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The effect of rising energy and consumer prices on household finances, poverty and social exclusion in the EU

A preliminary empirical analysis

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Abstract

This report contains an empirical analysis based on microdata from European household surveys to provide a preliminary assessment of the potential social consequences of increasing energy and consumer prices in the EU. It uses detailed information on recent price developments and the structure of household expenditures to quantify the extent of living cost increases and purchasing power losses in a granular and customised manner across different household types and income groups in the EU. The Report is also the first attempt to calculate the potential effects of rising prices on indicators of material and social deprivation, energy poverty and absolute poverty. It finds that, since August 2021, inflation is predicted to have increased material and social deprivation in the EU by about 2 percentage points on average, while the corresponding increase in energy poverty and absolute poverty may be closer to 5 percentage points. The adverse social effects of inflation are significantly larger in many Central and Eastern European Member States, especially among disadvantaged and/or vulnerable groups. This is likely to further deepen existing gaps in poverty and social exclusion between EU15 and non-EU15 countries, and calls for a strong and coordinated policy response.

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Author

Bálint Menyhért

Executive summary

This report contains an empirical analysis based on microdata from European household surveys to provide a preliminary assessment of the potential social consequences of increasing energy and consumer prices in the EU.

Policy context

After decades of low inflation, rising consumer prices present new economic, political and social challenges across the EU. According to recent Eurostat figures, the annual HCIP inflation in August 2022 has reached 10.1% at the EU level, and consumer prices have increased by double digits in at least seven Member States. Increases in the cost of living are fuelled mainly by surging energy prices that are roughly 40% higher on average than in the previous year. Rising energy and consumer prices are already causing substantial social costs in terms of decreasing purchasing power, and are further expected to increase material deprivation, poverty and social exclusion by a considerable margin across the EU.

Key conclusions

The extent and likely persistence of current inflation and its grave social implications call for a strong and coordinated policy response. One potential area for intervention concerns short-term emergency measures aimed at offsetting some of the immediate consequences of price increases (such as reduced VAT rates or excise duties on energy or price caps). While price measures are likely to remain important also in the medium term, an important social policy challenge consists in strengthening the redistributive capacity of fiscal policy and ensuring the effectiveness of social protection systems. This primarily requires targeted income policies that help channel public resources towards the most vulnerable population segments and ensure that essential goods and services are readily available to all.

The broader and long-term policy objective is to align protective measures with the strategic EU priorities of the twin transitions. This calls for realising the climate objectives of the European Green Deal and pursuing the social fairness agenda of the European Pillar of Social Rights simultaneously, and requires a wide range of coordinated policy packages aimed at energy security, investment in renewables, and energy efficiency in housing, transportation and industrial production. Structural reforms on the labour market and of wage-setting mechanisms may also support a successful twin transition. It is also worth noting the relevance of improved data collection and social monitoring for equitable and effective policy interventions along these lines.

Main findings

Despite some methodological shortcomings and limitations, the main conclusion of the Report appears robust: rising consumer and energy prices impose substantial welfare and social costs on the European society. Given large differences in price developments and expenditure patterns across Member States and different population segments, the social implications of the current situation are highly uneven across the EU. The prospects are particularly alarming in many Central and Eastern European countries, where low-income households and vulnerable groups (such as large households, rural population, children or elderly persons) face particularly high risks of financial distress and social exclusion.

At the EU level, inflation has increased the cost of living of median households by around 10%, the incidence of material and social deprivation by around 2 percentage points, and the rate of energy poverty and absolute monetary poverty by around 5 percentage points. In selected Member States and among vulnerable groups, the corresponding welfare effects are expected to be several times higher, which is likely to deepen existing gaps in poverty and social exclusion across the EU.

Related and future JRC work

The current analysis connects to various previous and ongoing strands of JRC work. The expertise and data architecture built up by the ABSPO project aimed at design and development of a cross-country comparable absolute poverty measure for the EU provided direct inputs to this work (JRC127444). The analysis also builds on the recent studies by Villani and Vidal Lorda on the distributional effects of inflation on living costs (JRC129558), and by Koukoufikis and Uihlein on energy and transport poverty (JRC128084). Long-standing and ongoing JRC work on fairness and inequality, resilience, and the 'Beyond GDP' initiative are also related through various conceptual, empirical and institutional ties.

1 Introduction

After decades of low inflation, rising consumer prices present new economic, political and social challenges across the EU. According to recent Eurostat figures, the annual inflation in August 2022 has reached 10.1% at the EU level, and consumer prices have increased by double digits in at least seven Member States. Increases in the cost of living are fuelled mainly by surging energy prices that are roughly 40% higher on average than in the previous year. Rising food prices further aggravate the situation, with only the cost of non-energy industrial goods and services remaining largely stable for the time being.

The extent, likely persistence and large uncertainty surrounding the ongoing price developments raise the question of how these affect, or are about to affect, European households' finances, purchasing power and socio-economic situation. This Report takes a cursory look at some of the most important related aspects, and offers a handful of novel insights into the likely impact of rising energy prices and living costs on selected social policy indicators and outcomes. The threat of increased poverty and social exclusion, in particular, represents a challenge to the successful implementation of the European Green Deal and the so-called twin transition that should leave no person or place behind.

The empirical analysis concerns five separate but closely related investigations, each of which take up a separate section of the Report. I start with presenting recent Eurostat data on HICP inflation in the EU, highlighting the severity and unevenness of consumer price trends across Member States and product categories, and discussing the potential implications of these for EU policy objectives and priorities. Second, I present a detailed analysis of the expenditure patterns of European households, and assess the heterogeneous impact of rising energy and food prices on the living costs of various population segments across the EU. The remaining three building blocks are devoted to quantifying the potential effects of recent inflation on various social policy-relevant outcomes. First, I estimate the direct effects of cost of living increases on the AROPE indicators of material and social deprivation (MSD), using the observed statistical relationship between the incidence of deprivation and households' real income position in the EU-SILC microdata. Second, I quantify the predicted impact of soaring energy costs on the level of energy poverty using a range of different indicators in circulation. Third, I calculate the effect of consumer price inflation on monetary poverty in the EU, using a novel experimental measure of absolute poverty (ABSPO) developed by the JRC that adequately reflects households' minimum needs and living costs.

The empirical analysis presented in the Report is preliminary and subject to various limiting assumptions. Its preliminary character is due to the fact that it relies on a snapshot of observed price developments as of August 2022, while inflation levels and inflation profiles are bound to keep changing continually with time. As for the limiting assumptions, three merit particular attention. First, I assume that official CPI data adequately represents price trends faced by different household types at the national level. Second, I assume that the observed structure of household expenditures remains stable and households do not substitute away from products and product categories hit by above-average inflation. Third, I do not consider built-in fiscal stabilisers or impending government interventions that can limit the effect of rising prices in the medium and long term. There is ample empirical evidence that these aspects are all important, but modelling them in the current context and in a forward-looking manner is very difficult and beyond the scope of this study. For this reason, it is important that the findings presented in this Report receive additional scrutiny as well as further scholarly and policy attention in the future.

These limitations notwithstanding, the main conclusions of the Report appear robust: the negative welfare and social effects of rising consumer prices are substantial throughout the EU. Given the large cross-sectional differences in price developments and consumer expenditure patterns, the social implications of the current situation are rather different across Member States and various population segments. The prospects are particularly alarming in many Central and Eastern European countries, where low-income households and vulnerable groups (such as large households, rural population, children or elderly persons) face particularly high risks of financial distress and social exclusion under the current circumstances. At the EU level, inflation has increased the cost of living of median households by around 10%, the incidence of material and social deprivation by around 2 percentage points, the rate of energy poverty and absolute monetary poverty by around 5 percentage points. In selected Member States and among vulnerable groups, the corresponding welfare effects are expected to be several times higher.

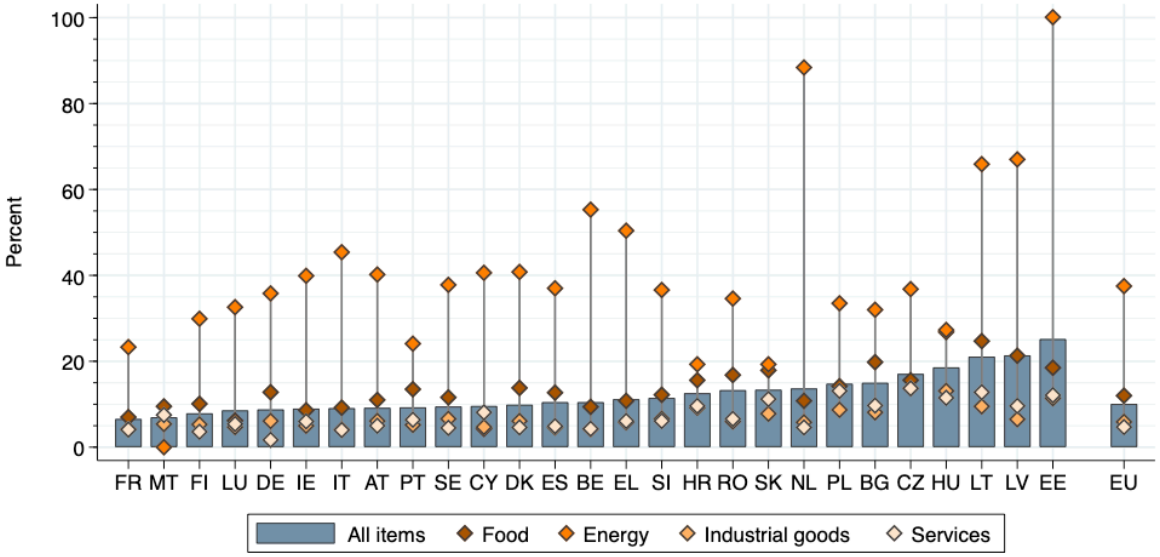
The extent and likely persistence of current inflation and its grave social implications call for a strong policy response. One obvious area for intervention concerns short-term emergency measures aimed at offsetting some of the immediate consequences of price increases (such as reduced VAT rates or excise duties on energy) or price caps), and most Member States have already resorted to measures of this kind recently. For more coordinated and efficient policy action along these lines, the European Commission's toolbox on energy has outlined a series of possible measures for national governments to strengthen the resilience of consumers and businesses in the short run. Over the medium term, a key social policy challenge lies in strengthening the redistributive capacity of fiscal policy and ensuring the effectiveness of social protection systems. This primarily requires targeted income policies that help channel public resources towards the most vulnerable population segments and ensure that essential goods and services are readily available to all. The broader and long-term policy objective of course is to align protective measures with the strategic EU priorities of the twin transitions. These include realising the climate objectives of the European Green Deal and pursuing the social fairness agenda of the European Pillar of Social Rights simultaneously, and requires a wide range of coordinated policy packages aimed at energy security, investment in renewables, and energy efficiency in housing, transportation and industrial production. Structural reforms on the labour market that reduce duality, segmentation and discrimination, cut back income inequality and ensure the purchasing power of earnings over sustained periods of time will also be key for a successful twin transition. It is also worth noting that the equity and efficiency of all listed interventions could be greatly enhanced by improvements in data collection and social monitoring.

The remainder of the Report is structured as follows. Section 2 presents the most relevant stylised facts about recent energy and consumer price developments in the EU. Section 3 gives a detailed account of the structure of household expenditures, and the differential effect of current inflation on various household types and income groups. Section 4 provides a quantitative estimate of the effect of rising prices and decreasing purchasing power on the incidence of material and social indicators, while Section 5 quantifies the corresponding impact on various indicators of energy poverty. Section 6 revisits the findings and methods of a recent experimental project by the JRC on absolute poverty measurement, and calculates the effect of inflation on needs-based monetary poverty. Section 7 summarizes, concludes and highlights the relevant policy implications and challenges.

2 Large and uneven increases in energy and consumer prices

After decades of price stability, the EU has been experiencing steeply increasing consumer prices from early 2021 onwards. Recent Eurostat figures indicate that, as of August 2022, headline annual HICP inflation in the EU has reached 8.8%. This level is much higher than the inflation European policy makers and households are accustomed to, and is similar – from a quantitative point of view, at least – to the inflationary episodes of the 1970s (in EU15 countries) and 1990s (in many CEE countries) that were the source of considerable social distress.[1] Much of the current inflation is driven by increasing energy prices: these latter have risen by 37.5% at the EU level between August 2021 and August 2022, and are fuelled in no small part by the war in Ukraine and its collateral effects. Food represents another product category with above-average inflation (12.0%), while the prices of non-energy industrial goods and services have remained comparatively stable so far (with 5.9% and 4.7% year-on-year inflation, respectively). Since a substantial part of the inflation in these (non-energy) categories is also due to high energy prices, this situation is likely to change with a more complete pass-through of energy price increases over the coming months.

Figure 1. Change in consumer prices between August 2021 and August 2022 by country

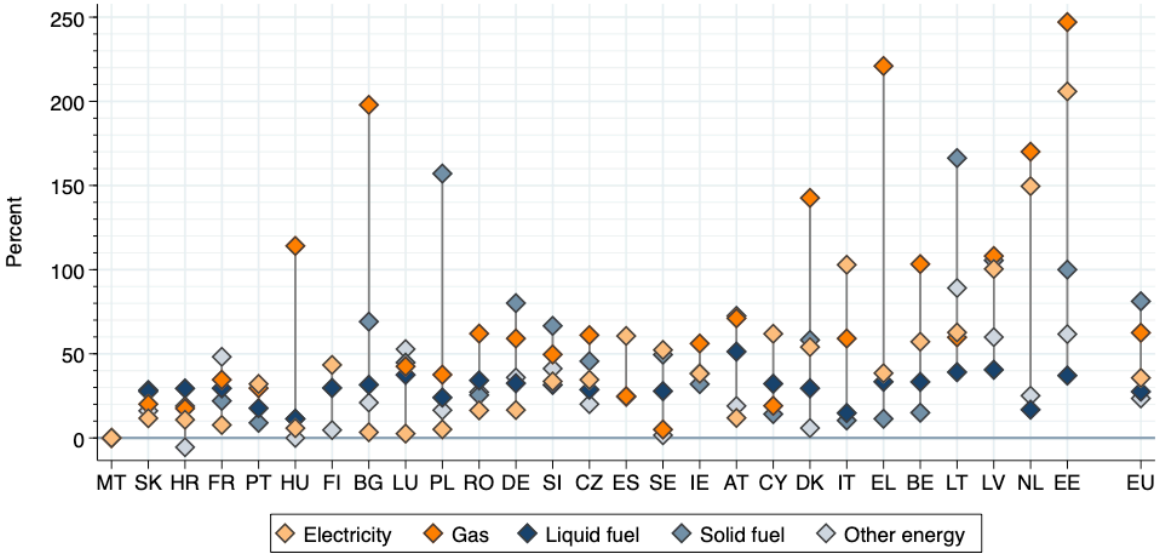


Notes: Recent data (as of August 2022) on annual HICP inflation by country and main consumption by purpose (COICOP) category by Eurostat (series pcr_hicp_manr). The EU average is calculated on the basis of official HICP country weights (as of 2022) used for EU-level inflation statistics by Eurostat. For more information, see the dedicated Euro indicators by Eurostat or the Eurostat data browser .

