

Session 12: Central banks and inequality hysteresis

S 12 Outline and summary

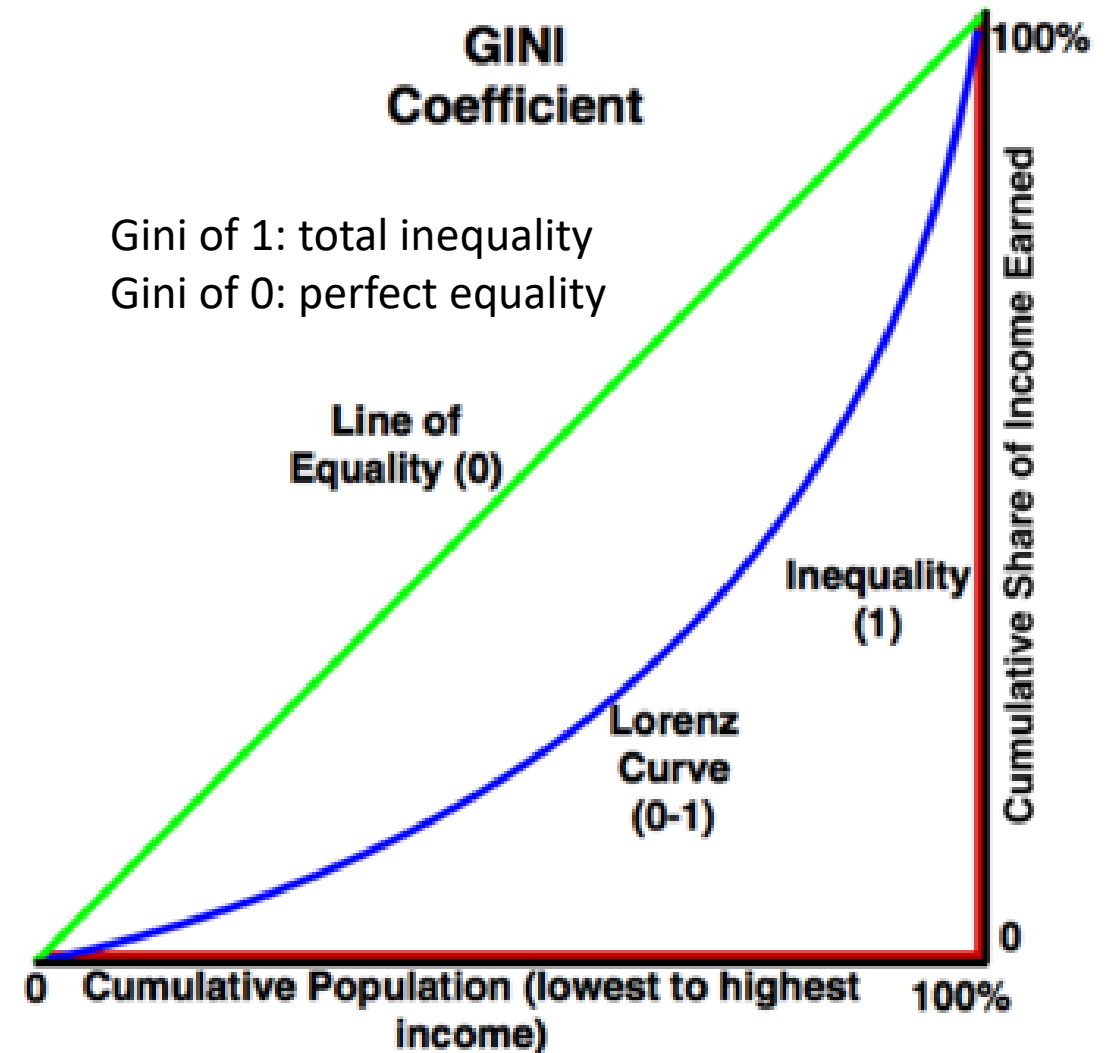
- S 12.1. Motivation
- S 12.2. Background stylized facts on inequality trends
- S 12.3. Inequality and recessions
- S 12.4. Inequality and fiscal policy
- S 12.5. Inequality and monetary policy
- S 12.6. Policy implications

Summary

- Many dimensions of inequality (income, wealth, opportunities, access to public goods and services, geographical, etc)
- The structural policies against income inequality after WWII (Keynes-Beveridge) led to the construction of the modern Social Welfare State
- **Rise in income inequality since the 1980s** (weaker labor bargaining power, less counter cyclical fiscal –unemployment, taxation—policies, technical change & progress and effects on skill premia in labor markets)
- **Why should MP and central banks bother? Inequality brings loss of effectiveness in monetary policy; deeper recessions and less effective MP transmission**
- The short-term effects and cyclical dimensions of inequality create stickiness and **inequality hysteresis**
- The policy consequences for stabilization and reforms: combine structural and stabilization measures to reduce inequality

Inequality has different measures

- **The Gini coefficient** is calculated based on the Lorenz curve, which plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini coefficient is the ratio of the area that lies between the Lorenz curve and the line of equality (the 45-degree line) over the total area under the line of equality.
- Many other metrics: share of 10% (top decile) of income distribution over rest of 50%; share of top 1%; etc
- If lumpsum transfers (through fiscal - tax policy) not possible between agents, Arrow-Debreu market equilibrium is not Pareto optimum



S 12.1. Motivation

Inequality has been a subject of old and new extensive research, despite dissent in the economics profession about its relevance



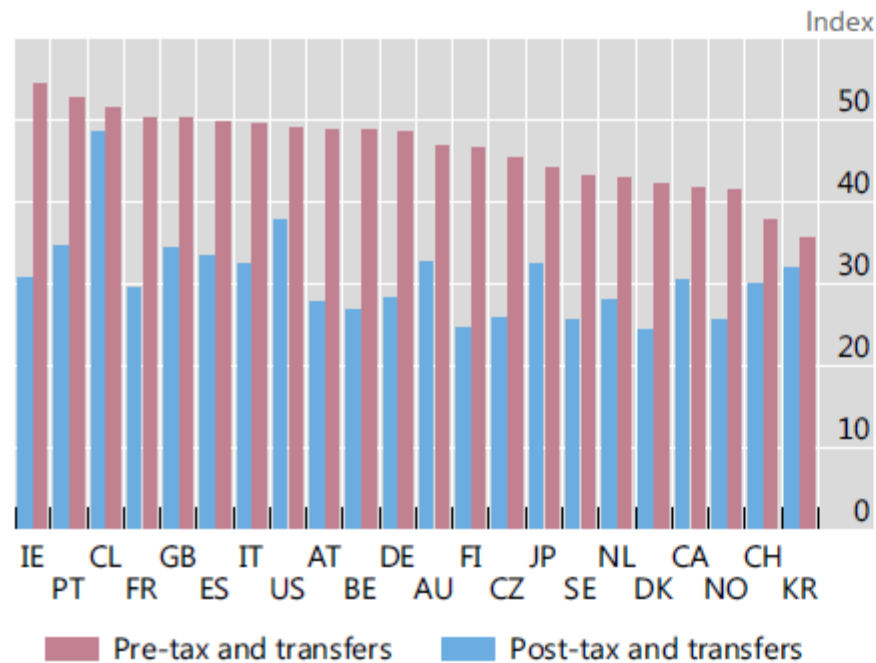
- Inequality mostly view as a long-term structural issue: causes are LT nature, education, training, skill-premia and labor market transformations due to globalization
- Fiscal policy main instrument to address inequality; social transfers and taxes can change dramatically Gini
- But we want to bring its cyclical and persistent (hysteresis) dimension; has bearing on stabilization effectiveness (both fiscal and monetary policies)

Gini: Pre-tax and transfers and post-tax and transfers

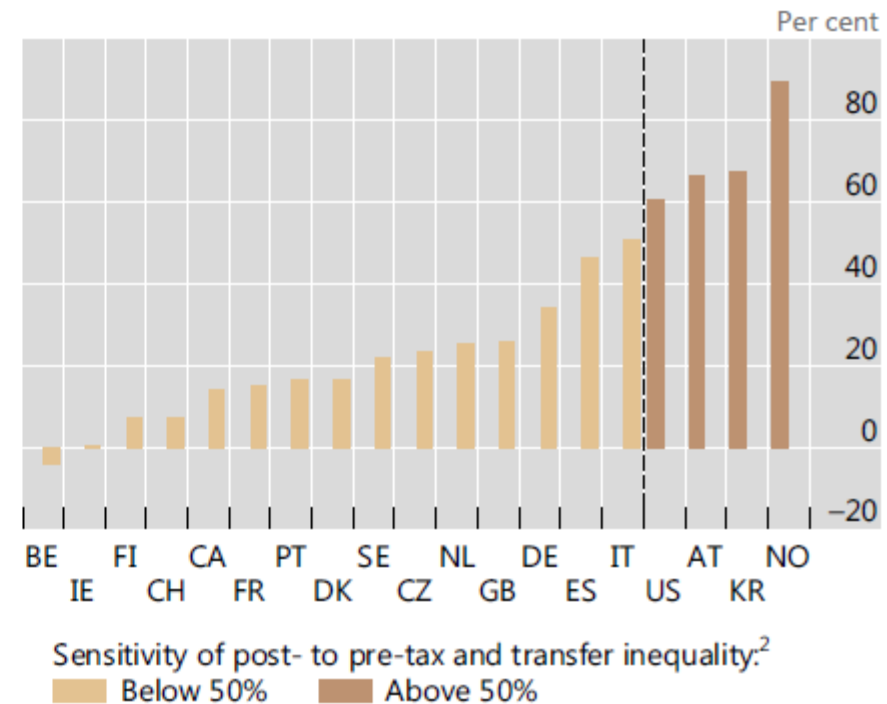
Fiscal policy can significantly limit inequality

Graph III.1

Taxes and transfers reduce Gini inequality levels¹



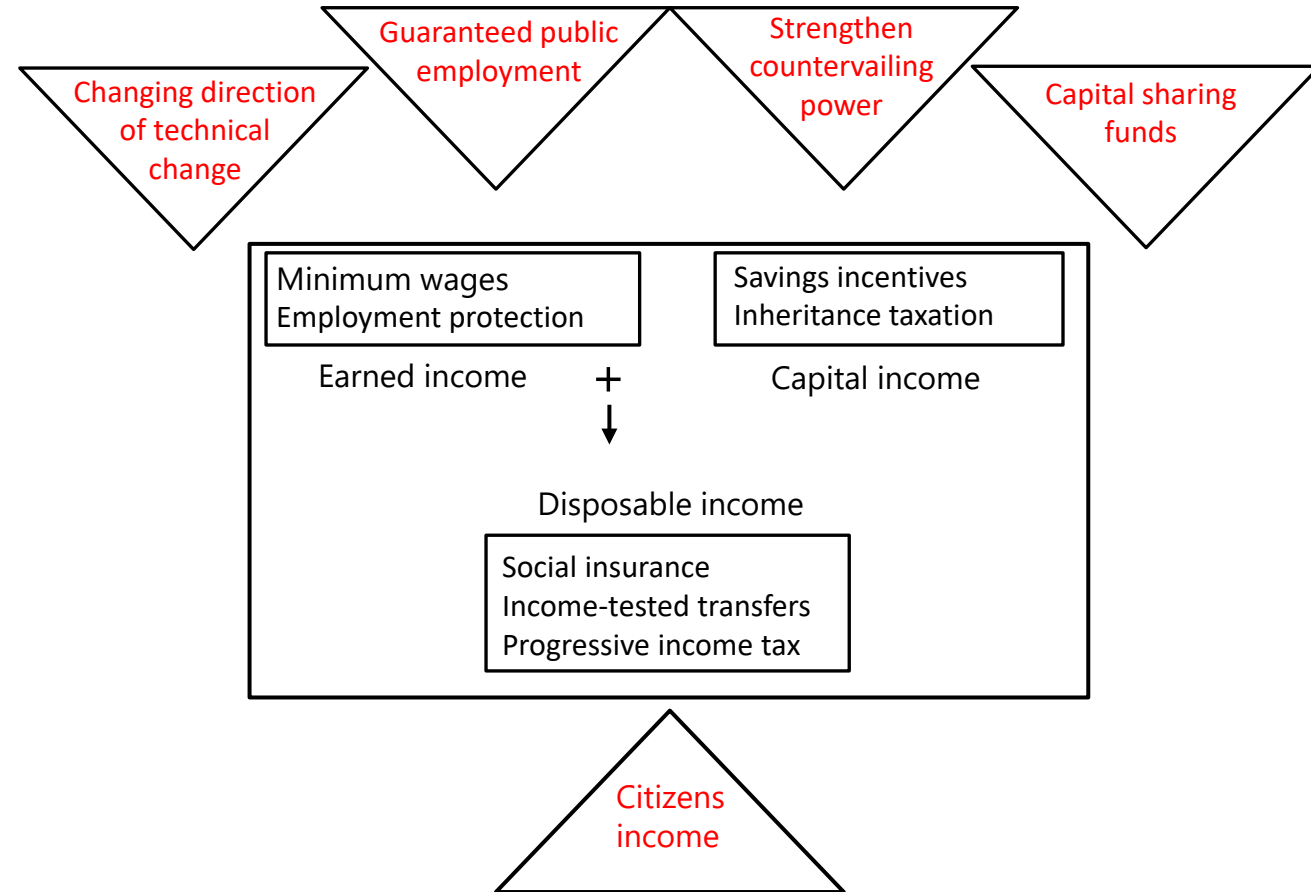
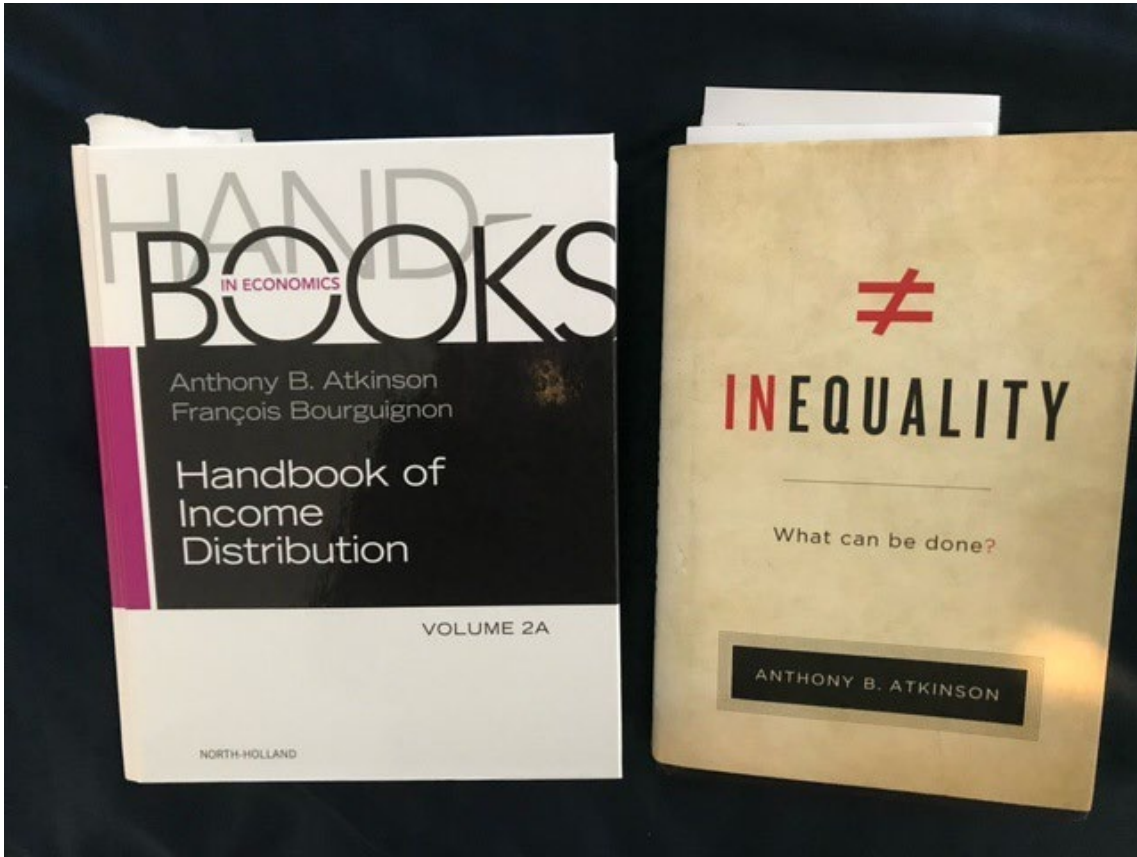
In many countries, taxes and transfers significantly dampen fluctuations in Gini inequality



¹ Gini indices are computed as simple averages over 2004–18, except for CH, CL, DE, DK, ES, FR (2005–18), IE (2004–17), IT (2006–17), JP (2006–15), KR (2006–18), NL (2005–16) and US (2005–17). ² Sensitivity is the coefficient on pre-tax and transfer Gini index in country-level regressions of post-tax and transfer Gini on its one-year lagged value, a constant and pre-tax and transfer Gini index.

