I. Inflation and its diverse social consequences across the euro area

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Abstract: *By the end of 2022, the Harmonised Index of Consumer Prices (HICP) had reached double digits in the euro area. Since inflation has been driven mainly by soaring energy and food prices, the structure of consumption expenditure plays a crucial role in determining households' vulnerability to ongoing price developments. Micro-level analysis of European households' expenditure reveals substantial differences both within and between Member States. This translates into uneven increases in living costs across the euro area. Inflation inequality is particularly high in some Member States, but differences in consumption structure also explain a large part of the cross-country variability in current price trends. Household income, social and demographic characteristics and individual factors are all important determinants of the changes in living costs faced by households across the euro area. Moreover, innovative statistical methods and data allow us to quantify the potential social costs of inflation: in the absence of offsetting policy measures, wage developments and behavioural adjustments, material and social deprivation and absolute monetary poverty would have increased by up to 3 and 6 percentage points respectively in 2022. The social effects of inflation can be substantial and largely uneven. Without an effective policy response, they could widen existing inequalities within countries and across the euro area ([1]).*

I.1. Introduction

After decades of low inflation, rising consumer prices present new economic, political and social challenges. According to recent Eurostat figures, the annual inflation in December 2022 was 9.2% in the euro area, with consumer prices increasing by double-digits in half of the Member States. Inflation has been fuelled mainly by surging energy prices that are 25.2% higher on average than a year ago and 57.6% higher than in early 2021. 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 and persistence of ongoing price developments and uncertainty about them raise the question of how these affect European households' finances, purchasing power and social background. This chapter examines some of the most important related aspects and offers some insights into the likely impact of rising prices on poverty and households' living conditions in the euro area. Its main conclusion is that the negative welfare effects and possible social consequences of inflation are substantial among vulnerable groups and particularly worrying in low-income Member States. Unless offset by targeted and effective support measures, high inflation could increase economic inequalities across and within euro area countries, eroding social cohesion and macroeconomic convergence.

The socio-economic findings in this section are preliminary and subject to various limiting assumptions. First, they rely on a snapshot of observed price developments as of December 2022 and are liable to changes as inflation trends and profiles keep evolving over time. Second, they are subject to various limiting assumptions where (1) official HICP data adequately represent price trends faced by different household types at national level; (2) the observed structure of household expenditure remains constant over time; and (3) recent income support measures and ongoing adjustments to households' available financial resources are not considered ([2]). Taking these features into account, this analysis does not

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([2]) For a discussion on the recent and ongoing policy response by national governments to the energy and living cost crisis, as well as their potential social effects, see OECD (2022). Income support for working-age individuals and their families; OECD (2022). Minimum wages in times of rising inflation; Bethuyne, G., A. Cima, B. Döhring, A. J. Lindén, R. Kasdorp, and J. Varga (2022). Targeted income support is the most social and climate-friendly measure for mitigating the impact of high energy prices, VoxEU; Sgaravatti, G., S. Tagliapietra and G. Zachmann. (2021). National policies to shield consumers from rising energy prices, Bruegel Datasets; as well as the EU PolicyWatch dataset by Eurofound.

aim to accurately describe actual ongoing social developments, but rather to provide a flexible analytical framework for predictive analysis under various real and hypothetical scenarios.

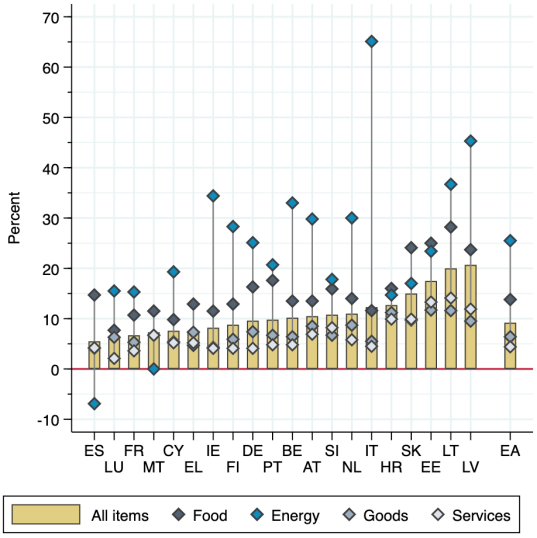
I.2. Patterns of inflation across countries and product categories

