THE UNEVEN IMPACT OF HIGH INFLATION

OECD PAPERS ON WELL-BEING AND INEQUALITIES

https://doi.org/10.1787/4ca48f7c-en

WORKING PAPER No.18

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European Commission

Organisation for Economic Co-operation and Development

WISE(2023)6

English text only

WELL-BEING, INCLUSION, SUSTAINABILITY AND EQUAL OPPORTUNITY CENTRE

The uneven impact of high inflation

JEL Classification: D12, E31, D14, D3, I31
Keywords: inflation measurement, inflation inequality, household consumption, cost of living

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The release of this policy paper has been authorised by Romina Boarini, Director of the OECD Centre on Well-being, Inclusion, Sustainability and Equal Opportunity (WISE).

ISBN 978-92-78-43597-4

Catalogue number KE-03-23-156-EN-N

Acknowledgements

This paper was prepared by the OECD WISE Centre and European Commission Directorate-General for Employment, Social Affairs and Inclusion (DG EMPL). It was developed under the leadership of Romina Boarini (Director of OECD WISE Centre) and Barbara Kauffmann (Director of DG EMPL Directorate of Employment and Social Governance, Analysis), and under the supervision of Carlotta Balestra (Head of the Inequalities Unit, OECD WISE Centre). The paper was written by Jakub Caisl (European Commission, Directorate-General for Employment, Social Affairs and Inclusion (DG EMPL)), Luiz Hermida (OECD WISE Centre), Horacio Levy (OECD WISE Centre) and Bálint Menyhért (Joint Research Centre (JRC), European Commission). Anne-Lise Faron (OECD WISE Centre) prepared the paper for publication, while Martine Zaïda (OECD WISE Centre) provided support and advice on communication. Gráinne Murphy contributed to the editing of the report.

The action was funded by the European Union (EU) via the Technical Support Instrument and implemented by the OECD, in cooperation with the Directorate-General for Structural Reform Support (DG REFORM) of the European Commission.

The authors would like to thank Jarmila Botev, Orsetta Causa, Zsombor Cseres-Gergely, Boris Cournède, Emil Dimitrov, Karolina Gralek, Katarina Jaksic, Herwig Immervoll, Annabelle Mourougane and Mark Pearson, for comments on an earlier version of this paper. They also gratefully acknowledge suggestions from participants to the joint OECD-European Commission expert workshop on the distributive impact of inflation that took place on 30 June 2023.

Abstract

Inflation indices such as national Consumer Price Indices (CPI) and the EU Harmonised Index of Consumer Prices (HICP) measure price changes for the overall economy, which may not reflect the inflation experience of an individual household or group of households. This paper contributes to previous studies of the distributive impact of recent high inflation in EU Member States. Using more recent and granular results, it finds a substantial rise in effective inflation dispersion across households and confirms that lower-income households continue to experience higher inflation. This inflation gap remains even after energy prices have eased and when controlling for other household characteristics. Results also show that the distributive impact of inflation on household groups has varied over time, with changes in relative prices influencing the extent of the impact of inflation across population groups. Finally, differences in effective inflation rates have cumulated, particularly for households with lower incomes, those headed by people aged 60 years or more, and those with lower levels of education.

Résumé

Les indices d'inflation - tels que les indices nationaux des prix à la consommation (IPC) et les indices des prix à la consommation harmonisés (IPCH) de l'UE – mesurent les variations de prix pour l'ensemble de l'économie, ce qui peut ne pas refléter l'expérience de l'inflation d'un ménage individuel ou d'un groupe de ménages. Ce document contribue aux études précédentes sur l'impact distributif de la forte inflation récente dans les pays de l'UE. En produisant des résultats plus granulaires et plus récents, il constate une augmentation substantielle de la dispersion effective de l'inflation entre les ménages et confirme que les ménages à faible revenu continuent à subir une inflation plus élevée. Cet écart d'inflation persiste même après la baisse des prix de l'énergie et lorsque l'on tient compte d'autres caractéristiques des ménages. Les résultats montrent également que l'impact distributif de l'inflation sur les groupes de ménages a varié dans le temps, les changements de prix relatifs au cours de la période inflationniste ayant influencé l'ampleur de l'impact de l'inflation sur les groupes de population. Enfin, les différences de taux d'inflation effectifs se sont cumulées au fil du temps, en particulier pour les ménages à faible revenu, dirigés par des personnes âgées de 60 ans ou plus et ayant un faible niveau d'éducation.

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1 Introduction

After several decades of relative price stability, European Union (EU) and Organisation for Economic Co-operation and Development (OECD) member countries experienced high inflation during the post-COVID-19 pandemic recovery and Russia's war of aggression against Ukraine.

Inflation indices usually measure price changes for the overall economy and do not indicate how these price changes are experienced by individual households. Evidence shows that "effective inflation"[1] may vary greatly across households and differ significantly from the level captured by an inflation index. There are several reasons for differences in household effective inflation. The most frequently analysed in the literature refers to diversity in consumption patterns. Inflation indices are calculated based on the change in the cost of a basket of goods and services deemed representative of the overall economy. However, variations in preferences and circumstances mean that the goods and services consumed by individual households may differ substantially from the basket underlying inflation indices. Households may also experience different price changes depending on where they shop, how they adjust their consumption habits in response to changes in prices, or whether they benefit from discounts and promotions. At the aggregate level, inflation indices can also differ from household effective inflation because of methodological differences.[2]

Inflation dispersion (how effective inflation varies across households) has several implications for policy. For instance, from a monetary policy perspective, households face different real interest rates as their inflation rates differ (Kaplan and Schulhofer-Wohl, 2017[1]). Inflation dispersion may also impact how inflation expectations are formed across population groups: evidence suggests that higher inflation dispersion is associated with larger variation in inflation expectations, which can affect inflation persistence (Johannsen, 2014[2]; Bernanke, 2007[3]; Kumar et al., 2015[4]; Grigoli, Gruss and Lizarazo, 2020[5]). Inflation dispersion may also have implications for the measurement of income inequality[3] (Crawford and Smith,

[1] Different terms are used in the literature to refer to inflation calculated at household level, including "effective inflation" (Charalampakis et al., 2022[14]), "household-specific rates of inflation" (Johannsen, 2014[2]; Gürer and Weichenrieder, 2020[46]), "actual rates of inflation faced by individual households" (Crawford and Smith, 2002[6]), and "inflation at the household level" and "household inflation rates" (Kaplan and Schulhofer-Wohl, 2017[1]). This paper primarily uses "effective inflation", differentiating when necessary between "effective inflation" at household level and on average for total population or a particular population group.

[2] Household effective inflation measures the composition of the basket of goods and services using only data from household budget surveys, while inflation indices may also use data from national accounts. Household effective inflation produces aggregate results using a "democratic" approach, where the inflation level experienced by each household is given equal weight. Inflation indices such as the CPI and HICP are based on a "plutocratic" approach, where the inflation of each household is implicitly weighed by their total expenditure. See Box 3.1 for details on the use of national account data and Annex A on aggregation methods. Another potential source of difference in inflation measurement refers to the observation period of the basket of goods. The period may be that in which measurement starts, i.e. "base year" (Laspeyres Index), or that in which measurement ends, i.e. "current year" (Paasche Index).

[3] Usually, income distribution indicators (including inequality) are measured on the basis of real incomes, which are calculated as nominal incomes deflated by a common price index (e.g. CPI). The underlying assumption is that the

2002[6]), the dispersion of tax rates due to "bracket creep" (Immervoll, 2005[7]) and the dynamics of wage bargaining and minimum-wage setting (OECD, 2022[8]).

Understanding how inflation varies across households is central to designing cost-effective fiscal interventions. In the current inflationary period, most government policies have focused on price support measures, including lower taxes and reduced or regulated prices (OECD, 2022[9]), and on income support measures, such as increases in minimum wages (OECD, 2022[8]), income supports (OECD, 2022[10]) and pensions (OECD, 2022[11]).

Price support measures tend to benefit all consumers, regardless of their ability to cope with rising prices. These measures are costly to governments and may disincentivise consumers from adjusting their spending, for example by reducing energy consumption, and may be regressive. Targeted income support measures (including transfers and tax credits to consumers) can be more effective in limiting the burden on government budgets and preserving price signals for energy saving, which also contributes to the green transition. Meanwhile, these policies still protect those most in need (OECD, 2022[12]; Causa et al., 2022[13]; OECD, 2022[8]). However, well-designed income support measures require timely granular data to identify the households most exposed to inflation, those with limited resources (OECD, 2022[10]; Causa et al., 2022[13]), or without the possibility of adjusting their consumption.

This paper presents a granular, detailed, temporal and timely analysis of the impact of high inflation across households in EU Member States. Building on previous studies that looked at the distributive impact of the recent rise in inflation (Causa et al., 2022[13]; Charalampakis et al., 2022[14]; Claeys, McCaffrey and Welslau, 2022[15]; Menyhért, 2022[16]; Sologon et al., 2022[17]; Villani and Vidal Lorda, 2022[18]), it contributes in four key ways. Firstly, it conducts a more granular analysis by computing effective inflation rates at household level, rather than by income or population group. This facilitates a novel measure of the impact of recent high inflation on effective inflation dispersion across EU Member States, as well as identifying those most affected by higher inflation by examining the association of household effective inflation with household characteristics. Secondly, the analysis adds granularity to the computation of effective inflation rates, using highly disaggregated expenditure data. Thirdly, it assesses effective inflation at different points in time, providing crucial information on the dynamics of price changes and relative prices of goods and services, and how they affect effective inflation. It also takes stock of inflation developments over the past three years in computing the cumulative effect of rising prices across population groups. Finally, the analysis is timely, as results are based on the latest available detailed inflation data.

The analysis follows the standard approach in the literature (Hagemann, 1982[19]; Crawford and Smith, 2002[6]; Menyhért, 2022[16]; Cusset and Trannoy, 2023[20]), which computes effective inflation rates for each household in a statistically representative sample by combining microdata from household budget surveys (HBS) with price indicators for a detailed list of goods and services. While informative on first-order distributive effects of inflation on the cost of living, this approach does not account for changes in nominal wages and incomes, nor for behavioural changes. In addition, the lack of timely HBS microdata (at the time of writing, the latest available for cross-country EU-wide analysis are from 2015) raises questions about their ability to capture recent changes in consumption behaviour that may have resulted from the COVID-19 crisis.

The main conclusion is that the impact of rising inflation across household groups has been not only diverse but dynamic, reflecting changes in relative prices throughout the inflationary period in question. Although headline inflation has remained at historically high levels for over a year in most EU and OECD member countries, different consumption items such as transport energy, domestic energy, food and services have contributed differently to these high levels of inflation. As these items vary in relative importance in

living conditions of all households are affected by inflation in the same way. If effective inflation is different across households, real income should be calculated using a household-specific, rather than single, deflator.

household budgets, the distributive impact of inflation across households also varies. To mitigate the impact of inflation on living standards, policies must consider these evolving dynamics.

Section 2 of this paper provides an overview of the recent rise in inflation. Section 3 assesses how consumption patterns vary within and between countries, as well as across population groups. Section 4 shows how inflation dispersion has evolved since inflation started to rise and assesses the impact of that inflation surge across population groups, over time and across countries. Section 5 presents preliminary estimates of the effects of inflation on material and social deprivation (MSD), while Section 6 discusses some conclusions and possible policy implications.

2 Inflation surged and reduced purchasing power

Inflation reached historically high levels in 2022, after several decades of moderate rates. Following supply chain disruptions and repressed consumer demand during the COVID-19 crisis, inflation rose in the second half of 2021, intensifying as a result of Russia's war of aggression against Ukraine, which began in February 2022. Inflation was primarily driven by a dramatic surge in domestic and transport energy prices and a substantial rise in food prices (Figure 2.1). According to the Harmonised Index of Consumer Prices (HICP), inflation rates across EU Member States reached double digits in the second half of 2022.

There is a marked variation in inflation levels across countries, with far higher levels in Central and Eastern European countries. Several factors explain the variation, including consumption patterns, the magnitude of energy price rises, the pass-through effect[4] from energy to other products, and the impact of the COVID-19 crisis and recovery on prices (Beynet and Goujard, 2022[21]). There are systematic cross-country differences in consumption patterns, particularly the expenditure share on food and energy (Menyhért, 2022[16]), which were among the product categories experiencing higher price rises in 2022. The variation in energy prices also reflects cross-country differences in the types of energy used and produced, the types of household utility contracts and regulations, and the measures adopted by governments to curb the impact of rising energy inflation (Gern, Sonnenberg and Stolzenburg, 2022[22]). Food price inflation also shows considerable cross-country variation, with higher differentials for processed foods that require more energy, implying a high pass-through effect (Gern, Sonnenberg and Stolzenburg, 2022[22]). In 2020, the COVID-19 pandemic led to some very low and volatile prices across countries. This volatility produced important cross-country differences in base effects,[5] which mechanically increased variations in year-on-year inflation levels in 2021-2022 (Beynet and Goujard, 2022[21]).

In most countries, headline inflation has begun to decline, but food inflation and core inflation (excluding food and energy prices) remain high. Although inflation rates are still well above the European Central Bank (ECB) target, they started to decrease in late 2022 as energy prices eased somewhat (OECD, 2023[23]). In July 2023, food inflation and, to a lower extent, core inflation remained high, although food prices started to fall in some countries.[6] According to the European Commission's

[4] "Pass-through effect" refers to a change in the price of products or services following a change in the cost of producing them.

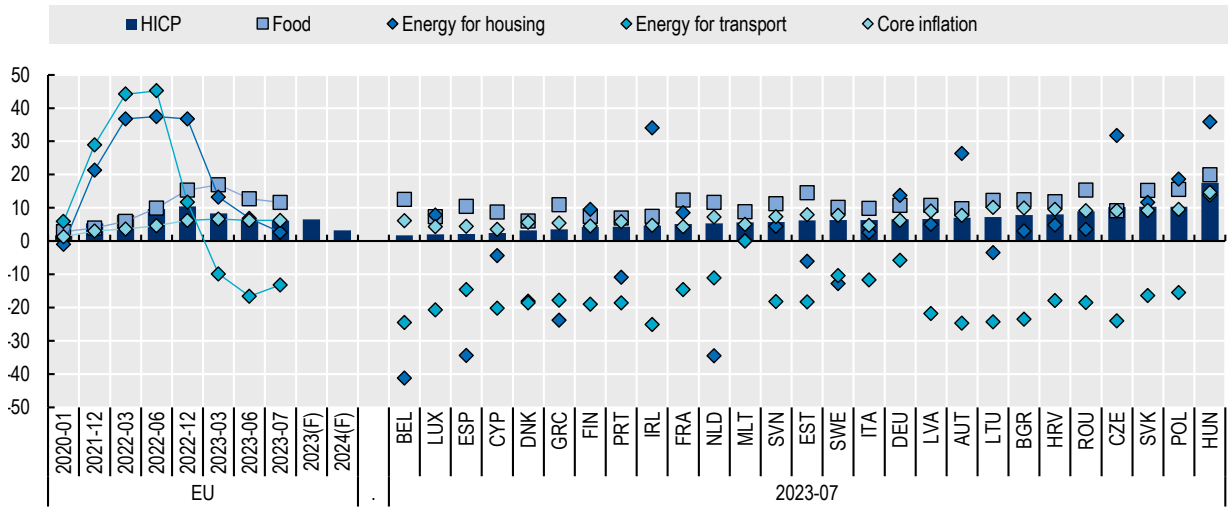
[5] The ECB defines "base effect" as "the contribution to the change in the year-on-year inflation rate in a particular month that stems from a deviation of the month-on-month rate of change in the base month (i.e. the same month one year earlier) from the usual seasonal pattern" (European Central Bank, 2007[67]).

[6] Higher food prices arose from restrictions on exports from Russia or Ukraine and were exacerbated by higher costs for agricultural inputs such as fertiliser (Alexander et al., 2022[70]). While global food prices have dropped considerably since their peak in March 2022 (FAO, 2023[64]), a recent study suggests that global food prices have a weak impact on domestic retail food prices (Kohlscheen, 2022[69]). Adverse climate conditions resulted in reduced crop yields in Europe in 2022 (Baruth et al., 2022[65]). Core inflation has not yet matched the decline in headline inflation, as strong cost pressures and higher profits in some sectors are still pushing prices up (OECD, 2023[23]; Hansen, Toscani and Zhou, 2023[61]).

Summer 2023 Economic Forecast, headline inflation in the EU is forecast to decrease from 9.2% in 2022 to 6.5% in 2023 and 3.2% in 2024[7]. In the latest OECD Economic Outlook (September 2023), headline inflation for the euro area is forecast at 5.52% in 2023 and 2.96% in 2024 (OECD, 2023[24])[8]. Headline inflation for G20 advanced economies is projected to fall from 6.37% in 2022, to 4.49% in 2023 and 2.64% in 2024 (OECD, 2023[24]).

Figure 2.1. Inflation surged in 2022 as energy and food prices soared

Year-on-year inflation, selected months for EU average and July 2023 for EU Member States



Note: (F) Forecast.
Source: Eurostat (2023[25]), HICP Database; European Commission (2023[26]), European Economic Forecast Summer 2023.

Purchasing power has fallen as inflation outpaced wages and incomes

Household purchasing power has eroded, as wages failed to keep up with increasing prices. Nominal wages have grown below inflation since the last quarter of 2021 (Figure 2.2). In the fourth quarter of 2022, nominal wages increased by 6.5%, while inflation rose by 11.6% on average across the 15 EU Member States for which household disposable income data are available. With inflation expected to remain well above the ECB target (European Commission, 2023[26]; ECB, 2023[27]; OECD, 2023[23]), wage demands may attempt to recoup purchasing power losses without de-anchoring longer-term inflation expectations (OECD, 2022[9]). Most countries with available data experienced a year-on-year decrease in real wages in the fourth quarter of 2022, except Bulgaria, where real wages increased by almost 6 percentage points and Romania, where it increased by almost 1.5 percentage points. Nominal wages increased around 10 percentage points below inflation in the Czech Republic, Estonia, Latvia, Lithuania and the Slovak Republic. In some countries, rising nominal wages pushed workers into higher tax brackets

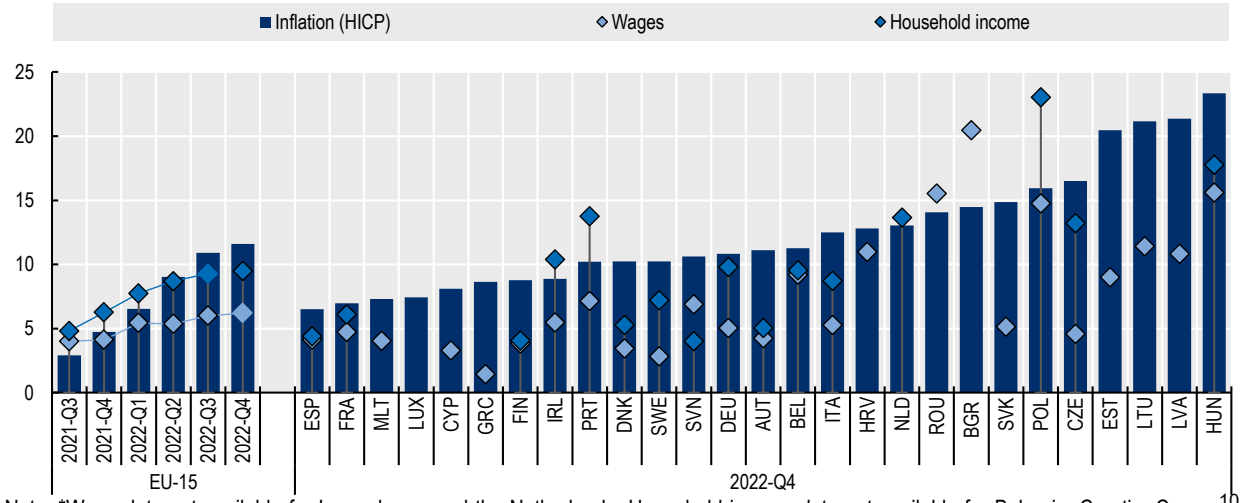
[7] These estimates are slightly different from the Spring 2023 Economic Forecast, which predicted rates of 6.7% and 3.1% for 2023 and 2024, respectively (European Commission, 2023[26]).