While the broad inflationary pressures are similar throughout the EU, cross-country differences in market conditions, energy use, resource dependence, price controls and regulatory environment imply that the size and structure of consumer price inflation have been uneven across Member States. **Figure 1** presents the headline annual CPI indicator by Eurostat for August 2022, and shows that national figures vary considerably (between 6.6% in France and Malta, and 25.2% in Estonia) around the EU average of 10.1%.[2] The figure also breaks down the year-on-year price increases by main product category. It reveals that energy price inflation is not only the highest but also the most variable across countries: the relevant national figures range from 0% in Malta to 88.4% in the Netherlands and 100.1% in Estonia. Food price trends are also rather divergent across the EU (i.e. food inflation ranges from 4.3% in Cyprus to 26.8% in Hungary), and further amplify aggregate inflation in several Member States. Inflation for non-energy industrial goods and services have remained below the headline CPI figures in all countries. The large cross-country variation in inflation rates and the divergence of national price developments suggest that households and national governments face rather different socio-economic challenges across the EU.

[1] For more details on historical comparisons, see the recent VoxEU piece by Ha et al., among others.
[2] The respective averages for EU15 and non-EU15 countries are 9.6% and 15.4%.

Figure 2. Change in energy prices by source and country between August 2021 and August 2022



Notes: Recent data (as of August 2022) on annual HICP inflation by country and detailed consumption by purpose (COICOP) category by Eurostat (series pcr_hicp_manr). According to HICP classification, the following data series were used: CP0451 (electricity), CP0452 (gas), FUEL (liquid fuel, including heating oil [CP0453] and lubricants for personal transport equipment [CP0722]), CP0454 (solid fuel) and CP0455 (other energy). The EU average is calculated on the basis of official HICP country weights (as of 2022) used for EU-level inflation statistics by Eurostat. For more information, see the relevant Eurostat data browser.

For a better understanding of recent inflation developments across countries, it is important to zoom in on energy prices as their main driver. This latter category includes the consumer prices of very different energy products: electricity, gas, liquid and solid fuel, as well as other energy products (such as heat energy purchased from district heating plants).[3] **Figure 2** presents the relevant year-on-year inflation figures as of August 2022 by main energy type, and reveals supreme heterogeneity across the EU. It shows that, on average, the price of natural gas (62.5%) and solid fuel (81.2%) have increased at a much higher rate than that of electricity (35.7%), liquid fuel (27.5%) or other energy products (23.5%). It also highlights, however, that the situation in individual Member States is highly variable: national inflation figures for each component may vary between 0% and 250%, and produce vastly divergent inflation profiles and rankings across countries.[4]

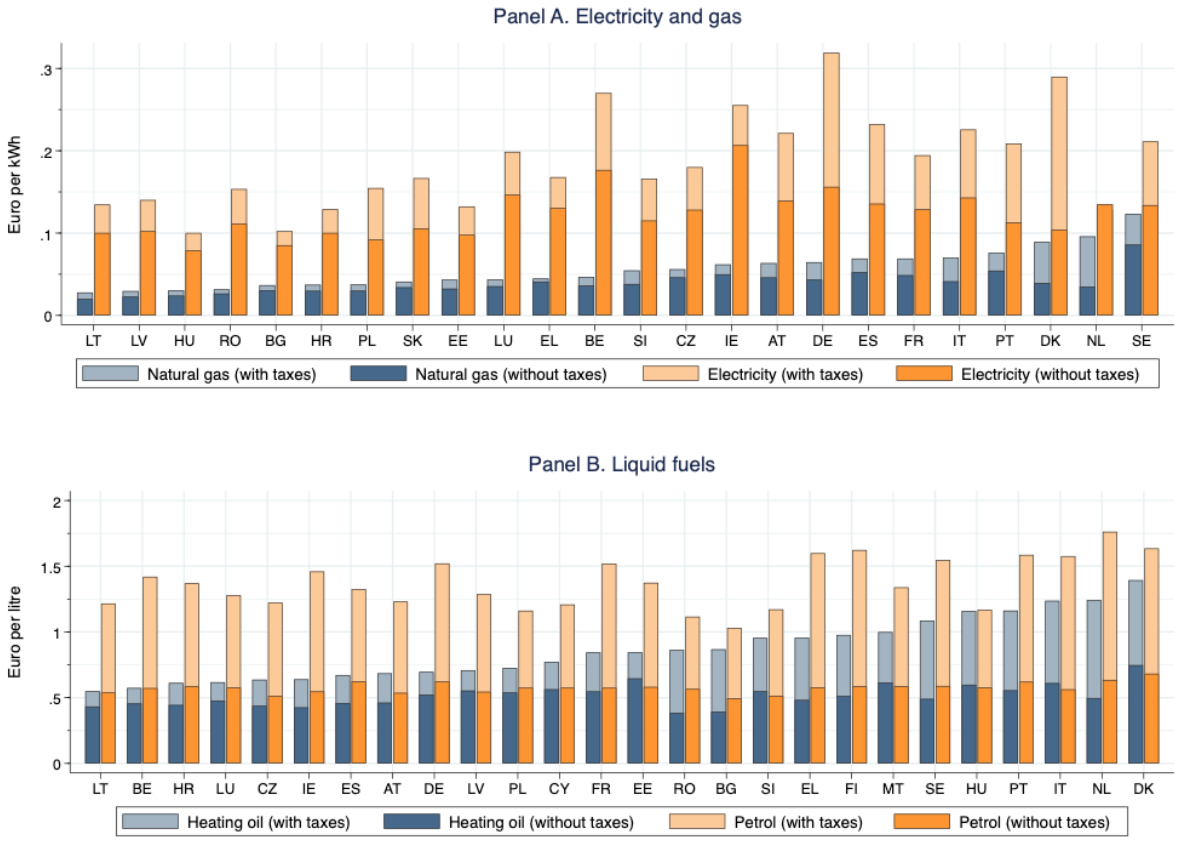
It is important to point out that a large part of energy prices faced by household consumers is subject to government regulation and shaped by various indirect taxes and excise duties. Fiscal and institutional differences across Member States likely contribute to the inflation divergence discussed above, and play an important part in determining the energy costs of European households. **Figure 3** shows the unit price of main energy products, as faced by a typical household, in the first half of 2021 (i.e. prior to the current inflationary period) by country. The figures show that the average (pre-inflation) share of taxes and levies in the overall retail price was 26.4% for natural gas, 30.4% for electricity, 37.6% on heating oil and 57.5% on petrol across the EU. The national tax burden varies substantially (i.e. between 8-64% for gas, 5-64% for electricity, 21-60% for heating oil and 49-64% for petrol), but provides ample scope for most EU governments to influence energy prices and mitigate inflation. Indeed, over the recent months, significant new measures (such as the reduction of excise duties, VAT discounts, price caps and/or reductions, tax credits etc.) have been introduced in several Member States with this objective.[5]

[3] For a detailed classification and explanation, consult the dedicated Eurostat website on the European Classification of Individual Consumption according to Purpose (ECOICOP) here.

[4] One may note that liquid fuels have two broadly different uses: as heating oil for housing-related use [CP0453] and as lubricants for transportation-related use of personal vehicles [CP0722]. The inflation for these two types has been rather different: 78.9% vs. 20.8%, respectively, at the EU level as of August 2022. The reason for not highlighting this in the main text is that heating oil represents a rather negligible part of both housing-related energy use and liquid fuel consumption. Its relative expenditure share among liquid fuels, for example, is around 5% at the EU level and only considerable in a few Member States (such as Belgium, Greece or Luxembourg).

[5] For a more comprehensive and detailed account, see for example the website of the International Road Transport Union (IRU).

Figure 3. Energy prices for household consumers during the first half of 2021 by country



Notes: The figures in Panel A represent recent Eurostat information on energy prices for household consumers in the EU as of the first half of 2021. Data for Cyprus, Finland and Malta are missing. For more information, see the relevant data series (nrg_pc_202, nrg_pc_204) and accompanying information on the dedicated Eurostat websites (here and here) or the online Eurostat data browser (here and here). The figures in Panel B are based on historical data from the European Commission's Weekly Oil Bulletin as of 26/04/2021 (Bulletin nr. 2046). For more details, see the Commission's dedicated website here.

Figure 3 also shows that, prior to the current inflation hikes, the consumer price of energy had been very uneven across the EU. Panel A reveals the price of natural gas varied between 0.03 euro per kWh (in Lithuania) and 0.13 euro per kWh (in Sweden), while the cost of electricity ranged from 0.10 euro per kWh (in Hungary) to 0.32 euro per kWh (in Germany). This divergence is larger than the cross-country dispersion of consumer prices in general, and is not driven by systematic differences in the tax component.[6] The situation is rather different in case of liquid fuels: as Panel B suggests, the spread of national prices is much smaller in relative terms (i.e. 64-161% of the EU average for heating oil, and 75-128% for petrol), and is driven almost entirely by differences in the tax component.

As recent European Commission reports on energy prices and costs demonstrate, the large divergence and high polarisation of energy prices across Member States create particular policy challenges.[7] First, it presents different incentives for EU Member States to achieve the main objectives of the European Green Deal towards transitioning to renewable energy sources, undertaking clean technological innovation, and decoupling economic growth from resource use. Second, it inhibits the creation of a single European energy market that could increase energy security, lower energy costs, keep industry competitive, and deliver government revenues for green investment. Third, it hinders the establishment of an efficient European system of energy subsidies and fiscal tools that ensures affordable energy prices for the vulnerable households and population segments.

[6] These comparison figures refer to 2021 and come from the Eurostat's purchasing power parities (PPPs) dataset (series PLI_EU27_2020). Based on these data, the national PPPs vary between 52% and 149% of the EU average. For more details, click here.

[7] For a detailed presentation of the EU's work on energy prices and costs, see the dedicated Commission website here.

In this regard, the current inflation developments have brought about some convergence in energy prices across the EU. **Figure 4** plots the initial (pre-inflation) level of energy prices (as of spring 2021) against the 2021-2022 annual inflation rates by product component, and reveals that Member States with higher pre-existing energy prices have typically experienced lower subsequent inflation during the past year.[8] While this may already reflect some of the various measures taken recently by national government to limit the financial burden of rising energy costs on firms and households, further coordinated efforts may be required for a strategic harmonisation of energy prices across the EU.

Figure 4. The statistical relationship between energy price levels and trends by country and energy source

Notes: The presented figures represent recent information on energy prices for household consumers in the EU (as of the first half of 2021), and recent data on HICP inflation (as of August 2022) based on information from Eurostat and the Commission's weekly oil bulletin. For more details, see the relevant notes to Figures 2 and 3 of this Report.

Despite recent and upcoming government interventions to limit energy and consumer prices, overall inflation is projected to remain elevated during the coming year, and possibly also beyond. Recent forecasts are only starting to factor in the direct and indirect effects of the war in Ukraine, and are naturally compromised by the high degree of uncertainty surrounding the future course of events. Existing projections by European Commission (such as its recent Summer 2022 Economic Forecast) and other international organisations foresee the stabilisation of inflation by the end of 2022 as well as contained price increases for 2023 and beyond.[9] However, recent research also suggests that long-term inflation expectations are increasing rapidly and becoming more uncertain, creating more persistent inflationary pressures from the demand side.[10] This implies that energy expenditures and consumer prices are expected to rise well in excess of 10% throughout the EU during the current years, which will likely have strong negative implications on households' living conditions, material deprivation, poverty and social exclusion. The remainder of this Report attempts to provide a quantitative preliminary estimate of these.

[8] The respective cross-country correlations are 5% for electricity, -15% for natural gas, -57% for heating oil and -15% for petrol.
[9] The Commission's recent European Economic Forecast can be downloaded in detail from its dedicated website. See also the ECB's recent macroeconomic projections from March 2022 for further details.
[10] The referenced research on inflation expectations are accessible through the recent VoxEU piece by Pascal Seiler and a European Economy Discussion Paper by Reiche and Meyler.

3 Household expenditures and living cost adjustments

In the presence of large inflation differences across product categories, the structure of household expenditures becomes crucial in determining the potential consequences of rising prices on households' finances, living costs and social situation. Depending on their consumption profile, households' exposure to inflationary pressure can be very uneven. The issue of so-called inflation inequality represents a long-standing tradition in economic research (Bach and Ando 1957), but has been on the periphery of monetary analysis for decades. In the wake of the recent inflation developments, it has received renewed scholarly and policy attention (e.g. Kaplan and Schulhofer-Wohl, 2017; Gürer and Weichenrieder, 2020; Villani and Vidal Lorda, 2022). The relevant studies typically find that necessities such as food or energy constitute a higher fraction of the total budget of poorer households, and have historically been exposed to above-average price increases.

In order to assess the extent and distribution of overall price increases European households are facing in the current context, this section presents the main structure of household expenditures across the EU and calculates the relevant adjustments in living costs and purchasing power in a customised manner.

