



EUROPEAN CENTRAL BANK

EUROSYSTEM

## **Inflation, fiscal policy and inequality: The distributional impact of fiscal measures to compensate consumer inflation**

Joint expert team of the European Commission's Joint Research Centre and the ESCB Working Group on Public Finance

EUROMOD Annual Meeting  
and Research Workshop  
21<sup>st</sup> September 2023

The views expressed are those of the authors and do not necessarily reflect those of their respective institutions.

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- Euro area **inflation rose to 8.4% in 2022**, currently expected to decline towards the ECB target of around 2% by 2025
- Large array of **government measures to cushion the impact of the current inflationary shock** for on households and firms.
- In the euro area, fiscal measures estimated to amount to close to **2% of GDP in 2022**.
  - A bit more than ½ of support aiming at directly containing price increases (“**price measures**”), including indirect tax cuts and tax and electricity price caps
  - A bit less than ½ of measures directed at supporting income of households and firms (“**income measures**”), e.g. public transfers with indirect and lagged effects on inflation via aggregate demand

# Questions and approach

- What is the impact of the **inflationary shock** and the **fiscal policy response** on the 2022 **household welfare distribution** in the euro area?
- What is the **fiscal impact** of the fiscal policy response to the surge of inflation?
- Uses tax-benefit microsimulation model for EU countries (**EUROMOD**)
- First systematic cross-country assessment of the **joint effect of income-side measures and price-side measures** in response to the inflationary shock, making use of the EUROMOD Indirect Tax Tool (ITTv4) extension
- Simulations for **six countries**: Germany, Greece, Spain, France, Italy and Portugal (euro area proxy)

# Main findings

1. Purchasing power of **lower-income households more severely affected** by the 2022 inflation surge than that of high-income households
  - higher weight of energy intensive goods in consumption basket
  - higher share of income spent on consumption (negative savings)
2. Fiscal measures significantly **contributed to compensating for the loss in purchasing power**, though with large country differences
  - Welfare gap almost completely closed in France, Greece, Portugal, and mostly closed in Italy
3. Most fiscal measures were **not particularly targeted to low-income households**, implying a high fiscal burden
  - income measures more targeted and efficient in reducing inequality gap than price measures

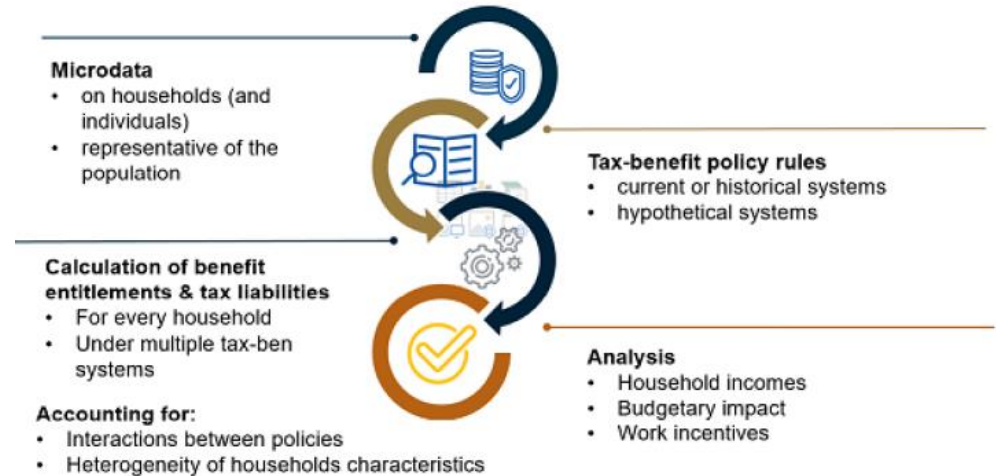
# Overview

- 1 Method and data
- 2 Simulation results
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- Uses micro data with information on different sources of income, household composition and individual socioeconomic characteristics to simulate the impact of the tax and benefit system on disposable income for every individual and household included in the input dataset.
- EUROMOD is a strictly *ceteris paribus*, i.e. it does not account for behavioral effects in labour and consumption (“morning after” effects).



- Problem: **EUROMOD only allows to simulate income measures** (i.e. fiscal measure that impact disposable impact of households)
- **How to simulate the impact of price measures** on the real disposable income of households?
  - **Simple approach:** allocate price measures across income quintiles or deciles according to their energy exposure in their consumption baskets
  - **Sophisticated approach:** Use the Indirect Tax Tool (ITT) extension to EUROMOD; only available as a pilot
- To use ITT tool, close cooperation with the EUROMOD team in the **European Commission's Joint Research Centre** (JRC in Sevilla)
  - **JRC advanced launch** of the EUROMOD-ITT for six euro area countries
  - **JRC provided training and technical support** on the modelling of 2022 price measures
  - **Eurosystem experts run EUROMOD-ITT** for the six euro area countries



- ITT extends EUROMOD with the **consumption side of households**
  - allows the simulation of **indirect tax liabilities** and of **indirect tax reforms**
  - allows also the simulation of the impact of **price developments** on real household consumption
- Model: EUROMOD by including **structure of indirect tax system** at a disaggregated level of consumption (in most cases at the commodity level, e.g. "Rice")
- Input data: **Combination of income and expenditure survey datasets**, namely (i) European Union Statistics on Income and Living Conditions (EU-SILC) and the Household Budget Surveys (HBS)
- Caveat: analysis is partial and does not account for likely **substitution effects** in consumption away from energy or energy-intensive products
- JRC will include the indirect tax tool in the EUROMOD **public release** starting from 2024



