInnen	4.0	2.6	3.4
Selbständige	1.6	1.0	0.8
Hochqual. Lohnabh.	1.0	1.2	1.1
Mittelqual. Lohnabh.	0.6	0.6	0.3
Geringqual. Lohnabh.	0.5	0.3	0.2

Source: Rehm, Naqvi, Hofmann (2016); data: HFCS 2010

Debt distribution by class
(Darker = higher income share relative to population share)

	Hypotheken	Unbesicherte Schulden
Top 1%	4.8	4.6
Rentiers	3.4	1.6
UnternehmerInnen	1.5	2.9
Selbständige	1.4	1.7
Hochqual. Lohnabh.	1.5	1.3
Mittelqual. Lohnabh.	0.8	0.8
Geringqual. Lohnabh.	0.5	0.6

Source: Rehm, Naqvi, Hofmann (2016); data: HFCS 2010

Manager pay & overhead costs

Manager pay & overhead costs

- Managers´ salaries are wages by accounting standards
- Conceptually, are they profit/capital income?
- Important for the definition of costs: variable or fixed?

Overhead labour (Palley 2005, Lavoie 2009)

- Wages and salaries: split between workers (variable costs) and managers (overhead costs)
- Ratio of wages depends endogenously on the capacity utilization (Lavoie 2009)
- Increase in overhead costs:
  - Target return pricing: firms have a target profit rate (based on total unit costs), and will thus raise prices when costs rise
  - Wage share of workers will fall, wage share of managers will rise
  - Profit share depends on capacity utilization and autonomous investment

Wage-/profit-led personal income distribution

Neo-Goodwinian Model (profit-led)

- Long-run effective demand:

  Demand curve $\dot{u} = f(u, \delta)$

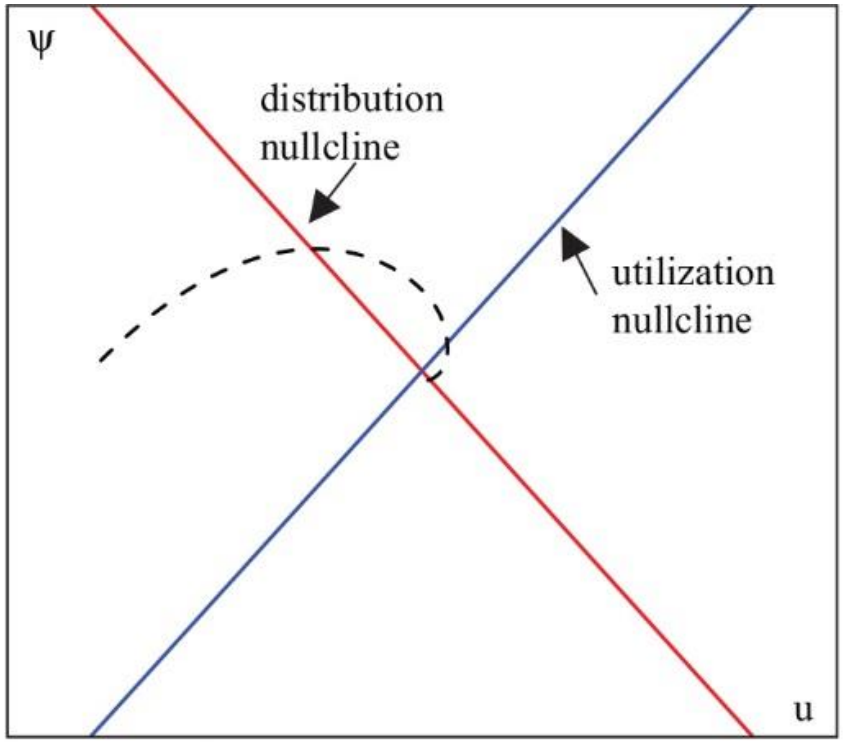
$$\dot{u} = 0 \begin{cases} \text{positive slope: profit-led} \\ \text{negative slope: wage-led} \end{cases}$$

- Long-run wage share:

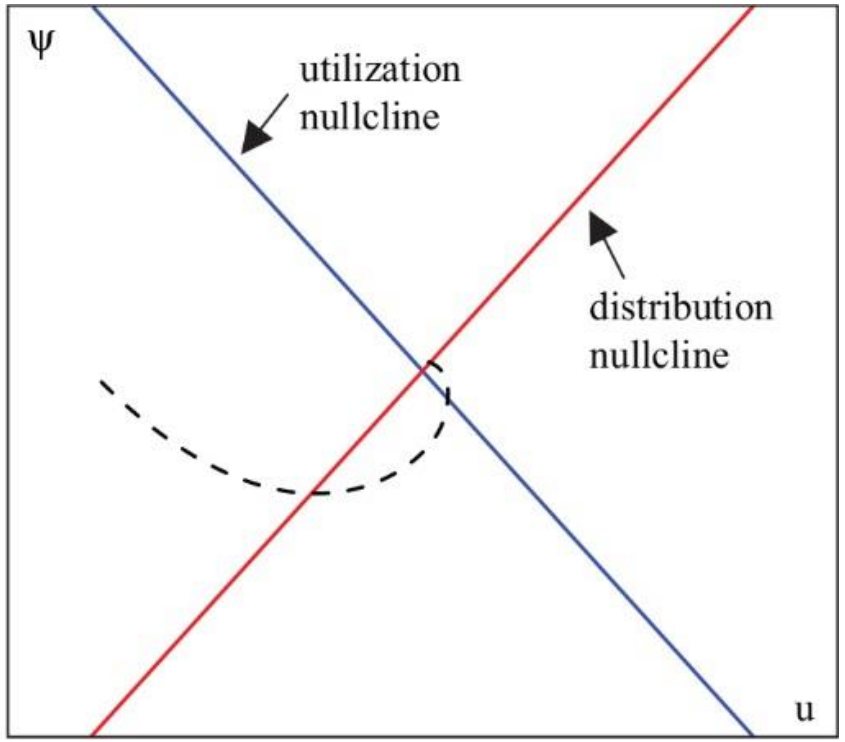
  Distribution curve $\dot{\delta} = g(u, \delta)$