[8] In the previous version (June 2023), forecasted rates were 5.79% and 3.2% for 2023 and 2024, respectively (OECD, 2023[23]).

and reduced their eligibility for tax credits and cash benefits, resulting in a double blow, particularly for low-income households with children[9] (OECD, 2023[28]).

Figure 2.2. Inflation outpaced wage and household income growth in 2022

Quarterly year-on-year growth of prices (inflation), nominal wages (labour compensation) and household income, selected quarters for EU average* (unweighted) and fourth quarter 2022 for EU Member States



Note: *Wage data not available for Luxembourg and the Netherlands. Household income data not available for Bulgaria, Croatia, Cyprus[10], Estonia, Greece, Latvia, Lithuania, Luxembourg, Malta, Romania and Slovak Republic. Nominal gross disposable household income (GDHI) per capita calculated from real GDHI per capita and HICP.
Source: OECD (2023[29]), Household disposable income (indicator); Eurostat (2023[25]), HICP Database; OECD (2023[30]), Unit labour costs and labour productivity (employment based), Total economy: Labour compensation per employed person.

Real household disposable income has also been eroded by inflation, although not as severely as wages. This partly reflects an increase in employment, the rollout of income support measures,[11] and a

[9] According to the OECD, the tax wedge increased in most OECD Member countries between 2021 and 2022, with the largest increases seen for households with children, particularly at lower income levels. The results underline the importance of policies to mitigate "fiscal drag", where tax burden increases due to incomplete adaptation of tax system parameters to inflation (OECD, 2023[28]).

[10] Note by the Republic of Türkiye

The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Türkiye recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Türkiye shall preserve its position concerning the "Cyprus issue".

Note by all the European Union Member States of the OECD and the European Union

The Republic of Cyprus is recognised by all members of the United Nations with the exception of Türkiye. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

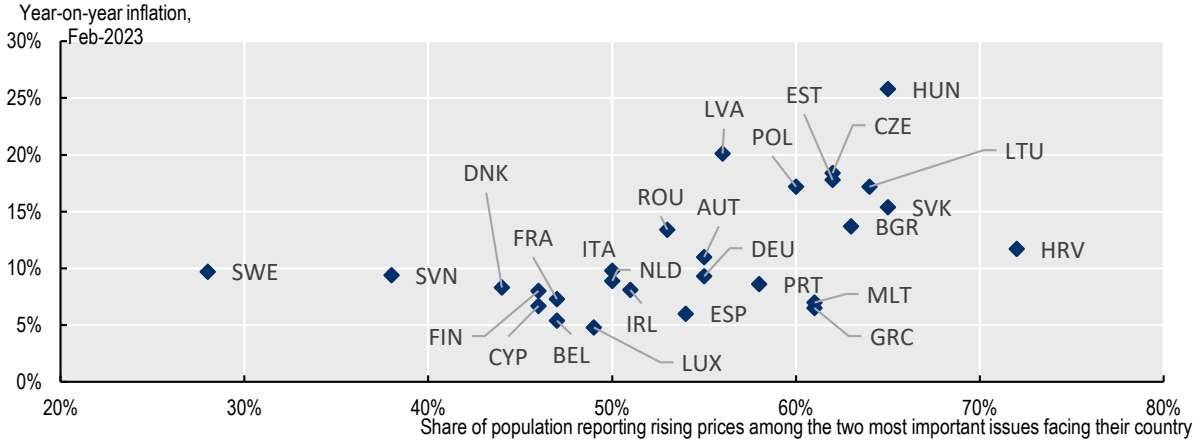
[11] In 2022, transfers to low-income households to offset high energy prices were likely to compensate the impact of inflation only partially (European Commission, 2022[68]).

considerable rise in self-employment and capital income.[12] In the second quarter of 2022, inflation outpaced quarterly year-on-year changes in nominal household disposable income per capita. In the fourth quarter of 2022, real household disposable income per capita grew in several countries compared to the previous quarter, yet real household disposable income per capita fell compared to the same quarter the previous year (OECD, 2023[31]). Real household disposable income per capita fell by 2.1 percentage points on a year-on-year basis on average across the 15 EU Member States for which data are available (Figure 2.2). Ireland, the Netherlands, Poland and Portugal were the only Member States in which real household disposable income grew in the fourth quarter of 2022 (OECD, 2023[29]). Between the fourth quarter of 2021 and of 2022, real household disposable income fell by more than 5% in Austria and Slovenia.

Inflation is perceived as one of the main challenges facing the EU and its Member States. According to an early 2023 Eurobarometer survey[13], one-third of the EU population considers inflation one of the two most important issues facing the EU, a higher proportion than for any other issue. The level of concern is even higher at national level: in 19 Member States, more than half of the national population considers inflation one of the two most important issues facing their country (Figure 2.3). In 22 countries, people point to inflation as the challenge they are most concerned about. The level of concern tends to be somewhat higher in countries facing higher inflation rates. According to new data from the OECD Risks that Matter survey,[14] 9 out of 10 working-age (18-64) respondents across 27 OECD member countries are somewhat or very concerned about inflation and costs of living in their country (Frey et al., 2023[32]).

Figure 2.3. Serious concerns about inflation in EU Member States

Proportion of population reporting rising prices/inflation/cost of living in the top two most important issues facing their country, plotted against actual year-on-year inflation, February 2023



Source: Eurostat (2023[25]), *HICP – Database*; Eurobarometer (2023[33])

[12] According to (Eurostat, 2023[66]), gross operating surplus and mixed income increased 11% between the fourth quarters of 2021 and 2022 in the 27 EU Member States (EU-27). Wages and salaries increased by 7% in the same period.

[13] Survey fieldwork conducted in January and February 2023.

[14] The OECD Risks that Matter survey was first conducted in spring and autumn 2018, covering 18-70-year-olds in 21 countries. The second wave was from September-October 2020, covering 18-65-year-olds in 25 OECD member countries, and the third wave ran from October-December 2022, including 18-65-year-olds from 27 countries. The countries participating in the latest wave were Austria, Belgium, Canada, Chile, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Israel, Italy, Korea, Latvia, Lithuania, Mexico, the Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Switzerland, Turkey, the United Kingdom (UK) and the US.

The inflationary wave is affecting people's ability to manage financially. Nearly half (47%) of the OECD Risks that Matter survey respondents report being somewhat or very concerned about their ability to pay for all four of the essential spending categories: food, housing costs, energy, and servicing debt (OECD, 2023[34]). Menyhért (2022[16]) notes that, since early 2021, inflation would have (in absence of mitigation measures) increased material and social deprivation and absolute monetary poverty in the EU by about 2 and 5 percentage points, respectively, on average. The negative welfare effects of inflation are far larger in many Central and Eastern European Member States, reflecting differences in both pre-existing deprivation patterns and the size of living cost adjustments.

Beyond its direct impact on people's material conditions, **high and sustained inflation poses a threat to current and future well-being**. Qualitative evidence from national studies suggests that the financial strain of rising living costs takes a toll on the mental and physical health of the most vulnerable, including affecting their relationships (Carnegie UK, 2023[35]). Forthcoming OECD work on well-being and mental health (OECD, 2023[36]) suggests that inflation is associated with lower life satisfaction (Dolan, Peasgood and White, 2008[37]), with larger declines for lower-income households (Prati, 2022[38]). From a longer-term perspective, the current high inflation scenario could weaken equal opportunities and impede social mobility by putting pressure on the ability of lower and middle-income classes to invest in their children's futures (APA, 2022[39]; Citroner, 2022[40]).

3 Inflation indices ignore the diversity of household consumption patterns

Inflation indices do not account for the variety of household consumption patterns in the population. They aim to measure price changes for the overall economy, based on a basket of goods and services deemed representative of consumption at an aggregate level (Box 3.1; Annex A). However, the composition of that basket may differ considerably from the goods and services actually consumed by each household, given the differences in their preferences, financial means and other circumstances. While an overall measure of the inflation rate is useful for computing overall real income or consumption, it hides variance that may be important for their distributional analysis.

Household consumption patterns vary significantly within and between countries, as well as across population groups. Using microdata on household consumption spending from the European Household Budget Survey (EU-HBS) 2015, this section shows the varied composition of households' baskets of goods and services. It presents the budget shares of selected consumption categories (food, energy for housing, energy for transport, other goods and services) across countries, within the population of each country, and across specific population characteristics (income, area of residence, sex, age, education, employment status, household type and country of birth).

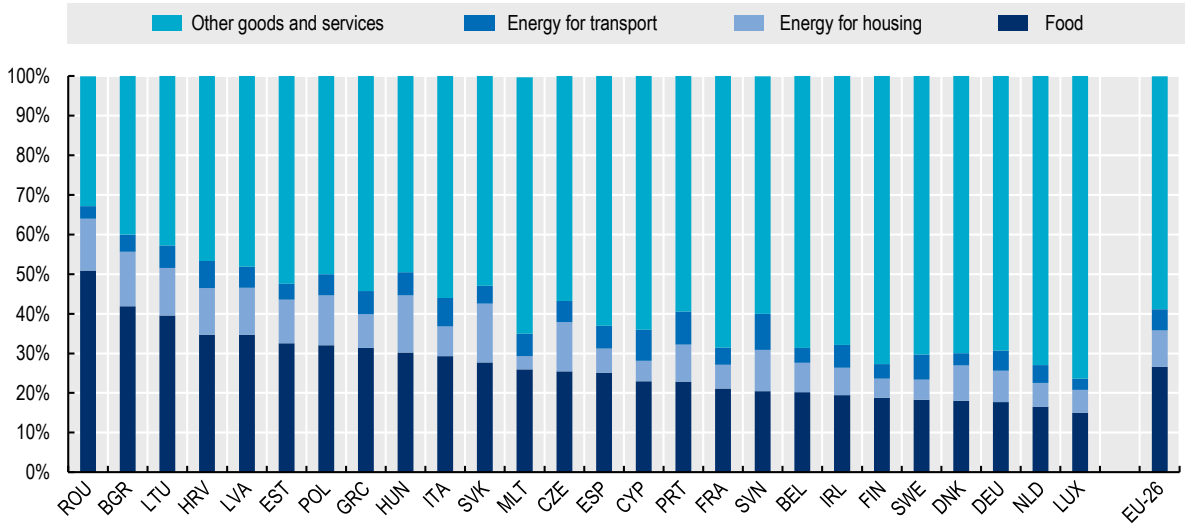
Consumption patterns vary significantly across households

Consumption patterns are quite different across EU Member States. Figure 3.1 shows the average composition of household expenditure on four main consumption categories – food, energy for housing, energy for transport, and other goods and services.[15] Across the EU Member States, on average, households spend 27% of their budget on food, 10% on energy for housing, 5% on energy for transport, and 58% on other goods and services. However, these shares vary considerably across countries. The budget share of food is higher in lower-income countries, reaching 51% in Romania and 42% in Bulgaria, compared to 15% in Luxembourg and 17% in the Netherlands. The budget share of energy for housing also tends to be higher in lower-income countries, at 10% or more in Central and Eastern European countries, compared to 5% in Finland and Sweden. By contrast, the budget share of other goods and services tends to be considerably higher in higher-income countries, accounting for more than 70% in Nordic countries, Germany, Luxembourg and the Netherlands, compared to less than 50% in lower-income countries such as Bulgaria, Croatia, Latvia, Lithuania and Romania.

[15] The consumption category "other goods and services" accounts for all expenditure except food and energy and is the base for the calculation of "core inflation" described in Section 1.2.

Figure 3.1. Consumption patterns vary across countries

Average composition of household expenditure, by four main consumption categories and country



Note: Includes all EU Member States except Austria.
Source: Authors' calculations, based on EU-HBS 2015.

Box 3.1. Household consumption patterns in inflation indices and household budget surveys

Consumption patterns in consumer price indices CPI and HICP

Inflation indices measure changes in prices of a basket of goods and services, which represents the aggregate expenditure of consumers in the economy. The baskets of goods and services used in the CPI and HICP follow the Classification of Individual Consumption according to Purpose (COICOP), which defines and classifies each expenditure item (good or service) considered in calculating the index. The contribution of each item to measuring inflation is determined by weights that represent the share of each item, or group of items, in relation to the total monetary cost of the basket. However, the two indices select different items in their baskets and use different weights. While national CPIs use country-specific approaches to select items and compute their weights, the HICP uses the same basket of goods and services and the same method to compute weights across countries in order to ensure comparability. However, the values of HICP weights at national level are not necessarily the same, as they are measured to be nationally representative and to reflect differences in consumption patterns (ECB, 2023[41]).

There are some additional differences between national CPIs and the HICP. Most European CPIs take a national approach, using all expenditure by residents (including abroad), while the HICP uses a domestic approach, using all expenditure in the country (including by non-residents).

HICP excludes owner-occupied housing costs, thereby seriously underestimating the weight of housing in consumption (Cournède, 2005[42]). In addition to creating a downward bias on the measured consumption share of housing and an upward bias in others, this peculiar feature of the HICP distorts

cross-country comparisons, as the rate of home ownership varies substantially across EU Member States (Eiglsperger et al., 2022[43]).[16]

In several countries, the weights in the CPI are primarily based on the structure of consumption according to HBS data. The HICP, by contrast, adjusts item weights with data from national accounts where possible. In Spain, for example, the 2023 weight for "restaurants and hotels" is 13.238% in the CPI and 14.235% in the HICP. As a result, the level of inflation varies depending on the index used. In February 2023, for instance, year-on-year inflation in Spain was 6% according to the CPI and 6.5% according to the HICP.

Statistical variation in household expenditure can be as high within countries as between countries. In most Member States, the difference in the budget share on food between the top and bottom 5% (i.e. 5th and 95th percentile of budget share on food) is larger than the mean difference (36 percentage points) between Romania and Luxembourg, which have the largest and lowest average budget share on food, respectively (Figure 3.2, Panel A).[17] In all countries, the differences between the top and bottom 5% are larger than the median budget share on food.[18] Accordingly, the difference tends to be higher in countries with a larger median.[19] There are notable exceptions: in France, for example, the bottom 5% has the lowest budget share on food (2%) among all countries, despite its moderate median (20%).

[16] Some countries include owner-occupied housing costs in their CPI, but approaches differ considerably from country to country (OECD, 2022[71]; Eurostat, 2017[72]).

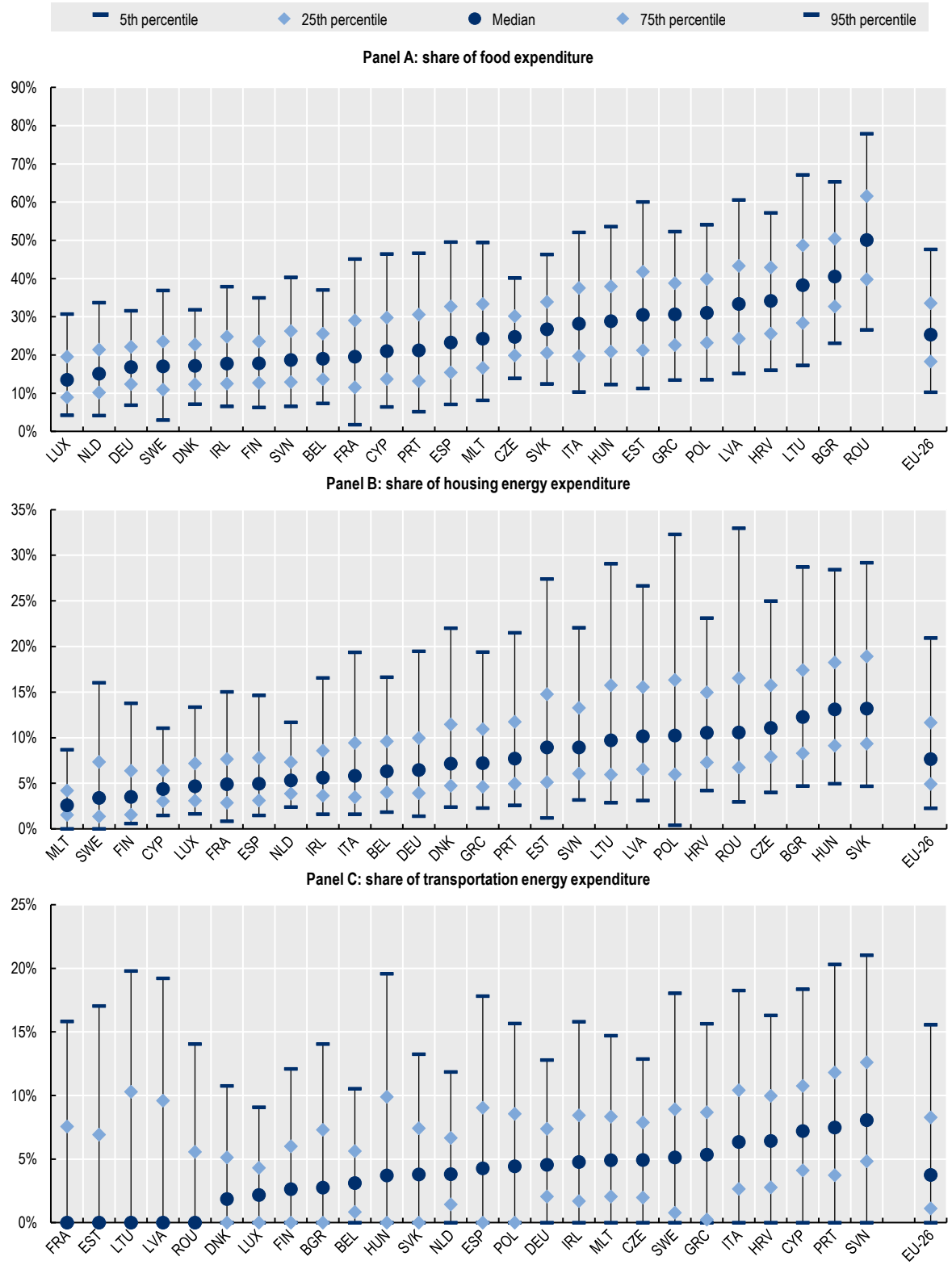
[17] Across EU Member States, the average difference in the budget share on food between the top and bottom 5% is 37.4 percentage points (10.2% for the bottom 5% and 47.6% for the top 5%). The difference between the median budget share on food in Romania and Luxembourg is 36.5 percentage points (13.5% in Luxembourg and 50% in Romania).