3.1 The main structure of household expenditures in the EU

Detailed comprehensive analyses of European households' expenditure structure are based on the European Household Budget Survey (EU-HBS), a harmonised version of national HBSs compiled by Eurostat. Microdata from the most recent available EU-HBS wave dates back to 2015, but the historical stability of households' expenditure structure over time makes these an adequate source for the current analysis.[11] EU-HBS data contain a detailed classification of sampled households' consumer expenditures by purpose (COICOP), which makes it possible to compare household spending between and within countries alike.[12]

For the empirical analysis, I break down observed total household spending in line with the price comparisons discussed in the previous section. In particular, I distinguish between four main expenditure categories (or special aggregates) in accordance with the official Eurostat HICP methodology used for inflation calculations: food, energy, non-energy industrial goods and services. These provide an exhaustive account of households' monetary expenditures, and are detailed enough to adequately capture the main cross-sectional differences in spending patterns across different population segments. For supplementary analysis and robustness purposes, I also explore the more granular classification of special HICP sub-aggregates as well as the detailed break-down of households' energy expenditures.[13]

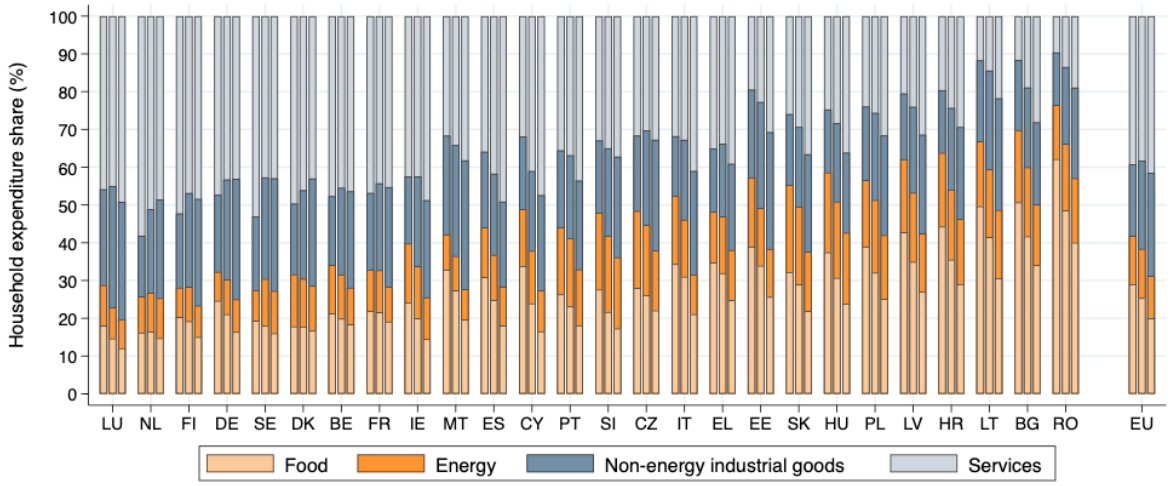
Figure 5 shows the typical structure of household expenditures by country and equivalised income quintile (i.e. 1st / 3rd / 5th, in order of appearance). It reveals that, on average, European households devote 25.4% of their total spending to food, 13.0% to energy, 23.3% to non-energy industrial goods and 38.3% to services.[14] The figure also shows that the expenditure shares of goods and energy are relatively stable across countries but the spending ratios on food and services are highly variable: while households in rich Member States spend around 15% of their budget on food and 45-50% on services, households in poor Member States do the opposite. Given the differences in current price trends across various expenditure categories (see Figure 1), this

[11] For example, the comparison of the two most recent collection waves from 2010 and 2015 reveals that the mean expenditure shares for broad (i.e. COICOP 1-digit) consumption categories at the country level are highly similar and typically within 1-2 percentage point of difference. Naturally, the over-time stability of consumption shares may decrease significantly during inflationary periods. For more details about potential substitution effects and biases, see the discussion in Section 3.2 of this Report.
[12] For more details on the European Household Budget Survey, see the dedicated Eurostat website.
[13] The special HICP sub-aggregates break down the main categories into 12 smaller categories are as follows: processed / non-processed food, electricity & gas / fuel energy, durable / semi-durable / non-durable industrial goods, and communication / housing / recreational / transportation / miscellaneous services. Following the COICOP classification, I also use the detailed breakdown of energy expenditures across the following 5 categories: electricity, gas, liquid fuel, solid fuel, other energy. For more details, see the Harmonised Index of Consumer Prices (HICP) Methodological Manual by Eurostat, available here.
[14] These figures are calculated as the representative (sample-weighted) average of the relevant expenditure shares calculated at the household level. (For more details on potential alternative methods, see the discussion surrounding Figure 9 in Section 3.2.) The EU-level figures were produced as the weighted average of the relevant national figures based on the official HICP country weights by Eurostat as of 2021.

helps illuminate why overall inflation in many poorer Central and Eastern European countries is higher than elsewhere in the EU.

Figure 5 also shows that the structure of household expenditures varies equally within countries, in rather similar fashion as discussed above. Low-income households typically spend a higher fraction of their budget on food, and relatively less on goods and services, than high-income households. Somewhat strangely, the expenditure share of energy is rather stable along the income margin. Figure 5 also reveals that the cross-quintile gaps are substantially higher in poorer Member States: for example, the average gap in combined food and energy spending between households of the 1st and 5th quintile is 8.4% in EU-15 countries and 16.9% in non-EU15 countries. The large disparity of consumption structure in poorer CEE countries also implies that low-income households likely spend the majority of their budget on necessities: in Romania, for example, the combined share of food and energy spending is a whopping 76.4% in the 1st income quintile. As a result, low-income households in poor Member States are worse off both in absolute and relative terms than their fellow Europeans, and are particularly vulnerable to the adverse effects of ongoing inflation.

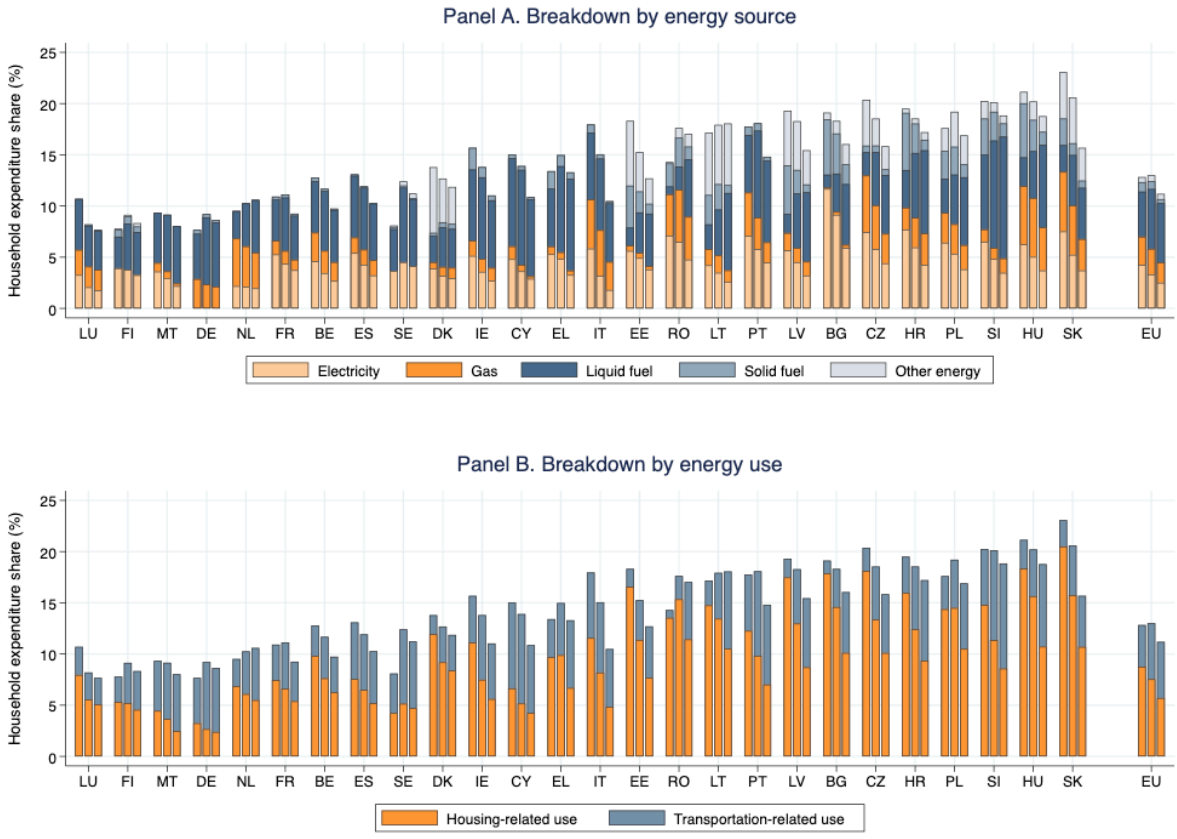
Figure 5. Structure of household expenditures by country and income quintile



Notes: Own analysis of microdata from the 2015 wave of the EU-HBS. The figures present representative country-specific averages of the structure of household expenditures, conditional on the 1st (left), 3rd (middle) and 5th (right) income quintile calculated on the basis of equivalised disposable monetary income [variable EUR_HH095]. The categorisation of expenditures is based on the Eurostat's HICP manual. The EU average is calculated on the basis of official HICP country weights (as of 2022) used for EU-level inflation statistics by Eurostat. The relevant figures for Austria are missing due to data limitations.

Zooming in on households' energy expenditure, **Figure 6** shows that it similarly varies across both countries and income groups. National values for median households range between 8.2% in Luxembourg and 20.6% in Slovakia, while the gap between the lowest and highest income quintiles in a country varies between -3.1 p.p. in Sweden and 7.4 p.p. in Italy. In general, poorer households and countries tend to be more financially dependent on energy, and are therefore more affected by ongoing price developments. Panel A breaks down households' energy expenditure by energy source. It shows that electricity and liquid fuels are the main energy components overall, but it also reveals substantial household spending on natural gas, solid fuels and/or other energy sources in individual Member States (such as Bulgaria, Denmark, Hungary, Lithuania, the Netherlands or Romania). Panel B focuses on the consumption purpose of households' energy spending: housing-related use is dominant in most countries (except for Cyprus, Germany, Malta and Sweden), and especially among poorer segments of the EU population. Transportation-related use strongly overlaps with expenditures on liquid fuels: while these latter are also used for heating purposes in selected Member States (such as Belgium, Greece, Ireland or Slovenia), they are almost exclusively used to power private road transportation in most cases.

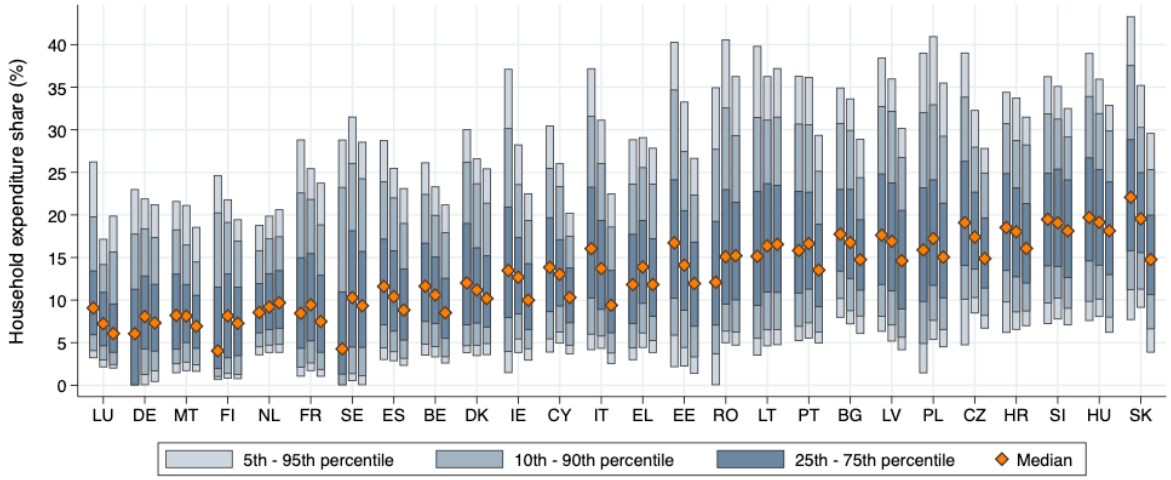
Figure 6. The detailed breakdown of households' energy expenditures by country and income quintile



Notes: Own analysis of microdata from the 2015 wave of the EU-HBS. The figures present representative country-specific averages of the structure of household expenditures, conditional on the 1st (left), 3rd (middle) and 5th (right) income quintile calculated on the basis of equivalised disposable monetary income [variable EUR_HH095]. The categorisation of expenditures is based on the Eurostat's HICP manual. The EU average is calculated on the basis of official HICP country weights (as of 2022) used for EU-level inflation statistics by Eurostat. The relevant figures for Austria are missing due to data limitations.

Another noteworthy aspect of households' energy spending is its large dispersion across national households. Most of this dispersion is unrelated to income and signals increased energy dependence in large segments of the population. **Figure 7** illustrates the distribution of the energy expenditure share by country and income quintile. It reveals that, among median-income households, the inter-quartile range of energy spending varies between 6.4 and 13.8 percentage points across countries. Moreover, in most Member States, one in ten households spends at least 10 p.p. more of their budget on energy than the median household. This highlights how summary statistics such as average expenditure shares can obscure important additional sources of variation across households, and may understate the true financial risks and social implications associated with rising energy prices in the EU.

Figure 7. The dispersion of households' energy expenditure share by country and income quintile



Notes: Own analysis of microdata from the 2015 wave of the EU-HBS. The figures present representative country-specific distributions of households' energy expenditure share conditional on the 1st (left), 3rd (middle) and 5th (right) income quintile calculated on the basis of equivalised disposable monetary income [variable EUR_HH095].

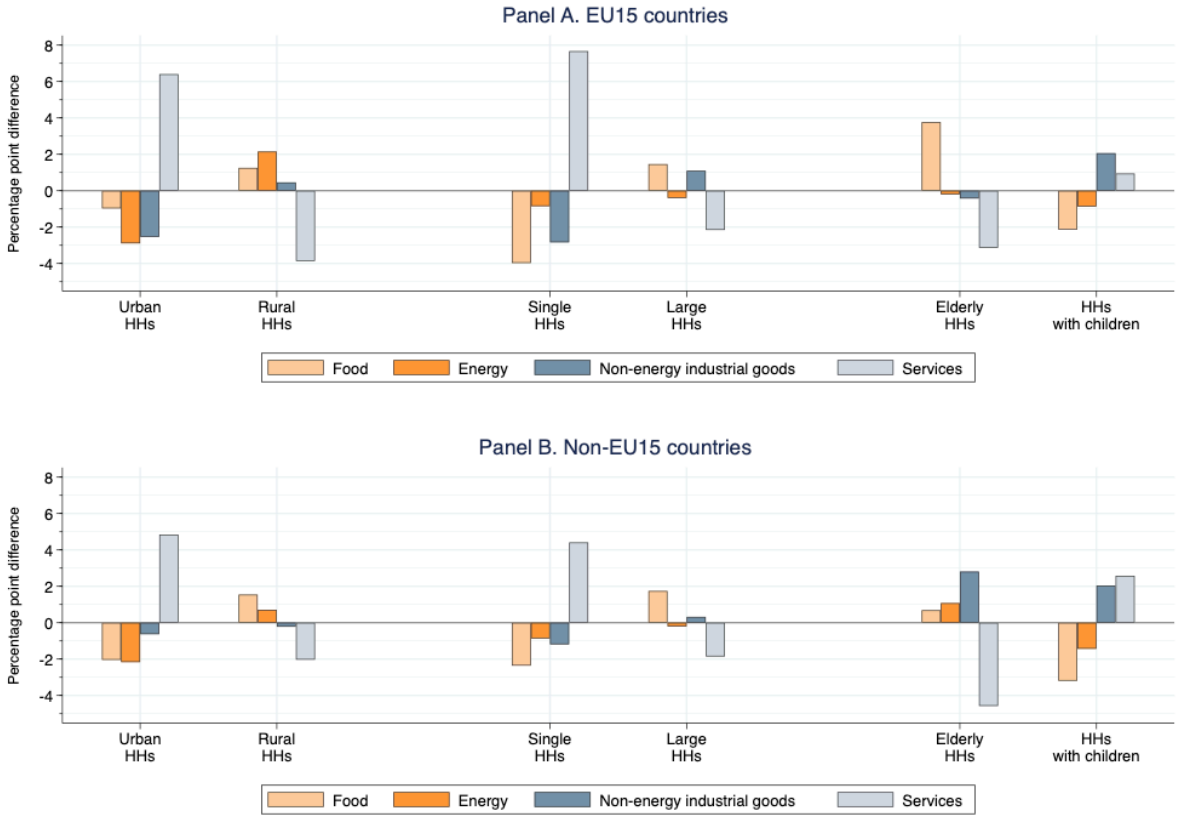
Regression analysis can help identify those factors that have a systematic influence on the structure of household consumption beyond income. In particular, one may regress the expenditure share of different product categories on households' socio-demographic characteristics and (the logarithm of equivalised) household income to obtain statistically significant differences in the cross-section.[15] Using EU-HBS microdata from 2015, **Figure 8** shows that, in a typical EU country, the largest horizontal differences in spending structure concern population density, household size and household composition. Regardless of their income, urban households tend to spend up to 5 p.p. less on energy and 10 p.p. more on services on average than similar rural households in a country. Differences in spending patterns are also substantial between small and large households as well as households with young or elderly members, but these are mostly limited to food and services spending rather than energy. The main spending patterns are rather similar among both EU15 and non-EU15 countries. This analysis highlights the importance of distributional aspects of household finances and may help identify entry points for targeted and effective policy interventions.