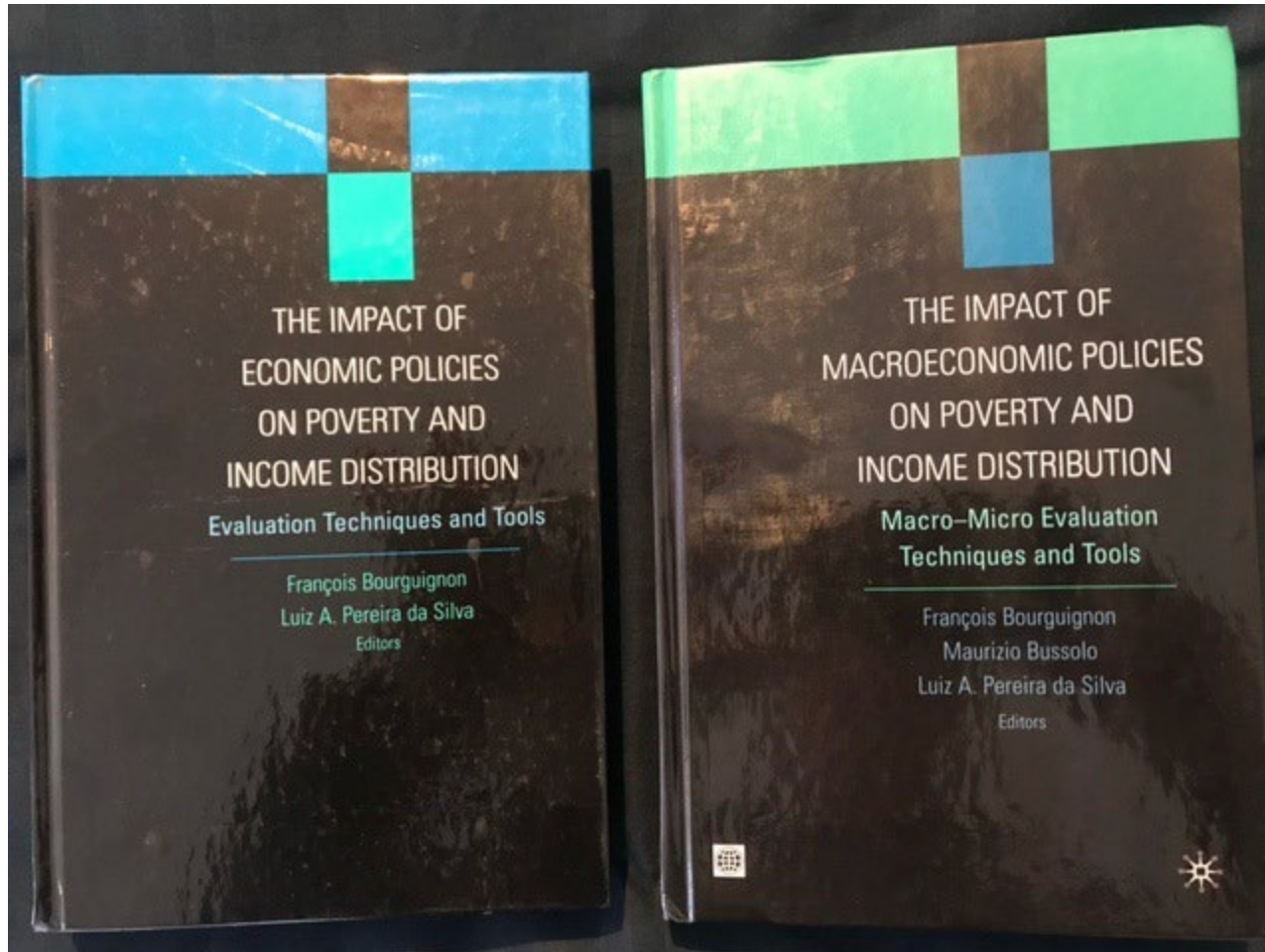
Sources: OECD; author's calculations.

Even for comprehensive Structural LT Policies to Reduce Inequality: Need to start Thinking outside the box (in red)



Sources: Atkinson (2015) and Atkinson and Bourguignon (2015)

Linking Macro-policies with HH databases: Top-Down Modeling Approach to evaluate policies and do simulations to measure impact on poverty



"Top" Level: Macro

General equilibrium macroeconomic model
(with sectoral disaggregation to model factor markets)

Linking aggregate variables (LAVs)
Y, C, I, w, p, etc..

"Bottom" Level: Micro

Individual/household microeconomic data set/
microeconometric model

"Source: Bourguignon F. and Pereira da Silva (2004)

Inequality and the business cycle

The cyclical factors' contribution to the rise in inequality has been overlooked. We provide new evidence

- 1. Inequality hysteresis: inequality rises in downturns, such increases are persistent**
- 2. Inequality makes recessions deeper**
- 3. Less redistributive fiscal policies have made it less counter-cyclical, raising the burden of stabilization for central banks and MP**
- 4. Inequality limits the stabilization effectiveness of monetary policy**

Link <https://www.bis.org/publ/othp50.htm>



Inequality hysteresis

and the effectiveness of macroeconomic stabilisation policies

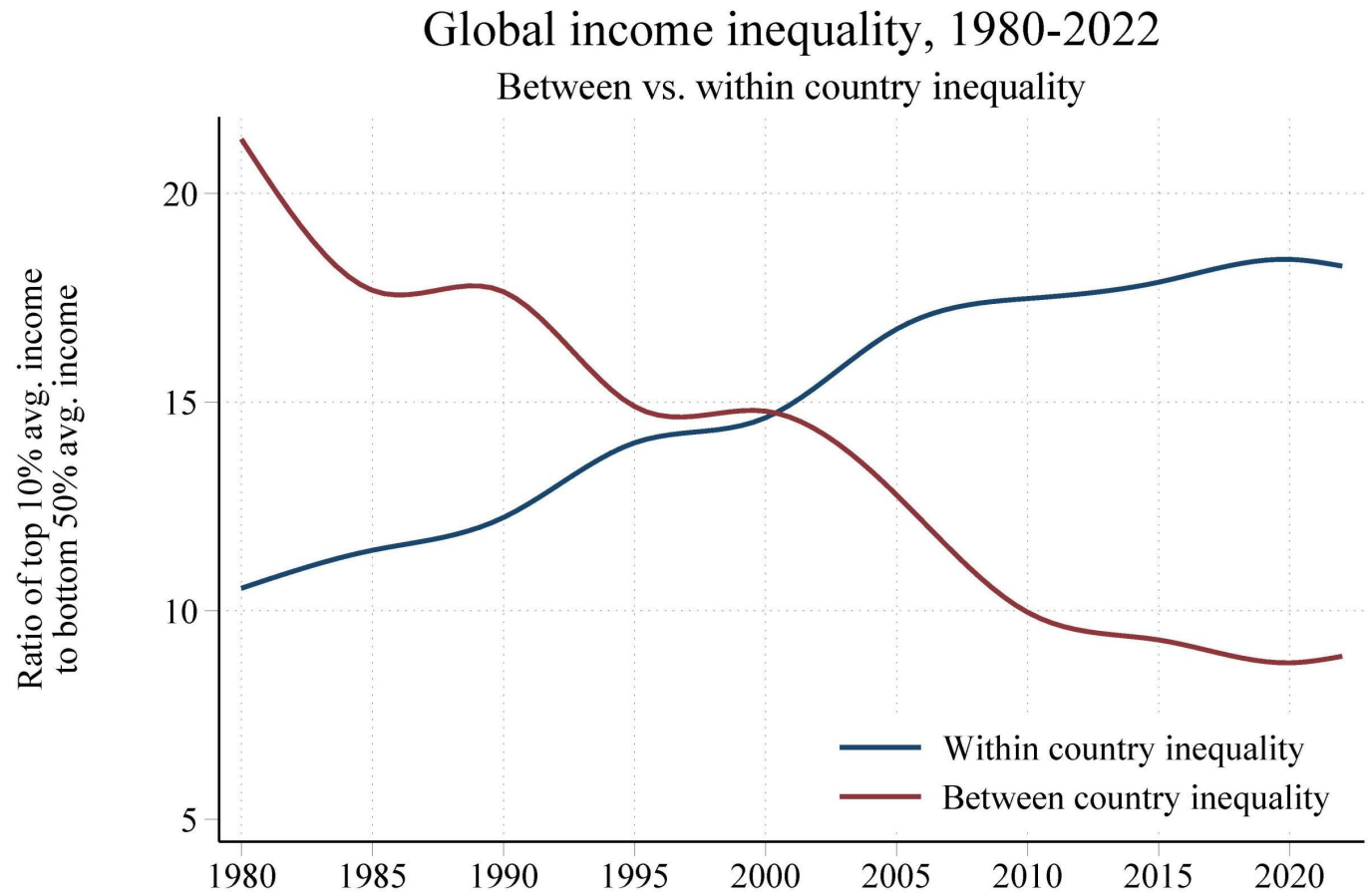
Luiz Awazu Pereira da Silva, Enisse Kharroubi,
Emanuel Kohlscheen, Marco Lombardi and Benoît Mojon

May 2022

S 12.2. Background stylized facts on inequality trends

Stylized facts on inequality trends

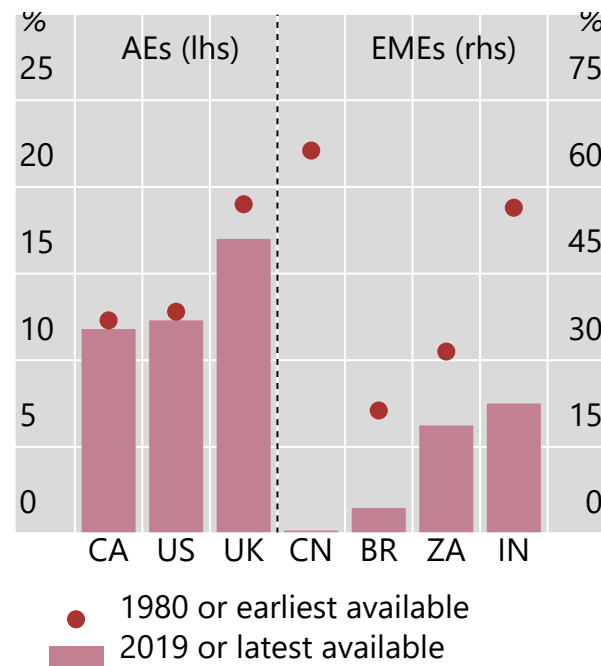
- Different measures of inequality, but within countries income and wealth shares increased, especially since the 1980s
- Most see the rise as a result of important slow moving factors (mostly technological progress and globalization)
- Policies to address the problem have thus tended to be of long-term structural nature (e.g. education, training programs to upgrade skills, infrastructure,...)



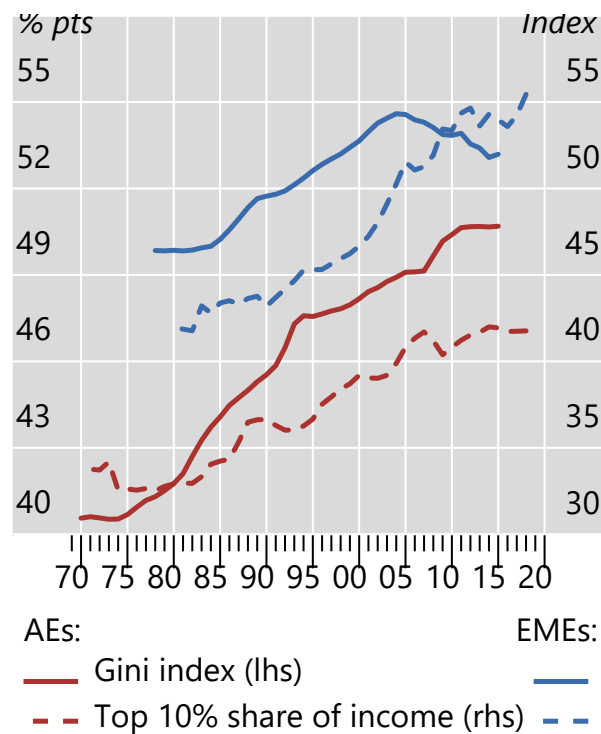
Source: World Inequality Database

Inequality on the rise amid declining poverty rates

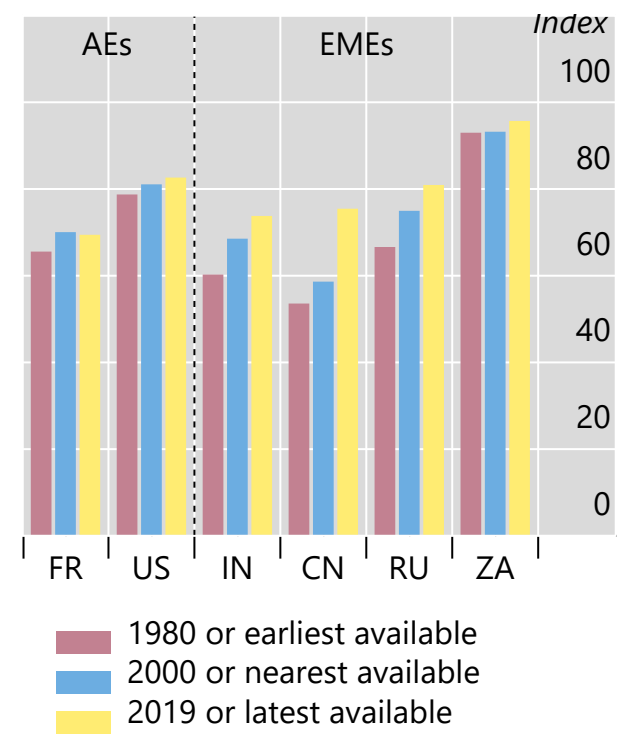
Poverty rates



Gini index and top 10%



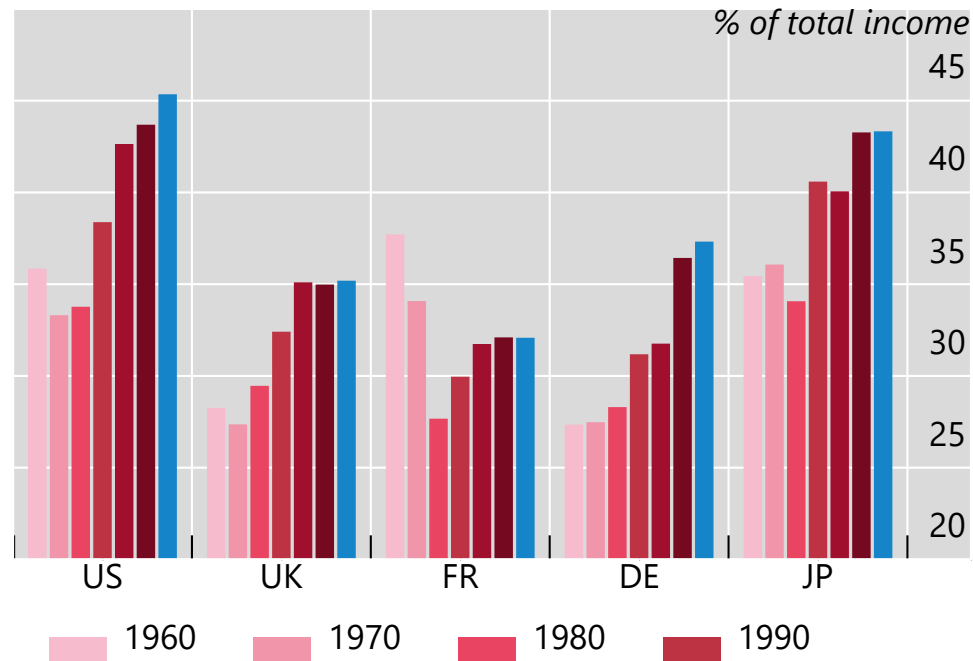
Wealth Gini index



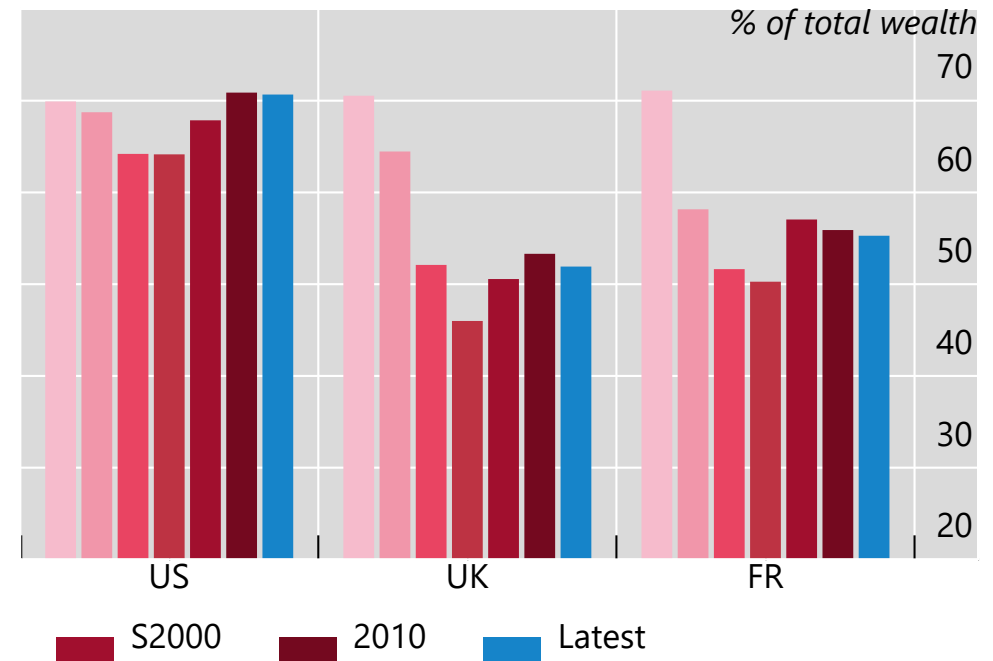
- Undisputable reduction in poverty in EMEs, however, Covid affected some of this progress
- Within-country income inequality has risen strongly since mid-1980s (both Gini, top 10%)
- Wealth inequality remains high, house price increases has limited its increase