[18] In Germany, for example, the top 5% spends 31.6% of their budget on food, while the bottom 5% spends 6.9%. This 24.7 percentage points difference is higher than the median budget share on food, at 16.8%.

[19] In Romania, which has the largest median budget share on food, the difference between the top and bottom 5% is 51.3 percentage points.

Figure 3.2. Consumption patterns within countries are scattered

Distribution of budget share of selected consumption categories across EU Member States



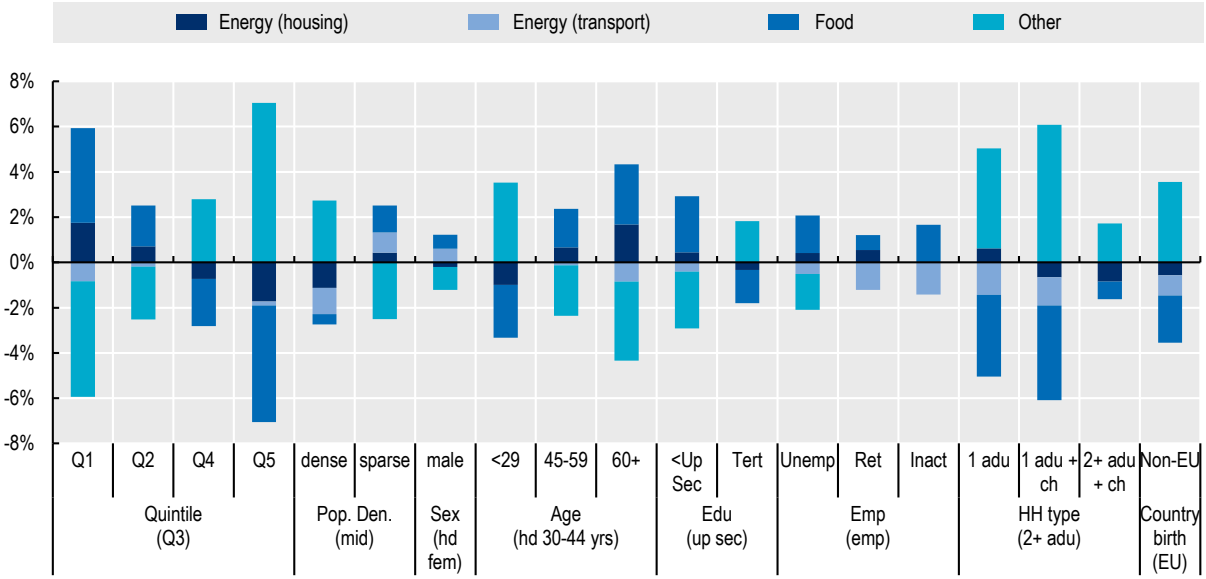
Note: In each panel, the percentiles refer to the budget share distribution of the consumption category in the country. Countries are ranked in ascending order of the median budget share of the relevant consumption category.
Source: Authors' calculations, based on EU-HBS 2015.

The distribution of the budget share on energy for housing and for transport varies substantially within countries. Energy for housing accounts for 2% of the budget of the bottom 5% (i.e. those spending the lowest share on housing energy) and for 21% of the top 5%, on average (Figure 3.2, Panel B). Poland has the largest difference between the bottom and top 5%, ranging from less than 1% to almost one-third, respectively. The distribution of spending on transport energy is quite different from the other consumption categories analysed. In all countries, significant shares of the population do not spend at all on transport energy (Figure 3.2, Panel C), including at least 5% of the population in all countries, at least one-quarter of the population in thirteen countries, and at least half of the population in Estonia, France, Latvia, Lithuania and Romania.

Consumption patterns differ considerably by group. Figure 3.3 shows how consumption patterns vary across income and population groups. With all other things equal, lower-income households spend 4.2 percentage points more on food and 1.8 percentage points more on domestic energy than middle-income households. By contrast, higher-income households spend proportionally less on food (-5.2 percentage points) and domestic energy (-1.7 percentage points) and 7 percentage points more on other goods and services. Similarly, households living in sparsely populated areas spend about 2 percentage points more on food, domestic energy and transport energy than households living in densely populated areas. Households headed by older people (60+) spend almost 3 percentage points more on food and almost 2 percentage points more on domestic energy, while households headed by younger people (<29) spend 3.5 percentage points more on other goods and services. Households headed by people with lower than upper secondary education spend a larger share of their budget on food (2.5 percentage points) and 2.5 percentage points less on other goods and services.

Figure 3.3. Consumption patterns vary by income and population group

Mean percentage point differences in the expenditure share of energy for housing, energy for transport, food, and other goods and services by household characteristics, EU Member States



Note: Conditional mean percentage point differences in expenditure share of energy for housing, energy for transport, food, and other goods and services obtained from Ordinary Least Squares (OLS) (population-weighted) regression of budget shares on household characteristics (income quintile, population density in area of residence, sex of head of household, age of head of household, education level of head of household, employment status of head of household, household type, country of birth) and country dummies. The reference categories are in brackets (Q3: middle (third) income quintile; mid: intermediate population density; hd fem: female-headed household; hd 30-44 yrs: household headed by person aged 30-44; up sec: household headed by person with upper secondary education; emp: household headed by employee). Estimates presented in this figure are statistically significant at 1% level. Data for all EU Member States except Austria.
Source: Authors' calculations, based on EU-HBS 2015.

4 High inflation is spread unevenly across households

The effective inflation level experienced by a household can differ significantly from that expressed by inflation indices and can vary significantly across households. Several studies have found that many households experience effective inflation levels substantially above or below official inflation indices. While some of these studies suggest that inflation dispersion increases when inflation is high (Crawford and Smith, 2002[6]; Brauny and Leinz, 2020[44]), others have not found a strong association between inflation dispersion and level of inflation (Hobijn and Lagakos, 2005[45]; Kaplan and Schulhofer-Wohl, 2017[1]).

Lower-income households tend to face higher effective inflation. Several studies have found higher effective inflation levels among lower-income households in European countries (Gürer and Weichenrieder, 2020[46]), Australia (Kints and Breunig, 2020[47]) and the United States (US) (Argente and Lee, 2020[48]; Klick and Stockburger, 2021[49]). Possible drivers include limited access to bulk discounts and temporary sales (Orhun and Palazzolo, 2019[50]), consumption of items that are less exposed to product innovation (Jaravel, 2018[51]), and reduced ability to substitute lower-quality products or change shopping behaviour (Argente and Lee, 2020[48]).

Recent studies indicate that lower-income households were hit harder by the rise in inflation in 2022, albeit with considerable cross-country variation (Causa et al., 2022[13]; Charalampakis et al., 2022[14]; Claeys, McCaffrey and Welslau, 2022[15]; Villani and Vidal Lorda, 2022[18]; European Commission, 2022[52]; European Commission, 2022[53]). Using microdata from the EU-HBS 2015 and annual HICP inflation data, Menyhért (2022[16]) found that lower-income households experienced above-average inflation, particularly in Central and Eastern European countries, and that the inflation gap between lower-income and higher-income households was driven mainly by energy and food prices. Similarly, Sologon et al. (2022[17]) broke down the distributional and welfare impact of price changes for a subset of European countries and found cross-country variability in inflation levels, composition, and relative rates across population groups. The distributional impact was moderate but significant.

Population characteristics other than income impact effective inflation. Studies have shown that the region or type of area of residence (Kaplan and Schulhofer-Wohl, 2017[1]; Causa et al., 2022[13]), household size (Kaplan and Schulhofer-Wohl, 2017[1]), and age of the head-of-household (Kaplan and Schulhofer-Wohl, 2017[1]) can all affect effective inflation. Similarly, Menyhért (2022[16]) found that consumption patterns in food, energy, and non-energy industrial goods and services vary significantly depending on population density, age, household size, and household composition.

This section provides new evidence on the distributive impact of recent high inflation in EU Member States, including more recent results, additional layers of granularity, detail and temporality. Instead of computing inflation rates by population groups defined by a common characteristic (e.g. income level), the analysis computes effective inflation rates at household level, allowing inflation dispersion to be measured and accounting for the simultaneous effect of multiple household characteristics. This approach provides a more accurate assessment of the impact of inflation on different household types. By using a detailed breakdown of expenditure data, effective inflation rates are calculated with greater precision, as they account for variations in relative prices within main expenditure categories (Box 4.1). Temporality is also considered by replicating results at different points in time, facilitating identification of the contribution

of price levels and dynamics on the distribution of effective inflation over time, and by providing an assessment of the cumulative level of inflation experienced by different household types since January 2020.

Household effective inflation is measured using the standard approach in the literature (Hagemann, 1982[19]; Crawford and Smith, 2002[6]; Menyhért, 2022[16]; Cusset and Trannoy, 2023[20]). Focusing on differences in household consumption patterns, it combines microdata from HBSs with price indicators for a detailed list of goods and services (Box 4.1). However, this approach does not measure changes in living standards, as it does not account for behavioural responses, such as households adjusting their consumption patterns in response to price changes. Although not accounting for substitution effects may overstate the impact of inflation on the cost of living, existing estimates of demand substitution due to recent prices hikes are relatively small, as the biggest price increases initially affected essential goods, which are, by definition, price inelastic (Sologon et al., 2022[17]). Other inflation-related factors that may influence the living standards of households are differences in product prices, product quality,[20] shopping behaviour, and quality/new goods bias[21] (Argente and Lee, 2020[48]; Kaplan and Schulhofer-Wohl, 2017[1]; Manser and McDonald, 1988[54]). These may differ across population and income groups. The analysis does not account for recent developments in wages (OECD, 2022[8]; European Commission, 2022[55]), incomes (OECD, 2022[10]; OECD, 2022[11]) and savings, nor for government income support measures, all of which impact on households' living standards. Finally, the analysis is based on EU-HBS 2015 and so does not reflect potential changes in consumption patterns in the medium term, for instance due to the COVID-19 crisis. However, these changes in consumption patterns do not meaningfully affect the inflation estimates or the conclusions (Box 4.2).

[20] In the United Kingdom, there has been a campaign to account for quality issues and changes in pricing structures for consumer goods that are relevant to poor people and are not adequately covered in official indices. One supermarket response to inflationary pressures in the United Kingdom was to discontinue own brand products, forcing people to switch to branded (more expensive) goods. Such changes may not be captured by official inflation indicators, understating actual changes in the cost of living of lower-income households (Financial Times, 2022[77]).

[21] The quality/new goods bias refers to the fact that baskets of goods and services do not account for changes in the quality of existing goods and services or the invention of new goods and services. This bias takes place when baskets are fixed or their updates are insufficiently prompt to account for these changes.

Box 4.1. Measuring household effective inflation

Many studies have measured the effective inflation rate experienced by different population groups based on their average consumption baskets (Causa et al., 2022[13]; Charalampakis et al., 2022[14]; Claeys, McCaffrey and Welslau, 2022[15]; Klick and Stockburger, 2021[49]). The advantage of this approach is its simplicity, as it only requires tabulated statistics that can be easily obtained and processed. However, it does not control for the interplay of different household characteristics (e.g. between household income and the level of education of the head-of-household), nor does it account for differences within each population group.

Conversely, the household effective inflation rates used here measure the price changes of goods and services for each observation of a sample of thousands of households that is representative of the population. This approach provides a high level of granularity that can improve measurement precision and account for multiple and overlapping population groups and their within/between diversity. It not only computes the average inflation of population groups, but also its diversity, measured as the share of population whose household effective inflation levels diverge from the average (Figure 4.4). It also accounts for differences across socioeconomic characteristics (e.g. household income, place of residence, age) (Figure 4.7) and for changes in relative prices (Figure 4.6).

Computations require two different data sources of data: i) microdata on household expenditure from EU-HBS 2015, and ii) indicators of price changes from the HICP. EU-HBS expenditure and HICP price changes are used at COICOP level 3 (e.g. food and non-alcoholic beverages are measured at the level of "bread and cereals"[22]), except for "recreation and culture", "education" and "miscellaneous goods and services", each of which is measured at level 1 (the most aggregate level).[23] In total, 74 different expenditure categories are used and differences in prices within the main expenditure categories are considered, allowing for a more accurate calculation of effective inflation rates. For example, instead of computing effective inflation based on the average price of all food items, this approach accounts for variation across nine food categories.[24]

[22] In addition to "bread and cereals", "food and non-alcoholic beverages" also includes: "meat", "fish and seafood", "milk, cheese and eggs", "oils and fats", "fruit", "vegetables", "sugar, jam, honey, chocolate and confectionery", "food products n.e.c.".

[23] Estonia, Germany and Sweden: due to missing data in most categories, all weights are computed based on COICOP level 1, except for data on "housing, water, electricity, gas and other fuels", which is disaggregated between "actual rentals for housing", "maintenance and repair of the dwelling". "water supply and miscellaneous services relating to the dwelling" and "electricity, gas and other fuels". Transport is also disaggregated between "purchase of vehicles", "operation of personal transport equipment" and "transport services". "Operation of personal transport equipment" is broken down into "fuels and lubricants for personal transport equipment" and "other".

[24] In February 2023, year-on-year food inflation was 19.5% on aggregate across EU Member States. Year-on-year inflation across the nine food sub-categories varied: bread and cereals – 20.8%; meat – 17.3%; fish and seafood – 14.6%; milk, cheese and eggs – 28.4%; oils and fats – 27.2%; fruit – 10%; vegetables – 19.1%; sugar, jam, honey, chocolate and confectionery – 18.4%; food products n.e.c – 19.3% (Eurostat, 2023[25]).

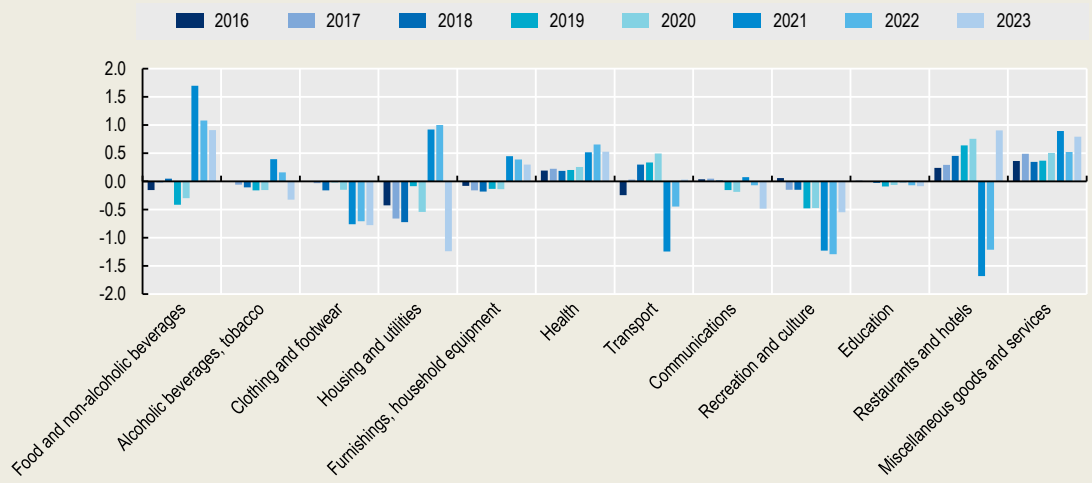
Box 4.2. EU-HBS 2015 and national surveys

Compiled by Eurostat, the EU-HBS is a harmonised version of the HBSs produced by national statistical offices. These surveys collect detailed expenditure data from a sample of households that is representative of each country population at national and sub-national level (Eurostat, 2023[56]). Household effective inflation (Box 4.1) is measured using the most recent EU-HBS microdata (2015). Data at the aggregate level are available for 2020 on Eurostat's website (Eurostat, 2023[57]). While more recent data would have been preferable, historically the structure of household expenditure tends to be relatively stable over time, suggesting that the 2015 data are adequate to analyse the current period (Figure 4.1). In many countries, the most recent data refer to 2020 and 2021, two years where consumption patterns were severely affected by the COVID-19 pandemic and related lockdowns.

Every year Eurostat updates the composition (item weights) of the basket of goods and services that represents the consumption pattern of the previous year and is used to calculate the HICP for each country (Eurostat, 2023[25]). Between 2016 and 2020, most expenditure categories remained around or below 1 percentage point of the 2015 consumption structure. In 2021 and 2022, weights changed considerably for items such as food, clothing, housing, transport, recreation, and restaurants. In 2023, some item weights have bounced back to pre-COVID-19 levels, while others have not.[25]

Figure 4.1. Household consumption patterns were quite stable before COVID-19

Percentage point change in the structure of consumption expenditure by COICOP consumption purpose, 2016 and 2023 (compared to 2015), EU



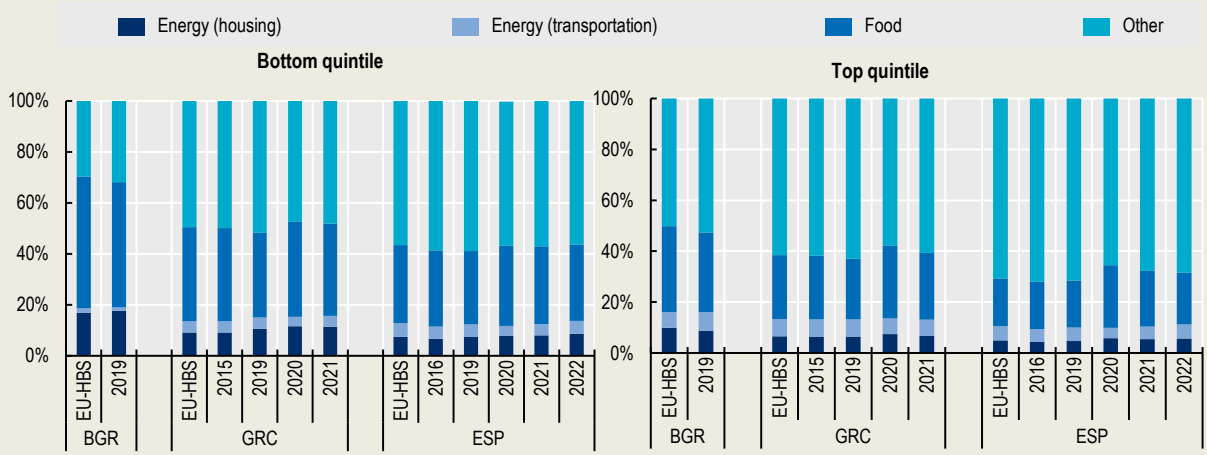
Note: "Alcoholic beverages and tobacco" includes narcotics; "housing and utilities" includes housing, water, electricity, gas and fuels; "furnishings, household equipment" includes routine household maintenance.
Source: Authors' calculations, based on (Eurostat, 2023[25]), HICP Database.