## Upgraded to 2021/2022

- yearly cross-sectional survey of households on income, poverty, social exclusion, and living conditions
- latest available input data from 2019

## Tax and benefit system updated to 2021/2022

## Upgraded to 2021/2022

- survey conducted every five years on household's expenditure on goods and services
- 2010 data matched with EU-SILC data from 2019

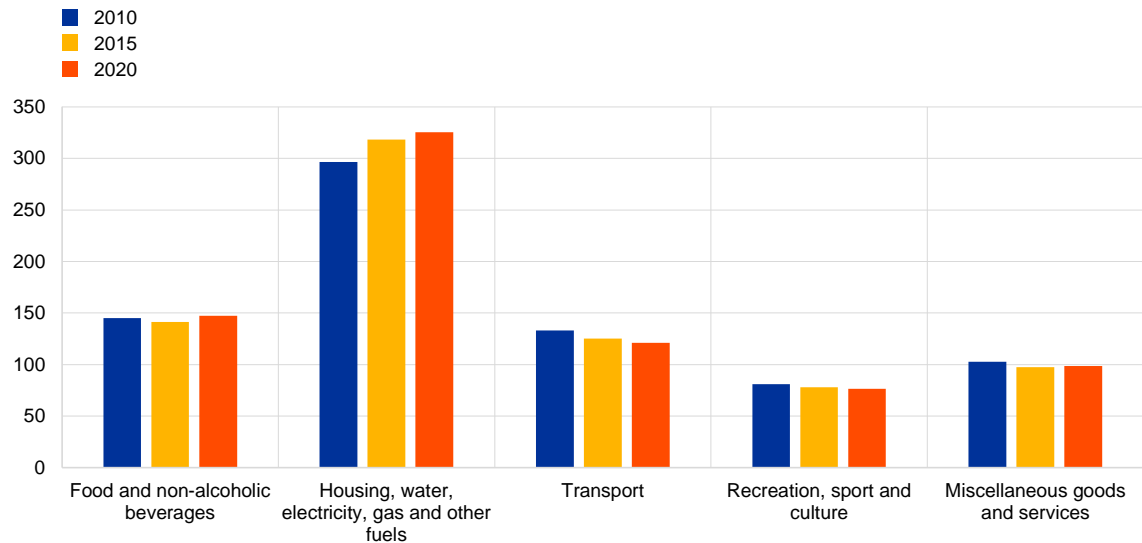
## Upgrading mechanism for wages and earnings (2021 to 2022)

	Germany	Greece	Spain	France	Italy	Portugal
<b>Wages/Earnings</b>	Gross income: + 8.7%	Employment earnings: 1.8% for private sector  0% for public sector	Wage cost, private sector: 2.1%	Net full-time salary: +3.9%	Salary index, private sector: +0.8%	Average wages of dependent employees: +2.0% for private sector and 1% for public sector
<b>Source</b>	German national statistical office	Estimates using Eurostat data	Spanish National Statistics Institute	French National Institute of Statistics	Italian National Institute of Statistics	Portuguese State Budget
<b>Differentiation of income groups in upgrading</b>	Sector specific upgrading	Separate upgrading for public/private sector	Separate upgrading for public/private sector	Quartile specific upgrading	Separate upgrading for public/private sector	Separate upgrading for public/private sector

Source: Data collected from EUROMOD country reports and model files.

Notes: The usual sources and figures of the upgrading in EUROMOD may have been changed for this exercise. In many cases it is approximated by central banks and AMECO forecasts, in a first stage, and then corrected according to the available information.

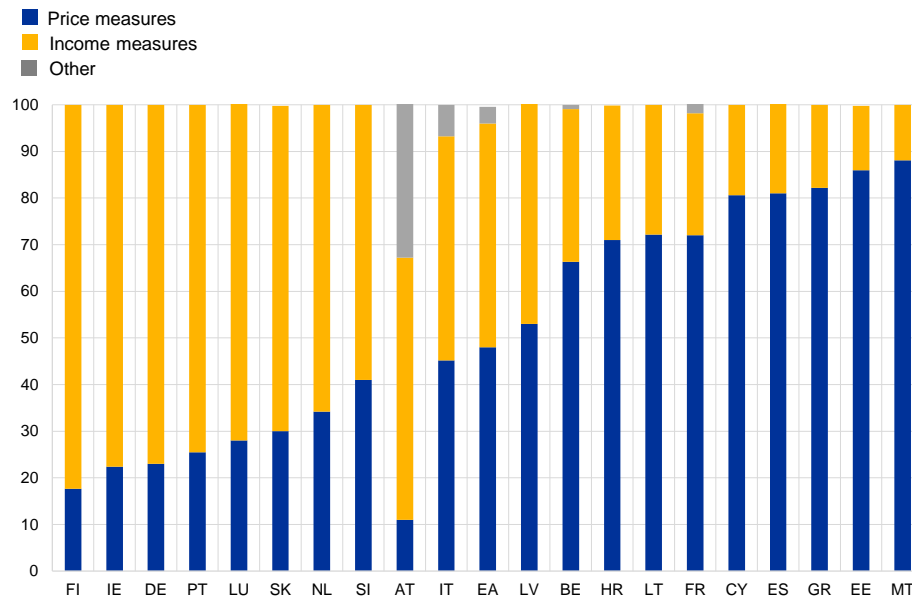
## Expenditure share of top five COICOP expenditure categories (permille of total expenditure)