Inequality has risen in most advanced economies

Pre-tax income, share of top 10%



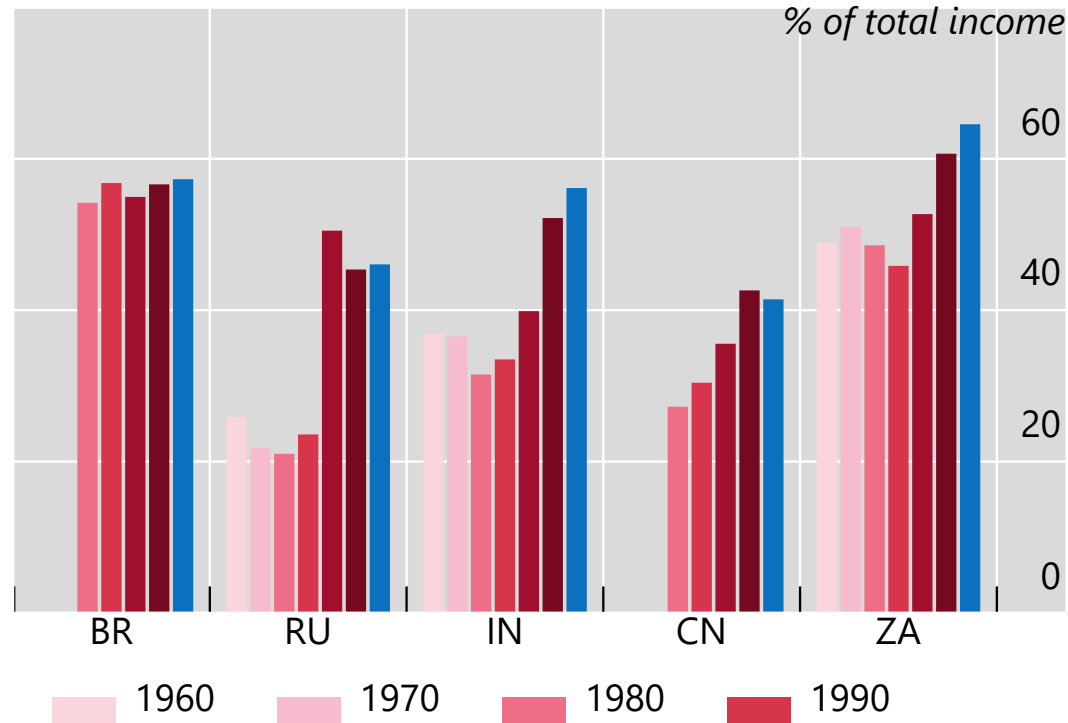
Wealth, share of top 10%



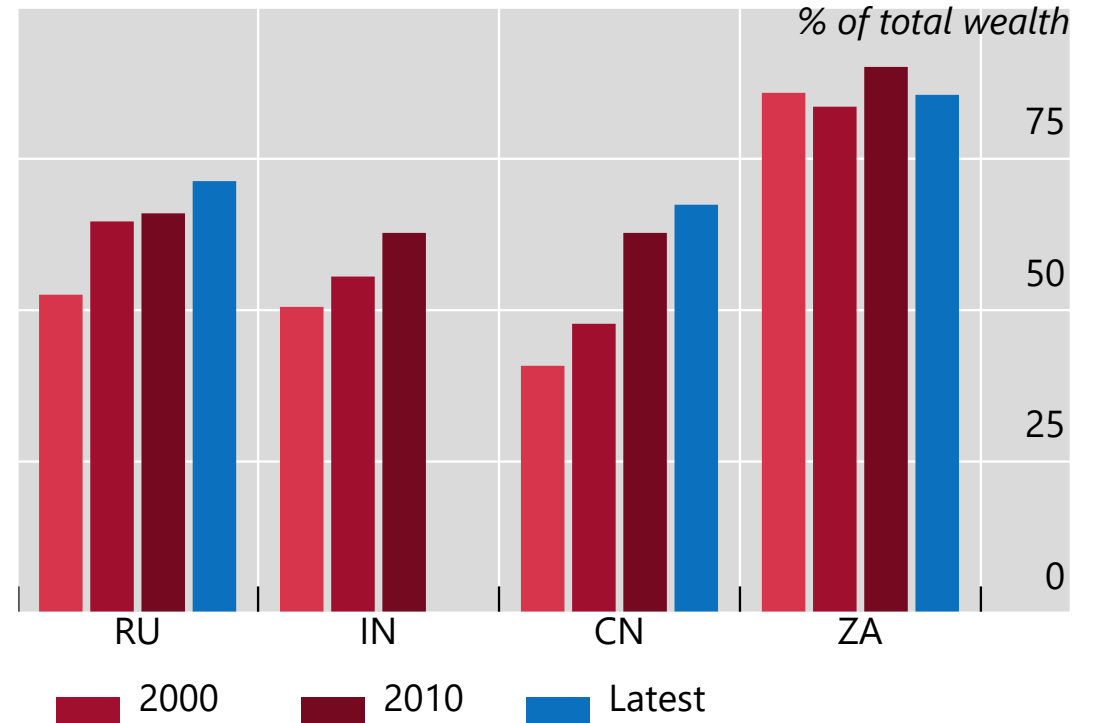
- Top 10%, i.e. high skill labour force, clear winners
 - Rapid technological change & globalization have increased demand in AEs for high skill tasks
 - When supply of skilled labour fails to keep pace, skill premium rises (Tinbergen's race)

Inequality has been rising also in EMEs

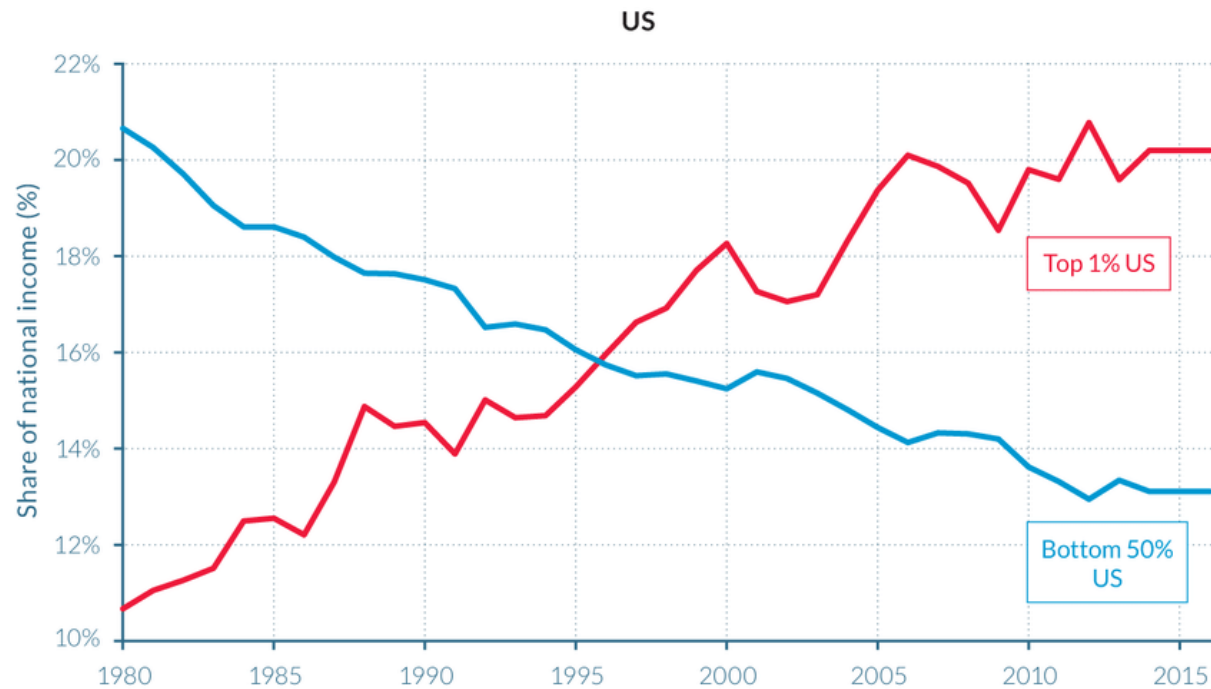
Pre-tax income, share of top 10%



Wealth, share of top 10%



Top 1% and 10% income share show inequality increased after 1980s

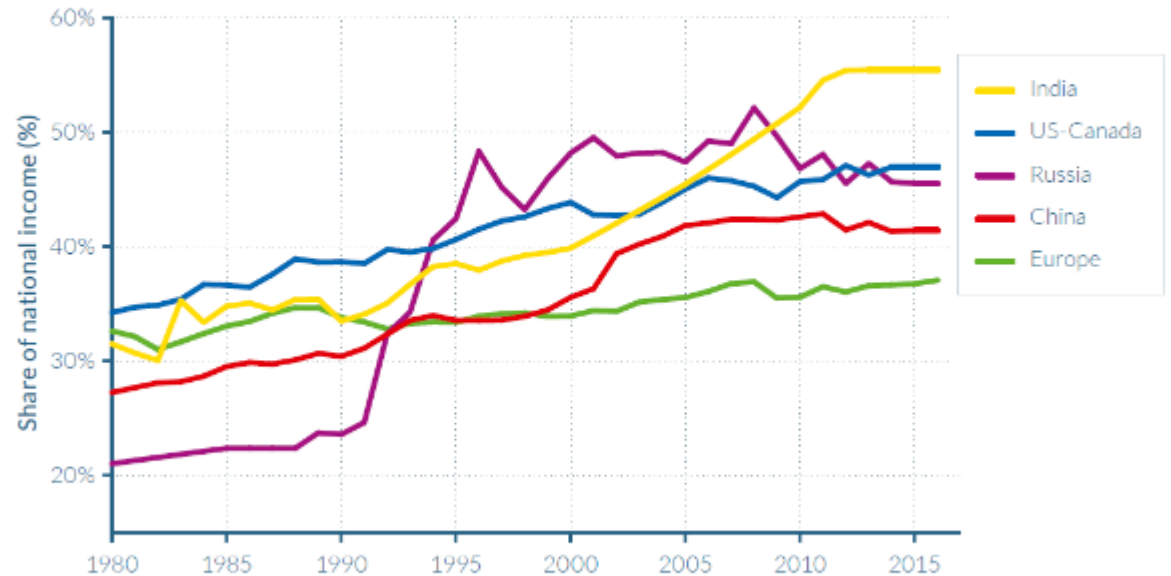


Source: WID.world (2017). See wir2018.wid.world/methodology.html for data series and notes.

In 2016, 12% of national income was received by the top 1% in Western Europe, compared to 20% in the United States. In 1980, 10% of national income was received by the top 1% in Western Europe, compared to 11% in the United States.

Figure E2a

Top 10% income shares across the world, 1980–2016: Rising inequality almost everywhere, but at different speeds



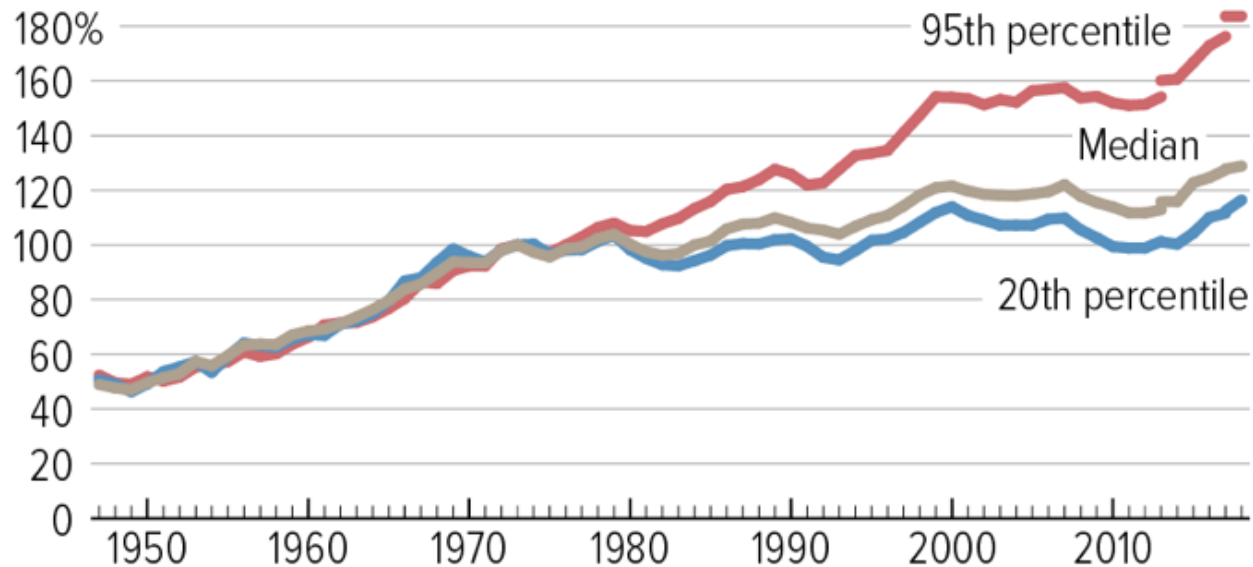
Source: WID.world (2017). See wir2018.wid.world for data series and notes.

In 2016, 47% of national income was received by the top 10% in US-Canada, compared to 34% in 1980.

Inequality of median income rising after 1980s (eg., USA)

Income Gains Widely Shared in Early Postwar Decades — But Not Since Then

Real family income between 1947 and 2018, as a percentage of 1973 level



Note: Breaks indicate implementation of a redesigned questionnaire (2013) and an updated data processing system (2017).

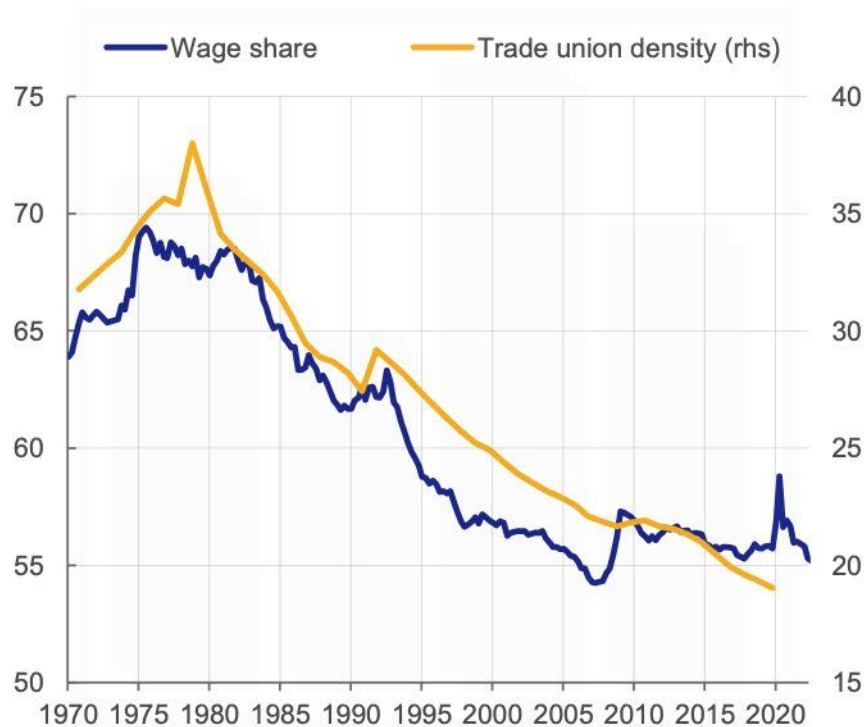
Source: CBPP calculations based on U.S. Census Bureau Data

CENTER ON BUDGET AND POLICY PRIORITIES | CBPP.ORG

Inequality also of wages x profits (eg. Europe)

Wage share and trade union density

(left-hand side: share of GDP, percentage; right-hand side: share of employment, percentage)



Source: Eurostat, Area-Wide model, OECD, and ECB calculations.
Note: The trade union density for the euro area is a GDP-weighted average of data for Austria, Belgium, France, Germany, Italy, the Netherlands, Portugal and Spain.
Latest observation: 2022Q2 for wage share; 2019 for trade union density.

Profit share

(share of GDP, percentage)



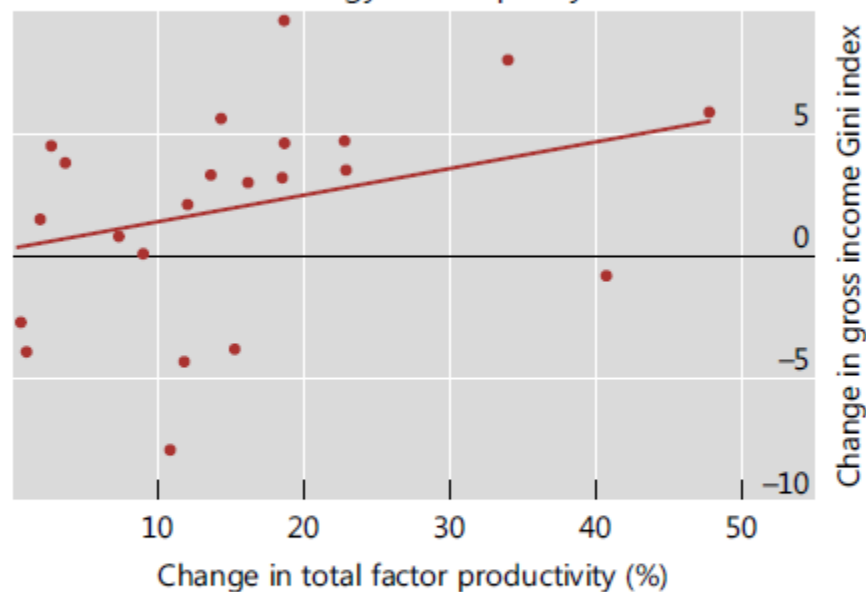
Source: Eurostat, Area-Wide model, and ECB calculations.
Latest observation: 2022Q2.