3.2 The effect of inflation on households' living cost

Putting together the inflation profiles presented in the previous section and the structure of household expenditures discussed above, it becomes possible to calculate the change in households' living costs and purchasing power in a customised manner. This simply requires taking the weighted-average of each main inflation component by product category, whereby the relevant expenditure shares of target households are used as weights. Households that spend a higher fraction of their budget on product categories with relatively high inflation will see a higher increase in their cost of living and bigger losses in purchasing power or real income.

[15] The figures presented and cited in this section are based on standard (population-weighted) OLS regressions using household-level microdata from the 2015 wave of the EU-HBS. In order to measure the average difference in energy expenditure between different household types in a country, I estimate a set of pooled regression specifications that uses households' expenditure share of a particular product category (i.e. food, energy, industrial goods, services, respectively) as the dependent variable, and features the logarithm of households' equivalised income, country dummies, and household-level indicator variables on settlement type, household size and household composition on the RHS. The parameter estimates associated with particular socio-demographic characteristics therefore represent the mean percentage point difference in energy spending share across household different types. The resulting estimates are highly robust and statistically significant at 1% level.

Figure 8. Horizontal differences in the structure of household expenditures unrelated to income



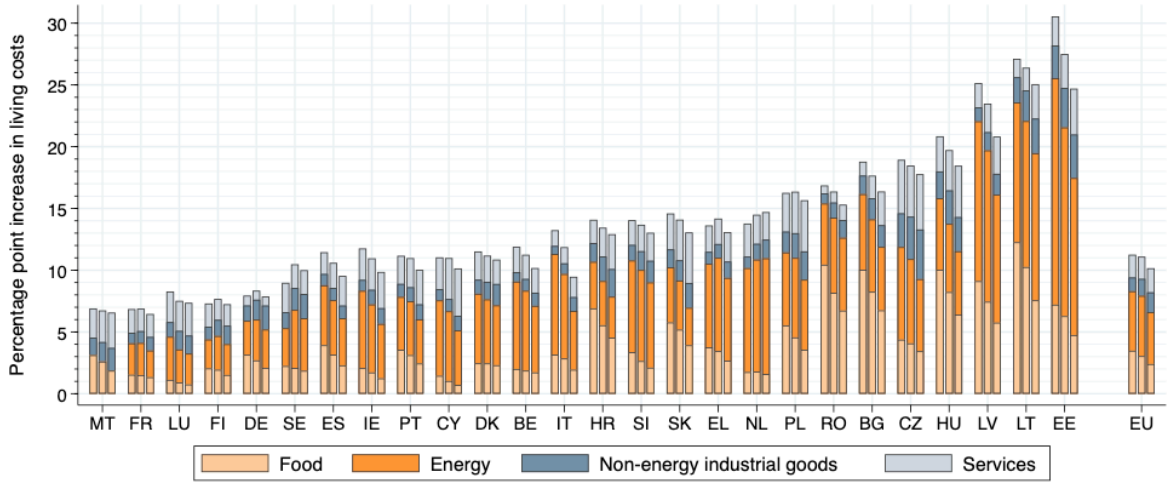
Notes: Own analysis of microdata from the 2015 wave of the EU-HBS. The figures represent conditional mean differences in the combined food and energy expenditure share of households, as obtained by parameter estimates to categorical control variables in a standard (weighted) least squares regression that also features the log of household equivalised income among the independent variables. The reference category is represented by prime-aged households with 2-4 members and without children that live in areas with intermediate population density. The figures represent (population-weighted) cross-country averages based on all EU Member States except for Austria.

This procedure is the standard approach to analysing the distributional aspects of inflation. It is worth noting, however, that the relevant calculations are based on two crucial implicit assumptions. The first assumption is that headline CPI figures adequately capture the change in consumer prices for all population segments in a country. There is a large empirical literature suggesting that this may not be true: several studies observe considerable geographical variations in consumer prices within countries, while JRC research on absolute poverty has identified large price dispersions even at the local level, across different data sources, and among different household types (Menyhért et al., 2021).[16] Although available research focuses mainly on the price level, it is reasonable to suspect considerable inflation dispersion, as well. For one, item-level price trends within product categories tend to be different and have heterogeneous effects on households with divergent consumption habits and preferences (see Eurostat HICP data or Menyhért et al. [2021] for more details). Secondly, the empirical relationship between inflation and price dispersion is not neutral (Reinsdorf, 1994; Sheremirov, 2020). Thirdly, the growing literature devoted to household-level inflation using scanner data finds considerable inflation differences between poorer and richer population segments (Kaplan and Schulhofer-Wohl, 2017). For these reasons, headline CPI inflation is likely to understate (overstate) the true change in the purchasing cost of the typical consumption basket for certain household types, especially in the low-income (high-income) population segment.

[16] For more detailed information, see Roos (2006), Reiff and Rumler (2014), Berardi, Sevestre, and Thébault (2017), Biggeri, Laureti, and Polidoro (2017), Janský and Kolcunova (2017), Léonard et al. (2019) and Weinand and von Auer (2020), among others.

The second implicit assumption I make is that substitution effects are negligible and that households do not change their demand structure as a result of a changes in relative prices. In reality, this demand substitution likely takes place simultaneously between and within product categories: during inflationary periods, consumers tend to prefer cheaper variants of the same products, cheaper products within the same product categories, and cheaper product categories themselves at the same time. The net expenditure effect of these is called the substitution bias, and has been estimated to be well below one percentage point in advanced economies during the previous low-inflation periods (Manser and McDonald, 1988; Knetsch et al, 2021; Nickel et al., 2021). Its size is likely to have increased in the wake of recent price developments, and especially for high-income households that spend a substantial part of their budget on non-essential products and services. For poor and low-income households, the scope for demand substitution is much more limited, and CPI figures are expected to offer a more accurate view of their living cost adjustments.

Figure 9. Contribution of different product components to increases in living costs by income quintile



Notes: Own calculations based on annual HICP inflation data from the Eurostat as of August 2022 (series prc_hicp_manr) and microdata from the 2015 wave of the EU-HBS. The bars represent the implied change in living costs of European households with average expenditure shares in each product category by country and (equivalised) income quintile, during the period between August 2021 and August 2022. (The left / middle / right bars represent the 1st / 3rd / 5th income quintiles, respectively.) The EU average is calculated on the basis of official HICP country weights (as of 2022) used for EU-level inflation statistics by Eurostat. The relevant figures for Austria are missing due to data limitations.

Figure 9 presents the resulting average change in households' living cost, broken down by expenditure category, by country and income quintile. It shows that, since August 2021, living costs have increased by 11.1% on average across the EU, ranging between 6.7% (in Malta) and 27.5% (in Estonia) at the level of individual Member States. The figure also reveals that energy prices contribute the most to the rise in living costs (43.9% at the EU level and up to 62.6% in the Netherlands in relative terms), whereas the impact of goods and services remains limited in most countries (except for Luxembourg and Malta). The contribution of food inflation to living cost increases is 27.5% (in relative terms) at the EU level, but represents the biggest source of households' purchasing power loss in countries like Bulgaria, Hungary and Malta.[17]

Figure 9 also reflects the different consumption structure of low-income and high-income households in a country, with typically higher food and energy contributions among the former. Despite these differences, the overall increase in households' living costs have so far remained broadly similar across the national population in most, if not all, countries. The gap in living costs adjustments between the lowest and highest income quintiles is 1.1 percentage point at the EU level, but reaches 3-5 percentage points in selected Member States such as Estonia, Italy or Latvia. Large national differences are driven mainly by the cross-quintile divergence in households' energy expenditure share, as presented in Figure 6. This also implies that in countries where the energy expenditure share increases with income (as in Germany, the Netherlands or Sweden), high-income

[17] Note that the presented breakdown of living cost increases is based on direct price effects alone. To the extent that rising energy prices are responsible for increases in the price of other expenditure categories, the combined (i.e. direct and indirect) effect of energy price inflation on households' budget may be considerably larger in relative terms.

households have typically seen somewhat larger increases to their living costs. Overall, however, these findings tend to corroborate existing evidence on inflation inequality that favours the more affluent and leave poorer households more vulnerable to price increases.

The results presented in **Figure 9** are comparable but not fully aligned with the findings by Villani and Vidal Lorda (2022) published in a recent JRC Science for Policy Brief (JRC129558). Using broadly similar methodology and data, these authors observe larger differences in living cost adjustments across income quintiles for a subset of EU Member States.[18] In particular, Villani and Vidal Lorda (2022) find that, as of March 2022, the increase in living costs was 1.5 p.p. higher among poor households (of the 1st income quintile) than among rich households (of the 5th income quintile) on average, and up to 5 p.p. higher in a handful of countries (like Belgium, Greece, Italy, Lithuania, the Netherlands or Spain). The main reasons for this divergence are twofold. First, Villani and Vidal Lorda (2022) use total household consumption (rather than equivalised household income) as the basis for quintile assignment, which leads to a considerably different allocation and increases the observed quintile gaps by around 0.5 p.p. on average.[19] Second, Villani and Vidal Lorda (2022) calculate the relevant expenditure shares not at the individual level, but as the aggregate ratio of quintile-specific average expenditures by country. Since households' observed expenditure shares tend to vary with income (consumption) within quintiles, this macro-level approach typically produces somewhat higher or lower aggregate figures than the averaging of individual (household-level) shares. Moreover, the numerical difference between these outcomes is rather changeable from one case to the next, and is an important source of the large cross-quintile differences in living cost adjustments identified by Villani and Vidal Lorda (2022).[20] The sensitivity of such calculations to technical decisions and assumptions highlights the importance of careful analysis, methodological transparency and collective judgment for effective evidence-based policy-making.

Given the divergent price and expenditure patterns associated with energy consumption across the EU, it is useful to further break down the resulting increase in households' energy costs. Panel A of **Figure 10** shows that electricity, liquid fuel and natural gas have been the main drivers of households' increasing energy bills.[21] The contribution of other components is smaller and limited mainly to selected Member States: for example, solid fuels matter greatly in Bulgaria and Poland, while other energy sources (such as district heating systems based on renewables) in the Baltic states. The figure also shows that different income groups in a country may face very different cost drivers depending on their energy mix. Panel B of **Figure 10** focuses on the purpose of energy consumption, and shows that poorer households are affected predominantly by increasing housing-related costs, whereas richer countries and population segments will notice their increasing transportation-related costs in the first place. Ongoing price developments may eventually alter this picture, but are likely to retain the large cross-country divergence (and the need for coordinated but customised policy solutions) with respect to their energy costs.

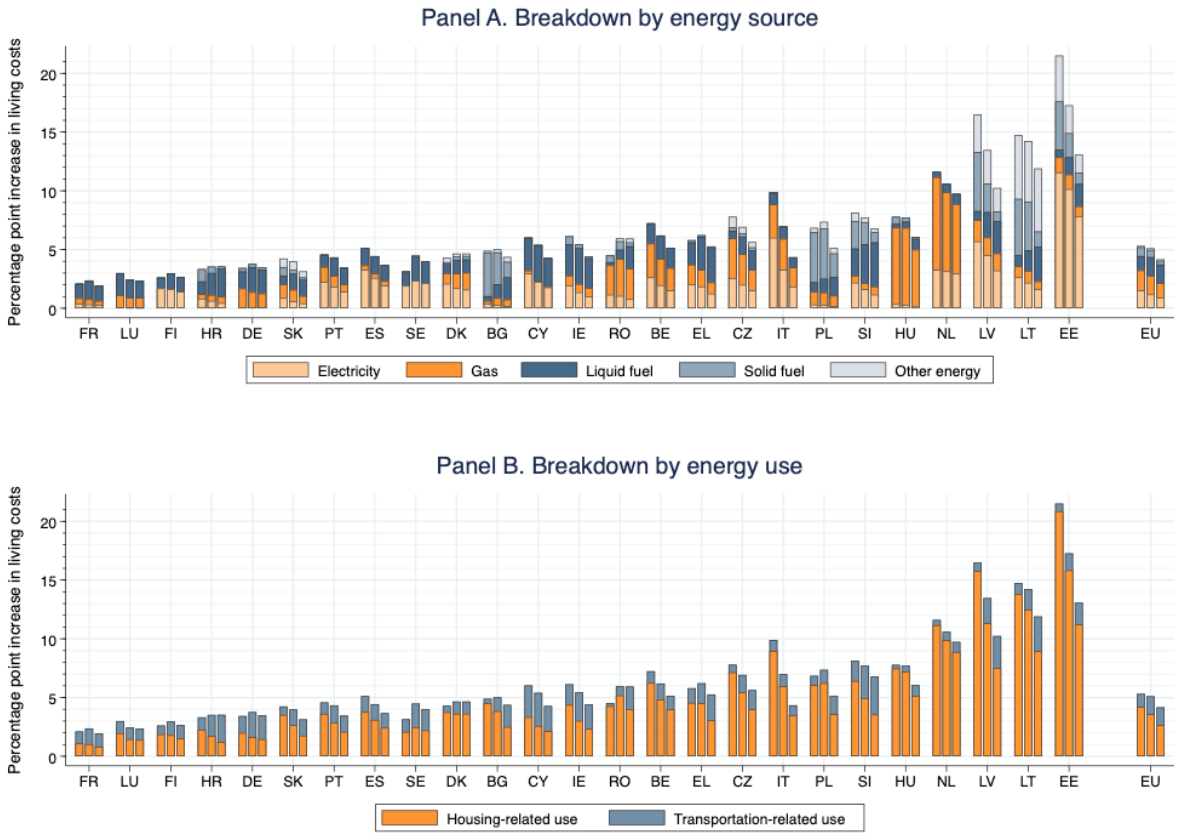
[18] Villani and Vidal Lorda (2022) use the same HBS microdata for 17 EU countries in their analysis, but rely on a more granular expenditure classification and national CPI data from the OECD as of March 2022 (rather than harmonised HICP data from Eurostat as of August 2022) in their analysis. For more details, see the relevant JRC Publications Repository site here.