After decades of price stability, the euro area has been experiencing soaring consumer prices from early 2021 onwards. Recent Eurostat figures indicate that, following a peak of 10.6% in October, headline annual HICP inflation in the euro area remained above 8% in the first quarter of 2023. This level is much higher than what European policy makers and households were accustomed to. It recalls the inflationary episodes of the 1970s and 1990s that produced a widespread social, economic and political distress. It is well documented that current inflation is driven mainly by soaring energy prices and is fuelled in no small part by the war in Ukraine and its collateral effects. Food is another product category with above-average inflation (13.8% in 2022), while increases in the price levels of non-energy industrial goods and services have remained relatively contained so far (6.4% and 4.4%, respectively). Despite inflation falling since October 2022, the Commission's 2023 Winter Economic Forecast still projects average inflation to remain 5.6% in the euro area and 6.4% across the EU in 2023 ([3]).

From a social perspective, the structure and heterogeneity of inflation profiles are just as relevant as the inflation rate itself. While the broad inflationary pressures are similar throughout the euro area, cross-country differences in market conditions, resource utilisation, fiscal policy, consumption patterns and regulatory environment imply that the trajectory and composition of consumer price trends have been rather uneven across Member States. Graph I.1 shows the main HICP indicator for annual inflation as of December 2022 and reveals that national figures vary between 5.5% (in Spain) and 20.7% (in Latvia). Breaking down the year-on-year price increases by main product category, the figure also reveals that energy price inflation varies greatly across countries (ranging from -6.9% in Spain to 65.1% in Italy) and food price inflation is highly volatile (ranging from 7.7% in Luxembourg to 28.2% in Lithuania). In 2022, inflation for non-energy industrial goods and services remained more contained and below the headline HICP figure in all euro area Member States.

Somewhat surprisingly, cross-country variation in these price components is statistically strongly related to food price inflation, but uncorrelated with energy price inflation ([4]). This suggests that the pass-through of the energy price hikes to other product categories and core inflation has remained rather muted so far ([5]).

Graph I.1: **HICP inflation as of December 2022 by country**



(1) Data (as of December 2022) on annual HICP inflation by country and main consumption by purpose (COICOP) category.
Source: Eurostat (series pcr_hicp_manr)

An in-depth understanding of the causes of cross-country volatility in food and energy price trends will require considerable research and analysis. While the contribution of national and institutional factors is clearly important, it is worth highlighting that a lot (56%) of the cross-country variation in headline HICP rates across the euro area is

([3]) This is in line with the ECB's recent inflation outlook. For details, see the Eurosystem staff macroeconomic projections for the euro area as of December 2022, or the dedicated ECB website.

([4]) The cross-country correlations of non-energy industrial goods and services inflation with respect to food price inflation are 79% and 89%, respectively. The corresponding correlation coefficients with respect to energy price inflation are 13% and 16%, respectively.

([5]) For historical pass-through estimates in the context of the euro area, see Conflitti C. and M. Luciani (2017). Oil price pass-through into core inflation. *Banca d'Italia Occasional Papers*, Nr. 405. Note that other factors could explain the low correlation with energy. For instance, consumer energy prices have been heavily distorted by government measures.

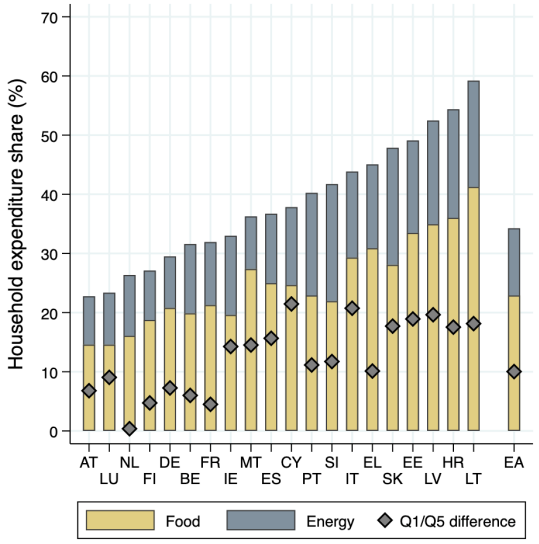
explained by differences in households' expenditure structure. As of December 2022, each percentage point increase in the combined food and energy expenditure share in a country was associated, on average, with the headline inflation rate 0.33 percentage points (pps) higher. This suggests that low-income Member States were likely to experience higher overall inflation even with uniform price trends, and face bigger socio-economic challenges compared to high-income countries that spend relatively more on goods and services.