Inequality: technology and globalization

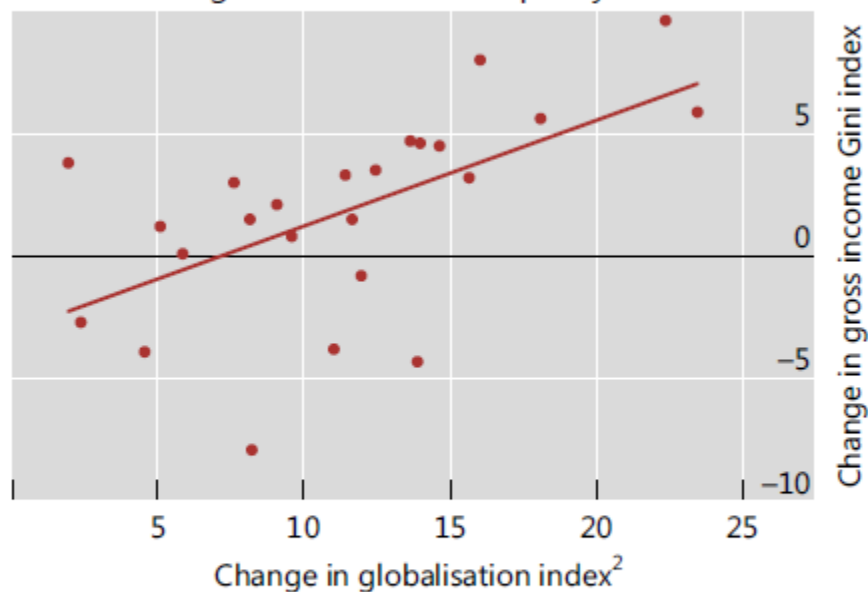
Structural forces have increased inequality¹

Graph II.3

The effect of technology on inequality



The effect of globalisation on inequality

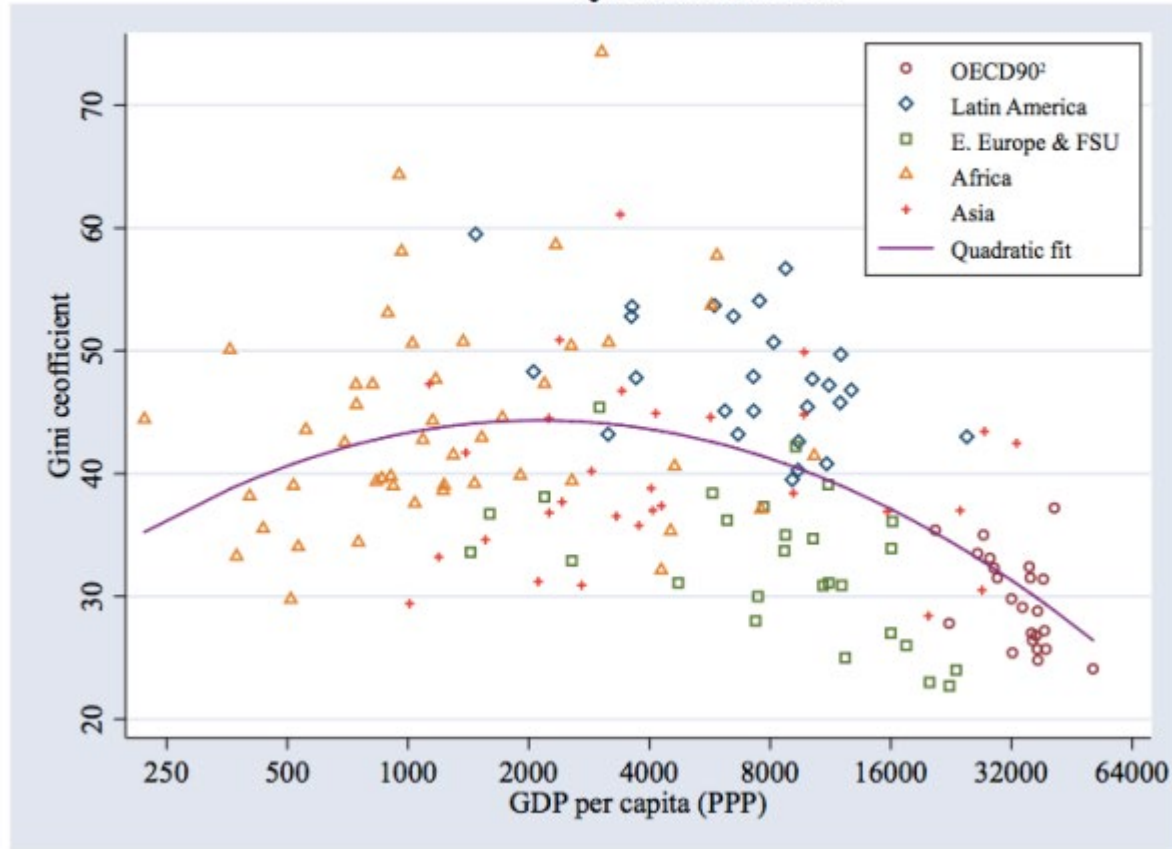


¹ The sample includes 15 AEs and nine EMEs; changes are computed over the period 1981–2015 (or shorter, depending on country-level data availability). ² Based on the KOF Globalisation Index.

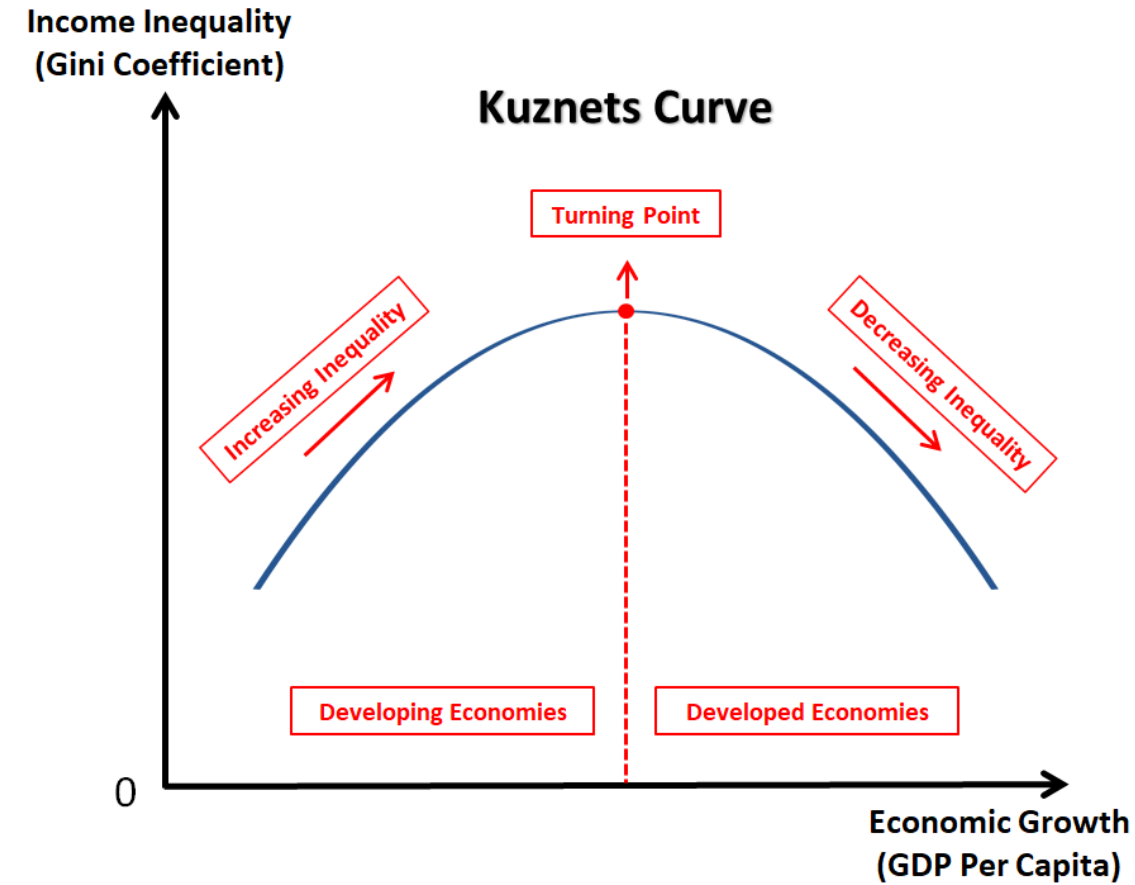
Sources: S Gygli, F Haelg, N Potrafke and J-E Sturm (2019); OECD; UNU-WIDER, World Income Inequality Database (WIID); World Bank; Penn World Table; BIS calculations.

Contradicts the Kuznets hypothesis that after rising during early phases of development, inequality (Gini) would progressively fall back

Figure 3: Inequality in a Cross Section of Countries with a Quadratic Fit



Source: <https://asociologist.com/2013/03/21/on-the-origins-of-the-kuznets-curve/>



www.economicsonline.co.uk

From inequality trends to inequality and the business cycle

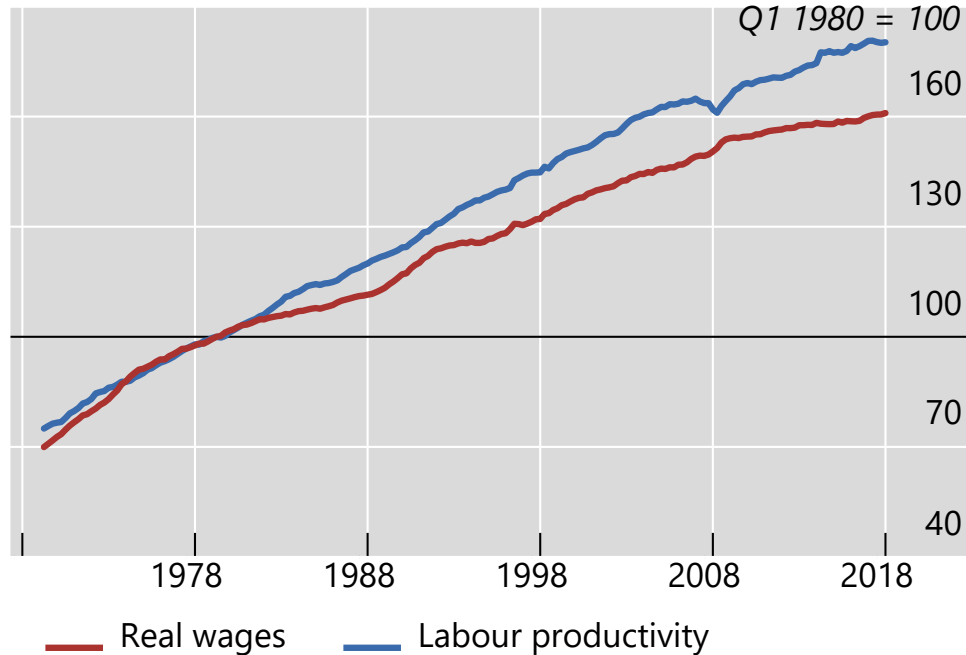
- World Inequality Database «WID» research agenda mostly on slow motion trends associated to
 - Social policies and structural factors (Atkinson, Bourguignon, Piketty, Saez)
 - Globalisation and technical change (Milanovic, Acemoglu)
- Shift the focus of inequality and its changes in the business cycle and «recessions»
 - Some recent work tied to the Heterogeneous Agent New Keynesian (HANK) agenda
 - Real time inequality (Saez and Zucman)

Vast majority of contributions on the US. We gather stylised facts on income inequality, the business cycle and both fiscal policy and monetary policy for both AE and EME

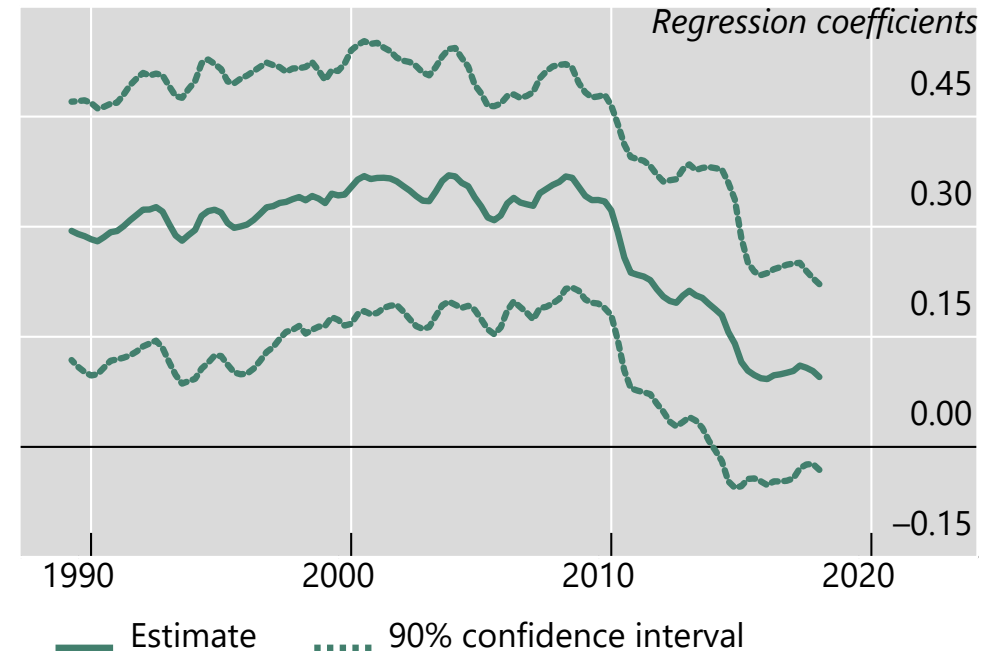
S 12.3. Inequality and recessions

Structural dimension of inequality reinforced during recessions....

Real wages lagged behind labour productivity



Productivity gains factor to a lesser extent into wages

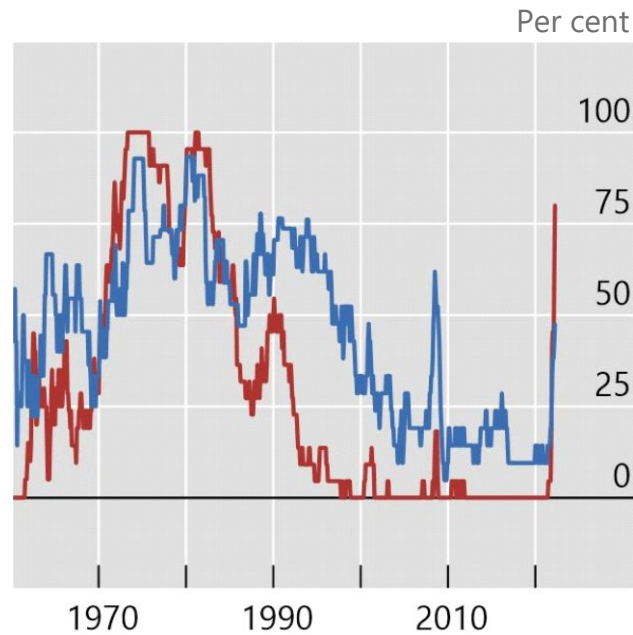


The division of productivity gains has been unfavorable to labor :

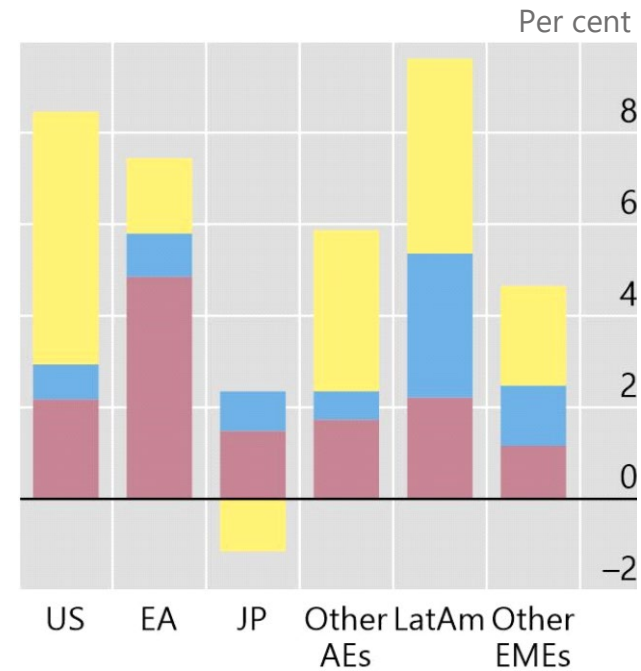
- widening gap between labor productivity and wages (average across AEs: AU, BE, CA, DE, DK, ES, FR, GB, IE, IT, JP, NL, SE and US.)
- and lower sensitivity of wages to labor productivity gains (Lombardi, Riggi and Viviano, 2020)

And inflation tends to hit the wallet of the poor and their consumption more (2021-22 inflation)...