[19] Since household size is strongly correlated with household income and consumption, equivalisation matters greatly for the quantile assignment. The non-equivalised approach by Villani and Vidal Lorda (2022) concentrates 47.2% of single-person households in the lowest income quintile, and 42.4% of large households (with 5+ members) in the highest income quintile. (The corresponding values for the equivalisation-based assignment are 24.9% and 10.7%, respectively.) Using household consumption as the basis for quintile assignment drives a further wedge between the respective allocations (i.e. the share of sampled households that are assigned to a different quintile from the reference one is 49.5% in case of non-equivalised income and 62.9% in case of non-equivalised consumption). To the extent that households of different size and combination have different consumption preferences at any given level of equivalised income or living standard, the various quintile assignments can amplify or reduce horizontal differences in living cost adjustments.

[20] The two methods differ in the order of calculations. The one used in this paper calculates the expenditure shares at the individual level first, and takes the (population-weighted) average of these by country and income quintile afterwards. The strategy by Villani and Vidal Lorda (2022) operates in reverse order: it first calculates the average expenditure level by category for each quintile, and derives the relevant expenditure shares based on these aggregate figures. Depending on the statistical relationship between the structure of expenditures and disposable income (or consumption) across households within each income quintile, the outcome of the two methods can be considerably different. In particular, since food and energy shares tend to decrease with household income, they get underestimated by the Villani and Vidal Lorda (2022) method. (Conversely, the aggregate expenditure shares for goods and services are overstates.) The extent of these biases typically depends on many idiosyncratic factors and is rather variable from one quintile to the next, and appears to be an important driver of the living costs differences identified by Villani and Vidal Lorda (2022) in countries like Belgium, Greece, Ireland, Italy, Lithuania or Spain.

[21] The relative contribution of energy components to living cost increases of middle-income households at the EU level is 25.7% for electricity, 19.4% for natural gas, 45.1% for liquid fuels, 5.9% for solid fuels and 3.8% for other energy.

Figure 10. The structure of living cost increases due to energy prices by country



Notes: Own calculations based on annual HICP inflation data from the Eurostat as of August 2022 (series prc_hicp_manr) and microdata from the 2015 wave of the EU-HBS. The figures represent the implied change in living costs of European households with equivalised income below the national median, based on their typical expenditure pattern, in the period of August 2021 and August 2022. The EU average is calculated on the basis of official HICP country weights (as of 2022) used for EU-level inflation statistics by Eurostat. The relevant figures for Austria and Malta are missing due to data limitations and zero change, respectively.

Finally, one may assess the robustness of the presented living cost changes and their relationship with headline inflation figures. **Figure 11** shows that using a more granular expenditure classification (based on 15 rather than 4 product categories) yields rather similar results for middle-income households in most Member States.[22] The average gap in implied living cost adjustments between the two calculation methods is less than 0.1 p.p. at the EU level, but may reach up to 2.5 p.p. in individual countries like Estonia or Lithuania. **Figure 11** also shows how the predicted living cost increases compare with headline inflation, and reveals that they are somewhat higher than official CPI figures in most countries.[23] One reason for this is the higher observed expenditure weight of items with above-average inflation (such as food and energy) in the EU-HBS microdata as compared to the current HCIP weights used by Eurostat for inflation statistics.[24] Indeed, using the official HICP weights from 2015 to produce hypothetical CPI values helps aligning the two indicators, but significant gaps still remain in selected EU countries (such as Greece, Italy, Romania or the Baltic states). Overall, these calculations appear to suggest that headline inflation, as of today, gives a realistic but rather conservative view

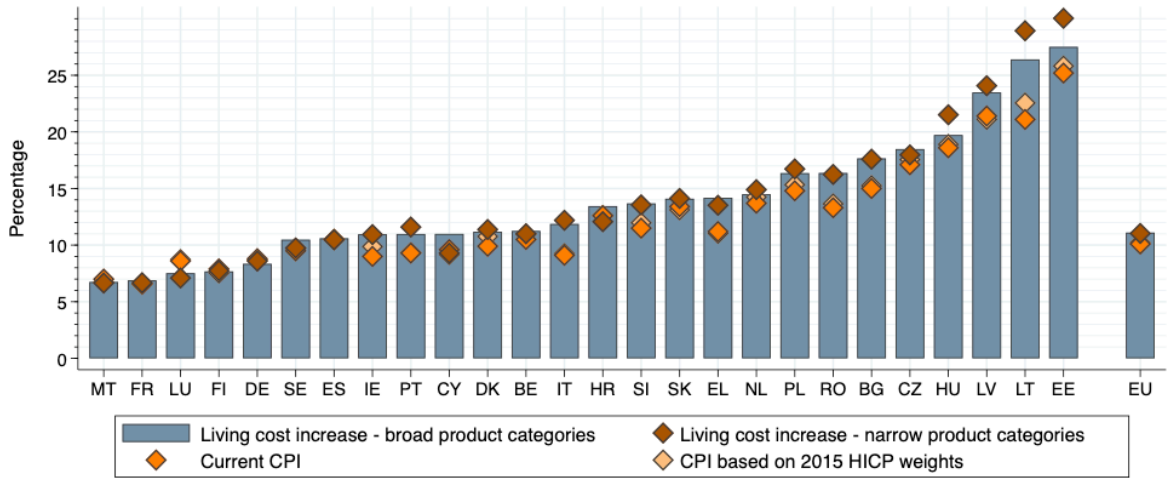
[22] The relevant product categories are as follows: processed / non-processed food, electricity / gas / liquid fuel / solid fuel / other energy, durable / semi-durable / non-durable industrial goods, communication / housing / recreational / transportation / miscellaneous services. For more details, see the Harmonised Index of Consumer Prices (HICP) Methodological Manual by Eurostat, available here.

[23] The difference is one percentage point at the EU level, but exceeds 3 p.p. in Lithuania and Romania.

[24] The relevant country-specific HICP item weights used by Eurostat are available here. These latter are adjusted annually based on data from national accounts pertaining to household consumption among domestic residents. Available statistics show that the HICP item weights have changed considerably over the recent years data, especially in expenditure segments (such as energy) with above-average recent inflation. The current gap between observed expenditure weights and effective HICP weights for energy is particularly large in Greece, Italy and the Baltic states.

of middle-income households' living cost adjustments in most Member States. For poorer households, however, the observed loss in purchasing power may be several percentage points higher than the relevant CPI figure.

Figure 11. Robustness of living cost increases in comparison with inflation by country



Notes: Own calculations based on HICP statistics and inflation data from the Eurostat as of August 2022 (series prc_hicp_manr) and microdata from the 2015 wave of the EU-HBS. The figures represent the implied change in living costs among European households of the middle income quintile, during the period between August 2021 and August 2022, based on different calculation methods and in comparison with various CPI indicators. The EU average is calculated on the basis of official HICP country weights (as of 2022) used for EU-level inflation statistics by Eurostat. The relevant figures for Austria are missing due to data limitations.

4 The effect of inflation on material and social deprivation

Despite detailed information on households' changing living costs and the decreasing purchasing power of their income, it is not straightforward to assess the effects of rising prices on the social situation. One important reason is that leading social policy indicators are often non-monetary and/or only indirectly affected by changes in households' living costs. For example, the headline indicator used by the European Commission for social monitoring, the share of the total population at risk of poverty or social exclusion (AROPE), is composed of sub-indicators that do not automatically capture the effect of rising prices. Its first component, the at-risk-of-poverty (AROP) rate, is based on a relative threshold of 60% of the national median (equivalised) income, and is independent of purchasing power considerations.[25] Similarly, the AROPE indicator of low-work-intensity (LWI) indicator has a non-monetary focus and is driven by changes in individuals' and households' labour force participation. It is the third AROPE component of material and social deprivation (MSD) indicators that represents an absolute (basic) standard of living, and is therefore responsive to increasing living costs and/or decreasing real household incomes. A large variety of alternative social indicators are also used in EU policy-making, but these tend to be more particular in character, limited in scope, or focussed on particular population groups.[26]

In the remaining analytical sections of the Report, I attempt to quantify the effect of observed changes in households' living cost on various social policy indicators. The first of these is the incidence of material and social deprivation as featured in the headline AROPE indicator. Since the relationship between increasing living costs and deprivation is not functional and in many ways incidental, a sound empirical strategy is required to identify how price changes are transmitted into forced inability on the parts of households. The simple solution proposed in this Report may be first but certainly not the only possible attempt at this problem.

4.1 Composite indicators of material and social deprivation

The starting point for the analysis is the recent work on absolute poverty measurement by the JRC that has documented a strong and rather stable statistical relationship between the level of household income and the incidence of material and social deprivation (MSD) in EU countries based on recent waves of EU-SILC microdata (see Menyhért et al. [2021] for further details). These results indicate that MSD is disproportionately concentrated among low-income households, and that each move from one income decile to the next in the national distribution reduces the deprivation rate by around one third on average.

Using these insights, one may assess the impact of rising prices on the deprivation rate by focusing on the corresponding change in households' purchasing power and real income. Since inflation-induced systemic changes to European households' real income have been scarce and hard-to-identify from time series data, using cross-sectional comparisons appears to be the only feasible option for an EU-wide analysis. I therefore propose to identify the deprivation effects of a percentage point change in households' real income using a single recent wave of EU-SILC microdata, and quantify the overall impact of ongoing inflation by scaling up these elasticities by the appropriate margin. In other words, instead of observing the same (or similar types of) households and documenting their MSD status repeatedly during inflationary periods, I concentrate on the difference in deprivation incidence across households with different real (and nominal) income positions at a single point in time.

For this strategy to work, three main preconditions need to be met. First, the probability of a household (of any given type) suffering from deprivation needs to be determined mainly by its contemporaneous level of income, rather than past income histories and/or savings. Second, conditional on real household income, changes in relative prices (as observed under the current inflationary environment) should not have a substantial effect on

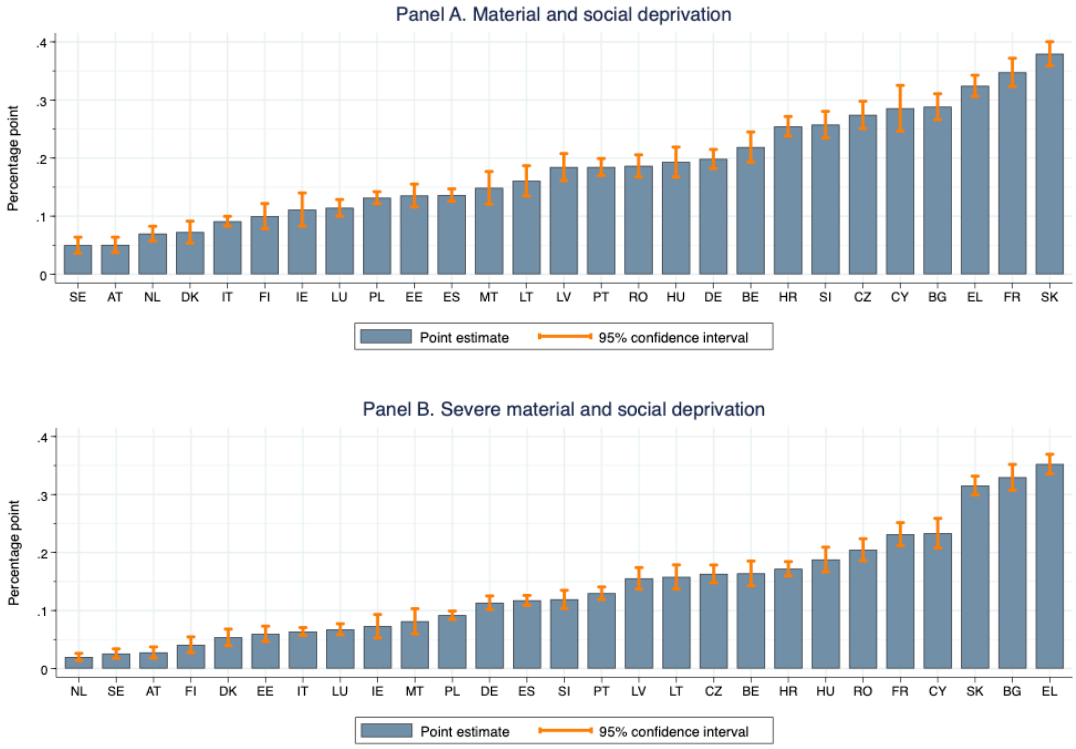
[25] In theory, one may focus on the anchored version of the AROP poverty line and express household incomes in real terms, in correspondence with the observed changes in the cost of living over different periods of time. This, however, appears out of step with the conceptual underpinnings of AROP that focuses on relative deprivation without targeting any particular level of purchasing power or living standard.

[26] Existing portfolios of social indicators at the EU level include the Social Protection Performance Monitor (SPPM), the Joint Assessment Framework (JAF) or the revised Social Scoreboard, among others. For further details, see the dedicated Commission and Eurostat websites here, here, here, or here.

the incidence of deprivation.[27] Third, the institutional framework (e.g. government regulations, social security systems, provision of essential services) need to remain relatively stable so that a given level of real income translates into the same deprivation incidence throughout the observation period.

Assuming that the above conditions hold, I estimate the income elasticity of MSD using a simple OLS regression framework and household-level microdata from the 2019 wave of the EU-SILC.[28] The regression specification features the binary indicator variables of MSD and severe MSD (SMSD), respectively, 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.[29] This setup may therefore be considered as a standard linear probability model (LPM) that identifies the percentage point change in deprivation associated with proportionate (1%) increase in household income across different household types.

Figure 12. Predicted increase in material and social deprivation due to 1% decrease in real household income



Notes: Own calculations based on microdata from the 2019 wave of the EU-SILC. The figures present regression-based estimates of income elasticity of material and social deprivation (MSD), and denote the predicted percentage point change in MSD associated with 1% decrease in real household income. The 95% confidence bands around the point estimates are also indicated.

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[27] Ascertaining the empirical validity of these conditions in the current context would go beyond the scope of this note. Theoretical considerations based on existing evidence, however, suggest that these conditions are not unrealistic. First, the saving rate among financially-constrained target households is very low, and it is reasonable to expect that, conditional on the contemporaneous level of income, information on their past income histories would not systematically alter their deprivation probability. Second, since most MSD households suffer from financial insecurity and cannot even afford all of the basic necessities, it is unlikely that relative price changes have a large effect on the conditional incidence of the composite (rather than individual) deprivation associated with any given level of real income.