I.3. Large cross-sectional variations in households' consumption patterns

To analyse the diverse impact of inflation, it is important to study households' consumption patterns and expenditure structure. Since current price trends are driven mainly by soaring food and energy prices, low-income households that tend to spend a relatively high share of their income on essential items and have less elastic consumer demand are at a disadvantage ([6]). This inequality aspect of inflation has traditionally received little scholarly or policy attention, but efforts to measure the gap between the perceived inflation rates experienced by low-income and high-income households have multiplied recently ([7]). Despite differences in scope, data and methodology, these studies confirm the existence of growing income-based inflation gaps that amount to multiple percentage points ([8]).

The detailed analysis of European households' expenditure patterns helps us better understand the main reasons for this phenomenon. Using microdata from the latest available wave of the EU Household Budget Survey (EU-HBS) from 2015, consumer spending can be differentiated between the main product categories of food, energy, (non-energy) industrial goods and services in line with the official COICOP classification by Eurostat ([9]). Empirical evidence shows that households in low-income Member States or with below-median income devote a much higher share of their total budget spending to food and energy than higher-income segments of the euro area population.

Graph I.2: **Structure of household expenditures in euro area countries**



(1) The bars represent the average share of food and energy expenditures in households' total consumption by country. The markers denote the difference in the combined food and energy expenditure share across households of the first (Q1) and fifth (Q5) income quintiles in each country.
Source: Own analysis of microdata from the 2015 wave of the EU-Household Budget Survey (see Menyhért, 2022). Data for Austria are based on aggregate figures by Eurostat [series HBS_STR_T211 and HBS_STR_T223].

Graph I.2 reveals the extent of these gaps. It shows that the combined expenditure share of food and energy ranges from 23% (in Austria) to 60% (in Lithuania) between euro area Member States. The degree of cross-country variability is similar across the food and energy components (i.e. the coefficient of variation is 28% in both cases), but –

([6]) Essential items are hard to define and may vary across individuals and populations. Pillar 20 of the European Pillar of Social Rights provides a non-exhaustive list of such items that include water, sanitation, energy, transport, digital and financial services. In the context of the current analysis, the product categories of food and energy will be considered as essential.

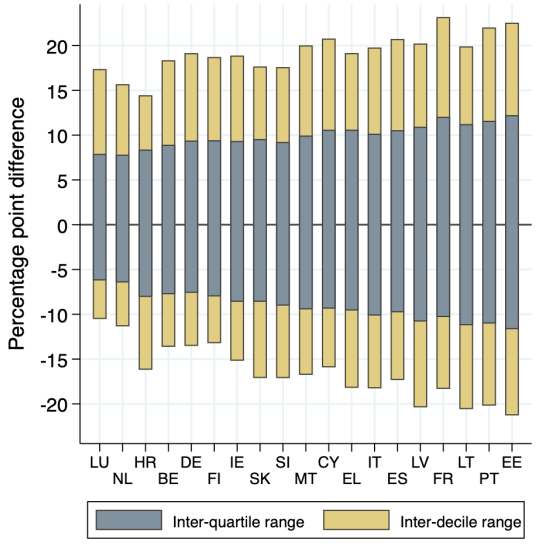
([7]) See Kaplan, G. and S. Schulhofer-Wohl (2017). Inflation at the household level, *Journal of Monetary Economics*, Vol. 91; Gürer, E. and A. Weichenrieder (2020). Pro-rich inflation in Europe: Implications for the measurement of inequality, *German Economic Review*, Vol. 21; Villani, D. and G. Vidal Lorda (2022). Whom does inflation hurt most?, *JRC Science for Policy Brief*, JRC129558; and Menyhért, B. (2022). The effect of rising energy and consumer prices on household finances, poverty and social exclusion in the EU, *JRC Science for Policy Report*, JRC130650.

([8]) See Charalampakis, E., Fagandini, B., Henkel, L. and C. Osbat (2022). The impact of the recent rise in inflation on low-income households, *ECB Economic Bulletin*, 7/2022 for further details. For detailed statistics on inflation inequality and its drivers in the EU, see the Briegel dataset by Claeys, G. and L. Guetta-Jeanrenaud, C. McCaffrey and L. Welslau (2022). In a small number of cases and reference periods, inflation inequality can also benefit low-income households – see Möhrle, S. and T. Wollmershäuser (2021). Zu den Verteilungseffekten der derzeit hohen Inflationsraten, *Ifo Schnelldienst*, 16/2021.