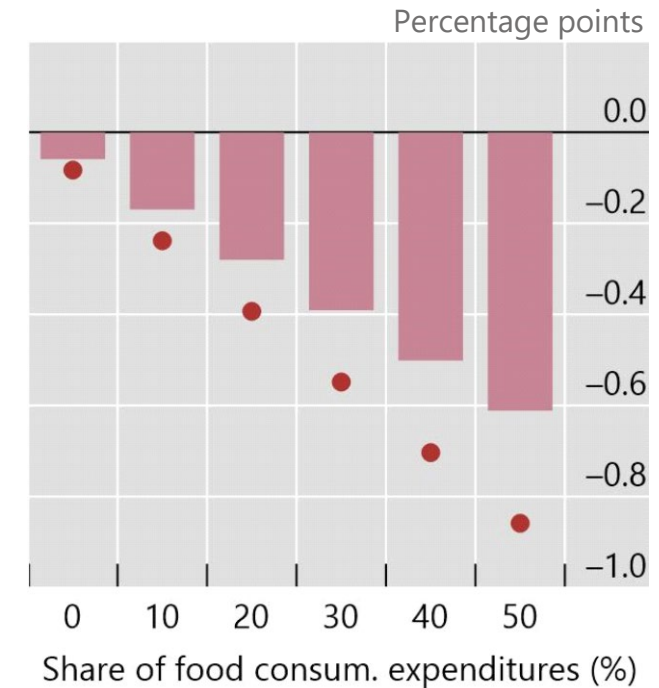
In many countries, inflation is rising...



...on the heels of rising energy and food prices¹



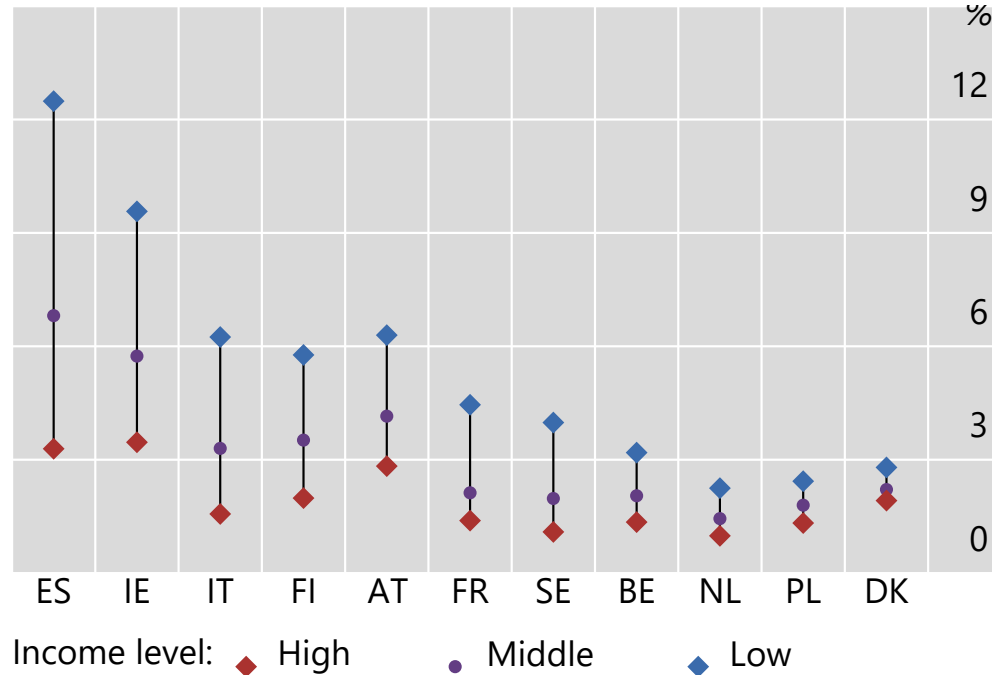
Private consumption falls in response to higher food prices²



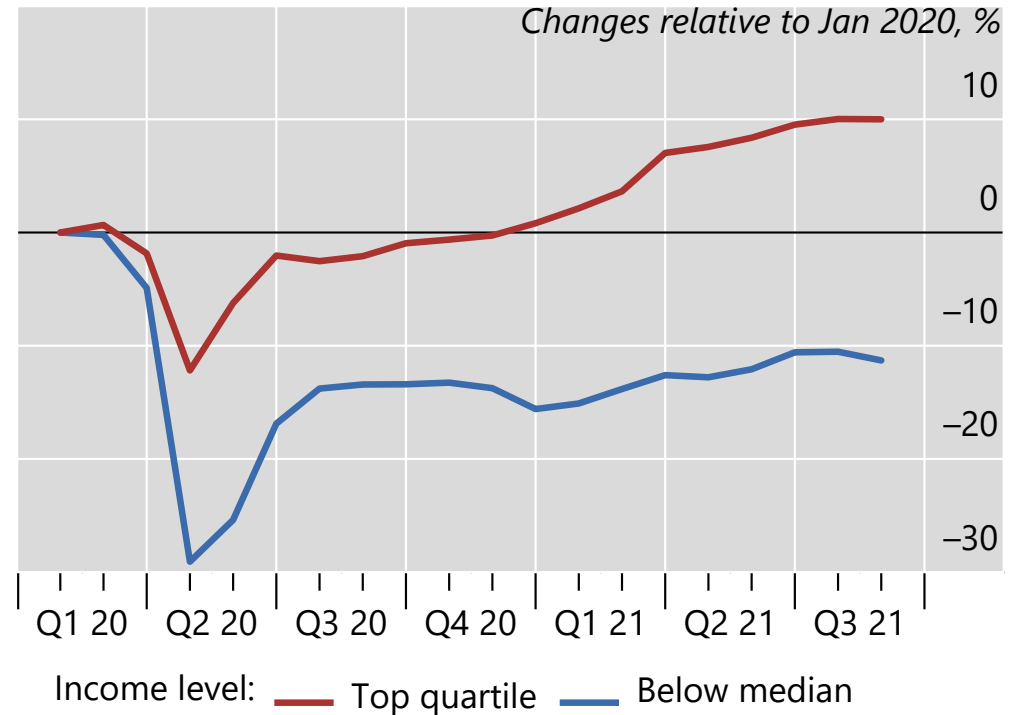
Cyclical factors matter for income inequality

As shown (again) by the Covid-19 recession

EU: risk of job loss by income during the pandemic



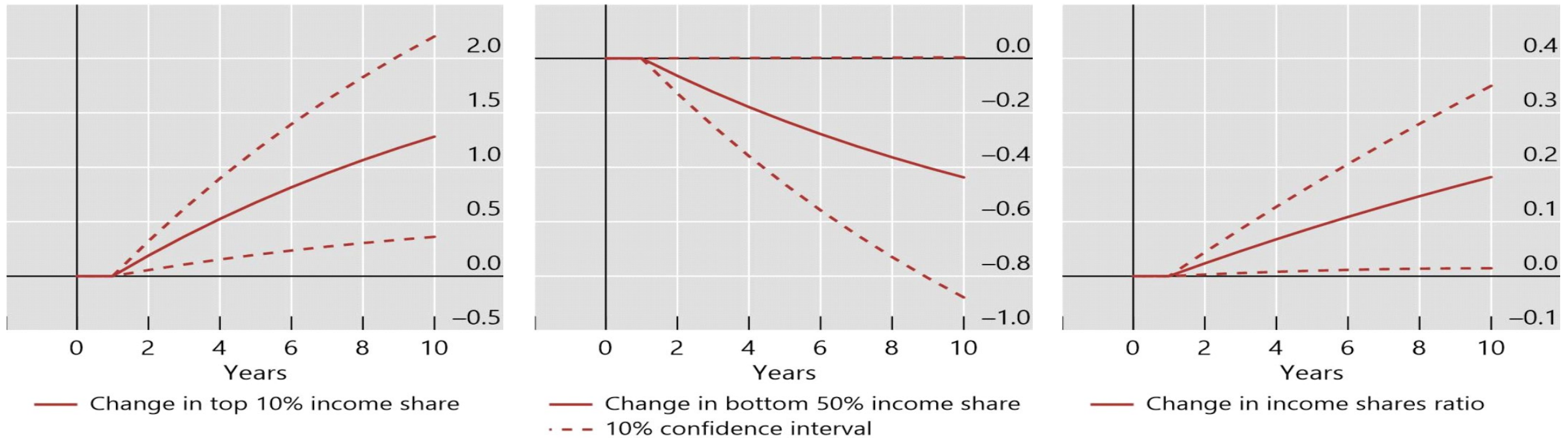
US: employment by income



- Likelihood of job loss significantly higher for low income workers, up to 3 times higher in many countries
- Known for the GFC in the US (not Italy where 1992 was more critical)

This pattern is frequent after recessions: inequality hysteresis

Shares of income of richest 10%, poorest 50% and their ratio



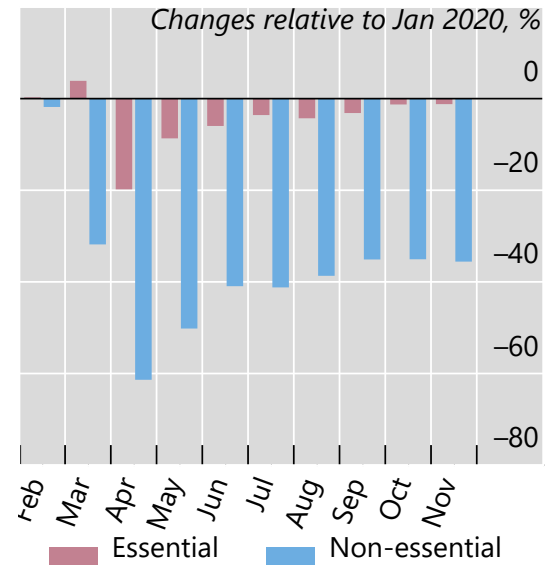
- Evidence on 182 recessions across 70 countries since 1980 (impulse response) shows that
 - Income inequality rises following recession years (t), and it persists
 - while share of top 10% rises, that of the bottom 50% declines, both persistently

Inequality make recessions steeper

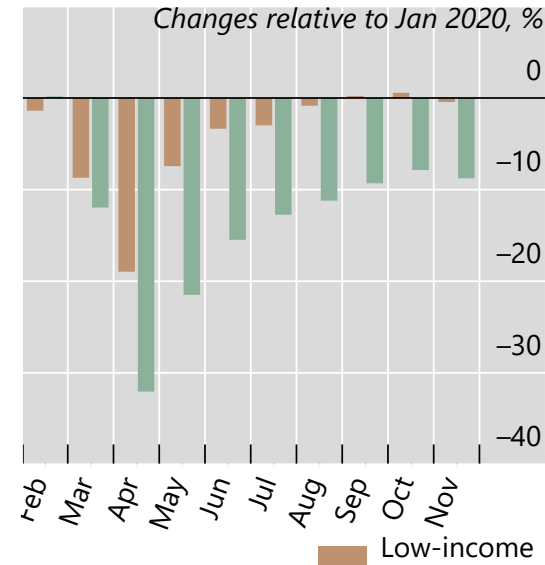
- Recessions are deeper when the income share of the top 10% is larger
- Two possible interpretations
 - Higher income share of bottom 90% is associated with better ability to smooth consumption, hence that produces milder recession in the aggregate
 - Higher top 10% income share means additional precautionary savings in recessions hence recoveries take longer (stimulus less potent)
- We investigate empirically the impact of top 10% income concentration on
 - consumption growth around recessions in sample of 91 countries, 1980-2019
 - output growth across 50 U.S. states after the GFC

High-income US households have cut consumption more in 2020

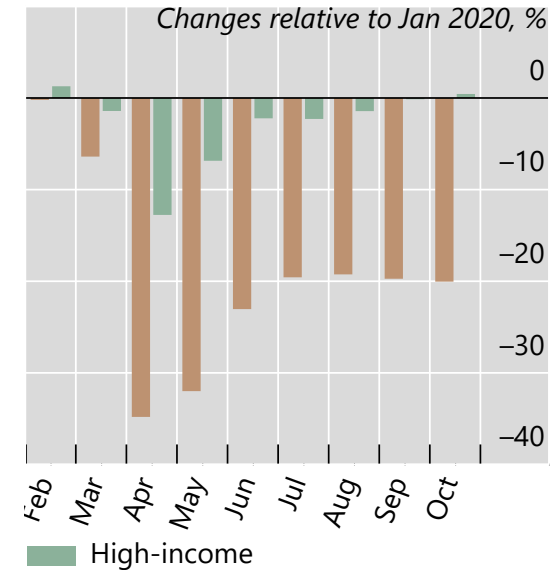
Spending by type of consumption



Spending by type of household



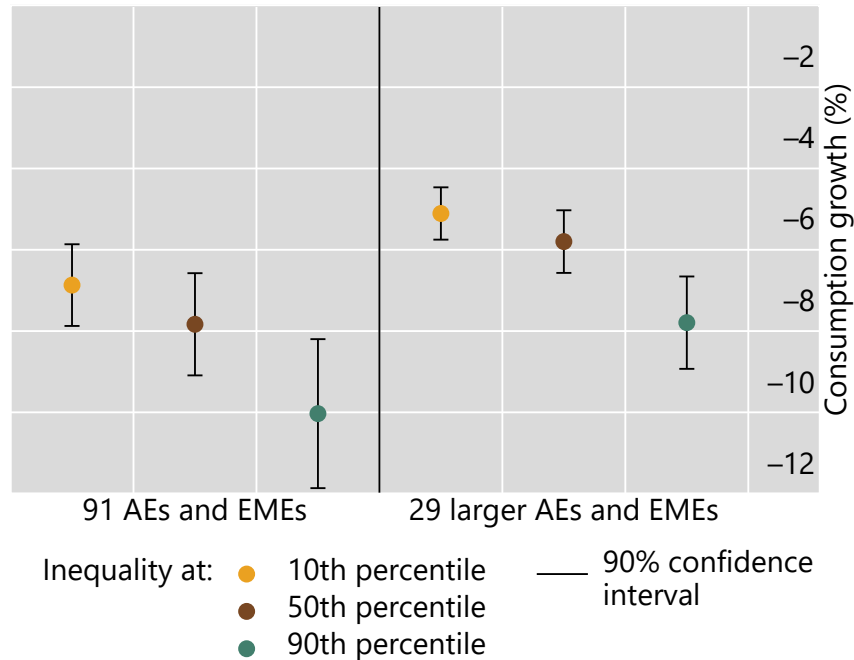
Employment by type of household



- Poor cannot cut back consumption (mostly essentials)
 - consumption of low-income households was back to pre-pandemic a few months after the shock (despite job losses!). Not so for the high-income households. So inequality tends to deepen recessions

The cost of income inequality: steeper declines in private consumption

Recessions in more unequal countries lead to steeper declines in consumption



More unequal US states had steeper declines in consumption during the GFC



- Recessions are significantly deeper in more unequal countries. Effect is economically significant (10th to 90th percentile, 3 p.p. negative effect on consumption growth)
- More unequal US states had deeper recessions post-GFC (inequality explains 25% of variation)

S 12.4. Inequality and fiscal policy

Fiscal policy, redistribution, and stabilisation

- Fiscal policy has a large impact on inequality
- Part of this impact relates to differences in redistributive policies and automatic stabilizers, i.e. tax progressivity and unemployment insurance (UI) replacement ratio (% of lost income)
- One step beyond: do tax progressivity and UI also affect fiscal policy ability to stabilize the business cycle?