Source: Own calculations based on Eurostat's HBS

Notes: The five categories shown are the COICOP categories with the highest share of total expenditure. The expenditure shares are in permille of total expenditure and correspond, from left to right, to COICOP categories CP01, CP04, C07, CP09 and CP12. The bars show the EA approximation used in this paper, consisting of GDP-weighted average of Germany, France, Italy, Portugal, and Greece. Data source are the 2010, 2015 and 2020 waves of the HBS.

## Price versus income measures in 2022 (% of total measures)



Sources: ESCB June 2023 Broad Macroeconomic Projection Exercise.

Notes: The classification of budgetary policy measures to mitigate the impact of high energy prices on households and firms is based on the European Commission methodology to classify such measures. The shares of price and income measures are calculated based on the total policy measures in 2022. The category 'Other' includes e.g. government purchases to fill gas storage

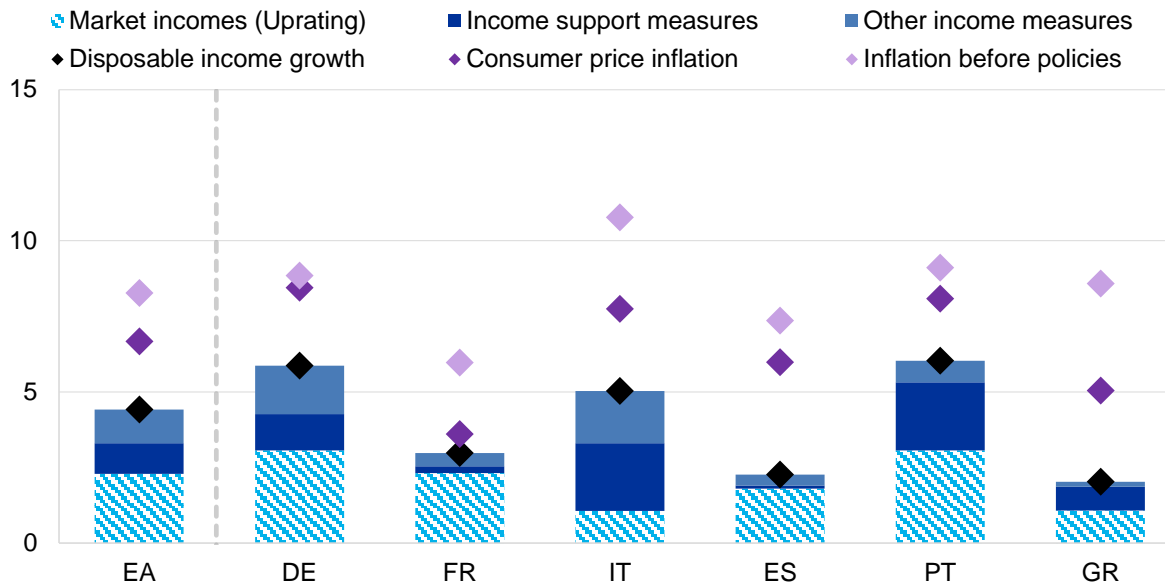
## Measures modelled by type

Type	Sub-type	Germany	Greece	Spain	France	Italy	Portugal	Grand Total
<b>Income</b>	Direct taxes by households	2	-	-	1	-	-	3
	Social security contributions	-	-	-	-	1	-	1
	Old age pensions	-	-	-	-	1	1	2
	Unemployment benefits	-	1	-	-	-	-	1
	Social transfers in kind	-	-	-	2	-	-	2
	Other social benefits other than in kind	5	5	2	1	3	3	19
<b>Income subtotal</b>		7	6	2	4	5	4	28
<b>Price</b>	VAT	1	2	2	-	1	1	7
	Excise	1	1	1	1	1	1	6
	Price cap	-	-	1	2	-	-	3
	Reimbursement	1	1	-	-	-	1	3
	Discount/Subsidy	-	4	1	1	2	-	7
	Social transfers in kind	-	1	-	-	-	-	1
<b>Price subtotal</b>		3	9	5	4		3	28
<b>Total</b>		10	15	7	8	9	7	56

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## Disposable income growth and consumer inflation in the euro area and euro area countries (percentage, 2021-2022)



Notes: Results from microsimulations based on EUROMOD and EU-SILC/HBS. Euro area proxied as weighted average of Germany, Greece, Spain, France, Italy and Portugal.