([9]) See Menyhért, B. (2022). The effect of rising energy and consumer prices on household finances, poverty and social exclusion in the EU, *JRC Science for Policy Report*, JRC130650, and Eurostat (2018). Harmonised Index of Consumer Prices (HICP).

given its higher expenditure share in most countries – the food component is the main driver of cross-country differences in household spending on essential items. Graph I.2 also reveals that household spending on food and energy also varies considerably within countries. The gap between the lowest (Q1) and highest (Q5) quintiles amounts to 9.9 pps at the euro area level and ranges between 0.3 pps (in the Netherlands) and 21.4 pps (in Cyprus). This suggests that low-income households are in a rather precarious position in most Member States, and at a double disadvantage in many Central and Eastern European countries.

Graph I.3: **Mean dispersion of household expenditures on food and energy within income quintiles**



(1) The figures represent the mean within-quintile dispersion of households' combined food and energy expenditure share around the respective quintile-specific median by country. Figures for Austria are missing due to data unavailability.
Source: Own analysis of EU-HBS microdata from 2015.

Another noteworthy aspect of households' consumption structure is the large variability within national populations. Even after controlling for income and socio-economic characteristics of households, available budget survey microdata reveals considerable heterogeneity and suggests that similar household types may spend vastly different amounts on essential goods and services. Graph I.3 shows the typical dispersion of households' joint food and energy expenditure share around the income quintile-specific median by country ([10]). The graph suggests that many households spend considerably more (or less) on food and energy than what is typical in their respective income bracket. Indeed, the inter-quartile range (25-75%) of food and energy spending varies between 14.1 pps (in Luxembourg) and 23.9 pps (in Estonia), while the inter-decile range (10-90%) varies much more, namely between 27.0 p.p. (in the Netherlands) and 43.8 pps (in Estonia) ([11]). This also 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 inflation or economic distress.

Moreover, the social and demographic characteristics of households play a rather limited role in explaining the cross-sectional variation in observed expenditure shares within countries ([12]). Regression analysis of national data not reported here shows that, on average, observable characteristics like disposable income, settlement type of residence, household size and composition explain only 18.3% of all variation in households' expenditure shares within countries in the euro area. The share of explained variation is around 30% in countries where income or urban-rural gaps are substantial (such as Cyprus or Slovakia). However, it is less than 10% in Member States with no major socio-demographic differences across population groups (such as Belgium or the Netherlands). This suggests that, to better understand household consumption patterns and their drivers, statistical data collection and analysis need to incorporate new, previously unexplored domains and dimensions (such as living conditions, purchasing habits, access to essential services etc.).

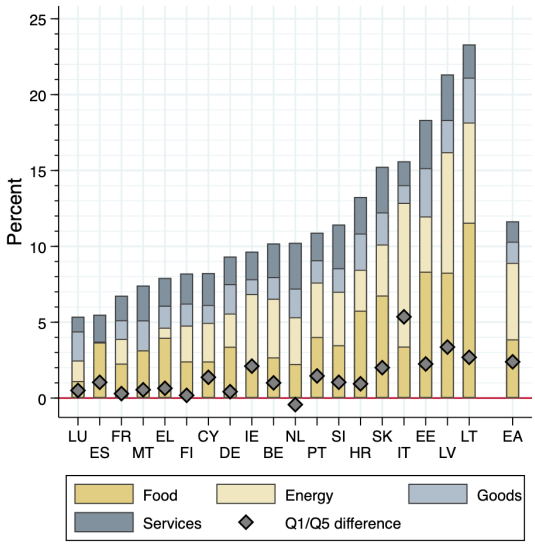
I.4. Uneven effects of inflation on households' cost of living

By combining the inflation profiles and the structure of household expenditures discussed in the previous sections, it becomes possible to

([10]) In other words, it presents the arithmetic average of the five quintile-specific inter-quartile ranges and inter-decile ranges, respectively, in each country.
([11]) The inter-quartile range (IQR) is a measure of statistical dispersion, and in particular the spread, of a particular variable. It is defined as the difference between the 75th and 25th percentiles of the data. The inter-decile range (IDR) corresponds to the difference between the 90th and 10th percentiles of the data and is characterised by similar statistical properties.
([12]) See Menyhert (2022) quoted.

calculate the change in households' living costs and purchasing power in a customised manner. In practice, this means 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 proportion 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 and real income.

Graph I.4: **The size and structure of households' living cost adjustments due to inflation by country (2022)**



(1) The bars represent the implied overall change in living costs of European households with average expenditure shares in each product category by country in 2022. The markers represent the percentage point difference in total living cost adjustments between the 1st and 5th income quintiles by country. The relevant figures for Austria are missing due to data limitations.
Source: Own calculations based on annual HICP inflation data from Eurostat and microdata from the 2015 wave of the EU-HBS.