[28] The most recent available SILC microdata refers to 2020. The choice of using the 2019 wave was instead motivated by the Covid-19 pandemic that may have distorted the historically stable relationship between income and deprivation in the 2020 wave in a temporary and/or idiosyncratic manner.

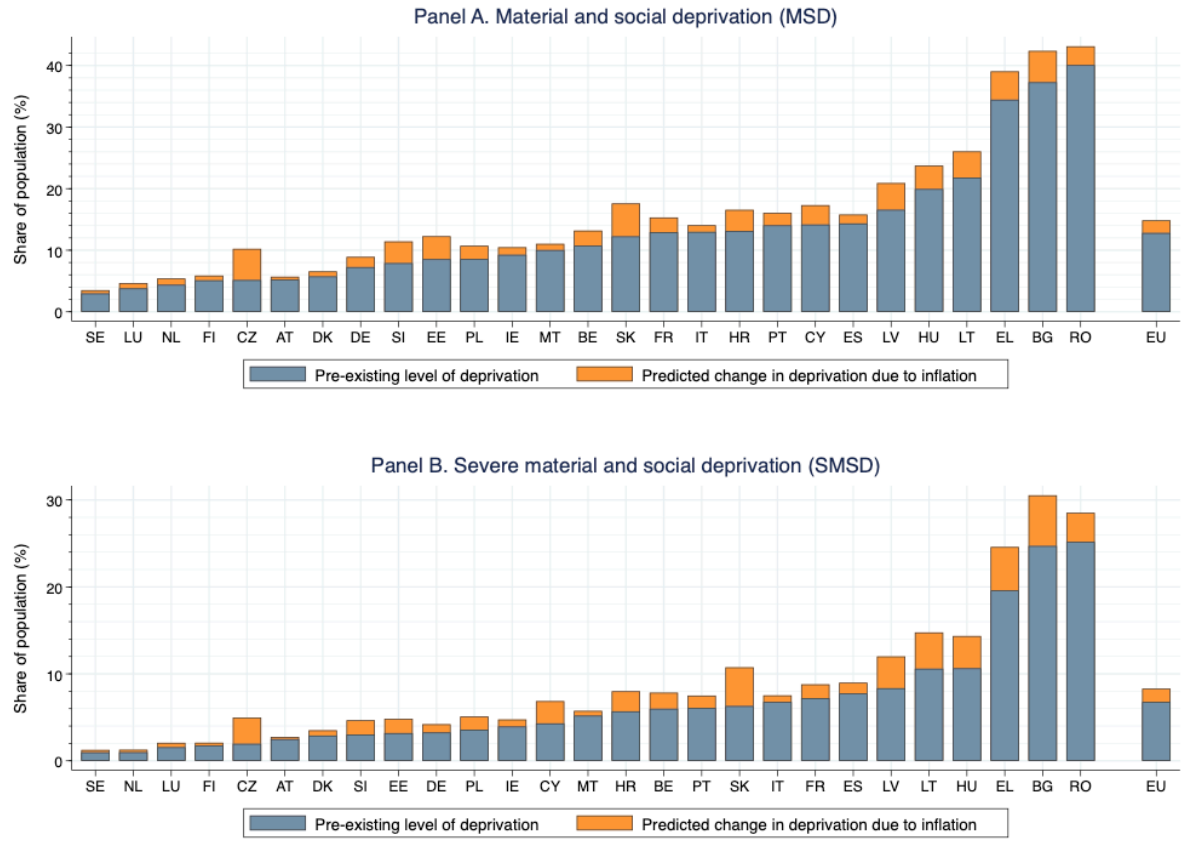
[29] The binary indicator of MSD and severe MSD status of each household and their members are calculated using the official (recently revised) MSD methodology based on 13 indicators (for more information, see the dedicated Eurostat website). I estimated the following regression specification

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

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

Figure 12 presents the resulting regression-based elasticity estimates for each country and indicator combinations. These figures indicate that a 1% decrease in (equivalised) household income is associated with a 0.18 percentage point increase in MSD and a 0.13 percentage point increase in severe MSD on average. The national elasticities are highly variable, and range between 0.06 - 0.36 percentage points for MSD and 0.02-0.35 percentage points for SMSD.[30] The figure also shows that the elasticity estimates are robust and highly significant statistically: the associated standard errors are consistently below 1.5 basis points (i.e. 0.015 percentage points), and the relevant 95% confidence intervals are within ±3 basis points around the point estimates. The elasticities are also robust to changes in the regression specification (i.e. the absolute difference between the most and least parsimonious specifications is 1.6 basis points on average) and the estimation sample (i.e. the average absolute difference is below 4 basis points).[31]

Figure 13. Predicted increase in material and social deprivation due to inflation



Notes: Own calculations based on microdata from the 2019 wave of the (cross-sectional) EU-SILC. The figures indicate the observed incidence of severe MSD in the data (based on the revised methodology), and the predicted increase in deprivation associated with different levels of price inflation, based on the estimated elasticities. The real inflation increase is not calculated for Austria for lack of data availability. The EU-level figures are calculated as the population-weighted average of the relevant country scores.

Scaling up these elasticities proportionately by the appropriate margin yields the predicted effect of any given drop in real household income on the deprivation rate. Focusing on the observed average loss in real incomes that median households in each EU country have suffered between August 2021 and August 2022 as a result of inflation (see Figure 9 for details), **Figure 13** presents the observed pre-inflation and predicted post-inflation incidence of MSD and SMSD in its respective panels, based on the 2019 EU-SILC wave. The results indicate that,

[30] The elasticity estimates tend to be larger (smaller) in countries with comparatively high (low) incidence of material and social deprivation. The lowest values are typically found in the Northern Member States characterised by low deprivation incidence, while the highest values are present in poorer CEE or Mediterranean countries with widespread deprivation (such as Bulgaria, Greece or Slovakia).

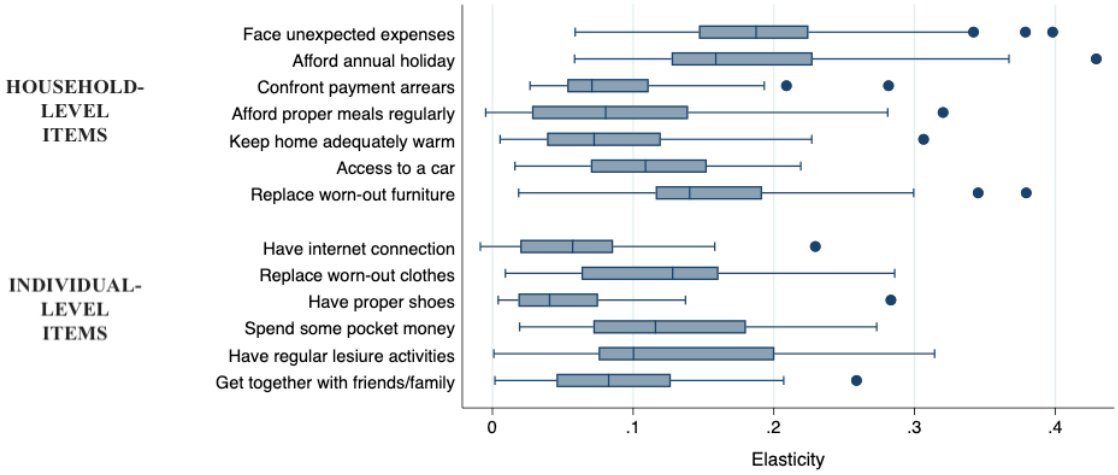
[31] The most parsimonious specification only contains the income variable (and a constant) on the RHS, while the least parsimonious reference specification is the one with the full control structure. As regards the estimation sample, the reference specification contains households with below-median income only, against the full-sample alternative that includes all households in the sample.

recent inflation is expected to have raised material and social deprivation by 2 p.p. and severe material and social deprivation by 1.5 p.p. at the EU level. The relevant national figures range between 0.5 p.p. (in Austria) and 5.3 p.p. (in Slovakia) for MSD, and between 0.3 p.p. (in Austria) and 5.8 p.p. (in Bulgaria) for SMSD. As may be expected, the predicted changes in MSD and SMSD are highly correlated across countries, and considerably larger in Member States with higher pre-existing deprivation levels. For example, the average predicted increase in MSD is 1.5 p.p. in EU15 countries and 3.7 p.p. in non-EU15 countries. This suggests that ongoing price developments are expected to further increase the substantial pre-existing gaps in poverty and social exclusion between poorer and richer EU Member States.

4.2 Specific focus on particular deprivation areas

The same strategy can also be used to uncover the relationship between the change in households' purchasing power and individual sub-indicators of material and social deprivation. This may help assess which MSD domains are most likely to be affected by rising living costs, even though the relevant estimates are less reliable than the ones concerning composite MSD indicators given changes in relative prices. Among the 13 MSD items considered, seven relate to the household-level and six concern individual needs.[32] The box plot in **Figure 14** shows the relevant distribution of country-level elasticity scores for each of these deprivation items, as derived from the same regression-based methodology. It reveals that the elasticity estimates are highly variable across countries and indicators alike. The deprivation items that are most sensitive to changes in household income are typically the most prevalent ones: the ability to face unexpected expenses, afford an annual holiday, or replace worn-out furniture and clothes. These are the items financially constrained household tend to give up on most often, even though ongoing changes in relative prices may substantially alter this picture in the future.[33]

Figure 14. Income elasticity of MSD by deprivation item across EU Member States



Notes: Own calculations based on microdata from the 2019 wave of the EU-SILC. The figures present regression-based estimates of income elasticity of material and social deprivation (MSD) items, as used for official statistical measurement by Eurostat. The figures denote the predicted percentage point change in the incidence of MSD associated with a 1% reduction in income across EU Member States. The markers on the chart present the cross-country distribution quartiles (shaded box), the relevant adjacent values (whiskers denoting the smallest/largest scores within the step of 150% of the IQR), as well as outlier values (point markers).

[32] All MSD indicators capture an enforced lack of a necessary and desirable item consensually required for an adequate life. For more details, see the dedicated Eurostat website.

[33] For example, substantial increases in the cost of energy and heating is likely to have only a considerable effect on households' ability to keep their home adequately warm. The same applies to rising food prices that may disproportionately affect households' ability to afford a balanced and healthy diet.

5 The effect of inflation on energy poverty

For a decent standard of living, the availability of affordable energy for heating, cooling, lighting one's home and daily travelling is essential. With soaring energy prices and often poor energy efficiency, many low-income households may see their energy expenditures increase to the point of facing financial distress. Also, inadequate comfort and sanitary conditions in housing and work environments as a result may lead to lower productivity, poor health or physical and emotional stress. Given that the EU has been facing an acute and persistent housing affordability challenge for decades, with an alarming number of Europeans being unable to afford rents or cover basic housing costs, energy poverty represents one of the most important socio-economic aspects of the current situation.

The EU is committed to tackling energy poverty by its roots and protecting vulnerable consumers, and made it a policy priority in the "Clean energy for all Europeans" package, adopted in 2019. This requires Member States to assess the number of households in energy poverty, tackle energy poverty wherever it is identified and protect vulnerable households. Moreover, as part of its Renovation Wave strategy, the Commission has issued its Recommendation on energy poverty (EU 2020/1563) that provides guidance on definitions and appropriate indicators for measurement.[34]

Energy poverty is defined as a situation in which households are unable to access essential energy services. For measurement, the main difficulty is how to obtain adequate indicators and reliable numerical data. A set of statistical indicators measuring the likely drivers of energy poverty and its consequences has been developed at the EU level. These are aggregate indicators that capture different aspects of the multi-dimensional phenomenon of energy poverty. The proposed indicators may be divided into four different groups: indicators based on energy spending ratios, indicators based on self-assessment, indicators based on direct measurement, as well as indirect indictors – see the Annex of the Recommendation for more details.

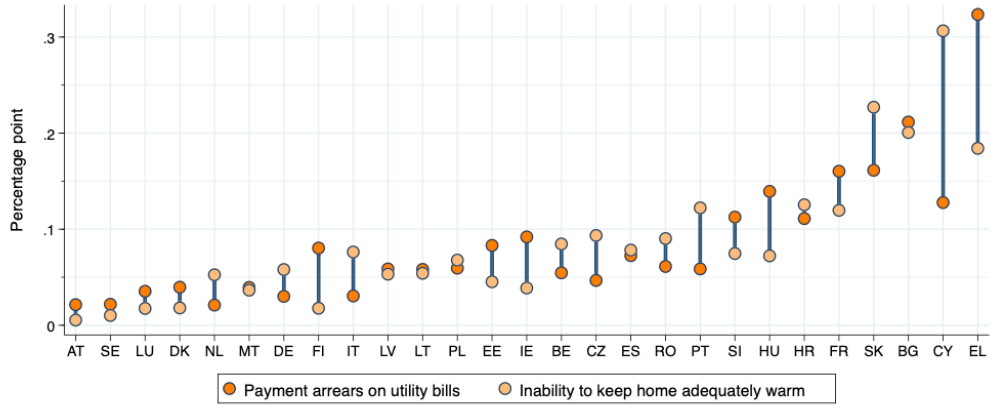
In the following, I consider the two main types of affordability indicators proposed – the subjective deprivation-related indicators based on the EU-SILC, and the energy expenditure centred indicators based on the EU-HBS – and consider their potential response to the observed recent inflation of energy prices. For a more comprehensive analysis of energy poverty in the EU based on EU-SILC and EU-HBS microdata, see Koukoufikis and Uihlein (2022).

5.1 Indicators based on self-reported deprivation

The first main set of indicators are based on or related to the deprivation questions in the EU-SILC: the ability to confront payment arrears on utility bills [variable HS021], and the ability to keep one's home adequately warm [variable HH050]. This self-reported information measures energy poverty by reflecting households' perceptions on the affordability of energy services by way of accepted basic standards of financial conduct and living conditions.[35] Energy and consumer price inflation are assumed to impede households' ability to conform to these standard and increase energy poverty as a result. Using the same regression-based methodology as discussed in the previous section, one can estimate the sensitivity of energy deprivation (energy poverty) to changes in real household income. The respective elasticity estimates are presented in **Figure 15** by country. These indicate that self-reported energy deprivation has traditionally been rather inelastic to changes in real household income: on average, the relevant elasticities are both below 0.1, even though a one-percent drop in income may increase deprivation by up to 0.3 p.p. in selected countries. Overall, the obtained elasticities are consistent with the relatively low share of households that report energy-related deprivation in many EU countries.[36]

[34] For more information on the relevant policy background and documents, see the dedicated Commission website here.
[35] The indicators of energy poverty proposed by the Commission have different variants: beside the default indicators discussed above, it also includes alternatives that are relevant to the population at risk of poverty (AROP). Given that the current analysis sets aside the issue of nominal income change, these alternative variants are not considered here. Microdata analysis, however, shows that the relevant elasticities and the resulting main conclusions are highly robust to the choice of the indicator variant.
[36] At the EU level, only around one third of materially and socially deprived households suffer from arrears on utility bills (36.5%), or the inability to afford a healthy meal (35.7%) or keep home adequately warm are (34.9%). In contrast, the corresponding ratios with respect to the inability to face unexpected expenses or afford annual holidays are 91.8% and 88.3%, respectively.