Inequality and redistribution through fiscal policy

- Focus on two pillars of redistribution through fiscal policy:
 - **Unemployment Insurance (UI) replacement ratios:** measure the extent to which people's income is maintained during unemployment spells
 - typically depends on family situation and unemployment durations
 - **Progressivity of income tax:** measures how average tax rates change with the level of pre-tax income
 - Estimated as the semi-elasticity of average tax rate to income, using data on marginal tax rates, income brackets and income distribution
- Basic intuition: Stronger redistribution –higher UI replacement ratio and/or tax progressivity– should be associated with lower post T&T inequality

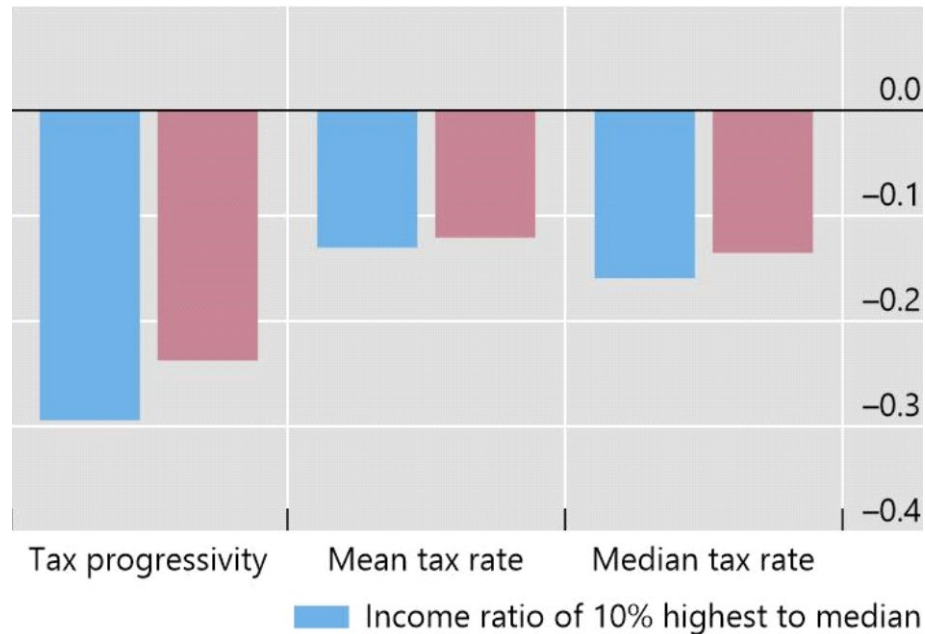
Inequality and redistribution through fiscal policy

Higher redistribution comes hand-in-hand with lower inequality

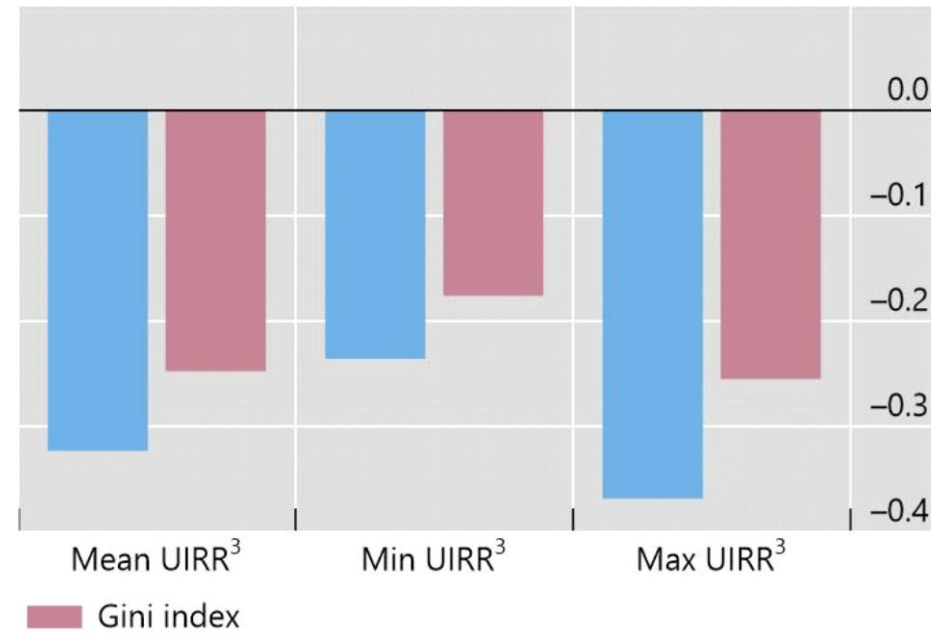
Correlation coefficients

Graph III.2

There is a strongly negative correlation between inequality and tax progressivity¹



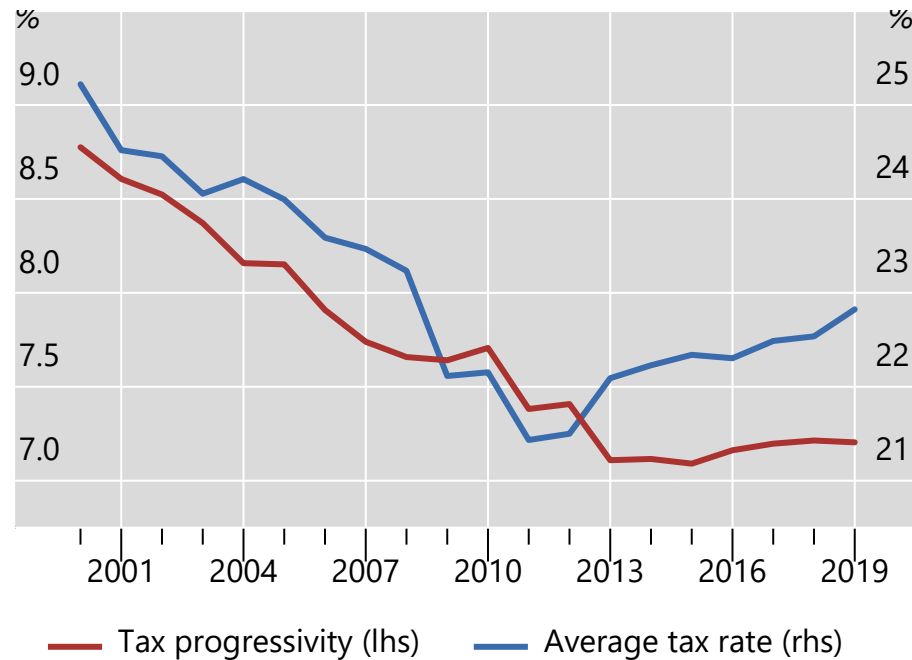
Inequality also correlates negatively with UI replacement ratios²



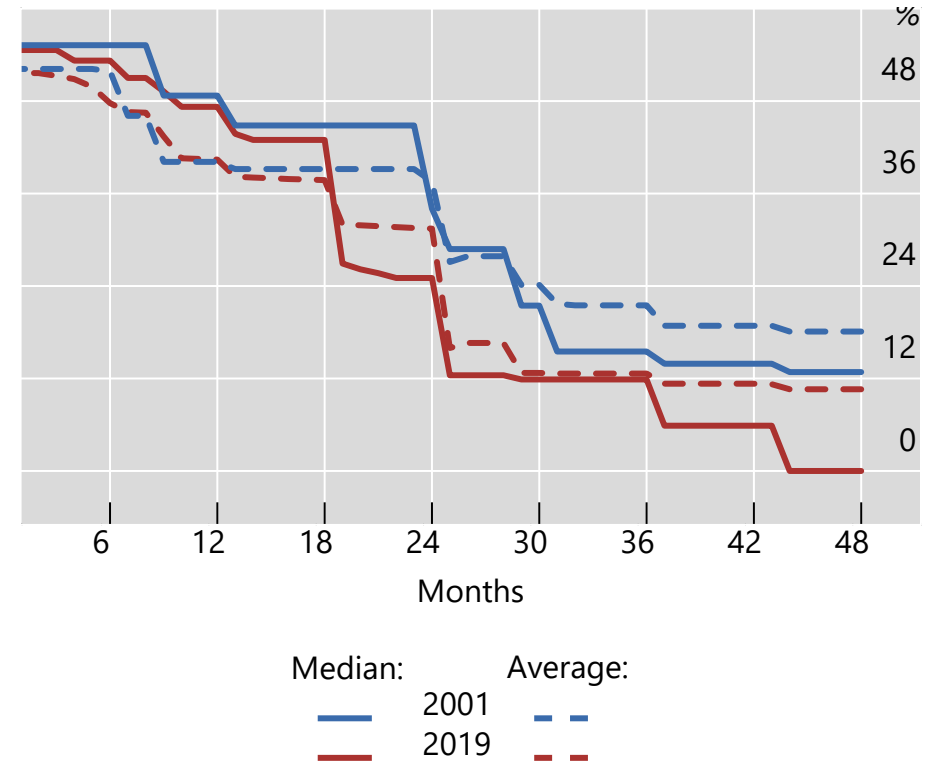
Panel of 22 AEs countries, from 2001 to 2019.

Less fiscal redistribution, weaker automatic stabilisers

Tax burden and tax progressivity have fallen



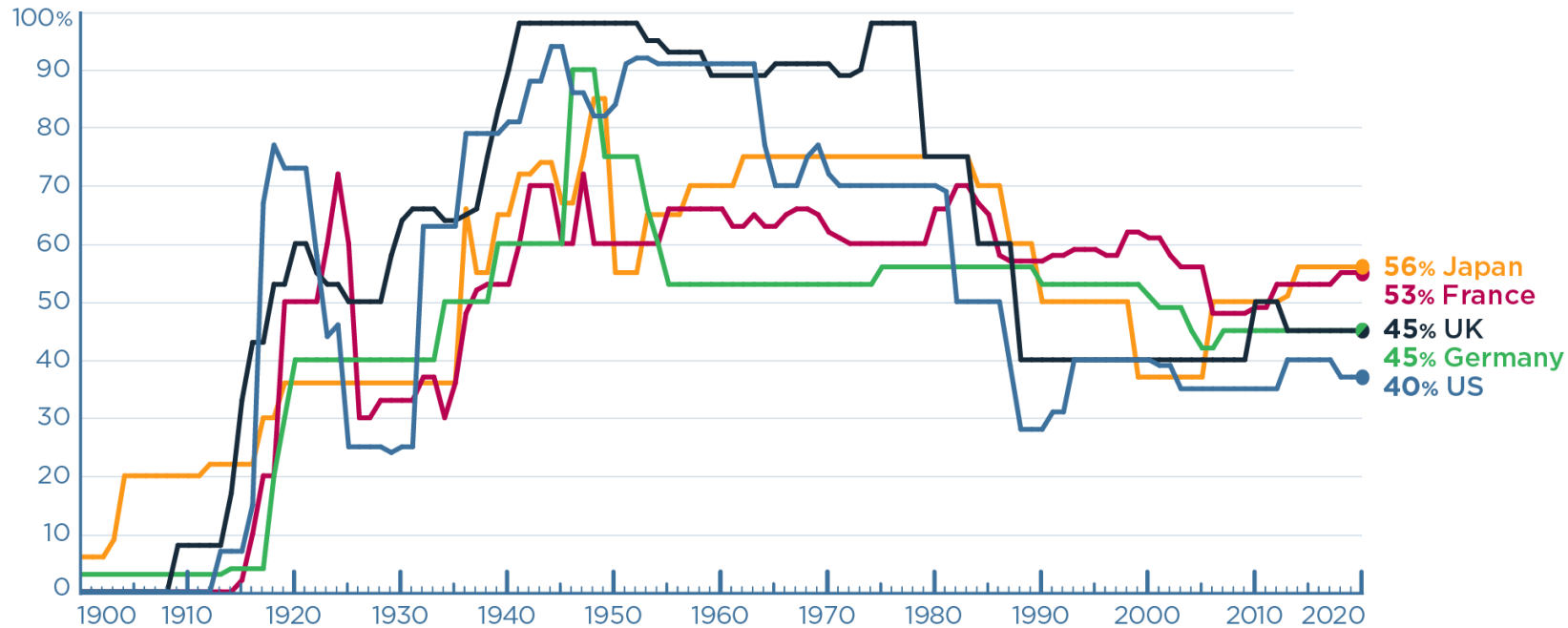
UI replacement rates have been cut, particularly at longer durations



- Fiscal policy has become markedly less redistributive

Top marginal income tax rates much lower after 1980s

Figure 17: Top marginal income tax rate, 1900–2020



Source: Chancel (2019) based on Piketty (2014) and updates; see 2018 World Inequality Report for data; Organisation for Economic Co-operation and Development (2018-2020).

Fiscal redistribution and automatic stabilisers

- In addition to their cross-section impact, UI and tax progressivity affect the stabilization properties of fiscal policy.
 - Strong UI, i.e. high replacement ratios, imply large deficits during high unemployment periods but also large surpluses during low unemployment periods
 - In expansions, incomes are high. So with progressive taxes, tax rates are higher and so are fiscal revenues. Conversely in recessions, incomes are lower and so are tax rates and fiscal revenues.
- Questions: How did redistribution and stabilization change over the last 20 years? Is there any link between the two?

Estimating fiscal policy stabilisation

- Estimate a fiscal policy rule using a series of panel regressions :

$$FB_{c,t} = \alpha_t + \alpha_c + \beta_0 FB_{c,t-1} + \beta_1 [D/Y]_{c,t-1} + \beta_2 GAP_{c,t} + \varepsilon_{c,t}$$

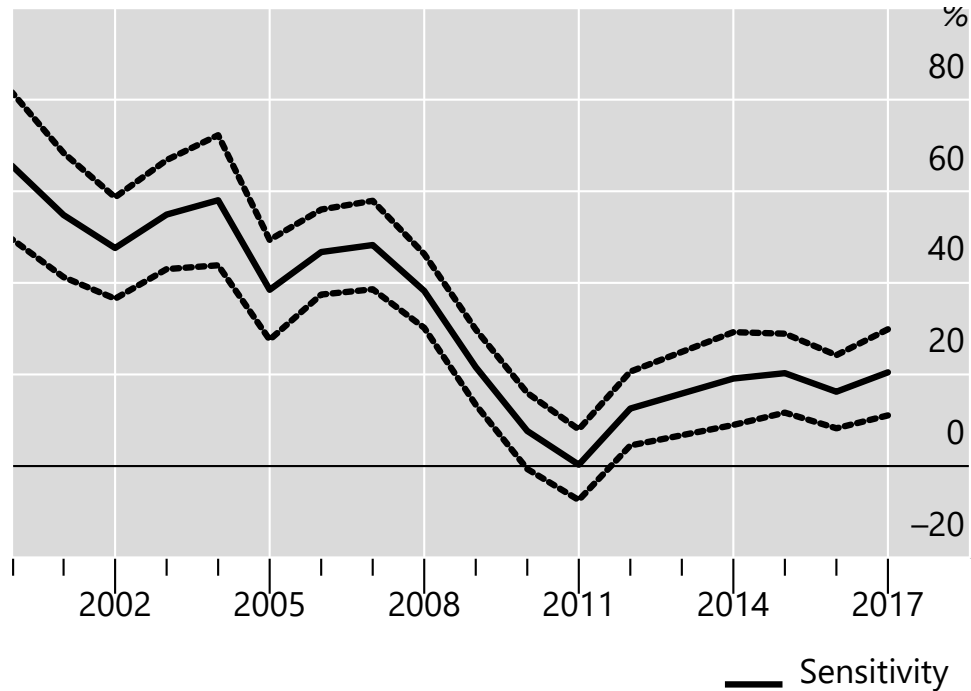
- FB: Total or primary fiscal balance to potential GDP
- D/Y: Public debt to GDP ratio
- GAP: Output Gap
- Sample: US, JP, DE, GB, FR, CA, IT, SE, NL, FI, DK, NO, IE, ES, PT, BE, CH, AT, KR, AU, NZ, IS, 2000-2019, data is annual.
 - To obtain time-varying estimates for the β 's, we use a version of rolling window regression
- Estimate of the impact of tax progressivity/Unemployment insurance “Red”

$$FB_{c,t} = \alpha_c + \alpha_t + \beta_0 FB_{c,t-1} + \beta_1 D_{c,t-1} + (\beta_2 + \beta_3 Red_{c,t-1}) GAP_{c,t} + \beta_4 Red_{c,t-1} + \varepsilon_{c,t}$$

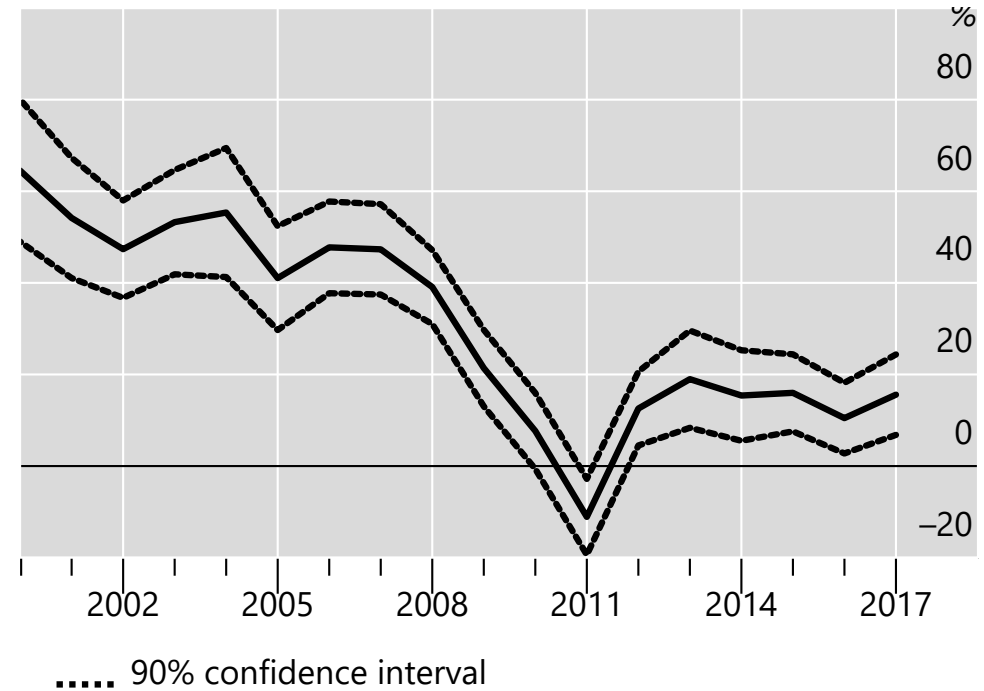
- Expected result: β Red should be positively correlated with GAP, and stable to stabilize