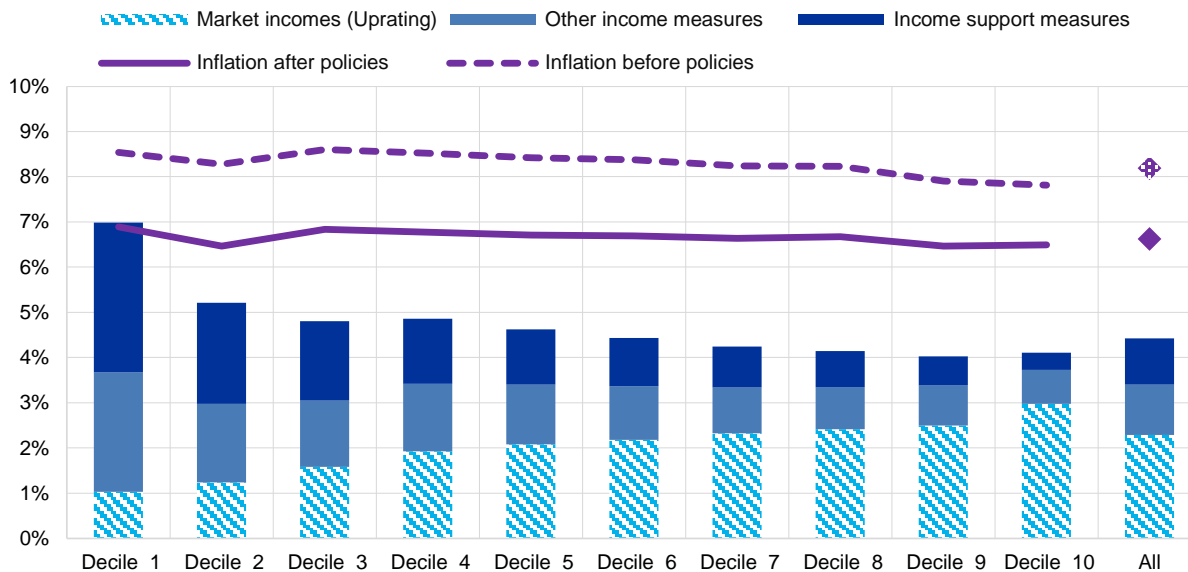
## Nominal disposable income growth and price increases according to simulations and official statistics (2021-2022)

	Germany	Greece	Spain	France	Italy	Portugal	Euro area
<b>Nominal disposable income growth (simulated)</b>	5.9	2	2.3	3	6.3	7.2	5.5
<b>Nominal disposable income growth (statistics)</b>	7.8	7.9	3.6	5.2	6.2	8.3	7.7
<b>Consumer inflation incl. price measures (simulated)</b>	8.4	5.0	6.0	3.6	7.7	8.1	6.6
<b>Counterfactual consumer inflation excl. price measures (simulated)</b>	8.9	8.6	7.4	6	10.5	9.1	8.2
<b>HICP</b>	8.7	9.3	8.3	5.9	8.7	8.1	8.4

Source: Own calculations based on the EUROMOD ITT extension simulations, EU-SILC and HBS data, National Statistical Offices and Eurostat.

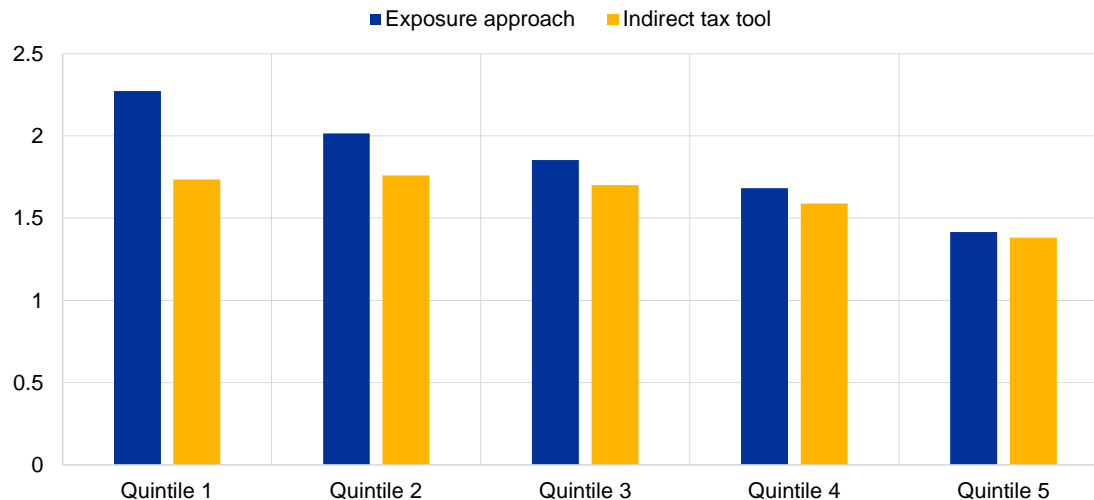
Notes: Nominal disposable income growth official statistics are based on National Accounts data on quarterly non-financial sector accounts. Sector Accounts data are not directly comparable to SILC data as they also include unincorporated household enterprises. These cover most sole proprietorships and most partnerships that do not have a legal status independent from their owners. Therefore, the household sector also generates output and entrepreneurial income. For Greece, for example, this is important and may explain why the gross disposable income growth in 2022 based on Sector Accounts data was 7.9%, i.e. much higher than the simulated 2%, as sole proprietorships did very well in 2022. Finally, in the European accounts, non-profit institutions serving households (NPISHs), such as charities and trade unions, are grouped with households. Their economic weight is relatively limited.