Figure 4.2 compares the structure of consumption expenditure of the top and bottom income quintiles in Bulgaria, Greece and Spain, using data from EU-HBS 2015 and more recent national surveys. Up to 2019, the four categories of expenditure remained stable, apart from a decrease of 3 percentage points in the share of food expenditure for the bottom quintile in Greece. Following the COVID-19 crisis, the share of food expenditure in Greece and Spain increased substantially in 2020 (by up to 5 percentage points), while energy for transportation and other expenditure decreased. In 2021, although the impact of the pandemic was not as large, consumption patterns had not yet returned to what they were in 2019.

Recent data for Spain (2022) show a strong increase in expenditure on categories such as transport (CP07), recreation, sport and culture (CP09), and restaurants and accommodation (CP11), bringing the consumption structure closer to that of 2019.

Figure 4.2. Although COVID-19 altered consumption patterns, early signs point to a reversal to pre-pandemic numbers

Share of expenditure, by category, bottom and top quintiles of disposable income



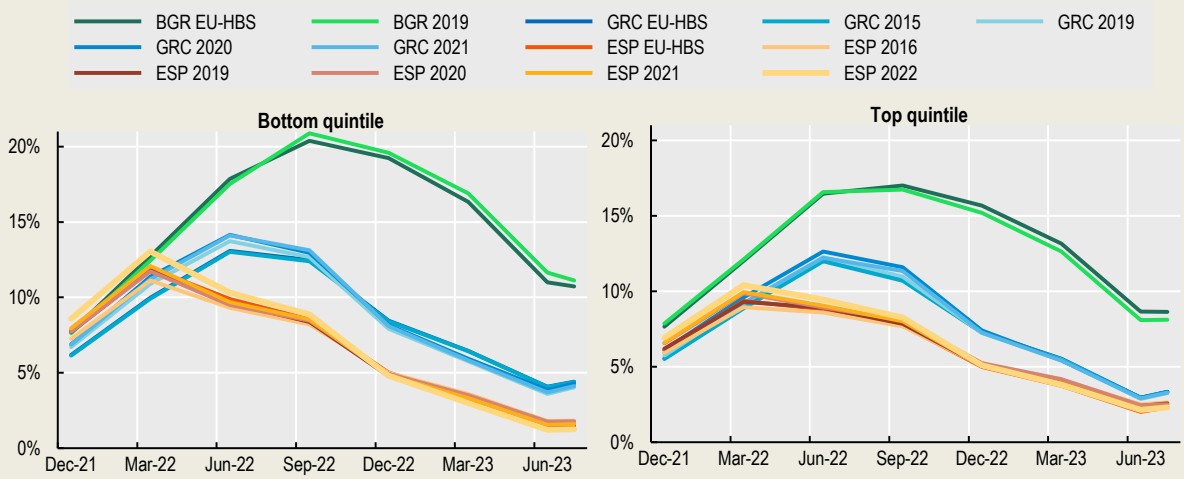
Note: A small number of observations (≤0.5% in any year) in Greece's national HBS were excluded when calculating income quintiles due to missing values for monetary income.
Source: Authors' calculations based on EU-HBS and national surveys for Bulgaria (National Statistical Institute (NSI) HBS), Greece (Hellenic Statistical Authority (ELSTAT) HBS), and Spain (National Statistics Institute (INE) *Encuesta de Presupuestos Familiares (EPF)*).

Despite these slight differences in consumption over time, effective inflation estimates lead to similar conclusions irrespective of the survey and year used. Figure 4.3 shows that results are consistent when using either EU-HBS 2015 or a more recent national survey. The largest differences are found in March 2022 in Spain, where the bottom quintile's 12-month inflation rate estimates range from 11% (EPF 2016) to 13% (EPF 2022), a 1.9 percentage point difference. This does not, however, strongly affect the spread between high-income and low-income inflation rates: while rates are 2.2 percentage points higher for the bottom quintile when using EPF 2016, the differential is 2.6 percentage points based on EPF 2022, only a 0.4 percentage point difference.

[25] See Claeys and Guetta-Jeanrenaud (2021[74]) for a discussion of how COVID-19 has affected inflation measurement in the euro area.

Figure 4.3. Effective inflation estimates do not change significantly with more recent data

Average effective inflation rates for the top and bottom quintiles of disposable income, December 2021 to July 2023



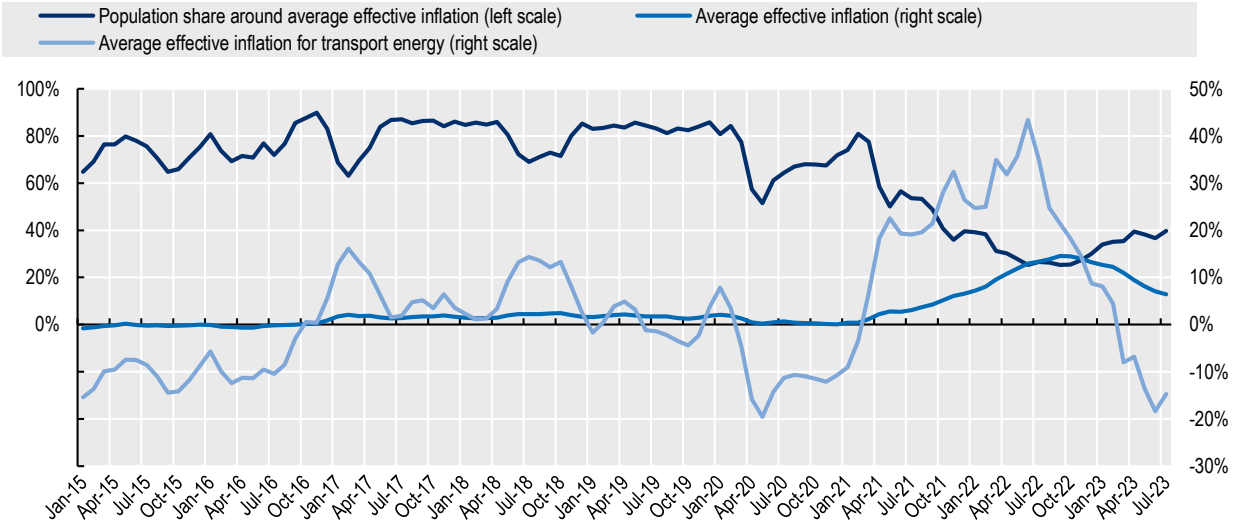
Note: A small number of observations (≤0.5% in any year) in Greece's national HBS were excluded when calculating income quintiles, due to missing values for monetary income.
Source: Authors' calculations, based on EU-HBS and national surveys for Bulgaria (NSI Household Budget Survey), Greece (ELSTAT HBS), and Spain (INE *EPF*).

Differences in inflation levels between household have increased…

Since inflation surged, fewer people are experiencing effective inflation rates close to the average. In July 2023, across 26 EU Member States[26]on average, only 40% of the population lived in households with effective inflation rates within one percentage point around the average effective inflation (Figure 4.4; Box 4.1). This is compared to an average 80% of the population within 1 percentage point of average effective inflation between 2016 and 2020, when inflation was low and relatively stable. During that period, fluctuations in inflation dispersion seemed to be associated with variations in the price of transport energy, including during the COVID-19 outbreak, when fuel prices plummeted (Figure 4.4). Between May 2021 and June 2022, the decrease in the share of population close to the average also seemed to be associated with rising fuel prices. As the expenditure share on transport energy varies substantially within countries (Figure 3.2), shocks in fuel prices (which are more volatile than the overall inflation rate) tend to disproportionately affect households with high transport energy spending, whereas parts of the population that do not spend on fuel are sheltered from these direct effects. Since July 2022, however, differences in effective inflation rates between households remained high despite the sharp decline in fuel inflation, partly reflecting the rise in food prices (Figure 2.1).

Figure 4.4. Few households now experience inflation rates close to the average

Average effective inflation (for all items and for transport energy) and share of population in households outside 1 percentage point range from average effective inflation, January 2015-July 2023, EU

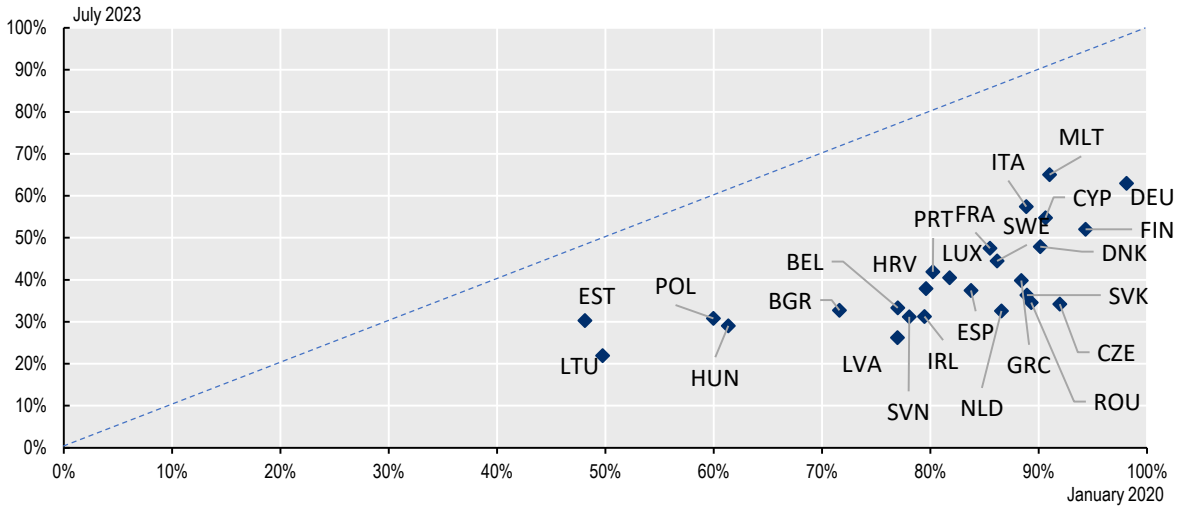


Note: Unweighted average for all EU Member States except Austria.
Source: Authors' calculations, based on EU-HBS 2015 and Eurostat (2023[25]), HICP Database.

Between January 2020 and July 2023, the share of the population experiencing effective inflation levels close to average inflation decreased in all EU Member States (Figure 4.5). In January 2020, at least half of the population had effective inflation rates within one percentage point of the national average, in all countries except Estonia. As of July 2023, Cyprus, Finland Germany, Italy and Malta are the only EU Member States in which at least half of the population have effective inflation rates close to the national average. In Hungary, Latvia and Lithuania, that proportion is below 30%. The largest reduction is evident in the Czech Republic, falling from 92% to 34%. In general, the share of households experiencing close to average inflation shows a greater decline in countries with higher levels of inflation, although the relationship is rather weak.

Figure 4.5. Household effective inflation dispersion has increased in all countries

Share of population in households within 1 percentage point range from average effective inflation, January 2020 and July 2023, EU



Note: All EU Member States except Austria. Countries below the 45-degree line have more inflation dispersion in July 2023 than in January 2020 (i.e. fewer people in households within 1 percentage point range from average effective inflation). Dispersion increases with distance below the 45-degree line.
Source: Authors' calculations, based on EU-HBS 2015 and Eurostat (2023[25]), HICP Database.

Figure 4.6 divides the distribution of effective inflation into five brackets, based on deviation from average inflation in the country. The inflation gap (the difference between average inflation in the bracket and average inflation in the country) is broken down by expenditure category and presented for a selection of months between January 2020 and July 2023. The middle bracket represents households whose effective inflation was within 1 percentage point of the average. The other brackets represent households whose effective inflation was slightly above/below the average (i.e. within 1 to 3 percentage points) or 'above/below the average (i.e. beyond 3 percentage points).

Energy for housing is the main contributor to effective inflation disparities. Since December 2021, energy for housing has been the largest source of inflation disparities for households above/below the average (Figure 4.6). In December 2022, energy for housing accounted for almost three-quarters of the inflation gap for households experiencing above-average inflation. Of an overall inflation gap of 6.1 percentage points, 4.4 percentage points corresponded to housing energy. The contribution of domestic energy to inflation disparities has fallen, as energy prices stopped increasing (or started reversing) in many countries in 2023.

Prices of energy for transport explained a large share of inflation disparities in the first half of 2022. Between December 2021 and June 2022, transport energy accounted for about 30% of the inflation gap for households above/below the average. Their contribution to inflation dispersion fell in the second half of 2022, as fuel prices decreased.

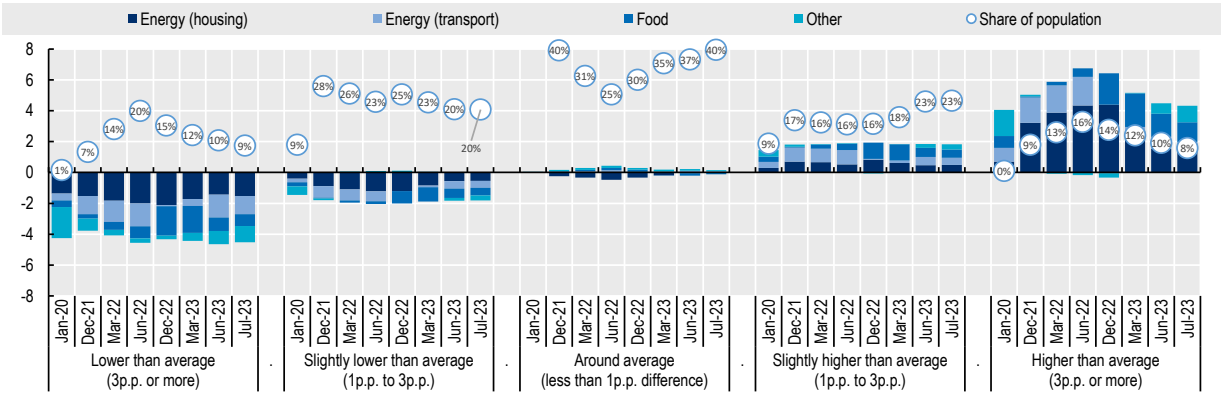
Food prices contributed significantly to inflation disparities since the second half of 2022, with their impact peaking in March 2023. In late 2022 and early 2023, food prices contributed almost 2 percentage points to the inflation gap of households above/below the average. As of July 2023, that contribution has fallen to less than one percentage point (0.8) for households below the average and slightly more than one percentage point (1.3) for households above the average.

The impact of prices of other goods and services on inflation disparities has strengthened in 2023. From the start of rising inflation in late 2021 until early 2023, other goods and services had a very limited

impact on household inflation differences. In recent months, however, their contribution has increased. As of July 2023, 1.1 percentage points of the difference of households above/below the inflation average is due to other goods and services.

Figure 4.6. Expenditure categories driving inflation dispersion have changed over time

Effective inflation difference (in percentage points), by expenditure category and share of population (boxes), January 2020-July 2023, EU



Note: Unweighted average for all EU Member States except Austria.
Reading note: In January 2020, 1% of the population lived in households whose inflation was lower than the average (effective inflation more than 3 percentage points below the average), by 4.3 percentage points (on average). Breaking down this difference into four expenditure groups, energy for housing accounts for 1.4 percentage point, energy for transport for 0.5 percentage points, food for 0.5 percentage points and other goods and services for 1.9 percentage points.
Source: Authors' calculations based on EU-HBS 2015 and Eurostat (2023[25]), HICP Database.

…harming disadvantaged groups more…

Effective inflation is higher among certain households, notably those with lower incomes and those headed by older/retired people or by less educated individuals. Figure 4.7 presents the association of household effective inflation (in July 2023) with household income and demographic characteristics for 26 EU Member States. To assess the robustness of these results and check for any potential bias produced by "base effects"[27] on year-on-year measures, inflation is assessed both as year-on-year price changes and as the price change accumulated since January 2020 (i.e. before the COVID-19 crisis).

In line with previous studies, **evidence suggests that high inflation is hardest on households ill-equipped to respond to the shock**. The cost of living increased more among households with limited resources (e.g. lower incomes, lower education), lower ability to adjust their consumption (e.g. living in sparsely populated areas, spending a higher share of their budget on essential goods and services), or lower capacity to rely on additional sources of income (e.g. older people, retired people).

All other things being equal, in July 2023, a household in the bottom 20% of the income distribution experienced a year-on-year effective inflation level that was one-third of a pp higher than that of a household in the top 20%.[28] Inflation was also inversely related to the age of the head-of-household, with

[27] The ECB defines "base effect" as "the contribution to the change in the year-on-year inflation rate in a particular month that stems from a deviation of the month-on-month rate of change in the base month (i.e. the same month one year earlier) from the usual seasonal pattern" (European Central Bank, 2007[67]).

[28] According to Figure 4.7, compared to a middle-income household, year-on-year inflation was 0.22 percentage points higher for households in the bottom 20% and 0.11 percentage points lower for households in the top 20%.

individuals in younger households experiencing year-on-year inflation that was 0.2 pp lower and those headed by people aged 60+ experiencing a rate 0.2 percentage point higher, compared to people in households headed by individuals aged 30-44. Inflation was also higher for households headed by people with less than upper secondary education (0.14 percentage point).

The cumulated inflation difference between lower-income and higher-income households was almost as much as the ECB inflation target for one year. On average across EU Member States, the cumulated inflation (January 2020 to July 2023) of someone in the bottom 20% was 1.73 percentage points higher than that of someone in the top 20%, close to the ECB inflation target of 2%.[29] Differences in effective inflation rates accumulated over time for most population groups. Figure 4.7 shows the same pattern between those most and least affected by inflation when inflation is measured over a longer period instead of on a year-on-year basis. The main exception was for population density: while the combined impact of inflation on people in densely populated areas was almost 1 percentage point lower than the reference group (areas of intermediate density), that effect was 0.16 percentage points higher in the 12 months to July 2023. Those in sparsely populated areas experienced cumulative inflation 0.35 percentage points higher than the reference group, while their 12-month rate was 0.23 percentage point lower (after controlling for other characteristics). Trends in cumulated inflation also differed from year-on-year inflation for single people,[30] single-parent households,[31] and households comprising two adults with children.