This procedure is the standard approach to analysing the distributional aspects of inflation. The two underlying assumptions are that headline HICP inflation adequately captures the change in consumer prices for all population segments, and that substitution effects are negligible, and households retain their consumption structure even in the face of changing relative prices ([13]). The figures in Graph I.4 show that living costs increased by 12.4% on average across the euro area in 2022, ranging from 6.1% (in Luxembourg) to 25.4% (in Lithuania) at Member State level ([14]). The figures also reveal that food and energy expenditures are the main drivers of the rise in living costs (33.3% and 32.3% on average, respectively), whereas the cost impact of non-energy industrial goods and services remains limited in most countries (except for Luxembourg and Malta).

Graph I.4 also shows the difference in the cost-of-living adjustments between low-income and high-income households as a result of their different consumption structure. Due to typically higher food and energy expenditure shares among low-income households, the gaps in living cost adjustments between the lowest and highest income quintiles is positive and amounts to 1.6 pps on average across the euro area. National figures range from -0.4 pps in the Netherlands to 5.7 pps in Italy and reflect the extent of within-country divergence in consumption structure. In countries where the household consumption structure is rather similar, with food and energy expenditure increasing elastically with income (as in Germany, the Netherlands or Sweden), inflation inequality remains very low. On the other hand, in countries where low-income households spend a visibly higher proportion of their budget on essential items, inflation inequality is very high and exposes low-income households to much higher losses in purchasing power. Graph I.4 also indicates a strong correlation between the average level of living cost adjustment and Q1/Q5 gap across countries. This suggests that low-income population segments of the euro area tend to be at a double disadvantage.

([13]) Neither of these assumptions are likely to hold true in reality. First, a sizeable empirical literature documents cross-sectional variations in consumer prices within countries, and the analysis of household scanner data also reveals considerable inflation differences between low-income and high-income population segments. With respect to substitution effects, available empirical evidence is rather limited and circumstantial. (For more details and references, see Kaplan, G. and S. Schulhofer-Wohl (2017). Inflation at the household level, *Journal of Monetary Economics*, Vol. 91, and Menyhért, B. (2022). The effect of rising energy and consumer prices on household finances, poverty and social exclusion in the EU, *JRC Science for Policy Report*, JRC130650.) Despite these shortcomings and given the amount of systemic information currently available to European policy makers, the figures represent the best estimates for the change in households' living costs at the proposed level of consumption granularity.

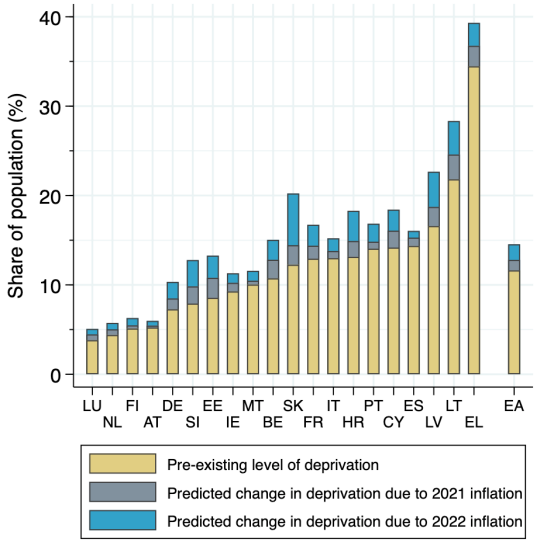
([14]) Given the use of different consumption weights and less granular product categorisation, the living cost adjustments in Graph I.4 are not exactly the same as the HICP inflation data produced by Eurostat.

I.5. Assessing the social consequences of inflation

In the absence of wage developments and government support measures, increases in households' living costs translate directly into commensurate losses in purchasing power and real disposable income ([15]). Quantifying the effects of inflation on key indicators of poverty and social exclusion is nevertheless far from straightforward. Part of the reason lies with data lags and limitations to European household surveys on income and consumption. However, equally important is the fact that many leading EU social policy indicators (such as the AROPE rate for the share of the population 'at risk of poverty and social exclusion') are either non-monetary or only indirectly affected by changes in households' cost of living. Box I.1 gives a brief overview of the different approaches to poverty measurement and social monitoring in the EU.