Fiscal policy has become less countercyclical

Total fiscal balance sensitivity to output gap in AEs



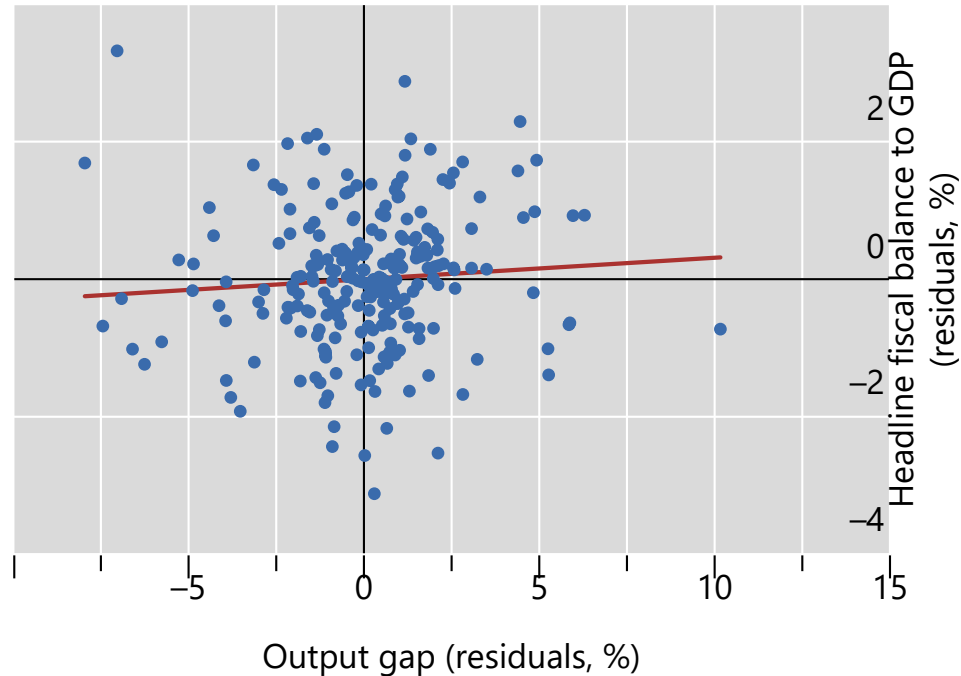
Primary fiscal balance sensitivity to output gap in AEs



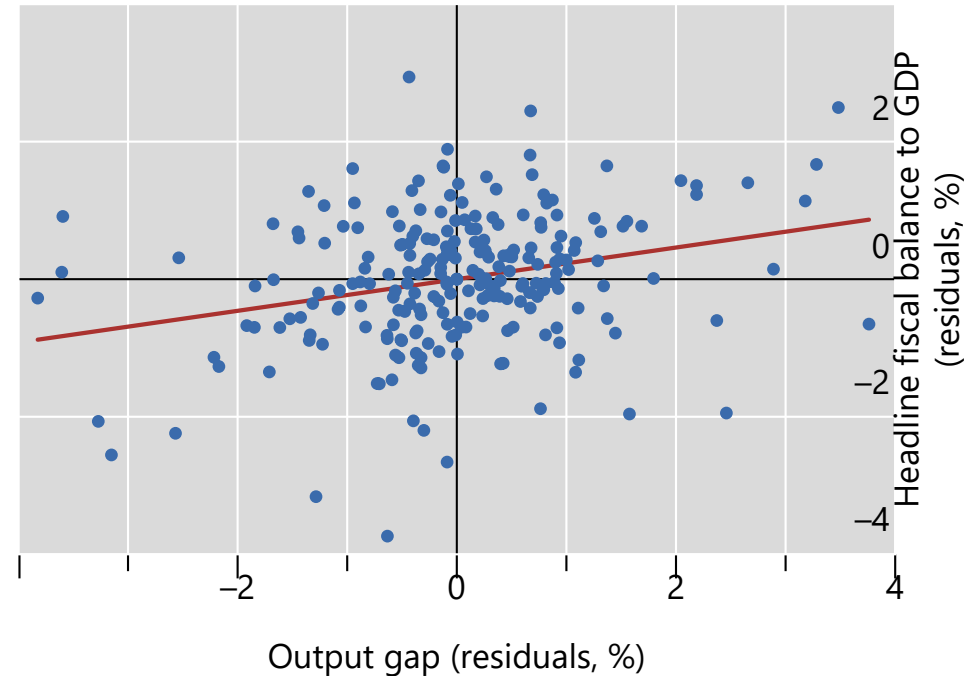
- Therefore, fiscal policy has become less stabilising, less counter-cyclical over the last 20 years

Similarly, progressive taxes also associated with countercyclical fiscal policy

Below median tax progressivity



Above median tax progressivity



- Tax progressivity, i.e. elasticity of tax rates to incomes, raises fiscal policy's countercyclical response to the business cycle

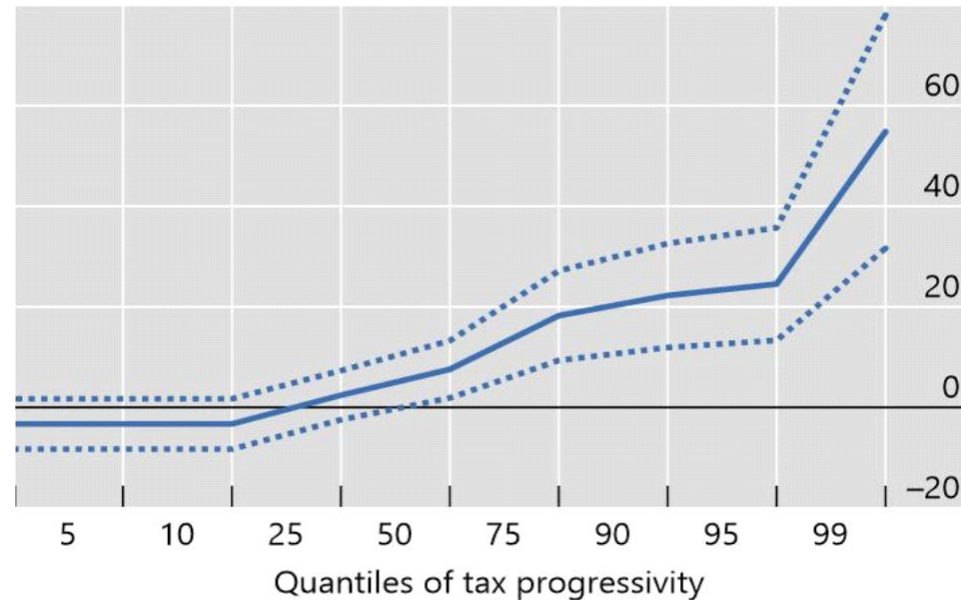
Similarly, progressive taxes also associated with countercyclical fiscal policy

Progressivity turns fiscal policy counter-cyclical through its impact on revenues¹

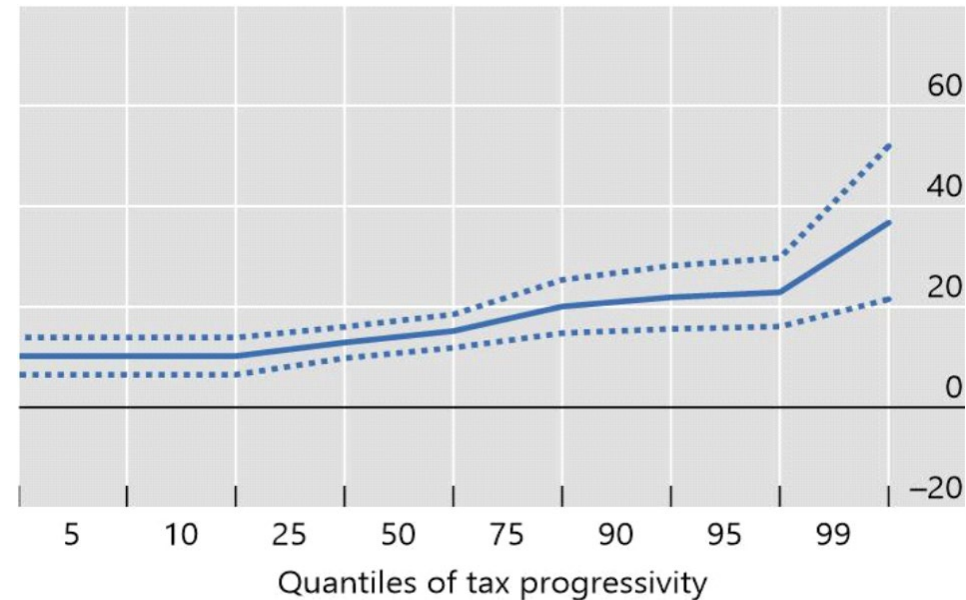
In per cent

Graph III.7

Primary fiscal balance is more sensitive to output gap when taxes are more progressive



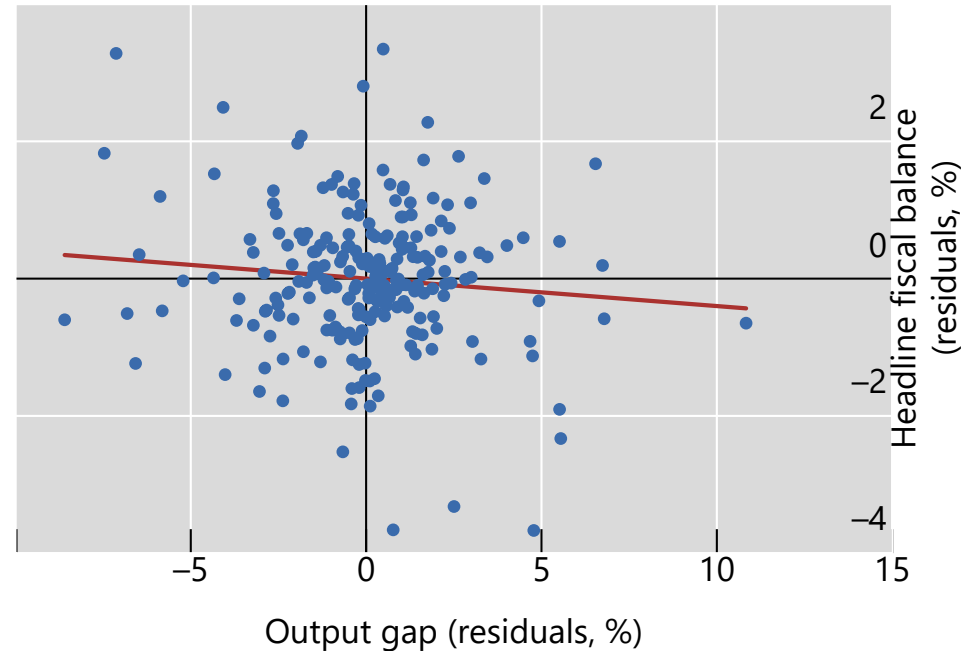
...essentially because government revenues co-move more tightly with the cycle



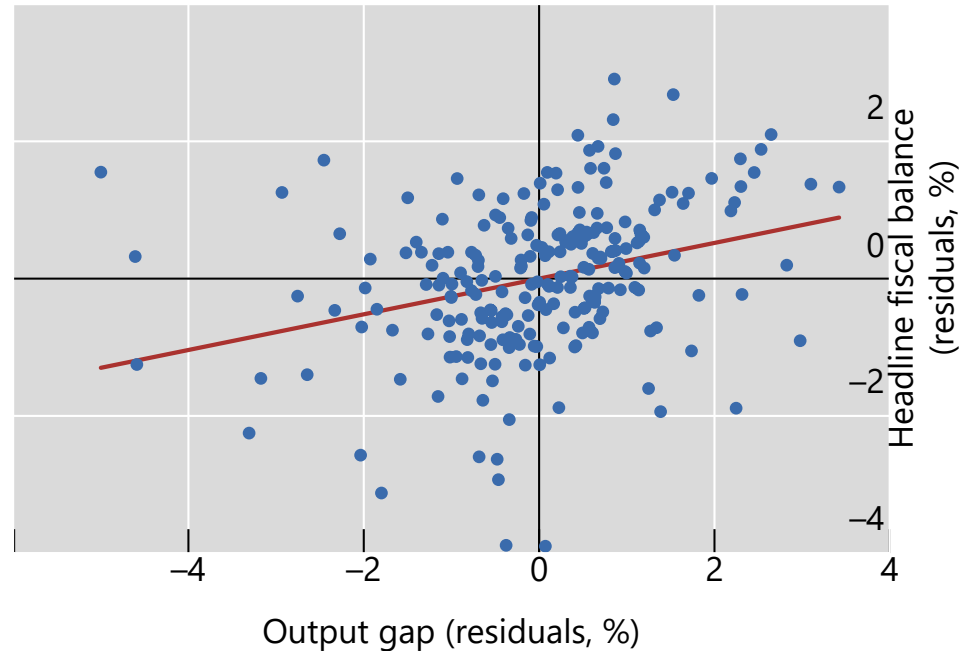
— Sensitivity 90% confidence interval

Does weaker UI account for the drop in fiscal policy stabilisation?

Below median replacement ratio



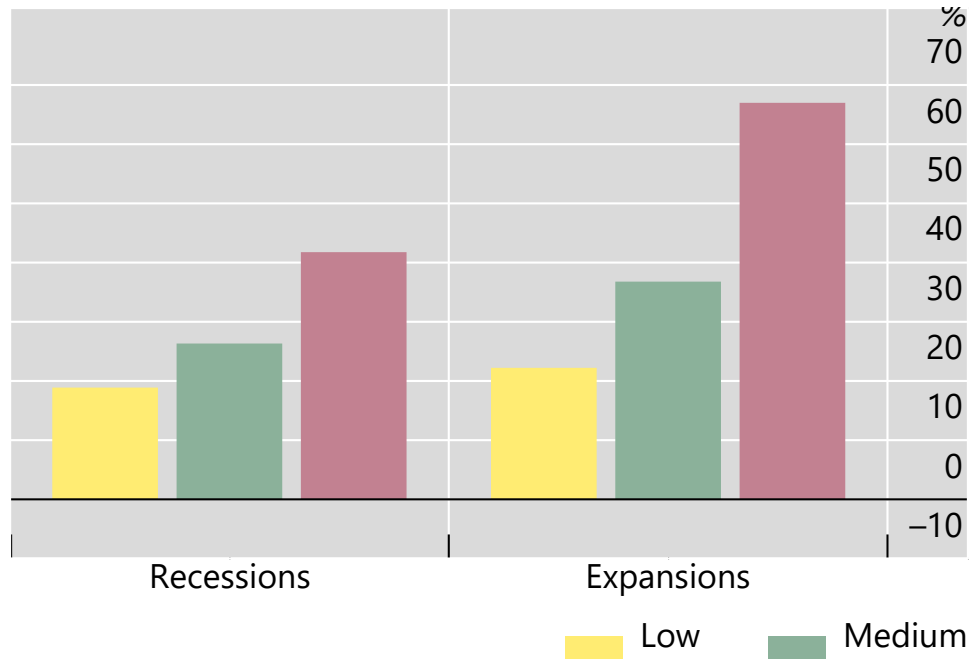
Above median replacement ratio



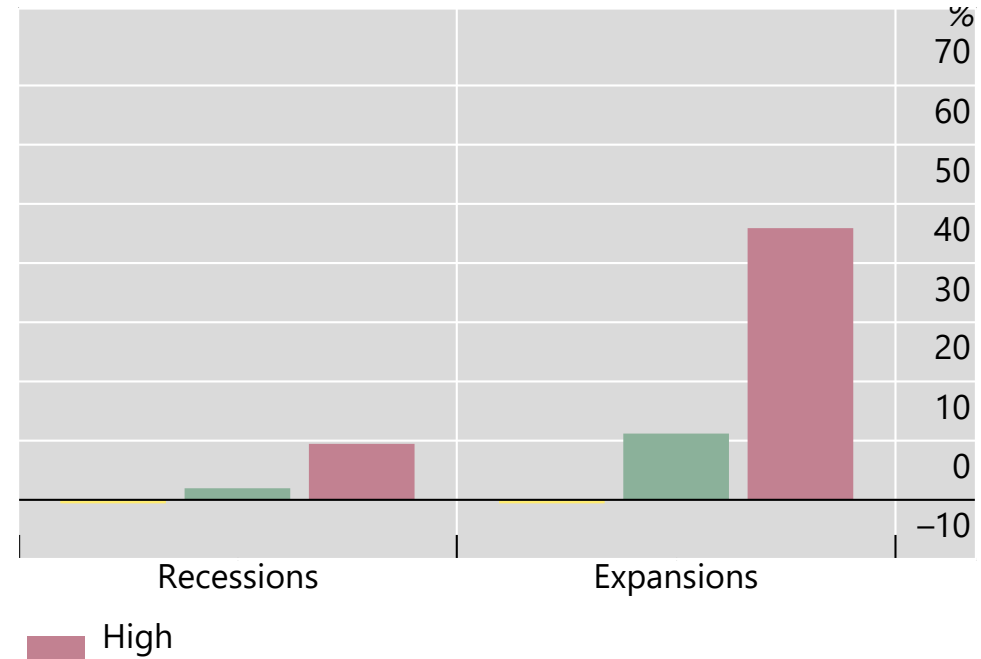
- Stronger unemployment insurance associated with significantly stronger sensitivity of fiscal policy to the business cycle

Fiscal policy, redistribution, and stabilisation: larger in expansions

Progressive taxes raise fiscal balance sensitivity to the business cycle, particularly in expansions



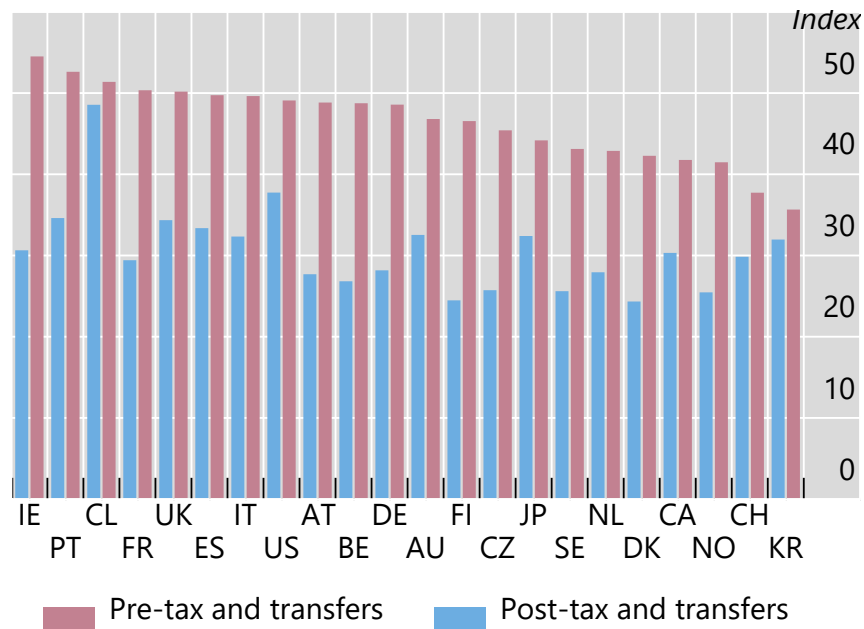
High UI replacement ratio also raises fiscal balance sensitivity to the output gap, driven by expansions