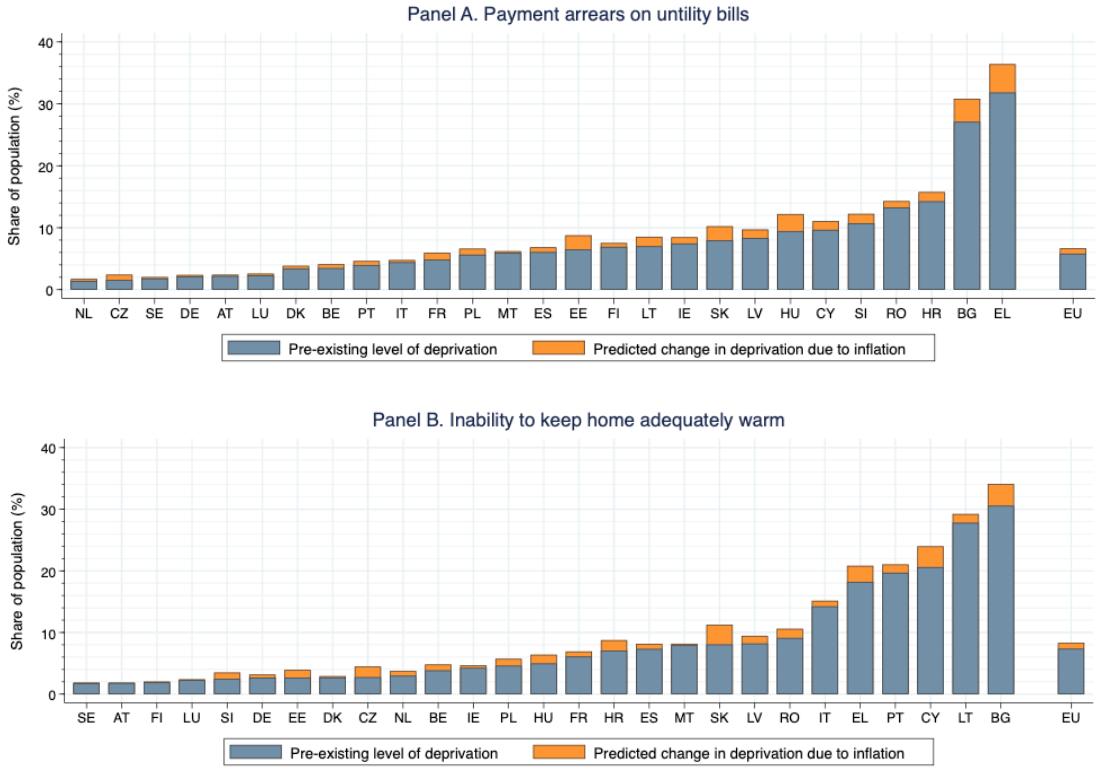
Figure 15. Predicted change in the incidence of energy deprivation due to 1% loss in real household income



Notes: Own calculations based on microdata from the 2019 wave of the EU-SILC. The figures present regression-based estimates of income elasticity of specific self-reported deprivation items (on payment arrears on utility bills [variable HS021] and the ability to keep one's home adequately warm [variable HH050]) as used for official statistical measurement by Eurostat. The figures denote the predicted percentage point change in the incidence of MSD items associated with a 1% reduction in income by country.

The implied effects of observed inflation and purchasing power loss on the relevant item-specific deprivation rates are presented in **Figure 16**. It shows that the predicted increase in energy deprivation related to payment arrears and inadequate home temperature are 0.86 and 0.95 percentage points, respectively, at the EU level. The largest jumps are observed in Bulgaria and Greece, where deprivation incidence may increase by as many as 3.7-4.6 percentage points. Given the indirect manner of the current analysis and the potential unforeseen effects of relative price changes on deprivation profiles, it is best to consider the presented figures as conservative lower bound estimates of the likely increase in energy-related deprivation in the EU.

Figure 16. Predicted increase in self-reported energy deprivation due to inflation by country



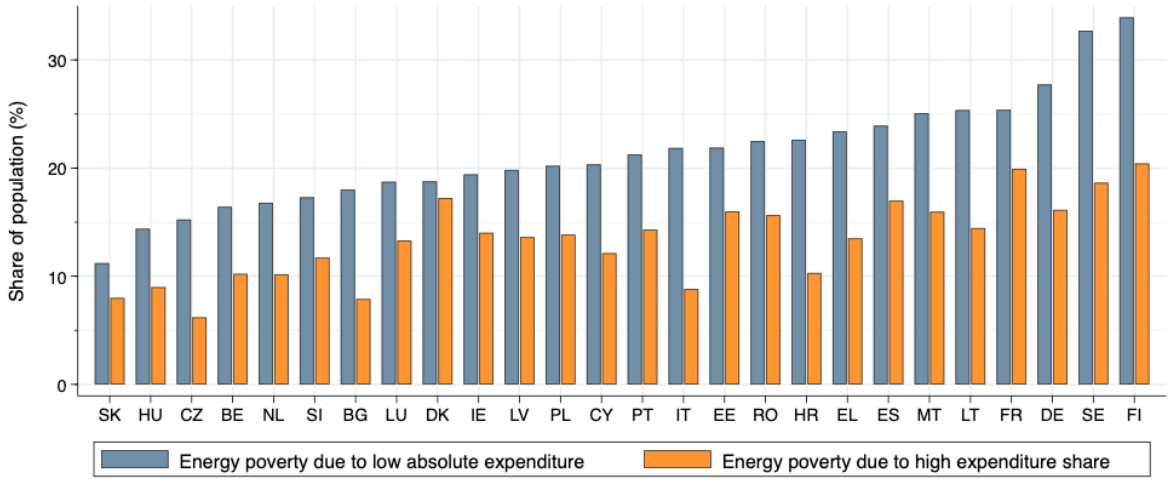
Notes: Own calculations based on microdata from the 2019 wave of the EU-SILC. The figures present regression-based estimates of income elasticity of specific material and social deprivation (MSD) items, as used for official statistical measurement by Eurostat. The figures denote the predicted percentage point change in the incidence of MSD items associated with the observed reduction in real household income due to inflation [in orange], as well as the pre-existing rate of deprivation [in blue] by EU Member State. The EU-level figures are calculated as the population-weighted average of the relevant country scores.

5.2 Indicators comparing energy spending with income

The second main type of energy poverty indicators focuses on the relationship between energy expenditures and disposable income in households' budget, using information from household budget surveys.[37] Of these, particular attention has been paid to the distribution of energy expenditures in the cross-section of households. The two most widely-used indicators concern the share of households 1) whose absolute energy expenditure is below half of the national median [i.e. low absolute energy expenditure], and/or 2) whose energy expenditure share in income is more than twice the national median share [i.e. high energy expenditure share]. Unfortunately, these indicators are rather ill-suited to measures changes in energy poverty due to rising living costs: as long as energy prices increase by the same margin for all households and no differentiated behavioural response is assumed, one's spending position relative to the national median remains unchanged and leaves the rate of energy poverty fixed.[38]

Figure 17 therefore only presents the pre-existing energy poverty figures based on the 2015 wave of the EU-HBS by country. It shows that energy poverty based on low absolute expenditures is 21.3% at the EU level, and ranges between 11.2% in Slovakia and 34% in Finland. The corresponding figures for energy poverty based on high expenditure shares are 13.4% [EU average] and 6.2% - 20.4% [range of country scores]. While too low absolute or too high relative energy spending may indeed signal deprivation and be cause for policy concern in certain cases, it is important to highlight the limitation of focusing on the distributional aspects. Firstly, heterogeneity in energy spending across households can be caused by a wide range of different factors (such as household size, climate, energy efficiency, among others). Second, energy poverty measured this way is often unrelated to actual deprivation as captured by payment arrears of heating deprivation – see this by comparing the position and performance of individual countries across Figure 16 and Figure 17.

Figure 17. Energy poverty based on distributional metrics of low absolute and high relative energy spending



Notes: Own calculations based on microdata from the 2015 wave of the EU-HBS. The figures represent the share of population whose absolute energy expenditure is below half the national median [i.e. energy poverty due to low absolute expenditure] and the share of population whose share of energy expenditure in income is more than twice the national median share [i.e. energy poverty due to high expenditure share]. The EU average is not calculated due to the national character of the relevant indicators. Figures for Austria are missing, and the energy expenditure share for Italy was calculated relative to total household expenditure (as opposed to income) due to data limitations.

The potential effects of inflation on energy poverty are better highlighted by focusing on metrics that target the proportion of households' total expenditure spent on electricity, gas and other fuels. Direct indicators of this kind also feature among the ones proposed by the Commission, but no particular specification seems to have

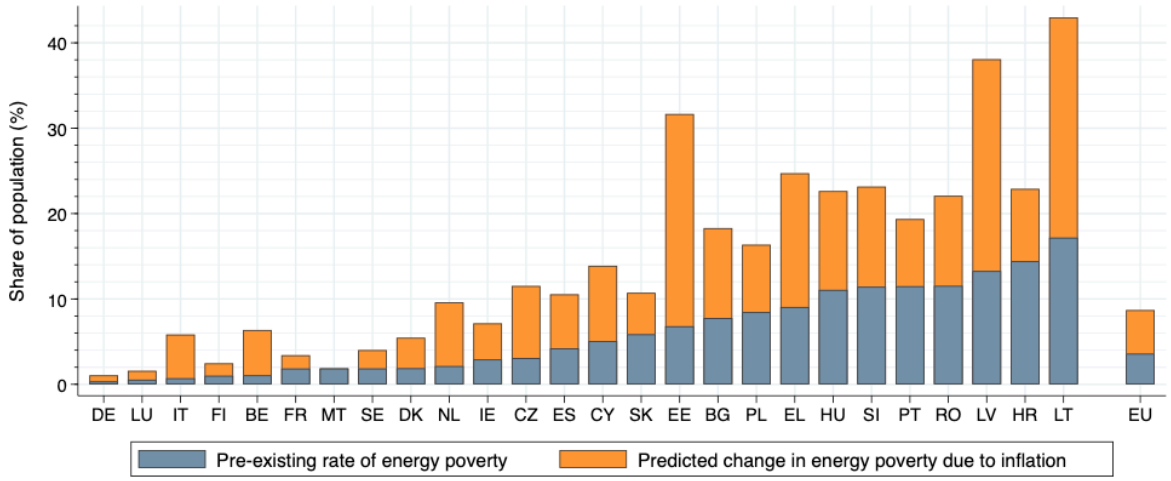
[37] For more details, see the Annex of the Commission's Recommendation on energy poverty (EU 2020/1563), available here.
[38] Even if one takes into account the different energy source profiles of households (see Figure 6 for more details), the resulting change in the poverty rate is negligible (i.e. considerably less than 1 percentage points on average) and/or limited to a small number of Member States.

emerged for the purposes of practical measurement. The main empirical question appears to concern the adequate level and exact definition of an expenditure threshold above which households may be reasonably considered energy poor.

For the purposes of the current analysis, I consider a simple numerical exercise in which the relevant threshold for energy spending is set at 30% percent of total household expenditure. A fixed relative threshold like this allows for a straightforward quantification of the effect of inflation as long as one assumes inelastic demand for energy on the part of households and a full pass-through of price increases in absence of any regulatory or mitigating policy measure. The particular choice of 30% is rather arbitrary but motivated by the consideration – consistent with households' observed expenditure patterns presented in Figure 5 – that concerned households would likely have very limited resources for non-essential purchases.[39]

Using 2015 EU-HBS data, **Figure 18** below shows the share of population that likely suffers from energy poverty thus defined. The pre-existing EU-level poverty rate amounts to 3.6%, with individual country-specific figures ranging between 0.4% (in Germany) and 17.2% (in Lithuania). With the predicted change brought on by rising energy prices, the EU-level poverty rate increases to 8.6% and the country-specific values move within the range of 1.1% and 41.8%. Not surprisingly, the larger initial poverty rates are statistically positively related with higher increases in poverty, and may prove particularly costly in the Baltic states, Greece and several CEE countries. Given the rather unrealistic underlying assumption on which these calculations are based, it is best to treat these figures as representing an upper-bound estimate of households' soaring energy dependence and poverty.

Figure 18. The predicted change in energy poverty based on a fixed relative expenditure threshold



Notes: Own calculations based on microdata from the 2015 wave of the EU-HBS. The figures represent the share of population whose energy expenditure share exceeds 30% of total household expenditures, based on both observed energy expenditures (i.e. pre-existing rate of energy poverty) and inflation-adjusted hypothetical data (i.e. predicted change in energy poverty). Figures for Austria are missing due to data limitations. The EU-level figures are calculated as the population-weighted average of the relevant country scores.

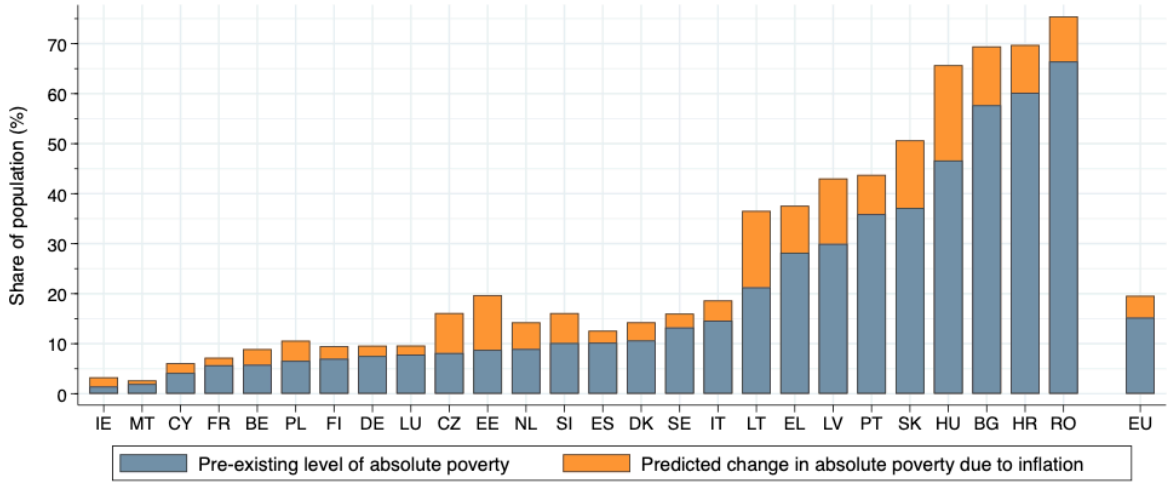
[39] Note that alternative thresholds (such as 25% or 33.3%) lead to rather similar poverty patterns and qualitative conclusions across the EU.