## Distribution of disposable income growth and consumer inflation in the euro area (percentage, 2021-2022)



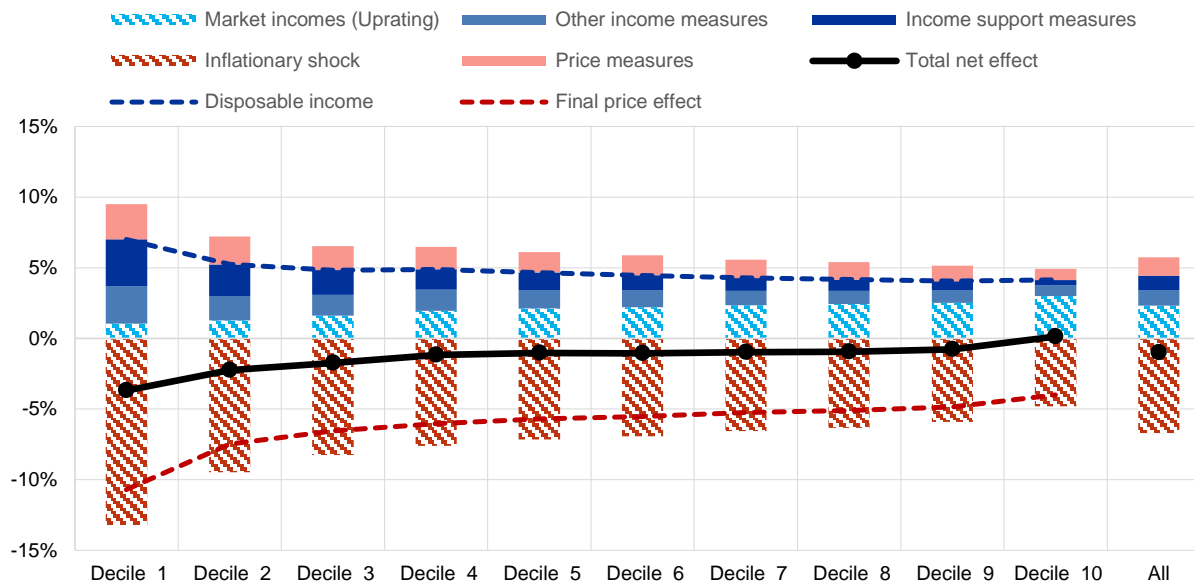
Notes: Results from microsimulations based on EUROMOD and EU-SILC/HBS. Euro area proxied as weighted average of Germany, Greece, Spain, France, Italy and Portugal.

## Policy effect of price measures according to ITT and simplified exposure approach for euro area (percentage, 2021-2022)



Notes: Results from microsimulations based on EUROMOD and EU-SILC/HBS. Euro area proxied as weighted average of Germany, Greece, Spain, France, Italy and Portugal.

## Price and income effects based on households' welfare (% change in equivalized disposable household income, 2021, per decile)

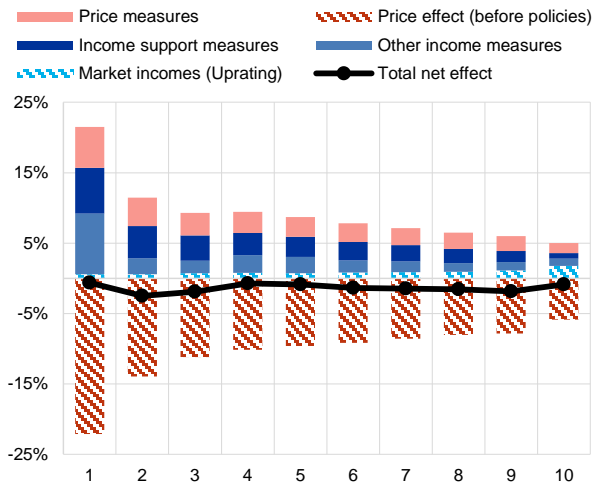


Source: Own calculations based on EUROMOD and the ITT extension simulations on EU-SILC and HBS data.

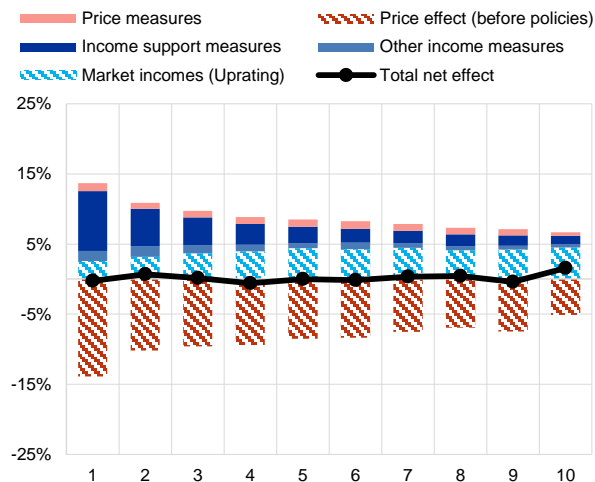
Notes: Market outcomes (before any government policies) are shaded. Government policies are shown in solid colours. Contributions to changes in disposable income pertaining to the price (income) side are shown in red (blue) tones. The dashed lines show the total effect on the income (price) side in blue (red). Equivalised disposable income is computed by dividing the household's disposable income by its size on the OECD's modified equivalence scale, which assigns a weight of one to the first adult of the household and a weight of 0.5 (0.3) to each additional household member over (under) 14.