Overall, **effective inflation differences across population groups are relatively small compared to cross-country variations**. Results from OLS regressions of household effective inflation indicate that household characteristics explain a very small share of the variation in inflation rates at country level. Regressions have higher predictive power when country samples are pooled, although most of the heterogeneity is explained by national variations in inflation.[32]

[29] "The ECB's Governing Council, after concluding its strategy review in July 2021, considers that price stability is best maintained by aiming for 2% inflation over the medium term" (European Central Bank, 2023[62]).

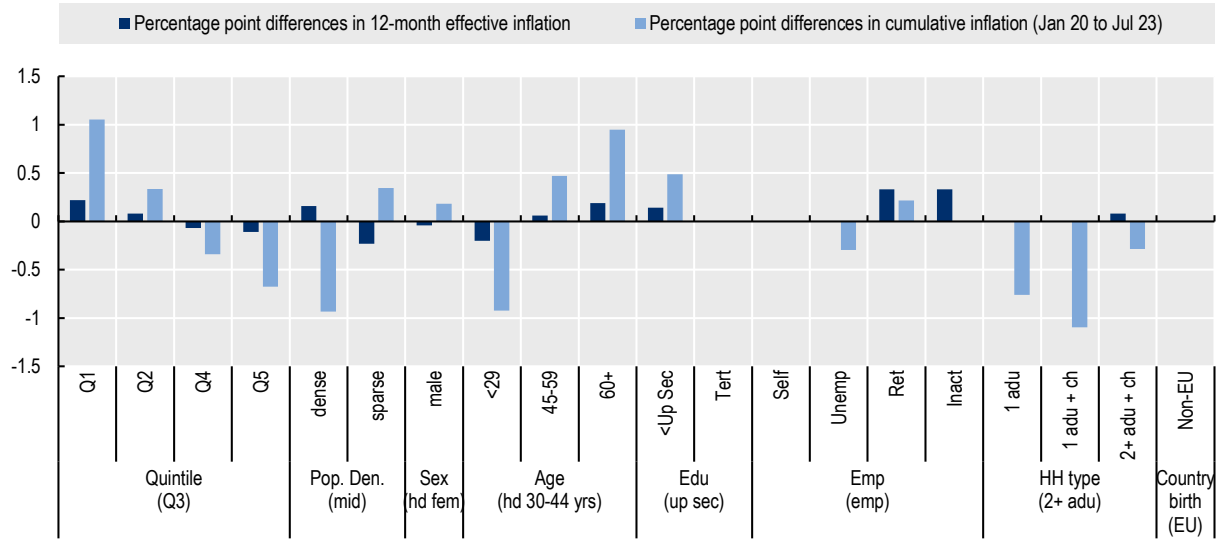
[30] On average, the gap to average effective inflation is positive among single-person households, mainly driven by housing energy. However, compared to couples without children and after controlling for other household characteristics, the inflation gap becomes negative. This reflects the considerable share of single-person households on low incomes and/or headed by people aged 60+.

[31] Single-parent households experience less inflation on average because they spend a smaller share of their budget on food and energy than the overall population (Figure 3.3).

[32] The R-squared in the OLS regressions at country level ranges from 0.02 for Spain to 0.31 for the Czech Republic. The R-squared is 0.74 for the pooled sample, but most variation is explained by country dummies. Pooled and country regressions (as well as R-squared regressions) are provided in Table A B.1 in Annex B. A previous study using time series data for the United States had similar results: the R-squared was 0.012, with 0.009 explained by the time dummies, while household characteristics explained 0.003 of the cross-sectional variation in inflation rates (Kaplan and Schulhofer-Wohl, 2017[1]).

Figure 4.7. Effective inflation rates are uneven across population groups

Mean percentage point differences in effective year-on-year and cumulative inflation by household characteristics, July 2023, EU



Note: Conditional mean percentage point differences in household effective year-on-year/cumulative inflation are obtained from OLS (population-weighted) regression of household effective year-on-year/cumulative inflation on household characteristics (income quintile, population density in the area of residence, sex of head of household, age of head of household, education level of head of household, employment status of head of household, household type, country of birth) and country dummies. The reference categories are in brackets (Q3: middle (third) income quintile; mid: intermediate population density; hd fem: female-headed household; hd 30-44 yrs: household headed by person aged 30-44; up sec: household headed by person with upper secondary education; emp: household headed by employee). Estimates are statistically significant at 1% level. Inflation rates calculated using HICP monthly data over the relevant period. Data for all EU Member States except Austria.
Source: Authors' calculations, based on EU-HBS 2015 and Eurostat (2023[25]), HICP Database.

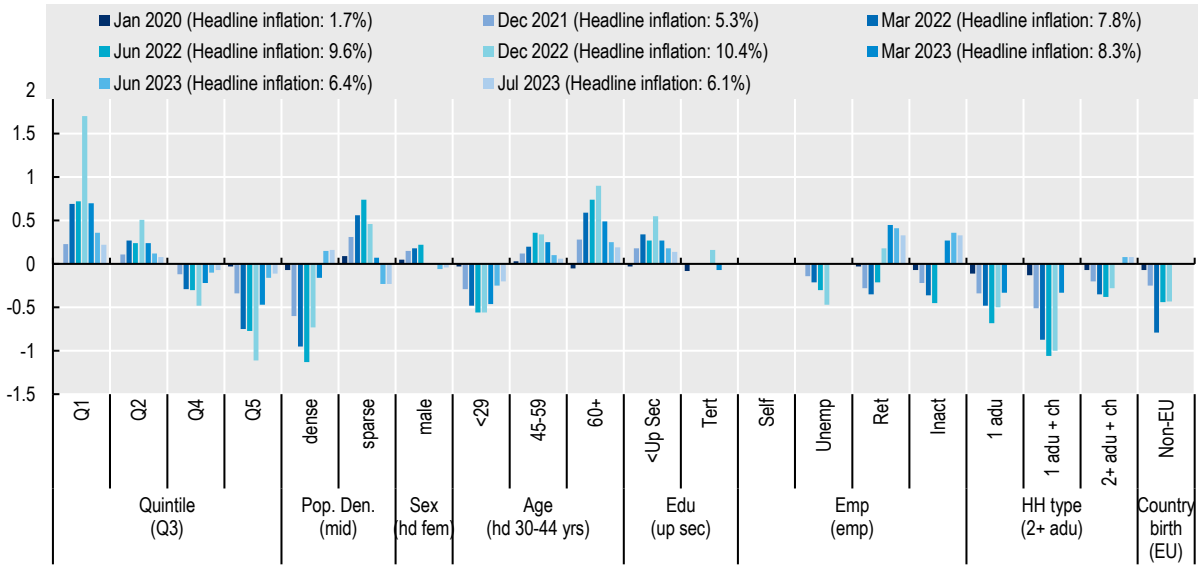
… with an impact that was volatile over time and heterogeneous across countries

The distributive impact of high inflation on household groups has varied over time. Figure 4.8 expands Figure 4.7 with year-on-year effective inflation data from a selection of months before and during the inflation rise. In January 2020, there were few differences in effective inflation across population groups, as both inflation levels and inflation dispersion were very low. However, differences began to emerge in December 2021, when energy prices started to increase, although at that time the impact on lower-income households was not significant.

Changes in relative prices across the inflation period influenced the extent of the impact of inflation across population groups. The size of the differences in year-on-year effective inflation across population groups varied even when changes in headline inflation levels were relatively small. Between June and December 2022, there were considerable changes in effective inflation differences across income groups and living areas, despite a rather small increase on EU average headline inflation (from 9.6% to 10.4%). The conditional inflation difference for lower-income individuals more than doubled – effective inflation was 0.7 percentage point higher than average inflation in June 2022 for this group, compared to 1.7 percentage point in December 2022. Meanwhile, the conditional inflation differences between sparsely and densely populated areas fell from over 1.9 percentage points (in June 2022 to 1.2 percentage points in December 2022. These variations were driven by substantial changes in relative prices, with transport energy prices playing a stronger role in June and food prices in December (Figure 2.1), and differences in the expenditure share of these items in the budgets of population groups.

Figure 4.8. Effective inflation rates across population groups have varied over time

Mean percentage point differences in effective inflation conditional on household characteristics, selected months between January 2020 and July 2023, EU



Note: Conditional mean percentage point differences in household effective inflation obtained from OLS (population-weighted) regression of household effective inflation on household characteristics (income quintile, population density in the area of residence, sex of head of household, age of head of household, education level of head of household, employment status of head of household, household type, country of birth) and country dummies. The reference categories are in brackets (Q3: middle (third) income quintile; mid: intermediate population density; hd fem: female-headed household; hd 30-44 yrs: household headed by person aged 30-44; up sec: household headed by person with upper secondary education; emp: household headed by employee). Estimates statistically significant at 1% level. Effective inflation calculated using year-on-year HICP inflation data from January 2020, December 2021, March 2022, June 2022, December 2022, March 2023, June 2023, and July 2023. Headline inflation rates refer to weighted average HICP for the EU-27. Data for all EU Member States except Austria.
Source: Authors' calculations, based on EU-HBS 2015 and Eurostat (2023[25]), HICP Database.

The impact of the current inflation rise on population groups has varied across countries. Figure 4.9 reproduces the analysis in Figure 4.7 at country level, using year-on-year household effective inflation levels for July 2023.[33] In most countries, the relationship between inflation and household characteristics was similar to the EU average, albeit with considerable differences in its extent and significance. The income gradient was highest in Central and Eastern European countries,[34] with the gap between the inflation rates experienced by individuals in lower-income and higher-income quintiles reaching 2.13 percentage points in Romania and above 1.5 percentage points in the Czech Republic and Poland. At the other end of the spectrum, higher-income individuals experienced higher inflation in Belgium, Cyprus, Luxembourg, Spain and Sweden. The largest gap by degree of urbanisation was in Hungary, where inflation rates for individuals in densely populated areas were some 1.9 percentage points lower than for those in sparsely populated areas. The reverse was true in several countries, particularly Ireland, the Czech Republic, Luxembourg and Poland, where individuals in rural settings experienced inflation rates 1 percentage point lower than those living in areas of intermediate density.

[33] For clarity, the figure highlights a selection of results. Complete results for all countries are available in Table A B.1 in Annex B.

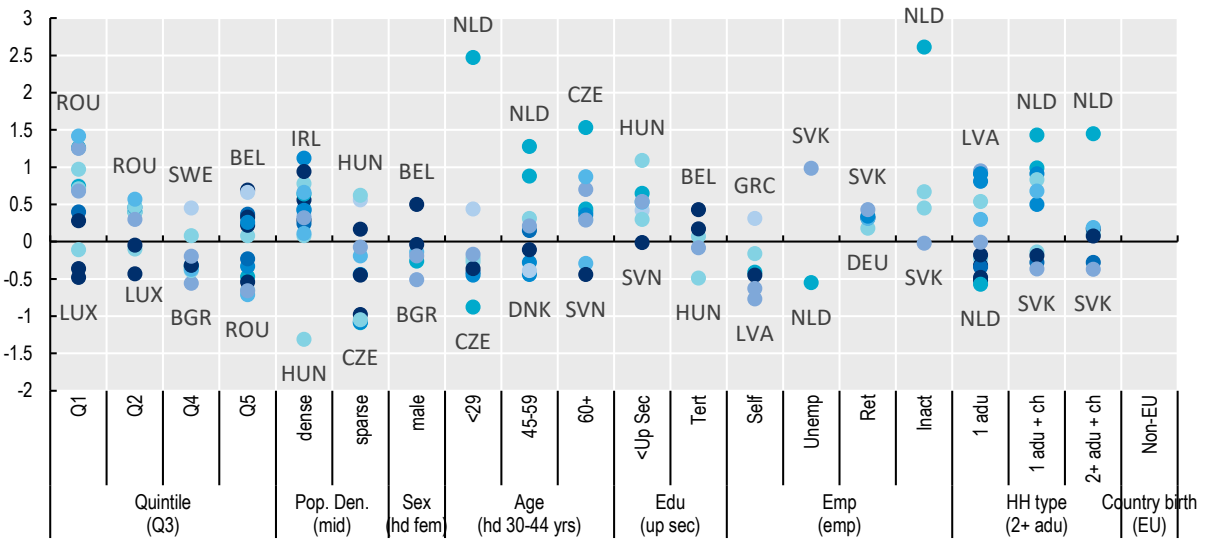
[34] Gros and Shamsfakhr (2023[73]) note that, to date, rents have increased below headline inflation, cushioning the impact of rising energy and food prices on the cost of living of lower-income households, which are more likely to rent. This cushioning effect is weaker in Central and Eastern European countries, where housing ownership rates are considerably higher, even among lower-income households.

The positive relationship between the age of the head-of-household and effective inflation broadly held across countries. In several countries, households with younger heads faced lower inflation rates, notably in the Czech Republic. However, in the Netherlands, younger households experienced higher inflation rates, due to the withdrawal of a measure introduced in August 2022, during the COVID-19 pandemic, that had halved tuition fees for secondary vocational education and tertiary education (Government of the Netherlands, 2023[58]). This had a significant impact on households headed by young people and those in inactivity (including students), as well as households with children. People in households headed by someone with lower than secondary education experienced higher inflation in several countries, particularly Hungary.

Cross-country differences are less stark when effective inflation is measured cumulatively rather than on a year-on-year basis. Figure A B.1 in Annex B replicates Figure 4.9 using cumulative inflation since January 2020. While the overall findings remain similar, cross-country variation diminishes due to offsetting price trends. In the Netherlands, for example, the inflation differentials for people in households headed by young or inactive individuals and those with children are considerably lower using cumulative inflation, as high year-on-year price swings for certain items (e.g. tuition fees that had been halved in 2020 returning to normal in 2022) cancelled each other out.

Figure 4.9. Effective inflation rates across population groups vary between countries

Mean percentage point differences in effective inflation conditional on household characteristics, July 2023, EU



Note: Conditional mean percentage point differences in household effective inflation obtained from OLS (population-weighted) regression of household effective inflation on household characteristics (income quintile, population density in the area of residence, sex of head of household, age of head of household, education level of head of household, employment status of head of household, household type) for each country. The reference categories are in brackets (Q3: middle (third) income quintile; mid: intermediate population density; hd fem: female-headed household; hd 30-44 yrs: household headed by person aged 30-44; up sec: household headed by person with upper secondary education; emp: household headed by employee). Effective inflation calculated using year-on-year HICP inflation data as of July 2023. Only countries for which estimates are statistically significant at 1% level are presented. Data for all EU Member States except Austria.
Source: Authors' calculations, based on EU-HBS 2015 and Eurostat (2023[25]), HICP Database.

5 High inflation increases material and social deprivation unevenly

This section attempts to quantify the effects of inflation and inflation dispersion on living standards in European households. Material and social deprivation (MSD)[35] is the only headline indicator targeted by EU social policy – as part of the broader at-risk-of-poverty-or-social-exclusion (AROPE) monitoring framework – that is closely related to households' income in real terms.[36] Various approaches can be used to identify how price changes relate to household deprivation. The approach proposed here consists of predicting the increase in MSD by deriving its elasticity to income based on historical cross-sectional data and then scaling-up the estimated income elasticities by the observed living cost adjustment. Its main advantages are its simplicity and ability to produce straightforward estimates of the inflation effect, assuming no behavioural adjustments on the households' part (see Menyhért (2022[16]) for further details).

Previous empirical work on poverty measurement documents a strong and somewhat stable relationship between the level of households' disposable income and the incidence of MSD in EU Member States Menyhért et al. (2021[59])).[37] These results indicate that MSD is disproportionately concentrated in low-income households, and that moving from one income decile to the next in the national distribution reduces the deprivation rate by around one-third, on average. Based on these insights, the impact of rising prices on the deprivation rate can be assessed by focusing on the corresponding change in households' purchasing power and income in real terms. However, such analysis relies on several assumptions about household responses to price changes. Chiefly, it does not comprehensively consider the effects of income support measures that may have helped people to cope with price increases, and only partially considers how MSD may have been affected by nominal income and wage developments (Box 5.1).[38] The results of the analysis should be read as an illustration of the potential magnitude of the effects of inflation on MSD rather than precise estimates of actual effects.

[35] Defined as the inability to afford a set of goods, services or social activities that are considered by most people to be necessary for a basic but socially acceptable standard of living.

[36] Anchored versions of the "at-risk-of-poverty" (AROP) poverty lines could be used to measure changes in the social situation. However, as these are not used as headline social indicators in the EU, are typically employed to measure the effect of long-term income developments rather than short-time nominal changes in prices, and may not have a clear conceptual or practical interpretation, this approach is not pursued here. For more information on the EU AROPE framework, see Eurostat glossary.

[37] This analysis uses the 2021 cross-sectional wave of the EU-SILC. The statistical relationship between income and deprivation, as well as the estimated MSD elasticities used for the calculations, are qualitatively similar when using EU-SILC data from pre-COVID-19 reference years (e.g. 2019).

[38] Households' disposable income in the EU-SILC is measured in gross terms before any reductions related to the consumption of fixed capital (CFC). Real (disposable) household income is calculated by proportionately rescaling the nominal level of households' disposable income by the observed change in aggregate price level due to observed effective inflation.

Box 5.1. Estimating the effects of inflation on MSD: methodology

The calculations presented here are based on estimating the elasticity of MSD to changes in real household income using a single recent wave of EU Statistics on Income and Living Conditions (EU-SILC) cross-sectional microdata and the scaling-up of those elasticities by the observed loss in purchasing power due to inflation.[39] This approach is adopted in light of the lack of recent historical data that could reliably identify inflation-driven changes to European households' real income as part of a longitudinal analysis at EU level. It focuses on the change in deprivation incidence across households with different real (and nominal) income positions at a single point in time, rather than observing the same (or similar types of) households and documenting their MSD status repeatedly during inflationary periods.

Three main preconditions need to hold to ensure valid analysis: 1) the deprivation probability of a household should depend (primarily) on its contemporaneous income rather than past income or savings; 2) conditional on real household income, changes in relative prices should not have a substantial effect on the deprivation probability; and 3) the institutional setting should remain stable so that a given level of real income translates into the same deprivation incidence throughout the observation period. While ascertaining the empirical validity of these conditions goes beyond the scope of this paper, existing empirical evidence suggests that these conditions are likely to hold. Firstly, the savings rate among financially constrained households most liable to deprivation is very low and it is reasonable to expect that current income flows are the main driver of their deprivation outcomes. Secondly, as most MSD households suffer from financial insecurity and cannot afford all basic necessities, relative price changes are unlikely to have a large effect on the (conditional) incidence of composite (rather than individual) deprivation. Thirdly, the analysis estimates the effects of inflation on MSD in the absence of mitigating measures affecting household income (e.g. specific income support measures).

Assuming that these preconditions hold,[40] the regression specification features the binary indicator variables of MSD as the dependent variable, while the right-hand side features (the logarithm of) equivalised household income and socio-demographic control variables on settlement type, household size and household composition.[41] This setup may be considered a standard linear probability model (LPM) that identifies the pp change in deprivation associated with a proportionate (1%) increase in household income across different household types.