6 The effect of inflation on needs-based absolute poverty

Given the uncertainties and limiting assumptions involved in quantifying the effect of living cost adjustments on social deprivation and energy poverty, it is useful to explore suitable alternative measures and methodologies of social accounting. Among these, the European Commission's recent pilot initiative "Measurement and monitoring of absolute poverty (ABSPO)" appears particularly promising. The ABSPO project was a novel attempt to better understand the patterns of poverty and social exclusion in the EU from the perspective of basic household needs and living costs.[40] The project explored the feasibility of developing a sound methodology for cross-country comparable absolute poverty measurement in the EU, and produced a set of new poverty measures that can help contextualise and complement existing indicators.

The ABSPO methodology builds on a mix of reference budget techniques and survey-based statistical methods to model individuals' and households' minimum financial needs for adequate social participation in a customised manner (see Menyhért et al. (2021) for details). Given that ABSPO poverty lines reflect the minimum cost of living by design, they can be easily adjusted in case of inflation to capture the corresponding change in households' minimum financial needs for making ends meet. Moreover, the bottom-up structure and granular construction of ABSPO poverty thresholds ensures that minimum expenditures associated with particular product components can be individually adjusted to reflect a wide range of real or hypothetical inflation configurations. Therefore, to measure the change in absolute poverty due to rising prices under the assumption of fixed nominal incomes, one only needs to re-calculate the ABSPO poverty lines and measure the share of households that fall below the revised thresholds using standard household survey data.

Figure 19. The predicted change in absolute poverty due to rising consumer prices by country



Notes: Own calculations based on microdata from the 2019 wave of the (cross-sectional) EU-SILC. The figures present nationally representative (pre-existing) rates of absolute poverty based on various data sources and calculation methods as described by Menyhért et al. (2021), using the so-called food-based absolute poverty lines. For the re-pricing of absolute poverty thresholds and the impact assessment, the national average change in living costs were used for all sampled households (see Figure 9 for details). Due to data limitations, figures for Austria are missing. The EU-level figures are calculated as the population-weighted average of the relevant country scores.

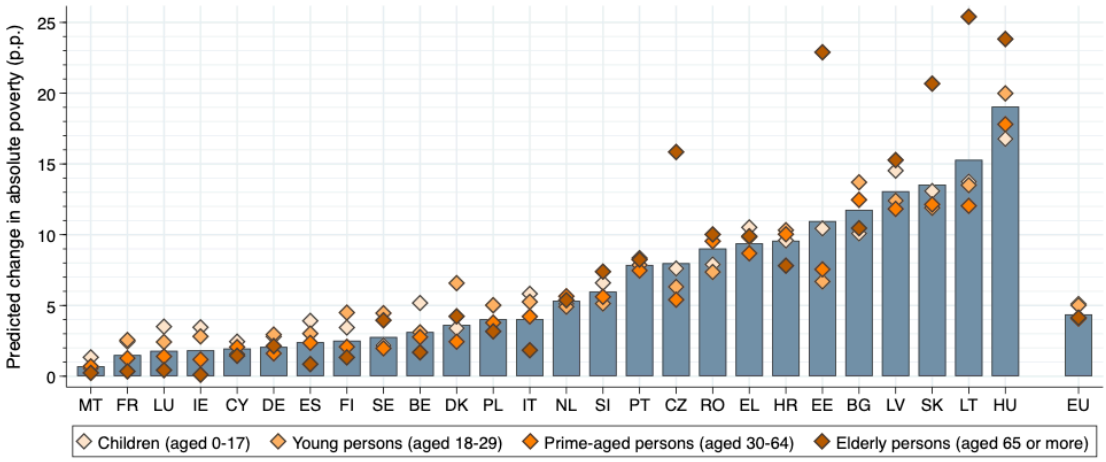
Since the COICOP profiles used for the inflation analysis (i.e. food, energy, non-energy industrial goods, services) in this study is not fully aligned with the main building blocks of the ABSPO poverty thresholds (i.e. food, housing, health, transportation, residual), I focus exclusively on the compound absolute poverty lines and overall inflation for the purposes of the current analysis.[41] **Figure 19** presents the effect of observed changes in living costs on

[40] The ABSPO project has been launched by the Directorate-General for Employment, Social Affairs and Inclusion and implemented by the Joint Research Centre. Its final report was published in December 2021 and is publicly available in the JRC Publication Repository.

[41] More specifically, for reasons of extensive country coverage, I use the so-called food-based absolute poverty lines that are based on a statistical extrapolation method. This method maps from customised nutritional food reference budgets to overall poverty

the resulting ABSPO absolute poverty rates by country using EU-SILC data from 2019.[42] The average EU-level increase in poverty amounts to 4.4 percentage points, while country-level scores range between 0.7 p.p. in Malta and 19.1 p.p. in Hungary. The predicted adjustment in absolute poverty is therefore noticeably larger than those related to material and social deprivation (see Figure 13 for details). The two measurements nevertheless have similar implications in the sense that the rate of change and the pre-existing level of poverty and deprivation are strongly correlated in both cases, and that EU15 countries are more resilient to inflationary pressures than non-EU15 countries of Central and Eastern Europe. (The predicted population-weighted average change in absolute poverty is 2.7 p.p. and 7.2 p.p. across the two groups.) In this latter region, broad segments of the population are at the risk of experience poverty and/or financial distress due to increasing consumer prices.

Figure 20. The heterogeneous effect of rising prices on absolute poverty by country



Notes: Own calculations based on microdata from the 2019 wave of the (cross-sectional) EU-SILC. The figures present the predicted change in absolute poverty, both at the national level [blue bars] and by age group [orange markers], associated with the observed change in living costs during the August 2021 – August 2022 period. The underlying calculations, data sources and methods are the same as used for Figure 19 and are described in detail by Menyhért et al. (2021). Figures for Austria are missing due to data limitations. The EU-level figures are calculated as the population-weighted average of the relevant country scores.

Another advantage of using the ABSPO framework in the current context is the possibility of modelling the welfare effects of inflation on particular population segments in a targeted manner. Even if the same change in living costs is considered for all household configurations in a country, their respective absolute poverty thresholds are typically different and better suited to reflect the differential welfare effects of a given inflationary environment. As an illustrative example, **Figure 20** shows the predicted change in absolute poverty due to inflation across different age cohorts by country. It reveals, in particular, that children and young persons are often affected very differently from prime-aged or elderly persons when it comes to rising prices and the risk of poverty.[43] Interestingly, systemic differences between EU15 and non-EU15 countries seem to prevail in this regard as well: children and young persons tend to be the most vulnerable age cohorts in EU15 countries, while elderly persons appear the most at risk in Central and Eastern countries. These findings offer further evidence that within-country differences in the risk of poverty are considerable, that certain groups are particularly vulnerable, and that individual Member States may prefer accentuating different aspects of their social protection systems in the face of current inflationary environment.

thresholds using regression-based methods and households observed expenditure patterns. For more details, see Menyhért et al. (2021).

[42] For simplicity, I assumed that the absolute poverty lines for all households in a country changes by the same proportion, in accordance with the average adjustments in living costs calculated at the national level. More detailed and granular calculations would result in slightly different numerical outcomes on account of certain horizontal differences in households' spending patterns and ABSPO reference budgets (see Figure 9 for example), but the emerging conclusions would be rather similar from a quantitative and qualitative perspective alike.

[43] It is worth noting that most of this difference stems not from large cross-sectional differences in ABSPO poverty lines, but is due to different relative concentration of households of different types around the poverty thresholds (or so-called composition effects). One could therefore find somewhat similar patterns by using alternative (even commonly defined) absolute poverty thresholds, as well. The cross-sectional differences along other socio-demographic margins (such as population density or household size) are typically less manifest.

7 Summary, key messages and policy conclusions

The empirical analysis in this Report uses European household survey microdata to offer a preliminary assessment of the potential social consequences of increasing energy and consumer prices in the EU.

The following main conclusions emerge:

- Recent and ongoing price developments are considerably different across countries and product categories. Energy prices are the main (but not the only) driver of inflation in the EU, and have recently contributed to a double-digit increase in households' cost of living in most Member States.
- The structure of household expenditures is substantially different between and within Member States. Low-income households across the EU spend considerably more on food and energy in relative terms, and are therefore particularly exposed and vulnerable to ongoing price developments. The social situation is especially problematic in poorer Central and Eastern European countries, where large segments of the population spend the majority of their budget on essential items.
- The social implications of rising prices are not straightforward to assess, and the relevant calculations are all based on a series of limiting assumptions. Notwithstanding these, the negative welfare and social effects of rising consumer prices appear substantial throughout the EU. Recent inflation is predicted to have increased material and social deprivation by about 2 percentage points on average, while the corresponding increase in the rate of energy poverty may be closer to 5 percentage points. The experimental ABSPO measure of absolute poverty is also expected to raise by a similar margin.
- Importantly, the social impact of rising prices is highly uneven across the EU. The predicted increase in deprivation, energy poverty and financial distress is significantly larger in many Central and Eastern European countries, and especially among disadvantaged or vulnerable groups (such as rural populations, large households, elderly persons). This is likely to further deepen existing inequalities not only between EU15 and non-EU15 countries, but also within national societies.

The likely persistence of high inflation and its unfavourable social consequences outlined in this Report poses formidable challenges for European policy-makers and calls for strong policy response. Given the complexity of the situation, effective policy intervention requires a heterodox combination of coordinated measures taken by different levels of government, with different policy objectives in mind, over different time horizons.

One possible area for intervention concerns short-term emergency measures aimed at offsetting some of the immediate consequences of price increases. These include the prohibition of residential electricity and gas supply disconnections for non-payments, or *ad hoc* fiscal measures (such as reduced VAT rates, lowered excise duties or price caps) aimed at reducing the retail price of energy products. During the past few months, several Member States have resorted to such measures and managed to offer partial and temporary relief to consumers. While these steps are timely and relatively easy to implement, they do not necessarily follow the principles of effectiveness, consistency and equity. To further these goals, the Commission has adopted a Communication on Energy prices as early as October 2021. Its objective is to address the immediate impact of current price increases in the short run and strengthen resilience against future shocks. The corresponding toolbox proposes short-term measures for national governments aimed at protecting consumers and businesses – such emergency income support, targeted tax breaks, enhanced supervision of energy market and wider access to renewable power purchase agreements, among others.[44]

While some variants of price controls and measures are likely to remain in place in the foreseeable future, an important social policy challenge in the medium term will consist in strengthening the redistributive capacity of fiscal policies and ensuring the effectiveness of social protection systems. This primarily requires adequate income policies that help channel public resources towards the most vulnerable population segments and ensure that essential goods and services are readily available to all. Policy evaluation and modelling suggest that targeted income support is the most social and climate-friendly measure for mitigating the impact of high energy prices.[45] One possibility is to raise taxes on extra revenues and profits of energy companies that have

[44] For more details on the Communication and the toolbox, see the dedicated Commission website here.
[45] For further details and references, see the recent VoxEU column by Commission experts here.

benefited from soaring energy prices, as has already been implemented in a selected number of Member States such as Italy. Increasing the progressivity of taxes, levies and tariffs on energy consumption to insulate low-income households, disincentivise profligate consumers and further expose large businesses also appears to be a necessary step in order to avoid major social distress (Mastropietro, 2019). The increased fiscal revenues could then be used for means-tested support measures for vulnerable households, as well as to improve access to, and affordability of, essential services.

The broader and long-term policy objective is to align these measures with the strategic EU priorities of the twin transitions. These include realising the climate objectives of the European Green Deal and pursuing the social fairness agenda of the European Pillar of Social Rights simultaneously.[46] Ensuring clean energy for all European requires a range of different policy packages aimed at strengthening energy security, subsidising investment in renewables, and promoting energy efficiency in housing, transportation and industrial production all at the same time. The Commission's Renovation Wave Strategy designed to improve the energy performance of buildings and thereby reduce households' energy bills can be an integral element of these efforts, especially if ring-fenced mechanisms could ensure that it prioritises the needs of low-income households, lagging regions and the energy poor. The same applies to the Commission's affordable housing initiative aimed at greener buildings and improved social housing, which is to be aligned with broader regulatory efforts to curtail rising rents and increasing indebtedness over housing mortgages. Moreover, a successful twin transition may also entail structural reforms on the labour market that reduce duality, segmentation and discrimination, cut back income inequality and ensure the purchasing power of earnings over sustained periods of time.

This Report also shows that sound evidence-based policies requires harmonised, frequent and timely socio-economic data at the micro level. The most important data source for household finances in the EU, the European Household Budget Survey data is currently too scarce. While some Member States run the survey annually or bi-annually and release extensive information on both purchased quantities and expenditures, harmonised information at the EU level is only available every five years and with significant delay. More frequent, better harmonised and integrated microdata on European households' expenditures, income, living condition – as stipulated by the IESS Regulation [2019/1700] for integrated European social statistics - would be a strong asset for evidence-based policy making.

In the short term, it would be important to collect and harmonise systematic and reliable new information on European households' energy use and dependence. The relevant inquiry may target households' self-perceived notion of what 'keeping home adequate warm' means, their preference and/or tolerance for lower energy consumption, their actual energy consumption, dwelling properties and unit prices paid, their demand elasticity and planned behavioural response to soaring energy prices, as well as the feasibility and opportunity costs of relying on alternative energy sources and consumption modes. Even a single Eurobarometer-type survey dedicated to these questions would go a long way towards a better understanding of the European households' energy situation. The same goes for pooling and harmonising detailed longitudinal information on households' energy consumption that is currently available only at the national or regional levels.

Beyond more extensive data collection and analysis, improvements in social measurement and indicators should also be a priority. According to recent data, only few EU countries (such as Cyprus and France) provide official definitions for energy poverty in their legislation, while some others (including Germany or Poland) commonly accept definitions proposed by academia (Castaño-Rosa et al., 2019; European Commission, 2020). National differences and the various limitations surrounding the current indicators in circulation further complicate international measurement and hinder efforts at effective EU-level policy response. Beside energy poverty, new additions to existing social indicator portfolios would also be useful in the domains of absolute poverty, housing affordability and essential services where, as of today, no monetary or price-sensitive measures exist.

[46] For more information on the European Green Deal and the European Pillar of Social Rights, see the dedicated Commission websites here and here.

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List of abbreviations

ABSPO	A joint JRC-EMPL project aimed at measuring and monitoring absolute poverty in the EU
AROP	At-risk-of-poverty
AROPE	At risk of poverty or social exclusion
CEE	Central and Eastern Europe
CPI	Consumer price inflation
HICP	Harmonised Index of Consumer Prices
EU-HBS	European Household Budget Survey
EU-SILC	European Union Statistics on Income and Living Conditions
MSD	Material and social deprivation
RHS	Right-hand-side of the regression equation that contains the so-called independent variables
SMSD	Severe material and social deprivation

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