## Price and income effects based on households' welfare in the euro area countries (% change in equivalised disposable household income, per decile)

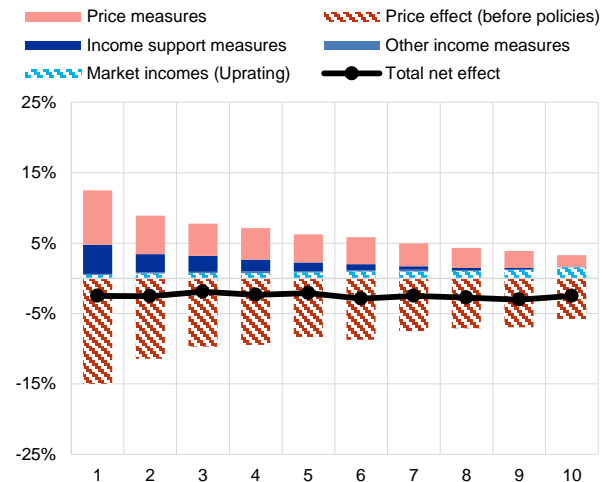
### Italy



### Portugal



### Greece

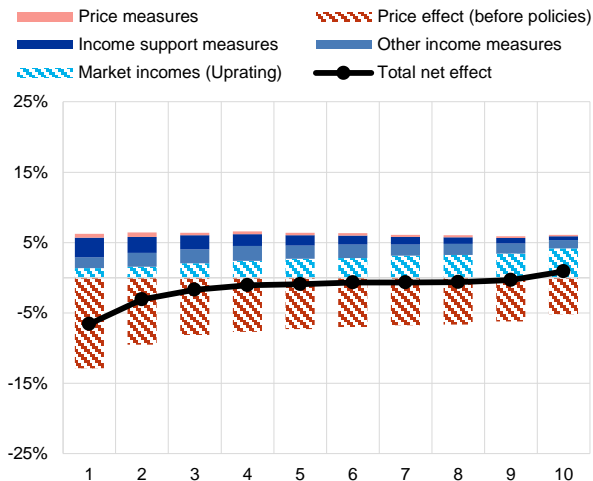


Source: Own calculations based on EUROMOD and the ITT extension simulations on EU-SILC and HBS data.

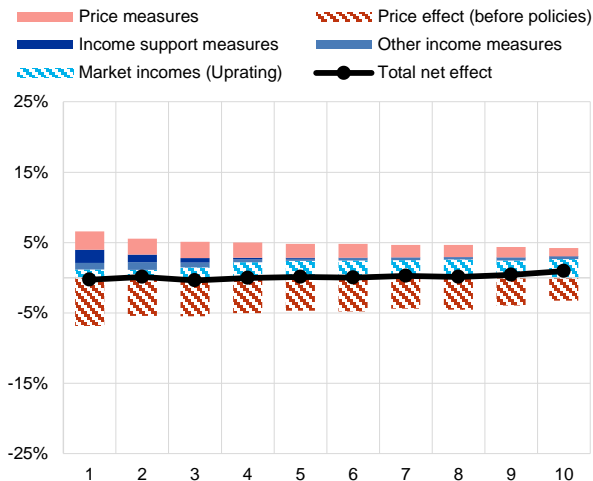
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## Price and income effects based on households' welfare in the euro area countries (% change in equivalised disposable household income, per decile)