This approach is used to estimate income elasticities of MSD at national level for all EU Member States. Income elasticities of MSD are also estimated separately for individuals and household types, depending on whether a) the equivalised income of the household was above or below the national median; b) the sampled head-of-household was above or below 45 years old; and c) the household resided in densely or sparsely populated area. These demographic types were selected for analysis because of considerable variation in their pre-existing deprivation rate and recent effective inflation rate.

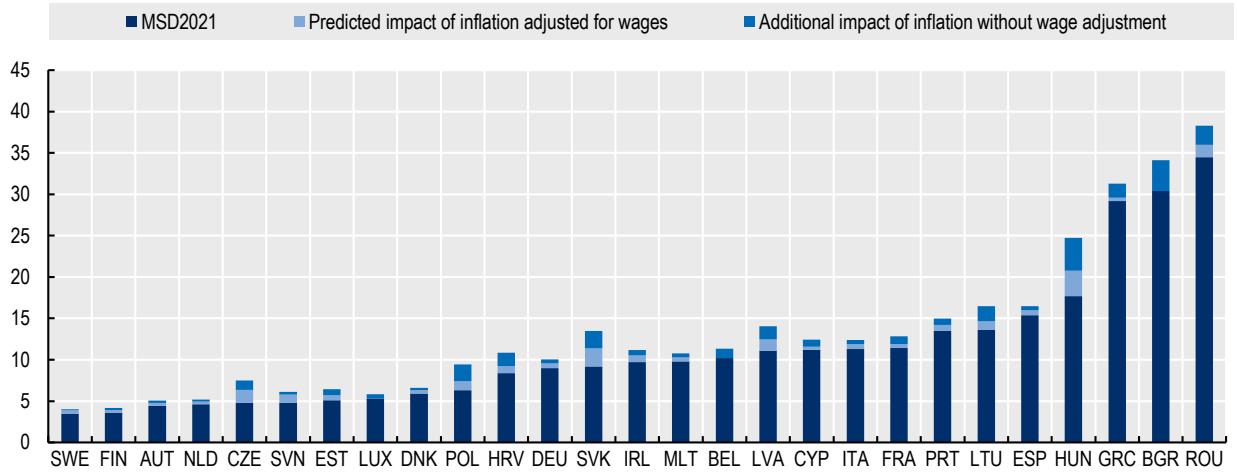
The strength of the relationship between MSD incidence and real household income varies considerably by Member State. The relevant country-specific estimates for the income elasticity of the MSD vary between 0.05 (Sweden) and 0.32 (Greece). This reflects large differences in both the pre-existing deprivation rate and the relative concentration of deprivation among low-income households. Using the relevant elasticities and national effective inflation rates presented in Section 1.4, it is possible to calculate the likely effect of inflation on MSD in each EU Member State.

In absence of wage adjustments and mitigation measures, inflation is predicted to have led to increases in MSD between February 2022 and February 2023 (Figure 5.1). Changes in living costs alone are likely to have increased the deprivation rate by 1.9 percentage point on average (an increase of

around 15% in relative terms), and in a highly variable manner at national level (between 0.5 percentage points in Luxemburg and Sweden and 7.0 percentage points in Hungary). The cross-country correlation between the pre-existing level and the estimated change is strong and positive (52%) and signals increasing inequalities in social deprivation across the EU. Figure 5.1 also shows that while real wages have fallen significantly in most OECD Member countries (Araki et al., 2023[60]), MSD would have increased even more had wages not been adjusted. Increases in MSD may have also been mitigated by measures to support incomes and regulate prices of specific items, which the analysis does not take into account.

Figure 5.1. The predicted effect of inflation on material and social deprivation

Predicted effect of inflation on MSD rates compared to pre-inflationary MSD levels (%), by country, with or without adjustment for wage developments, February 2022-February 2023



Note: For simplicity, observed wage adjustments at national level were assumed to translate into equal and proportionate changes in the income of all households in the sample.
Source: Authors' calculations, based on EU-SILC microdata from the 2021 cross-sectional wave.

At national level, inflation has likely led to higher increases in MSD for households with higher pre-existing deprivation rates. This is apparent from comparing MSD increases due to inflation (without

[39] Similar elasticity estimates are obtained for all recent years of EU-SILC data, regardless of whether or not these were collected during the COVID-19 crisis.

[40] The relevant sample collection period for the EU-SILC in most Member States is the first and second quarters of 2021. The relevant income reference period is the previous calendar year (2020). It is implicitly assumed that no systematic change took place in the relative income position of households between 2020 and 2021.

[41] The binary indicator of MSD status of households and their members is calculated using the official (recently revised) MSD methodology based on 13 indicators (for more information, see Eurostat glossary). The following regression specification was estimated:

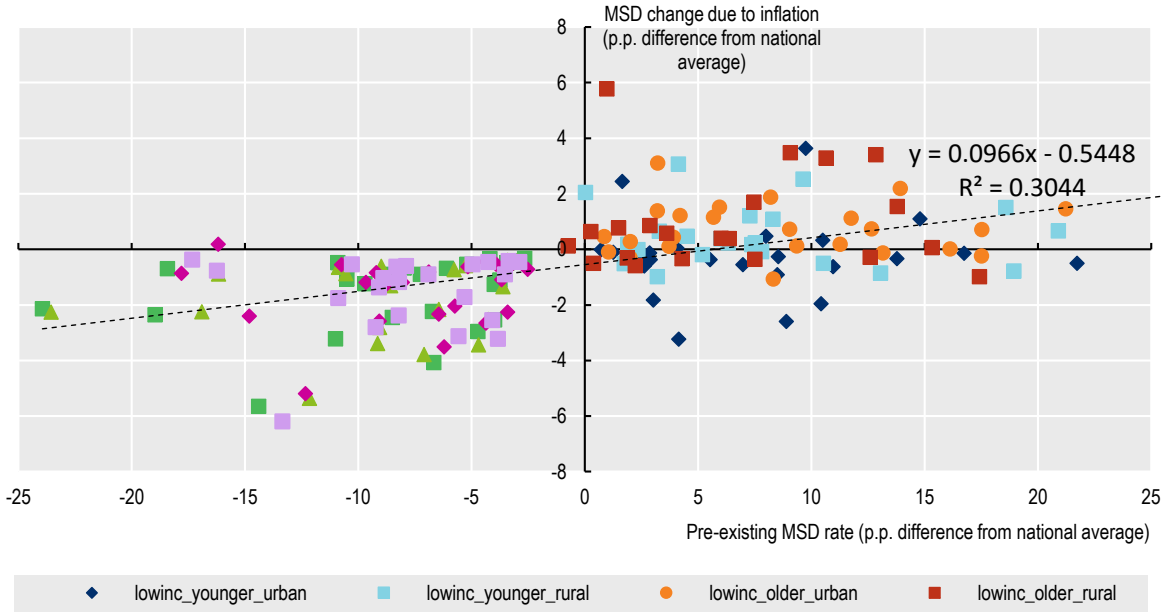
$$y_{ih} = \alpha + \beta \log(income_h) + \gamma^T X_h + \varepsilon_{ih}$$

where the dependent variable is an indicator function of MSD status, income denotes total disposable household income in equivalised terms (i.e. variable HX090) and represents a vector of household-level dummy variables featuring household size, household composition based on members' age, and settlement type. The main elasticities ($\hat{\beta}$) were obtained by separate estimation of the model on the full national sample of households in each country, using the relevant cross-sectional weights (DB090) for representativeness.

nominal wage adjustments) for several household types differing in pre-existing deprivation rates, income elasticities of MSD, and effective inflation rates since 2021. Figure 5.2 provides a comprehensive view of all 216 household segments considered (i.e. eight household types across 27 EU Member States) and shows that households with equivalised income above the national median faced systematically lower pre-inflationary MSD rates compared to the national average. These population segments also experienced below-average increases in MSD due to inflation. Conversely, low-income households below the national median not only faced above-average initial deprivation rates, but also experienced comparatively high increases in MSD due to rising prices (in some cases by as much as 4 pp). This means that inflation has likely exacerbated pre-existing inequalities in MSD. The regression line shows that higher pre-existing deprivation rates (for a given household type, relative to the national average) were associated with higher predicted increases in MSD due to inflation (relevant correlation coefficient of 55%, with each pp increase in pre-existing deprivation associated with a 0.1 pp additional increase in MSD due to inflation). Pre-existing deprivation and deprivation-related effects of inflation varied less by household characteristics other than income (degree of urbanity, age). The most notable difference was that among lower-income households, the average inflation-related increase in MSD was somewhat higher where the household head was aged 45+.

Figure 5.2. Effect of inflation on material and social deprivation, by household type

Predicted effect of inflation on MSD rates compared to pre-inflationary MSD rates, selected household types, 27 EU Member States



Note: the figure shows pre-existing MSD rates (horizontal axis) and MSD changes (vertical axis) due to inflation, expressed in pp differences from the respective national averages for different household types. These are as follows: 1) below median income, household head aged below 45, urban area (lowinc_younger_urban) 2) below median income, head aged below 45, non-urban area (lowinc_younger_rural) 3) below median income, head aged 45+, urban area (lowinc_older_urban) 4) below median income, head aged 45+, non-urban area (lowinc_older_rural) 5) above median income, head aged below 45, urban area (highinc_younger_urban) 6) above median income, head aged below 45, non-urban area (highinc_younger_rural) 7) above median income, head aged 45+, urban area (highinc_older_urban) 8) above median income, head aged 45+, non-urban area (highinc_older_rural).

Source: Authors' calculations, based on EU-SILC microdata from 2021 cross-sectional wave; EU-HBS microdata 2015; Eurostat HICP Database.

The disproportionate effect of inflation on deprivation in lower-income households reflects the higher sensitivity of deprivation to income changes among this population group. The median income elasticity of MSD across all household types with below-median income was estimated at 0.16, meaning that a 10% loss in real income implies a 1.6 percentage point increase in deprivation rate. For household types with above-median income, the median income elasticity was below 0.04. This means that even where households with below-median and above-median incomes faced similar inflation rates, the impact on MSD was likely to be much more pronounced for the former. In fact, a simple decomposition of differences in MSD effects of inflation across household types shows that these were largely the result of differences in income elasticity of MSD rather than differences in effective inflation rates these households faced.

6 Conclusion and policy implications

Inflation reached historically high levels in 2022, after several decades of moderate rates. There was a marked variation in inflation levels across the EU Member States, with Central and Eastern European countries experiencing far higher inflation. While headline inflation has begun to decline in most countries, following a fall in energy prices, consumer food prices and core inflation remain high. At the same time, nominal wages and incomes have often failed to keep pace with inflation, leading to an erosion of purchasing power.

Headline inflation indices measure price changes on aggregate and thus differ from the effective inflation level experienced by individual households. While certain population groups tend to be more affected by inflation, the extent of the impact reflects country-specific factors, changes in the inflation level, and relative prices. In general, effective inflation was higher among households more vulnerable to shocks, with a lower ability to adjust their consumption or spend a higher share of their budget on essential goods and services, and which cannot easily rely on additional sources of income.

Compared to previous studies focusing on distributive effects of inflation, **this paper contributes more granular comprehensive and recent results,** tested for statistical significance while controlling for other household characteristics. It produces **several new findings:**

- **Effective inflation dispersion across households has increased substantially in EU Member States**. Since prices for food and energy rose in 2021, fewer households have experienced inflation rates close to the average effective inflation. In general, dispersion tended to increase more in countries where inflation also increased more, although the relationship was quite weak. Several countries experienced similar changes in dispersion despite notable differences in inflation levels. In 2022, energy for housing was the main driver of disparities in effective inflation, while the contribution of food prices has increased markedly since December 2022.
- **Lower-income households experienced higher inflation, even after energy prices eased**, as high food prices also had a stronger impact on this group. Effective inflation was also higher for households headed by older people and those with lower education.
- **People living in sparsely populated areas experienced higher inflation than the rest of the population, but that difference has reduced since energy prices peaked** in summer 2022.
- The distributive impact of inflation on household groups varied over time, as **changes in relative prices across the inflationary period influenced the extent of the impact of inflation across population groups**. Differences in **effective inflation rates were cumulative over time, particularly for lower-income households, those headed by people aged 60+, and those with lower levels of education.**
- **Inflation may have contributed to marked increases in MSD, especially among lower-income households.** This was particularly evident in countries with a muted wage response and/or income adjustments.

Other important factors that could affect the level, change and profile of effective inflation (e.g. substitution effects) and its impact on households' living standards (e.g. changes in nominal wages and incomes) are beyond the scope of this paper. The evidence presented here should be interpreted with caution, as it

provides only an initial assessment of the distributional impacts of the recent inflationary wave in EU Member States. A more accurate and timely identification of households in need of support would require improved timeliness and frequency of HBS data and/or investment in new sources of high-frequency expenditure data that could also provide useful information on incomes and prices.

Governments in OECD and EU Member States quickly rolled out significant price-related measures – and, to a lesser extent, income support measures – to cushion the impact of rising prices on households' living standards and purchasing power. Most of these interventions were untargeted, benefiting all consumers regardless of their ability to cope with rising prices.[42] **This paper highlights the uneven and irregular impact of inflation across population groups and over time, suggesting the need for support to target those households with limited resources to cope with rising prices, yet which tend to face higher inflation levels than the rest of the population**.

Where inflationary pressures require further support measures, temporary targeted income supports could secure more resources for those who need them most and be more cost-effective to the government budget. Other criteria based on household characteristics (e.g. age, area of residence) may be relevant in some circumstances, although their role seems less prominent in relation to material and social deprivation. Measures to assist vulnerable households affected by price shocks should reach them quickly, as many such households have limited liquid assets with which to face unexpected rises in expenses. Assuming efforts to improve the timeliness and frequency of expenditure data, these could be implemented as ad hoc support measures or by scaling-up existing benefits. Regular assessment and adjustment would ensure that they continue to operate as intended, considering the dynamic nature of inflation and its impact on households' living costs.

[42] In 2022, targeted policies accounted for 28.3% of all measures to mitigate the impact of high energy prices (European Commission, 2022[75]). Using recent OECD data (Hemmerlé et al., 2023[63]; OECD, 2023[24]), upcoming OECD work estimates that 35.22% of all support measures directed to households were targeted (OECD, forthcoming[76]).

References

Alexander, P. et al. (2022), "High energy and fertilizer prices are more damaging than food export curtailment from Ukraine and Russia for food prices, health and the environment", *Nature Food*, Vol. 4/1, pp. 84-95, https://doi.org/10.1038/s43016-022-00659-9. [70]

APA (2022), *Americans Anxious Over Inflation; Almost Twice More Likely to Lean on Family and Friends Than Speak Openly About Feelings After a Traumatic Event*, American Psychiatric Association, https://psychiatry.org/news-room/apa-public-opinion-polls. [39]

Araki, S. et al. (2023), "Under pressure: Labour market and wage developments in OECD countries", in *OECD Employment Outlook 2023: Artificial Intelligence and the Labour Market*, OECD Publishing, Paris, https://doi.org/10.1787/b3013c36-en. [60]

Argente, D. and M. Lee (2020), "Cost of Living Inequality During the Great Recession", *Journal of the European Economic Association*, Vol. 19/2, pp. 913-952, https://doi.org/10.1093/jeea/jvaa018. [48]

Bernanke, B. (2007), *Inflation Expectations and Inflation Forecasting*, https://www.federalreserve.gov/newsevents/speech/bernanke20070710a.htm. [3]

Beynet, P. and A. Goujard (2022), *What is driving the spike in inflation dispersion in the euro area and how should policy react?*, https://oecdecoscope.blog/2022/09/06/what-is-driving-the-spike-in-inflation-dispersion-in-the-euro-area-and-how-should-policy-react/. [21]

Brauny, R. and S. Leinz (2020), *Heterogeneity in Inflation and Preferences across Households*, http://www.sarah-lein.ch/HH_inflation.pdf. [44]

Carnegie UK (2023), *The long shadow of the cost of living emergency*, https://d1ssu070pg2v9i.cloudfront.net/pex/pex_carnegie2021/2023/04/18100344/Carnegie-UK_LongShadow_Final-1.pdf. [35]

Causa, O. et al. (2022), "A cost-of-living squeeze? Distributional implications of rising inflation", *OECD Economics Department Working Papers*, No. 1744, OECD Publishing, Paris, https://doi.org/10.1787/4b7539a3-en. [13]

Charalampakis, E. et al. (2022), *The impact of the recent rise in inflation on low-income households*, https://www.ecb.europa.eu/pub/economic-bulletin/html/eb202207.en.html#toc18. [14]

Citroner, G. (2022), *Nearly 90% of Americans Report Inflation-Related Anxiety, Poll Shows*, https://www.healthline.com/health-news/nearly-90-percent-of-americans-report-inflation-related-anxiety (accessed on 5 August 2022). [40]

Claeys, G. and L. Guetta-Jeanrenaud (2021), *How has COVID-19 affected inflation measurement in the euro area?*, https://www.bruegel.org/blog-post/how-has-covid-19-affected-inflation-measurement-euro-area. [74]

Claeys, G., C. McCaffrey and L. Welslau (2022), "Does inflation hit the poor hardest everywhere?", *Bruegel*, https://www.bruegel.org/blog-post/does-inflation-hit-poor-hardest-everywhere. [15]

Cournède, B. (2005), "House Prices and Inflation in the Euro Area", *OECD Economics Department Working Papers*, No. 450, OECD Publishing, Paris, https://doi.org/10.1787/037842735074. [42]

Crawford, I. and Z. Smith (2002), *Distributional aspects of inflation*, Institute for Fiscal Studies, https://ifs.org.uk/publications/distributional-aspects-inflation. [6]

Cusset, P. and A. Trannoy (2023), *Spatial variation of purchasing power in France*, https://www.strategie.gouv.fr/english-articles/food-housing-transport-who-bears-brunt-inflation. [20]

Dolan, P., T. Peasgood and M. White (2008), "Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being", *Journal of Economic Psychology*, Vol. 29/1, pp. 94-122, https://doi.org/10.1016/J.JOEP.2007.09.001. [37]

ECB (2023), *ECB staff macroeconomic projections for the euro area, March*, https://www.ecb.europa.eu/pub/pdf/other/ecb.projections202303_ecbstaff~77c0227058.en.pdf. [27]

ECB (2023), *Statistical Insights: Inflation*, https://www.euro-area-statistics.org/digital-publication/statistics-insights-inflation/?lang=en. [41]

Eiglsperger, M. et al. (2022), "Owner-occupied housing and inflation measurement" ECB Economic Bulletin, Issue 1/2022, https://www.ecb.europa.eu/pub/economic-bulletin/articles/2022/html/ecb.ebart202201_01~f643aad55c.en.html. [43]

Eurobarometer (2023), *Eurobarometer 98 - Winter 2022-2023*, https://europa.eu/eurobarometer/surveys/detail/2872. [33]