$$\dot{\delta} = 0 \begin{cases} \text{positive slope: profit squeeze} \\ \text{negative slope: forced saving} \end{cases}$$

Phase diagrams (profit-led)



(a) wage-led/wage-squeeze



(b) profit-led/profit-squeeze

Source: Kiefer, Rada (2015)

Wage-/profit-led personal income distribution

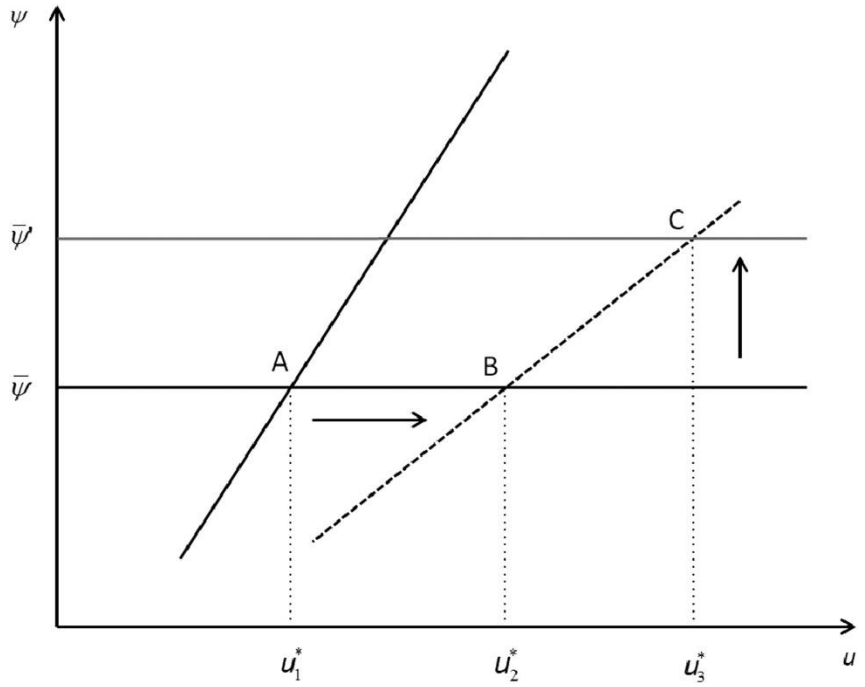
- Carvalho, Rezai (2016): What if inequality of wage income falls?
- Direct effect: Lower saving out of wages

  => higher differential between saving out of wages and profits

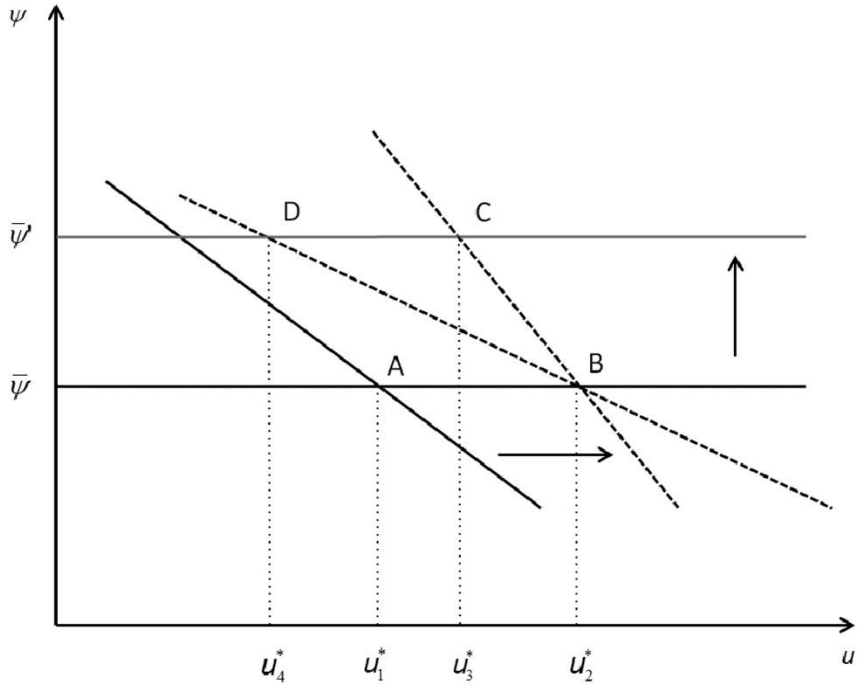
  => more wage-led/less profit-led
- Indirect effect: higher capacity utilisation (due to higher consumption) and additionally
  - Wage-led and weakly profit-led => more wage-led
  - Strongly profit-led => more profit-led