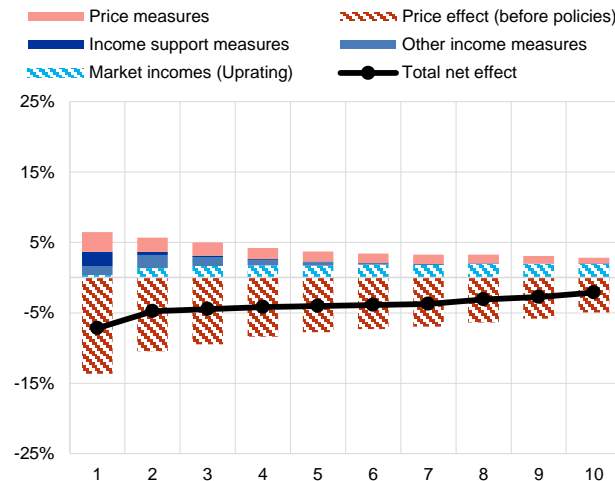
### Germany



### France



### Spain



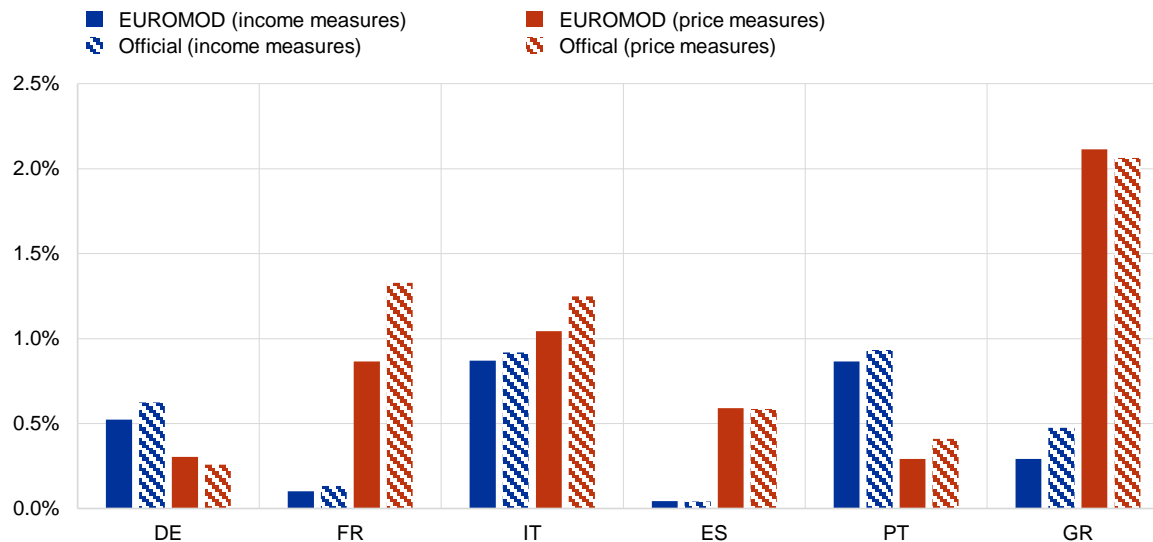
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## Comparison of EUROMOD cost estimates with government estimates (percentage of GDP)

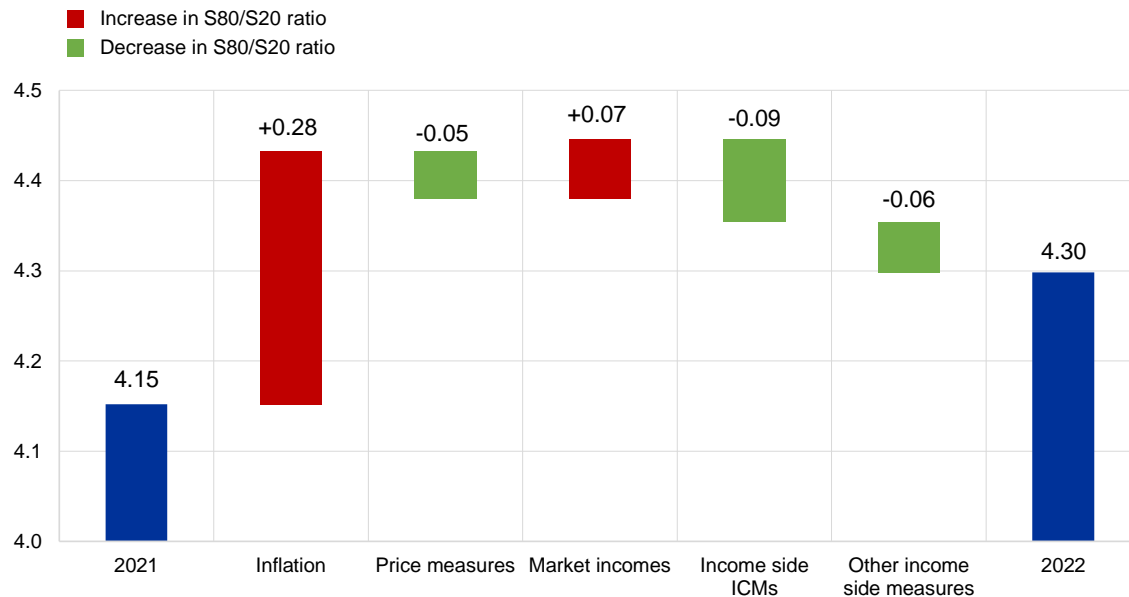


Sources: Own calculations based on EUROMOD and the ITT extension simulations on EU-SILC and HBS data.

Notes: The relatively large discrepancy between the simulated and official cost of the price measures for France derives mainly from the underestimation of the cost of the gas price growth cap simulated by EUROMOD vis-a-vis the amount of subsidies to compensate gas firms (used as a reference for the official budgetary cost of the measure).