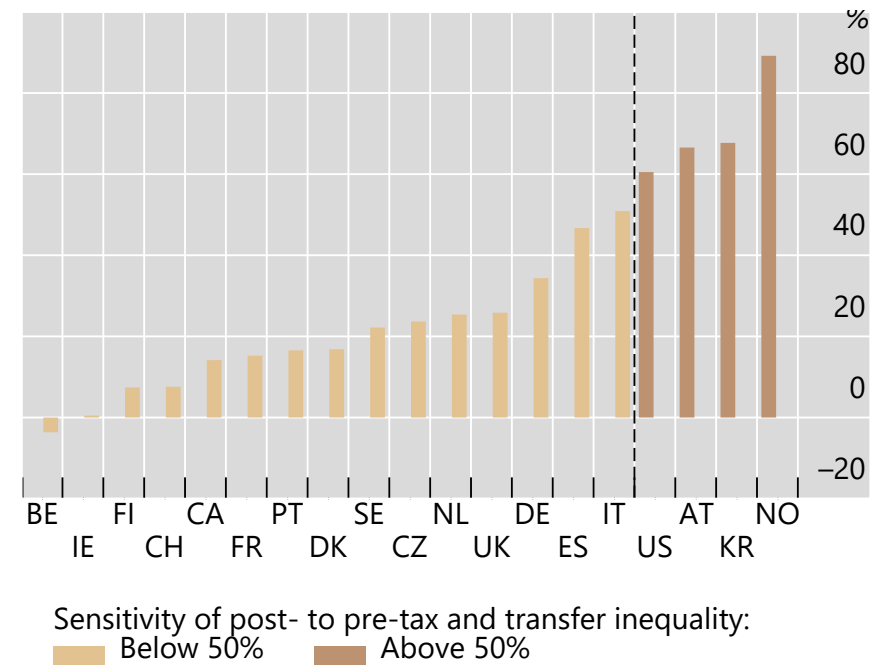
- High progressivity and/or high unemployment replacement ratios make fiscal policy react more strongly to the business cycle, particularly in expansions

Again without fiscal policy, redistribution, and stabilisation get worse

Taxes and transfers reduce Gini levels



In many countries, taxes and transfers dampen fluctuations in Gini inequality



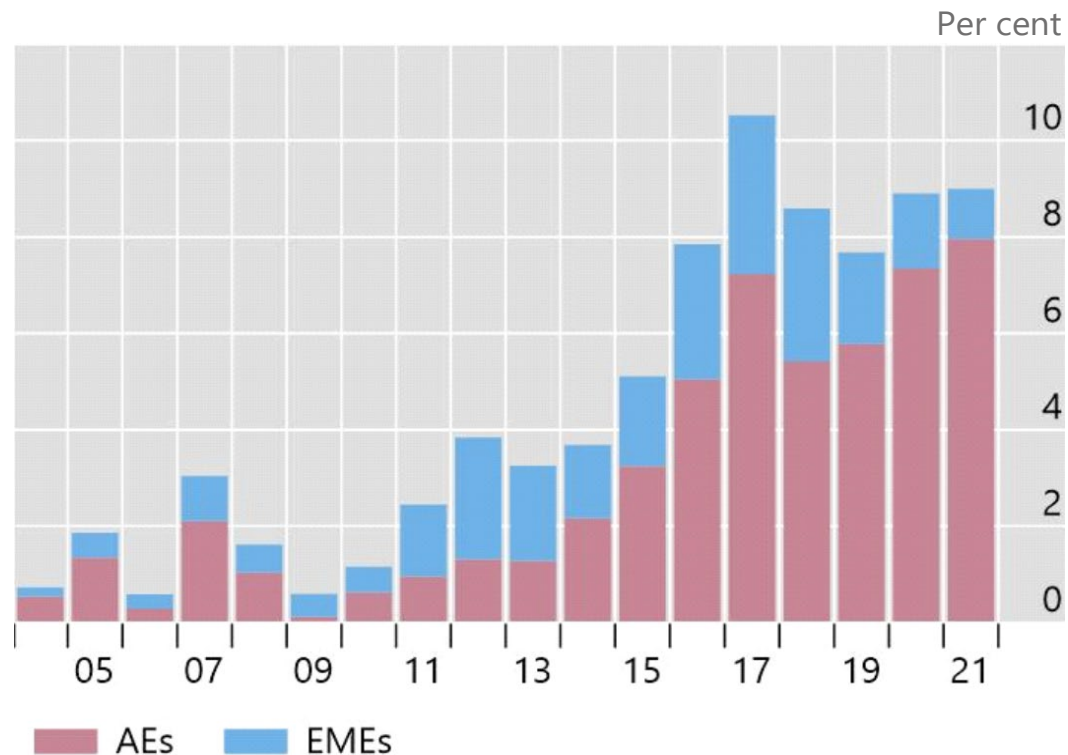
- Fiscal policy has a large impact on inequality.
 - Significant wedge between before and after-T&T inequality.
 - After-T&T inequality shows little sensitivity to before-T&T inequality

Fiscal policy, redistribution, and stabilisation

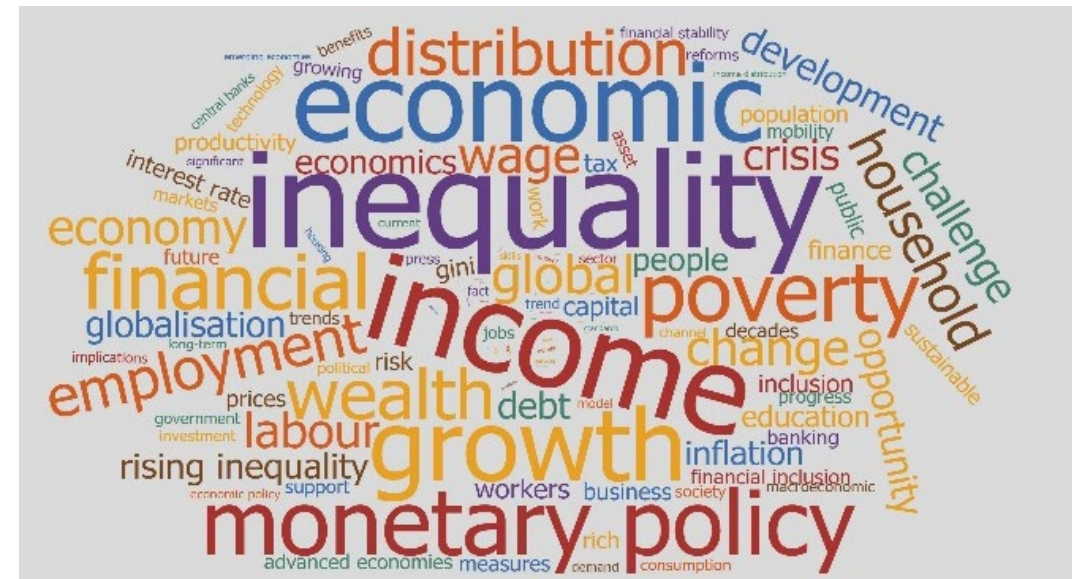
- Take-aways: redistributive fiscal policies deliver three benefits
 - Inequality reduction (containment)
 - Fiscal stabilisation
- Macro rationale for redistributive policies beyond inequality reduction
 - Taming business cycle volatility
 - Ensuring fiscal buffers are replenished in expansions
- Policy implications/stakes:
 - Strong automatic fiscal stabilisers help smooth business cycles; help effectiveness of policy-mix and therefore of Monetary Policy
 - Might not require some aspect of MP that had to be deployed during recent crises

Why should Monetary Policy and Central banks bother? Growing awareness on inequality

Share of speeches mentioning inequality¹



Frequency of occurrence of words in short excerpts of speeches around mentions of inequality²



Concern: is monetary policy less effective when societies have higher inequality?

- Test the hypothesis by:
- Looking at supposed effect of MP (during recessions, boost private consumption, personal income); by providing more stimuli through MP action (shocks of policy rate)
- Verifying that the effect of MP stimuli is the same regardless of the status of income and wealth (use quantile regressions)

S 12.5. Inequality and monetary policy

Monetary policy and inequality – a cross-country perspective

Data for 20 advanced economies (1999Q1 to 2019Q4)

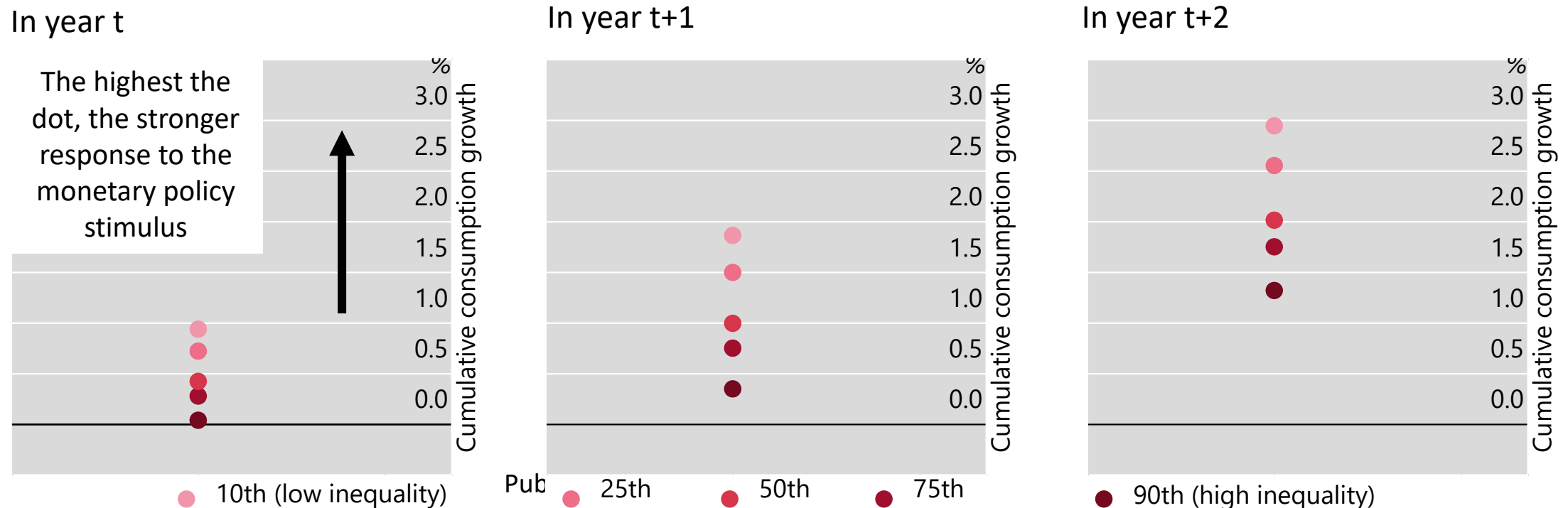
Two-step procedure:

- Identification of monetary policy shocks (m) as innovation to policy rates that are orthogonal to those of economic growth and inflation:
 - Three-equation panel VAR, with data at quarterly frequency
 - [GDP (log diff) CPI (log diff) policy rate]
- Estimation of effects of these monetary shocks on real per capita consumption growth (in country i in year t) through a local projection regression:

$$\Delta_h c_{i,t+h-1} = \rho^h \Delta c_{i,t-1} + \alpha^h m_{i,t} + \beta^h m_{i,t} \times I_{i,t-1} + \gamma^h I_{i,t-1} + \lambda_i^h + \epsilon_{i,t+h-1},$$

- $I_{i,t}$ is the share of income accruing to the top 10% of earners

- Econometric exercise with panel of 21 advanced economies (1999Q1 to 2019Q4)
- Simulate a monetary policy stimulus (cut of 40bps of interest rate); results (color dots) in stimulating consumption growth in year t , $(t+1)$ and $(t+2)$; measured by monetary policy “multiplier” effect; expectation: low interest rate triggers more consumption
- Darker dots (brown) = more unequal countries; lighter dots (pink) = more equal countries
- In more equal countries, dots (pink) the stimulus is higher 2 to 3 percentage points above those of less equal countries, dots (brown)



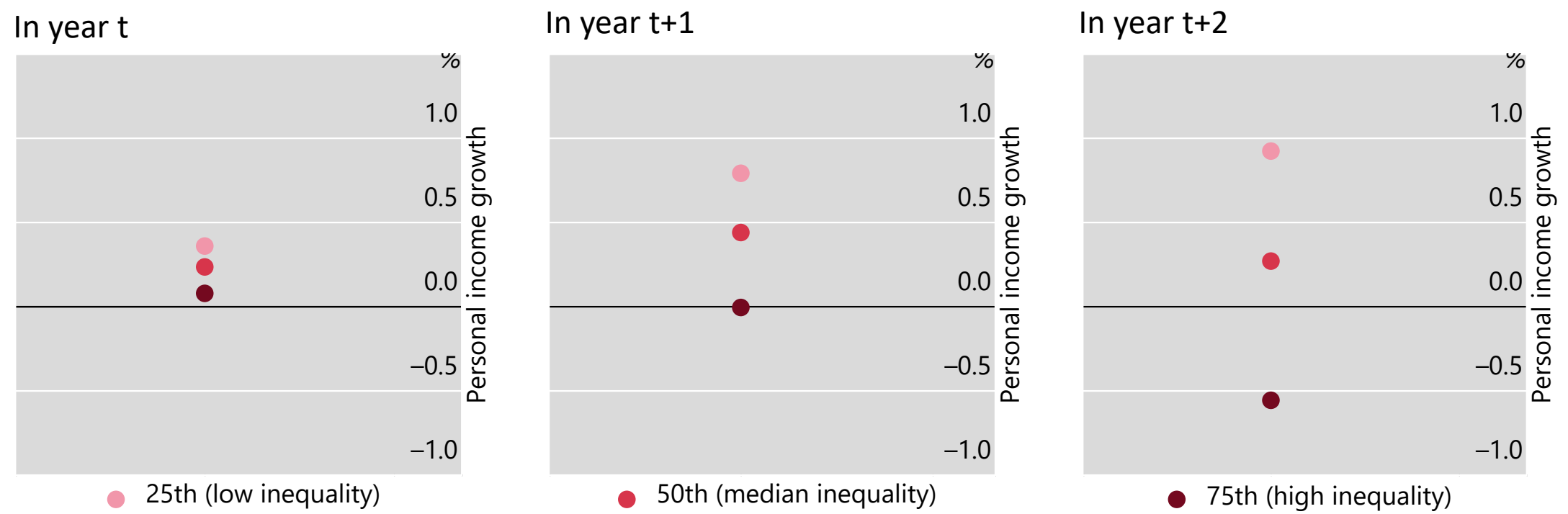
A more specific US-centric exercise confirms the finding testing for identical monetary policy

State-level data on inequality and income (1969 to 2008), 48 States, annual data

- From 1990 also data on unemployment and social spending
- Romer and Romer (2004) monetary policy shocks for the US
- Controls at the national level: unemployment, inflation, SP500 returns, change in the BA-treasury 10-year spread
- Estimation of effects of monetary shocks on personal income growth through a local projection regression:

$$\Delta_h y_{s,t+h-1} = \lambda_s^h + \rho^h \Delta y_{s,t-1} + \alpha^h m_t + \beta^h m_t \times I_{s,t-1} + \gamma^h I_{s,t-1} + \delta^h X_t + \epsilon_{s,t+h-1},$$

Inequality dampens the effects of monetary stimulus on personal income



- Cumulative personal income growth following a monetary stimulus is weaker in high-inequality states

S 12.6. Policy implications

Conclusions and Wrap up

- **Inequality hysteresis:** recessions imply steep increases in income inequality, **that are only partly reverted in subsequent expansions**
- Inequality **matters for** the business cycle
 - Countries with higher inequality have deeper recessions
 - Countries with less redistribution through “fiscal” policy have:
 - less countercyclical fiscal policy, **raising the stabilization burden for central banks**
 - less effective monetary policy
- Policies that **reduce the incidence of recessions** a first line of defense against inequality
- **Keeping inequality in check also key to assure that stabilization policies (fiscal and monetary) are more effective**
- “Holistic” policy approach to address the inequality challenges involve better cooperation between fiscal and monetary authorities
- Enhancement and planning of coordinated countercyclical policies

Implication for monetary policy frameworks?

- This suggests inequality and heterogeneity have to be taken into account in the formulation of monetary policy
- Focusing on the employment of more disadvantaged categories would lead to shorter recessions
 - Monetary policy strategies that provide sufficient accommodation in critical moments of recessions yield comparatively better results when households' heterogeneity is taken into account (empirical justification for targeted monetary transfers or QE?)
 - This does not mean adopting inequality as a policy objective, which could add to political economy pressures
- Fiscal measures aimed at leaning against the inequality trends would have the side benefit of lowering the macroeconomic stabilisation burden of central banks

S 12 References

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