European Central Bank (2023), "Two per cent inflation target", https://www.ecb.europa.eu/mopo/strategy/pricestab/html/index.en.html. [62]

European Central Bank (2007), *The role of base effects in driving recent and prospective developments in HICP inflation*, https://www.ecb.europa.eu/pub/pdf/mobu/mb200701en.pdf. [67]

European Commission (2023), "European Economic Forecast. Summer 2023" Institutional, https://ec.europa.eu/commission/presscorner/detail/en/ip_23_4408. [26]

European Commission (2022), "2023 European Semester: Proposal for a Joint Employment Report", *2023 European Semester: Autumn package* 22 November 2022, https://commission.europa.eu/publications/2023-european-semester-proposal-joint-employment-report_en. [53]

European Commission (2022), "Employment and Social Developments - Quarterly Review October 2022", https://ec.europa.eu/social/main.jsp?catId=738&langId=en&pubId=8507&furtherPubs=yes. [52]

European Commission (2022), "Employment and Social Developments in Europe 2022", Vol. Directorate-General for Employment, Social Affairs and Inclusion/Directorate F, https://ec.europa.eu/social/main.jsp?catId=738&langId=en&pubId=8483&furtherPubs=yes. [68]

European Commission (2022), "European Economic Forecast, Autumn 2022", *Institutional Paper 187, November*, https://economy-finance.ec.europa.eu/system/files/2023-02/ip187_en.pdf. [75]

European Commission (2022), *Labour Market and Wage Developments in Europe, Annual Review 2022*, Directorate-General for Employment, Social Affairs and Inclusion, https://op.europa.eu/en/publication-detail/-/publication/ff9a3b0c-7b6e-11ed-9887-01aa75ed71a1/language-en. [55]

Eurostat (2023), *GDP and main components (output, expenditure and income)*, https://ec.europa.eu/eurostat/databrowser/view/NAMQ_10_GDP/default/table?lang=en. [66]

Eurostat (2023), "Harmonised Indices of Consumer Prices (HICP) - Database", https://ec.europa.eu/eurostat/web/hicp/data/database. [25]

Eurostat (2023), *Household budget survey*, https://ec.europa.eu/eurostat/web/microdata/household-budget-survey. [56]

Eurostat (2023), *Structure of consumption expenditure by income quintile and COICOP consumption purpose*, https://ec.europa.eu/eurostat/databrowser/view/HBS_STR_T223__custom_3406843/default/table?lang=en. [57]

Eurostat (2017), "Technical Manual on Owner-Occupied Housing and House Price Indices", https://ec.europa.eu/eurostat/documents/7590317/0/Technical-Manual-OOH-HPI-2017/. [72]

FAO (2023), "The FAO Food Price Index drops again in February, albeit only marginally", *Food and Agriculture Organization of the United Nations* Release date: 03/03/2023, https://www.fao.org/worldfoodsituation/foodpricesindex/en/. [64]

Financial Times (2022), *Headline inflation may not tell the full story*, https://www.ft.com/content/fc154328-f00d-446b-9c71-0b6360b729db. [77]

Frey, V. et al. (2023), *Worries about affording essentials abound in a high-inflation environment*, OECD Risks that Matter Survey, https://www.oecd.org/els/soc/OECD2023-RTM2022-PolicyBrief-Inflation.pdf. [32]

Gern, K., N. Sonnenberg and U. Stolzenburg (2022), *Inflation Divergence in the Euro Area–Nature and Implications.*, https://www.europarl.europa.eu/RegData/etudes/IDAN/2022/733996/IPOL_IDA(2022)733996_EN.pdf. [22]

Government of the Netherlands (2023), *Tuition fees halved for first year of higher education*, https://www.government.nl/topics/secondary-vocational-education-mbo-and-tertiary-higher-education/tuition-fee-refund-and-loan/plan-to-halve-higher-education-tuition-fees#:~:text=From%20the%202021%2F2022%20academic,in%202018%2F2019%20or%20later. [58]

Grigoli, F., B. Gruss and S. Lizarazo (2020), *Monetary Policy Surprises and Inflation Expectation Dispersion*, https://www.imf.org/en/Publications/WP/Issues/2020/11/14/Monetary-Policy-Surprises-and-Inflation-Expectation-Dispersion-49833. [5]

Gros, D. and F. Shamsfakhr (2023), "Inflation and inequality: Energy and food versus rents", https://www.europarl.europa.eu/RegData/etudes/IDAN/2023/747845/IPOL_IDA(202. [73]

Gürer, E. and A. Weichenrieder (2020), "Pro-rich inflation in Europe: Implications for the measurement of inequality", *German Economic Review*, Vol. 21/1, pp. 107-138, https://doi.org/10.1515/ger-2018-0146. [46]

Hagemann, R. (1982), "The Variability of Inflation Rates Across Household Types", *Journal of Money, Credit and Banking*, Vol. 14/No. 4, Part 1, pp. 494–510, https://doi.org/10.2307/1991657. [19]

Hansen, N., F. Toscani and J. Zhou (2023), "Euro Area Inflation after the Pandemic and Energy Shock: Import Prices, Profits and Wages", *IMF Working Papers, WP/23/131*, https://www.imf.org/en/Publications/WP/Issues/2023/06/23/Euro-Area-Inflation-after-the-Pandemic-and-Energy-Shock-Import-Prices-Profits-and-Wages-534837?cid=bl-com-WPIEA2023131. [61]

Hemmerlé, Y. et al. (2023), "Aiming better: Government support for households and firms during the energy crisis", *OECD Economic Policy Papers*, No. 32, OECD Publishing, Paris, https://doi.org/10.1787/839e3ae1-en. [63]

Hobijn, B. and D. Lagakos (2005), "Inflation Inequality in the United States", *Review of Income and Wealth*, Vol. 51/4, pp. 581-606, https://doi.org/10.1111/j.1475-4991.2005.00170.x. [45]

Immervoll, H. (2005), "FALLING UP THE STAIRS: THE EFFECTS OF "BRACKET CREEP" ON HOUSEHOLD INCOMES", *Review of Income and Wealth*, Vol. 51/1, pp. 37-62, https://doi.org/10.1111/j.1475-4991.2005.00144.x. [7]

Jaravel, X. (2018), "The Unequal Gains from Product Innovations: Evidence from the U.S. Retail Sector*", *The Quarterly Journal of Economics*, Vol. 134/2, pp. 715-783, https://doi.org/10.1093/qje/qjy031. [51]

Johannsen, B. (2014), "Inflation experience and inflation expectations: Dispersion and disagreement within demographic groups", *Finance and Economics Discussion Series 2014-89, Board of Governors of the Federal Reserve System*, https://doi.org/10.2139/ssrn.2529160. [2]

Kaplan, G. and S. Schulhofer-Wohl (2017), "Inflation at the household level", *Journal of Monetary Economics*, Vol. 91, pp. 19-38, https://doi.org/10.1016/j.jmoneco.2017.08.002. [1]

Kints, M. and R. Breunig (2020), "Inflation Variability Across Australian Households: Implications for Inequality and Indexation Policy*", *Economic Record*, Vol. 97/316, pp. 1-23, https://doi.org/10.1111/1475-4932.12575. [47]

Klick, J. and A. Stockburger (2021), "Experimental CPI for lower and higher income households", *BLS Working Paper 537, Bureau of Labor Statistics*, https://www.bls.gov/osmr/research-papers/2021/ec210030.htm. [49]

Kohlscheen, E. (2022), "Understanding the Food Component of Inflation", *BIS Working Papers* No 1056, https://www.bis.org/publ/work1056.pdf. [69]

Kumar, S. et al. (2015), *Inflation Targeting Does Not Anchor Inflation Expectations: Evidence from Firms in New Zealand*, National Bureau of Economic Research, Cambridge, MA, https://doi.org/10.3386/w21814. [4]

Manser, M. and R. McDonald (1988), "An Analysis of Substitution Bias in Measuring Inflation, 1959-85", *Econometrica*, Vol. 56/4, p. 909, https://doi.org/10.2307/1912704. [54]

Menyhért, B. (2022), "The effect of rising energy and consumer prices on household finances, poverty and social exclusion in the EU" JRC Science for Policy Report, European Commission, https://doi.org/10.2760/418422. [16]

Menyhért, B. et al. (2021), "Measuring and monitoring absolute poverty (ABSPO) – Final Report" JRC Technical Report, European Commission.. [59]

OECD (2023), *Household disposable income* (indicator), https://doi.org/10.1787/dd50eddd-en (accessed on 26 June 2023). [29]

OECD (2023), *OECD Economic Outlook, Interim Report September 2023*, OECD Publishing, Paris, https://doi.org/10.1787/1f628002-en. [24]

OECD (2023), *OECD Economic Outlook, Volume 2023 Issue 1*, OECD Publishing, Paris, https://doi.org/10.1787/ce188438-en. [23]

OECD (2023), *Real household income rises in the second half of an otherwise weak 2022*, https://www.oecd.org/sdd/na/Growth-and-economic-well-being-oecd-05-2023.pdf. [31]

OECD (2023), *Taxing Wages 2023: Indexation of Labour Taxation and Benefits in OECD Countries*, OECD Publishing, Paris, https://doi.org/10.1787/8c99fa4d-en. [28]

OECD (2023), *Thriving Societies: Coordinating approaches to promote well-being and mental health*, OECD Publishing, Paris. [36]

OECD (2023), *Unit labour costs and labour productivity (employment based), Total economy : Labour compensation per employed person*, https://stats.oecd.org/index.aspx?queryid=87046. [30]

OECD (2023), *Worries about affording essentials abound in a high-inflation environment*. [34]

OECD (2022), *How inflation challenges pensions*, https://www.oecd.org/pensions/How-inflation-challenges-pensions.pdf. [11]

OECD (2022), *Income support for working-age individuals and their families*, https://www.oecd.org/social/Income-support-for-working-age-individuals-and-their-families.pdf. [10]

OECD (2022), *Minimum wages in times of rising inflation*, https://www.oecd.org/employment/Minimum-wages-in-times-of-rising-inflation.pdf. [8]

OECD (2022), *OECD Economic Outlook, Volume 2022 Issue 2*, OECD Publishing, Paris, https://doi.org/10.1787/f6da2159-en. [9]

OECD (2022), "Statistical Insights: Why is inflation so high now in the largest OECD economies? A statistical analysis", https://www.oecd.org/sdd/prices-ppp/statistical-insights-why-is-inflation-so-high-now-in-the-largest-oecd-economies-a-statistical-analysis.htm. [71]

OECD (2022), "Why governments should target support amidst high energy prices", *OECD Policy Responses on the Impacts of the War in Ukraine*, OECD Publishing, Paris, https://doi.org/10.1787/40f44f78-en. [12]

OECD (forthcoming), "Who's paying the costs of higher inflation". [76]

Orhun, A. and M. Palazzolo (2019), "Frugality Is Hard to Afford", *Journal of Marketing Research*, Vol. 56/1, pp. 1-17, https://doi.org/10.1177/0022243718821660. [50]

Prati, A. (2022), "The well-being cost of inflation inequalities", *Discussion Paper*, No. 1870, Centre for Economic Performance, https://www.insee.fr/fr/statistiques/2418131 (accessed on 16 October 2022). [38]

Sologon, D. et al. (2022), *Welfare and Distributional Impact of Soaring Prices in Europe*, https://docs.iza.org/dp15738.pdf. [17]

Van Den Berg, M., S. Niemeyer and M. Van Der Velde (eds.) (2022), *Crop monitoring in Europe - October 2022 Vol. 30 No 10*, Publications Office of the European Union, Luxembourg, https://publications.jrc.ec.europa.eu/repository/handle/JRC127966. [65]

Villani, D. and G. Vidal Lorda (2022), "Whom does inflation hurt most?", *European Commission, 2022, JRC129558*, https://publications.jrc.ec.europa.eu/repository/handle/JRC129558. [18]

Annex A. Differences between average household effective inflation and inflation indices

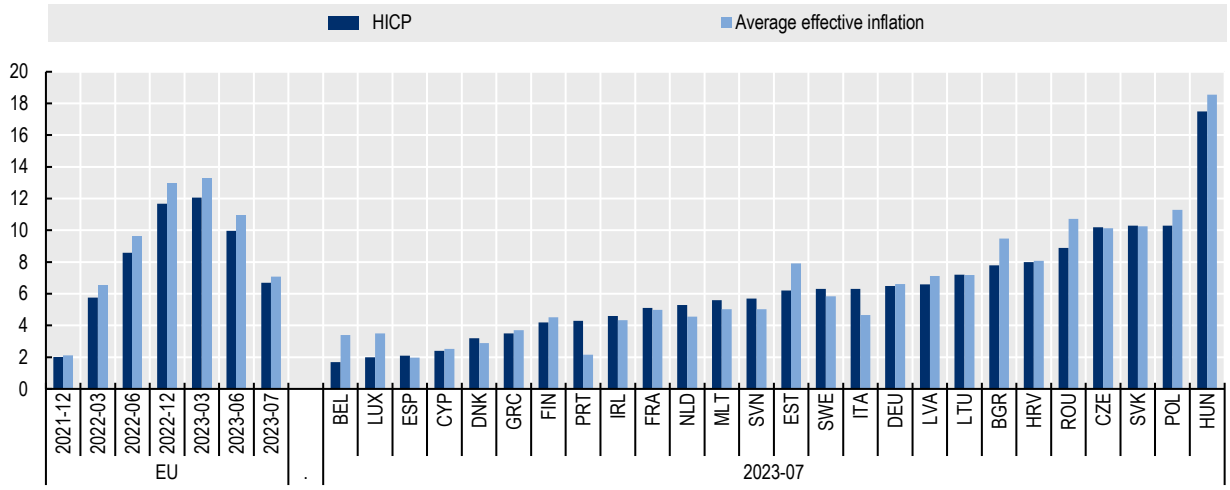
Inflation rates computed using average household effective inflation may differ from those reported in inflation indices because of methodology variations. Average effective inflation is measured using a "democratic" approach, while the inflation level experienced by each household is given equal weight. Inflation indices such as the CPI and HICP are based on a "plutocratic" approach, with the inflation of each household implicitly weighted by its total expenditure. Thus, households that spend more in absolute terms (usually those that are better off) exert more influence on the overall inflation rate. Unlike the HICP, average effective inflation is computed using item weights that are exclusively based on EU-HBS data and are not adjusted with data from national account (Box 3.1).

Compared to weights in the HICP, food and non-alcoholic beverages (CP01) and housing and utilities (CP04) (notably electricity, gas and other fuels (CP045)) account for a larger share of total expenditure in EU-HBS data. By contrast, alcoholic beverages, tobacco, and narcotics (CP02) and restaurants and hotels (CP11) account for a smaller share. This varies considerably across countries and tends to be larger in Bulgaria, Croatia, Hungary, Lithuania, Poland and Romania.

Given the importance of food, and electricity, gas and other fuels in current inflation levels, such differences in weights can lead to differences in inflation levels. In general, the HICP and average effective inflation produce similar results in relation to trends over time and levels across countries (Figure A A.1). However, differences have increased with the rise in inflation and are larger in countries with higher inflation levels. To prevent results bias stemming from these differences, all analyses here compare household effective inflation to average effective inflation.

Figure A A.1. Differences between HICP and average effective inflation rates

Year-on-year inflation rates measured by HICP and average effective inflation, selected months for average* and July 2023, EU Member States



Note: * Includes all EU Member States except Austria.
Source: Authors' calculations, based on EU-HBS 2015 and Eurostat (2023[25]), HICP Database.

Annex B. Additional results

Table A B.1. Regressions of household-level inflation rates on household incomes and demographics

	Pooled	BEL	BGR	CYP	CZE	DEU	DNK	EST	GRC	ESP	FIN	FRA	HRV	HUN	IRL	ITA	LTU	LUX	LVA	MLT	NLD	POL	PRT	ROU	SWE	SVN	SVK
Income quintiles (reference: Q3)																											
Q1	-0.22***	-0.26	0.77**	0.40***	1.26***	-0.11***	-0.06	0.46*	0.75***	-0.36***	0.01	0.08	0.74***	0.71***	0.38**		0.74*	-0.48***	1.25***	0.18	-0.43***	0.97***	0.26***	1.42***	0.19	0.28	0.68***
	(0.02)	(0.19)	(0.34)	(0.15)	(0.15)	(0.03)	(0.27)	(0.26)	(0.19)	(0.08)	(0.18)	(0.08)	(0.24)	(0.14)	(0.16)		(0.43)	(0.15)	(0.32)	(0.14)	(0.17)	(0.07)	(0.11)	(0.09)	(0.17)	(0.23)	(0.14)
Q2	-0.08***	-0.32**	0.45**	0.26**	0.40***	-0.10***	-0.17	0.13	0.31	-0.07	0.10	0.09	0.45***	0.39***	0.46***		0.52	-0.43***	0.57***	0.12	-0.30*	0.47***	0.12	0.57***	0.22	-0.05	0.30**
	(0.02)	(0.14)	(0.24)	(0.13)	(0.13)	(0.02)	(0.17)	(0.24)	(0.19)	(0.06)	(0.17)	(0.07)	(0.21)	(0.12)	(0.13)		(0.35)	(0.14)	(0.27)	(0.11)	(0.15)	(0.07)	(0.10)	(0.08)	(0.17)	(0.17)	(0.14)
Q4	-0.07***	0.22**	-0.56***	0.20*	-0.34***	0.08***	-0.02	0.19	0.16	0.11*	-0.04	-0.06	-0.10	-0.29***	-0.32***		-0.38	-0.10	0.29	-0.11	-0.08	-0.39***	0.03	-0.37***	0.45***	-0.32***	-0.20
	(0.02)	(0.12)	(0.21)	(0.11)	(0.12)	(0.03)	(0.15)	(0.20)	(0.18)	(0.06)	(0.15)	(0.06)	(0.20)	(0.12)	(0.12)		(0.30)	(0.13)	(0.24)	(0.07)	(0.13)	(0.07)	(0.10)	(0.08)	(0.17)	(0.15)	(0.14)
Q5	-0.11***	0.69***	-0.336	0.37***	-0.47***	0.08***	0.23	-0.07	0.34***	0.22***	0.20	-0.02	0.43***	0.35***	-0.33***		-0.61***	0.33***	0.03	-0.23***	0.01	-0.65***	0.26***	-0.71***	0.66***	-0.54***	-0.66***
	(0.02)	(0.13)	(0.22)	(0.12)	(0.13)	(0.03)	(0.16)	(0.20)	(0.15)	(0.06)	(0.17)	(0.07)	(0.19)	(0.16)	(0.11)		(0.30)	(0.12)	(0.25)	(0.08)	(0.13)	(0.07)	(0.10)	(0.09)	(0.24)	(0.17)	(0.15)
Population density (reference: intermediate density)																											
Densely pop.	0.16***	0.29***	-0.05	-0.03	-0.08	0.08***	0.44***	0.42	0.35***	-0.04	0.42***	0.24***	-0.17	-1.31***	1.12***	0.11***	-0.06	0.56***	0.78	0.05	0.64***	0.78***	0.42***	0.66***	0.33***	0.94***	0.32***
	(0.01)	(0.10)	(0.18)	(0.09)	(0.10)	(0.02)	(0.13)	(0.31)	(0.11)	(0.05)	(0.12)	(0.05)	(0.16)	(0.12)	(0.11)	(0.04)	(0.66)	(0.10)	(0.69)	(0.09)	(0.09)	(0.06)	(0.07)	(0.07)	(0.16)	(0.16)	(0.10)