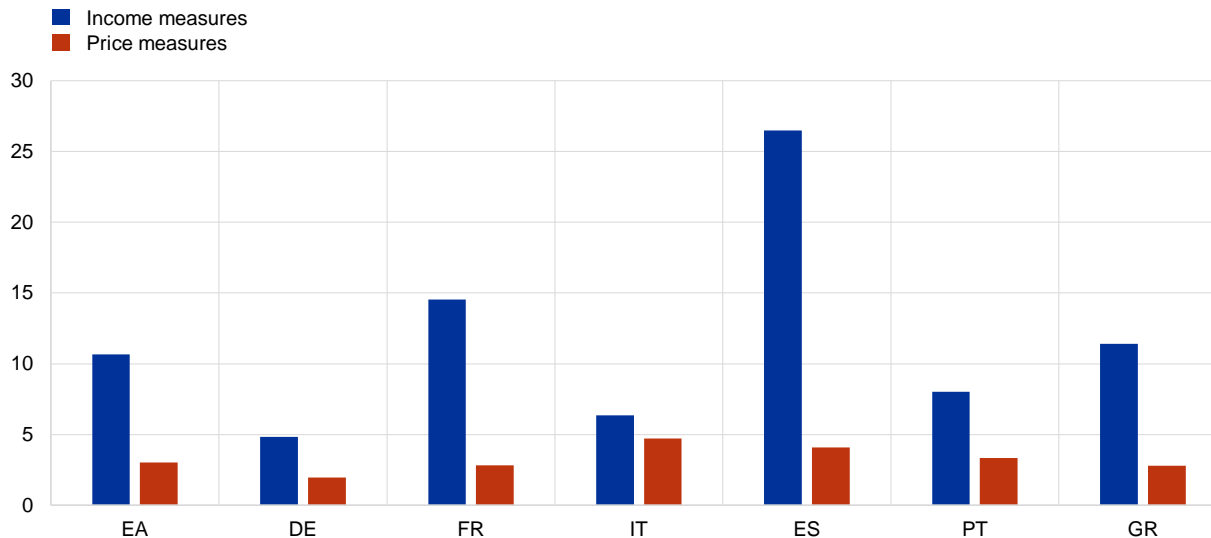


## Decomposition of changes in 80/20 inequality measure (percentage change, 2021-2022)



Notes: Results from microsimulations based on EUROMOD and EU-SILC/HBS.

## Change in real disposable income of first quintile per euro spent (% change in welfare of first quintile per expenditure, % of GDP)



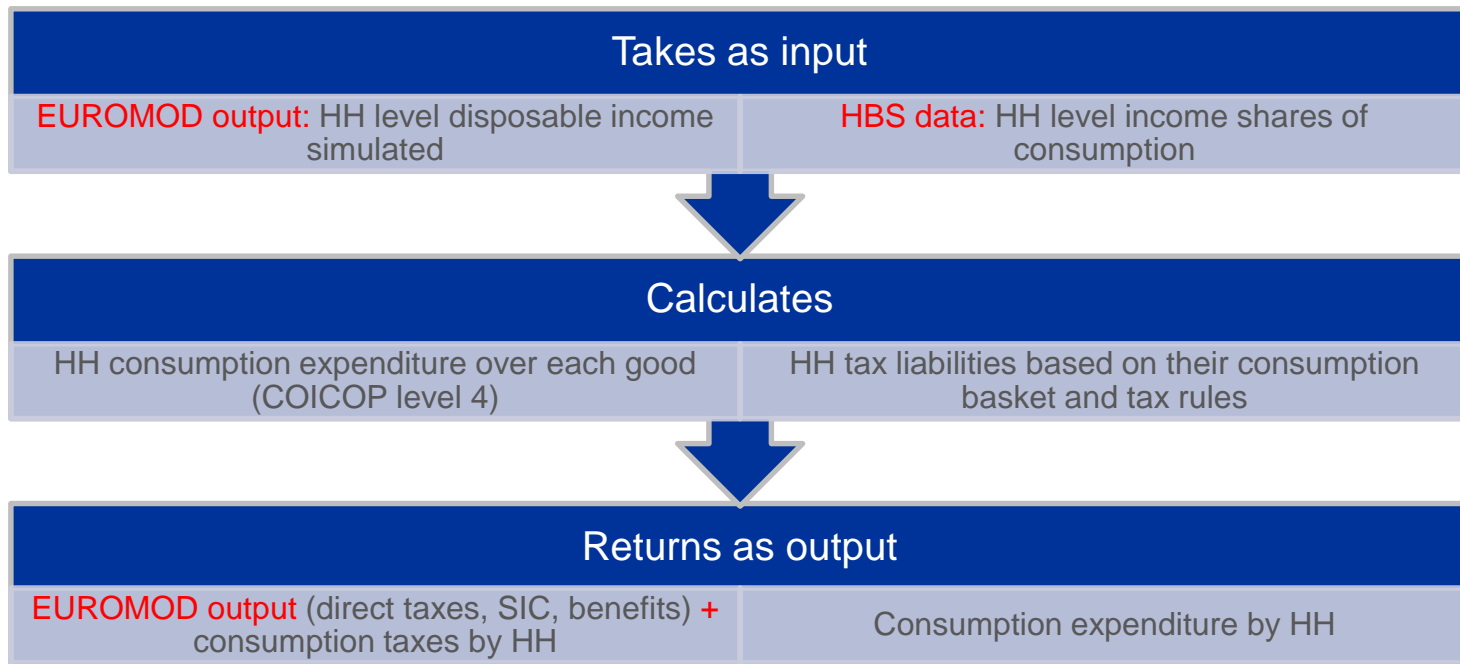
Sources: Own calculations based on EUROMOD and the ITT extension simulations on EU-SILC and HBS data.

Notes: The bars show the change in disposable income of the bottom 20% of the income distribution (first quintile) divided by the cost of the price and income measures in % of GDP. Equivalised disposable income is computed by dividing the household's disposable income by its size on the OECD's modified equivalence scale, which assigns a weight of one to the first adult of the household and a weight of 0.5 (0.3) to each additional household member over (under) 14.

# Main findings

1. Purchasing power of **lower-income households more severely affected** by the 2022 inflation surge than that of high-income households
  - higher weight of energy intensive goods in consumption basket
  - higher share of income spent on consumption (negative savings)
2. Fiscal measures significantly **contributed to compensating for the loss in purchasing power**, though with large country differences
  - Welfare gap almost completely closed in France, Greece, Portugal, and mostly closed in Italy
3. Most fiscal measures were **not particularly targeted to low-income households**, implying a high fiscal burden
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# BACKGROUND SLIDES



Source: European Commission.