Wage/profit-led: Personal income distribution

Wage-led



Profit-led



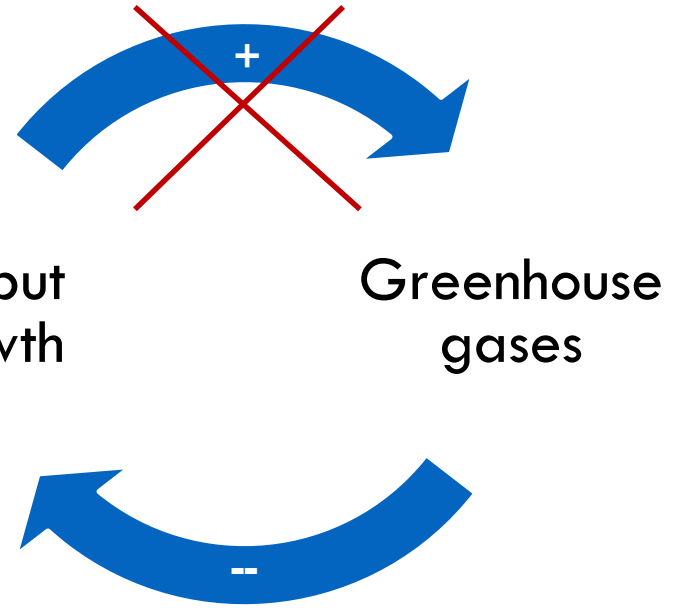
Source: Carvalho und Rezai (2016)

Post-Keynesian theory and ecological economics

Growth Imperative?

- Investment/accumulation is one of the key features of capitalism:
  Competition forces companies to invest, or else perish
  (But no monetary growth imperative, Fontana/Sawyer 2016)

⇒ Growth of the capital stock



- Historically, there is a near linear 1:1 relationship of income and energy use (Semieniuk 2018)
- Ecological impact depends on quality of growth: which sectors, which products/services, which jobs?
- Two possible strategies for severing the top link: Decoupling and mitigation (carbon capture & storage)

Post-Keynesianism und Ecological Economics I: Growth Models

- Leontief production function (constant marginal cost), mark up over cost, focus on the short run
  - ✓ No contradiction
    Realistic view of technological change: retro fitting, net investment
- Classes as social actors
  - ✓ No contradiction
- Steady state models
  - ✓ No contradiction
    Growth is not baked into models, adequate parameters yield CO_2-neutral steady state (Hein 2021)
- Wage-/profit-led debate (Does redistribution to capital or to labor lead to more growth?)
  - ✓ No contradiction
    Small absolute effects, main point: there is no trade off between equity and efficiency

Post-Keynesianism und Ecological Economics II: Economic policy

- Fiscal policy for stabilization
  - ✓ No contradiction
    Generating growth is not a goal
- Monetary policy is endogenous
  - ✓ No contradiction
    Quantity of money follows output growth (horizontalist view, Cahen-Fourot/Lavoie 2016), monetary policy is accommodating
- Strong state
  - ✓ No contradiction
    Active welfare state (investments in socio-ecological transformation), debt thus sustainable

Post-Keynesianism und Ecological Economics III: Contradictions

- Focus on distribution: differential saving rates, demand-driven growth
  - Contradiction

    Redistribution to the bottom leads to higher growth,

    low-income groups have higher relative CO_2 emissions
- Growth imperative (Marxist)
  - Contradiction

    Forced accumulation of capital (cut-throat competition)

Post-Keynesianism und Ecological Economics III: Resolvable?

- Focus on distribution: differential saving rates, demand-driven growth
  - But: absolute CO2 level relevant for global warming

  ⇒ Sustainable consumption paths (Fuchs et al. 2016, Gough 2020)
  Public investments (insulation, public transport)
- Growth imperative (Marxist)
  - Fundamental socio-ecological transformation?
  - Mixed economy?: remove economic domains from the profit/accumulation logic

  ⇒ Not necessarily central government, can be under the auspices of cooperatives, NGOs, different levels of government etc.

Political Economy of a PK EcolEcon Synthesis

- Major obstacle of political feasibility: power
- Pressure from below (activists)
- Pressure by authority (scientists)
- Strategic coalitions (faction of capital: e.g. renewables)

Political debates

- Political debates:
  - Wealth tax (Elizabeth Warren)
  - Top income tax (Alexandria Ocasio-Cortez)
  - MMT (Stephanie Kelton, Warren Mosler, Randall Wray, Pavlina Tcherneva)