	Pooled	BEL	BGR	CYP	CZE	DEU	DNK	EST	GRC	ESP	FIN	FRA	HRV	HUN	IRL	ITA	LTU	LUX	LVA	MLT	NLD	POL	PRT	ROU	SWE	SVN	SVK
Sparsely pop.	-0.23***	0.09	-0.30	-0.28**	-1.09***	-0.01	-0.44***	-0.29	0.56***	-0.45***	-0.14	-0.13**	0.13	0.62***	-1.08***	-0.19***	1.06	-0.98***	-0.71		-0.23*	-1.05***	-0.03	-0.16**	-0.38**	0.17	-0.07
	(0.02)	(0.19)	(0.20)	(0.11)	(0.10)	(0.03)	(0.12)	(0.31)	(0.16)	(0.06)	(0.13)	(0.06)	(0.16)	(0.12)	(0.12)	(0.05)	(0.67)	(0.12)	(0.69)		(0.13)	(0.06)	(0.08)	(0.07)	(0.16)	(0.12)	(0.11)
Sex of head of household (reference: female)																											
Male	-0.02	0.47***	-0.54***	0.13	-0.24*	0.09***	0.03	-0.23	-0.05	0.10*	-0.03	0.05	0.13	0.16	0.15*	-0.07	-0.31	0.00	-0.27	0.01	-0.18	-0.10**	0.06	-0.25***	-0.21**	0.01	-0.15
	(0.02)	(0.12)	(0.19)	(0.08)	(0.12)	(0.02)	(0.11)	(0.17)	(0.12)	(0.06)	(0.12)	(0.05)	(0.15)	(0.12)	(0.08)	(0.05)	(0.27)	(0.10)	(0.24)	(0.07)	(0.11)	(0.04)	(0.08)	(0.06)	(0.11)	(0.12)	(0.11)
Age group of head of household (reference: 30-44)																											
0_29	-0.20***	-0.13	0.17	0.08	-0.88***	-0.27***	0.10	0.28	0.11	0.29*	-0.38**	-0.41***	0.47**	-0.10	-0.45***	-0.13	0.22	-0.16	0.03	-0.11	2.47***	-0.22***	0.07	0.17*	0.44***	-0.36*	-0.17
	(0.03)	(0.16)	(0.44)	(0.18)	(0.27)	(0.04)	(0.17)	(0.32)	(0.20)	(0.16)	(0.17)	(0.08)	(0.21)	(0.19)	(0.15)	(0.12)	(0.42)	(0.17)	(0.27)	(0.10)	(0.26)	(0.07)	(0.18)	(0.09)	(0.17)	(0.21)	(0.17)
45_59	0.06***	-0.08	0.21	-0.06	0.88***	0.31***	-0.44***	0.23	0.04	-0.02	-0.15	0.15**	-0.03	-0.29***	-0.28***	0.11**	0.17	-0.19**	-0.21	-0.12*	1.28***	-0.11**	0.16**	-0.08	-0.39**	-0.11	0.21*
	(0.02)	(0.11)	(0.18)	(0.09)	(0.11)	(0.02)	(0.13)	(0.17)	(0.11)	(0.05)	(0.13)	(0.05)	(0.14)	(0.13)	(0.10)	(0.05)	(0.25)	(0.09)	(0.21)	(0.06)	(0.12)	(0.05)	(0.08)	(0.06)	(0.15)	(0.12)	(0.11)
60_Inf	0.19***	-0.60**	0.70***	0.17	1.53***	0.40***	-0.28	0.87***	0.23	-0.18	-0.11	0.12	0.31	0.25	-0.11	0.40***	0.26	0.35	0.33	0.07	0.44***	0.30***	0.36***	-0.29***	-0.48***	-0.44	0.29
	(0.03)	(0.27)	(0.25)	(0.15)	(0.16)	(0.04)	(0.24)	(0.22)	(0.21)	(0.13)	(0.18)	(0.12)	(0.28)	(0.18)	(0.16)	(0.07)	(0.34)	(0.23)	(0.27)	(0.12)	(0.16)	(0.10)	(0.13)	(0.10)	(0.19)	(0.39)	(0.20)
Education (reference: upper secondary)																											
Less than upper sec.	0.14***	-0.18	0.24	0.22*	0.13	0.00	-0.09	-0.17	0.42***	0.05	-0.15	0.17***	0.65***	1.09***	0.21*	0.01	0.65	-0.28**	0.30	-0.04		0.30***	0.01	0.53***	-0.18	-0.01	0.54***
	(0.02)	(0.16)	(0.26)	(0.12)	(0.25)	(0.04)	(0.16)	(0.25)	(0.14)	(0.06)	(0.18)	(0.07)	(0.22)	(0.12)	(0.13)	(0.04)	(0.52)	(0.11)	(0.30)	(0.08)		(0.10)	(0.10)	(0.08)	(0.16)	(0.19)	(0.20)

	Pooled	BEL	BGR	CYP	CZE	DEU	DNK	EST	GRC	ESP	FIN	FRA	HRV	HUN	IRL	ITA	LTU	LUX	LVA	MLT	NLD	POL	PRT	ROU	SWE	SVN	SVK
Tertiary	0.02	-0.43***	0.01	-0.05	0.02	0.07***	-0.06	0.01	-0.36***	-0.01	0.28*	0.10*	0.03	-0.49***	-0.12	0.04	-0.04	0.05	0.03	0.08		-0.13***	0.19*	-0.21*	0.11	0.17	-0.08
	(0.02)	(0.12)	(0.23)	(0.10)	(0.12)	(0.02)	(0.12)	(0.18)	(0.14)	(0.08)	(0.15)	(0.05)	(0.17)	(0.14)	(0.10)	(0.05)	(0.28)	(0.11)	(0.22)	(0.07)		(0.06)	(0.10)	(0.11)	(0.17)	(0.15)	(0.12)
Employment status (reference: employee)																											
Self-employed	0.01	-0.35***	0.10	-0.02	-0.41***	-0.02	-0.01	0.16	0.31***	0.02	-0.07	0.05	0.40***	-0.32	-0.27*	-0.09*	-0.21	0.32***	-0.77***	-0.17	0.03	-0.16***	-0.21*	0.07		-0.45	-0.63***
	(0.02)	(0.17)	(0.26)	(0.14)	(0.14)	(0.05)	(0.35)	(0.22)	(0.12)	(0.07)	(0.15)	(0.08)	(0.19)	(0.28)	(0.14)	(0.05)	(0.36)	(0.16)	(0.26)	(0.14)	(0.14)	(0.06)	(0.13)	(0.08)		(0.29)	(0.13)
Unemployed	-0.02			-0.02	0.71***	-0.03	-0.25		0.42***	-0.17	0.17	0.18***		0.30		-0.12					-0.55***		0.12				0.99
	(0.04)			(0.16)	(0.29)	(0.04)	(0.34)		(0.21)	(0.12)	(0.28)	(0.09)		(0.29)		(0.10)					(0.19)		(0.11)				(0.71)
Retired	0.33***				0.33***	0.18***	0.23			0.32***	0.00	0.31		0.35***	0.24	0.31***					0.04		0.34***				0.43***
	(0.03)				(0.16)	(0.03)	(0.34)			(0.11)	(0.23)	(0.21)		(0.16)	(0.16)	(0.07)					(0.14)		(0.11)				(0.20)
Inactive	0.33***				-0.03	0.45***	0.55**			0.16	-0.17	-0.25		0.67***	0.25	0.23*					2.61***		0.11				-0.02
	(0.03)				(0.36)	(0.06)	(0.22)			(0.12)	(0.21)	(0.31)		(0.25)	(0.19)	(0.12)					(0.34)		(0.27)				(0.30)
Household type (ref: 2+ adults without children)																											
One adult without children	-0.01	-0.52***	0.32	-0.02	0.92***	-0.23***	0.12	-0.01	0.08	-0.32***	-0.17	-0.34***	0.31	0.21***	0.81***	0.08*	0.21	-0.48***	0.95***	0.20	-0.57***	0.54***	0.91***	0.30***	0.23	-0.18	-0.01
	(0.02)	(0.16)	(0.29)	(0.15)	(0.15)	(0.02)	(0.14)	(0.23)	(0.14)	(0.07)	(0.13)	(0.07)	(0.33)	(0.11)	(0.13)	(0.05)	(0.30)	(0.17)	(0.24)	(0.20)	(0.13)	(0.08)	(0.08)	(0.06)	(0.15)	(0.32)	(0.12)
One adult with children	-0.01	-0.56***	0.09	0.46***	0.99***	-0.14***	0.27	0.12	0.46**	-0.10	-0.20	-0.28***	0.19	-0.56***	0.91***	0.06	0.50	0.09	0.48	-0.01	1.43***	0.83***	0.50***	0.68***	0.19	-0.19	-0.36

	Pooled	BEL	BGR	CYP	CZE	DEU	DNK	EST	GRC	ESP	FIN	FRA	HRV	HUN	IRL	ITA	LTU	LUX	LVA	MLT	NLD	POL	PRT	ROU	SWE	SVN	SVK
	(0.03)	(0.25)	(0.41)	(0.20)	(0.20)	(0.04)	(0.22)	(0.33)	(0.21)	(0.14)	(0.32)	(0.08)	(0.34)	(0.22)	(0.22)	(0.11)	(0.39)	(0.19)	(0.43)	(0.40)	(0.26)	(0.11)	(0.15)	(0.14)	(0.19)	(0.33)	(0.23)
2+ adults with children	0.08***	0.22***	0.02	0.20*	0.17	0.11***	0.15	0.39***	0.12	0.17***	0.13	0.02	0.01	-0.09	0.17*	0.10***	0.40	0.23***	0.53***	-0.28***	1.45***	-0.01	-0.01	0.19***	0.34*	0.08	-0.37***
	(0.02)	(0.11)	(0.19)	(0.11)	(0.12)	(0.02)	(0.14)	(0.18)	(0.11)	(0.06)	(0.14)	(0.06)	(0.14)	(0.11)	(0.10)	(0.05)	(0.25)	(0.11)	(0.21)	(0.07)	(0.14)	(0.05)	(0.08)	(0.06)	(0.21)	(0.12)	(0.11)
Country of birth (ref: EU)																											
Non-EU	-0.03																										
	(0.04)																										
Not specified	0.86***																										
	(0.30)																										
Country dummy																											
BGR	6.07***																										
	(0.06)																										
CYP	-0.79***																										
	(0.05)																										
CZE	6.89***																										
	(0.06)																										
DEU	3.21***																										
	(0.04)																										
DNK	-0.33***																										
	(0.06)																										

	Pooled	BEL	BGR	CYP	CZE	DEU	DNK	EST	GRC	ESP	FIN	FRA	HRV	HUN	IRL	ITA	LTU	LUX	LVA	MLT	NLD	POL	PRT	ROU	SWE	SVN	SVK
EST	4.70***																										
	(0.07)																										
GRC	0.37***																										
	(0.06)																										
ESP	-1.40***																										
	(0.05)																										
FIN	1.17***																										
	(0.05)																										
FRA	1.69***																										
	(0.05)																										
HRV	4.82***																										
	(0.07)																										
HUN	15.34***																										
	(0.07)																										
IRL	1.09***																										
	(0.06)																										
ITA	1.27***																										
	(0.04)																										
LTU	3.08***																										
	(0.31)																										
LUX	0.14**																										

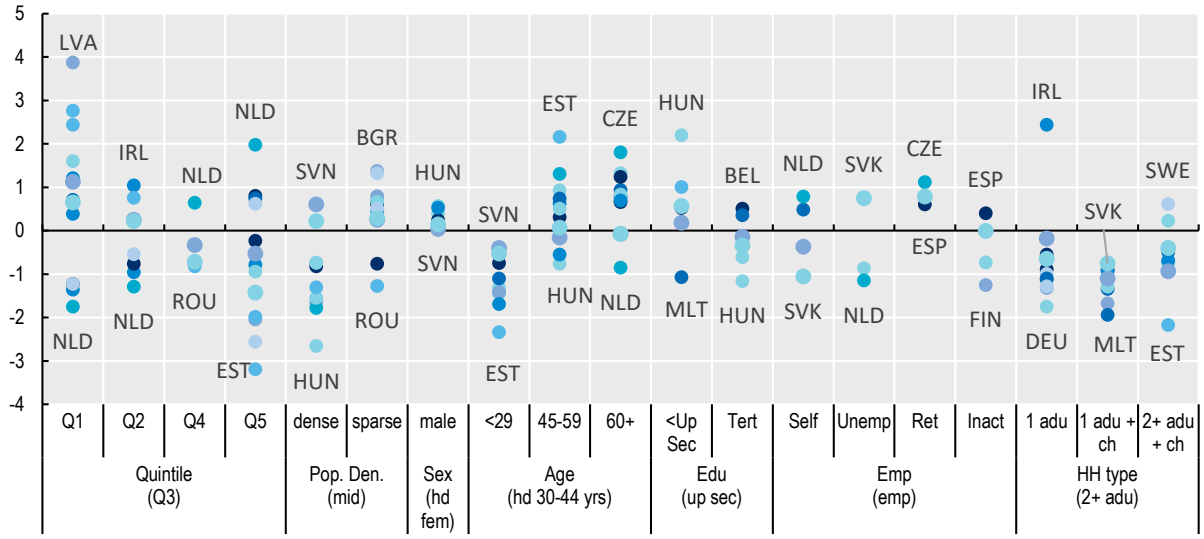
	Pooled	BEL	BGR	CYP	CZE	DEU	DNK	EST	GRC	ESP	FIN	FRA	HRV	HUN	IRL	ITA	LTU	LUX	LVA	MLT	NLD	POL	PRT	ROU	SWE	SVN	SVK
	(0.06)																										
LVA	3.84***																										
	(0.08)																										
MLT	1.60***																										
	(0.05)																										
POL	8.05***																										
	(0.05)																										
PRT	-1.21***																										
	(0.05)																										
ROU	7.51***																										
	(0.05)																										
SVN	0.96***																										
	(0.30)																										
SVK	7.05***																										
	(0.06)																										
Occupation (ref: medium-skilled)																											
High-skilled		0.12	-0.26	-0.09			0.10	0.00	-0.04	0.11**	-0.08	-0.01	-0.29*	-0.05	-0.05	-0.10**	0.28	0.15	-0.11	-0.17**		-0.05	0.10	-0.27**		-0.32***	-0.23**
		(0.12)	(0.25)	(0.11)			(0.14)	(0.18)	(0.13)	(0.06)	(0.15)	(0.06)	(0.17)	(0.13)	(0.10)	(0.05)	(0.29)	(0.11)	(0.23)	(0.08)		(0.06)	(0.10)	(0.11)		(0.15)	(0.12)
Low-skilled		0.05	-0.03	-0.18*			0.14	0.02	0.14	0.01	-0.03	-0.04	-0.15	-0.10	0.32***	0.02	0.06	-0.16	0.16	0.01		0.22***	0.14*	-0.03		-0.15	-0.19
		(0.16)	(0.17)	(0.10)			(0.16)	(0.20)	(0.13)	(0.06)	(0.16)	(0.07)	(0.18)	(0.11)	(0.11)	(0.05)	(0.28)	(0.12)	(0.23)	(0.09)		(0.06)	(0.08)	(0.06)		(0.16)	(0.11)

	Pooled	BEL	BGR	CYP	CZE	DEU	DNK	EST	GRC	ESP	FIN	FRA	HRV	HUN	IRL	ITA	LTU	LUX	LVA	MLT	NLD	POL	PRT	ROU	SWE	SVN	SVK
Intercept	3.07***	2.81***	9.11***	2.09***	9.47***	6.26***	2.97***	7.32***	2.64***	1.95***	4.45***	4.64***	7.47***	18.47***	3.89***	4.44***	5.81***	3.68***	6.50***	5.06***	2.93***	11.25***	1.38***	10.41***	5.80***	4.82***	10.50***
	(0.05)	(0.18)	(0.30)	(0.16)	(0.17)	(0.03)	(0.22)	(0.40)	(0.24)	(0.11)	(0.24)	(0.09)	(0.26)	(0.18)	(0.17)	(0.07)	(0.76)	(0.18)	(0.74)	(0.13)	(0.19)	(0.09)	(0.15)	(0.10)	(0.23)	(0.20)	(0.18)
R-squared	0.74	0.07	0.07	0.03	0.31	0.04	0.09	0.04	0.08	0.02	0.05	0.03	0.10	0.22	0.18	0.05	0.07	0.16	0.11	0.03	0.13	0.13	0.06	0.14	0.04	0.04	0.16

Note: *** p<.01, ** p<.05, * p<.1. OLS (population-weighted) regression of household effective inflation rates on household characteristics (income quintile, population density, sex of head of household, age of head of household, education level of head of household, employment status of head of household, household type, country of birth, occupation). Standard errors in parentheses. First column pools data for all EU Member States except Austria, with country dummies. Succeeding columns for each country separately. The reference categories are Q3: middle (third) income quintile; intermediate population density; household headed by female; household headed by person aged 30-44; household headed by person with upper secondary education; household headed by person is employee); household with at least two adults and no children; household headed by an EU-born person. Household effective inflation calculated using year-on-year HICP inflation data as of July 2023.
Source: Authors' calculations, based on EU-HBS 2015 and Eurostat (2023[25]), HICP Database.

Figure A B.1. Cumulative inflation rates across population groups

Mean percentage point differences in cumulative inflation between January 2020-July 2023, conditional on household characteristics, EU Member States



Note: Conditional mean percentage point differences in household effective inflation obtained from OLS (population-weighted) regression of household effective inflation on household characteristics (income quintile, population density in the area of residence, sex of head of household, age of head of household, education level of head of household, employment status of head of household, household type) for each country. The reference categories are in brackets (Q3: middle (third) income quintile; mid: intermediate population density; hd fem: female-headed household; hd 30-44 yrs: household headed by person aged 30-44; up sec: household headed by person with upper secondary education; emp: household headed by employee). Only countries for which estimates are statistically significant at 1% level are presented in the chart. Effective inflation calculated using cumulative HICP inflation data between January 2020 and July 2023. Data for all EU Member States except Austria.
Source: Authors' calculations, based on EU-HBS 2015 and Eurostat (2023[25]), HICP Database.