This section discusses the potential effects of inflation on poverty and social exclusion indicators that are responsive to changes in households' purchasing power. The analysis is based on relatively simple comparative statics and focuses on the partial effect of inflation, while disregarding the potential impact of income growth, government support, demand substitution or other behavioural changes and interventions. As a result, the inflation effects outlined should not be taken as a literal description of current social reality, but rather as potential mechanistic consequences in a hypothetical and unmediated socio-economic system ([16]).

Graph I.5: **The potential effect of inflation on material and social deprivation by country**



(1) The bars represent the pre-existing level and predicted change in the MSD rate, as calculated from the change in households' living cost adjustments and estimated real income elasticities.
Source: Own analysis of microdata from the 2019 wave of the EU-SILC based on Menyhért (2022).

The first indicator under consideration is the material and social deprivation (MSD) rate based on EU statistics on income and living conditions (EU-SILC). This MSD rate – along with the severe MSD rate as part of the AROPE framework – indicates households' enforced inability to afford certain necessary or desirable items needed for an adequate standard of living. As a composite non-monetary indicator across 13 sub-categories, it records the share of the population experiencing deprivation in at least five areas. To capture the inflation effects on MSD, we can employ a regression-based model that identifies ongoing (within-household) changes in deprivation over time from historical cross-sectional (between-household) differences (see Box I.2 for details on the methodology.) Scaling up the estimated income elasticities by the appropriate living cost change by country yields the predicted increase in the MSD rate. This amounted to 1.76 pps as a result of 2022 inflation and 2.94 pps in 2021-2022 across the euro area. National figures for 2021-2022 vary between 0.7 pps in Austria and 8 pps in Slovakia, reflecting large cross-country differences in both the income elasticity of deprivation and size of the living cost shock (Graph I.5).

([15]) Real income is calculated by dividing nominal income by the price level and measures the amount of goods and services that can be purchased with a given level of income. Since the change in the cost of living refers to the change in inflation faced by a particular population segment, the change in the relevant households' real income amounts to the cost of living change with an opposite sign by construction. Change in purchasing power and real income are therefore used interchangeably from now on.

([16]) The relationship between the (unobservable) true effects of inflation and the (hypothetical) partial effects presented in this article is not clear or straightforward. Income support measures (especially targeted ones) and demand substitution away from high-inflation food and energy goods are widely expected to mitigate the measurable social consequences of inflation. On the other hand, important factors (e.g. heterogeneity of item-level and local price trends, idiosyncratic cross-sectional dispersion of household expenditures) and potential second-order effects (e.g. relative price-effects, deprivation trade-offs) are not (yet) known. We should therefore not consider the resulting calculations as upper bounds to the true social effects of inflation.

Box I.1: Measuring poverty and social exclusion in the EU

Poverty and social exclusion are complex and multi-dimensional concepts, and are measured in a number of ways ([1]). In the EU, existing national and EU-level indicators used in the context of the Social Protection Performance Monitor, the Joint Assessment Framework or the revised Social Scoreboard provide comprehensive coverage of various aspects of poverty, inequality and social exclusion ([2]). The different targets and indicators vary considerably in terms of measurement scope, operative function and policy relevance ([3]).

Different approaches to conceptualising and measuring poverty tend to focus on different aspects, forms and dimensions of the social situation. As a complex phenomenon, poverty can be measured in a multi-dimensional way covering a wide range of deprivation areas, but also in terms of its most salient aspect – the financial resources of individuals or households. Such a uni-dimensional measurement is often focused on monetary aspects related to households' income or consumption. These are imperfect proxies of individual well-being, but are found to be instrumental for, and a crucial determinant of, the fulfilment of individuals' capabilities and basic needs. It is worth noting that not all uni-dimensional poverty measures are of a monetary character, especially the ones that target deprivation from particular thematic perspectives (such as energy poverty or transport poverty). Among the most widely-used and policy-relevant monetary indicators, a certain duality prevails in terms of whether poverty is (i) primarily an objective social construct or a subjective phenomenon based on individuals' own perception; and (ii) refers to relative inequalities or absolute deprivation. These two perspectives are often closely connected in practice (i.e., inequalities often leave people so far behind that they fail to meet even their most basic needs), but often imply very different standards for measurement. Absolute poverty indicators are based on some concept of basic needs and focus on minimum acceptable standards of living at the level of individuals and households. The more recent concept of relative poverty, on the other hand, emphasises the importance of prevailing (context-specific) standards of material and social development, and focuses mainly on inequalities, deprivations and the social exclusion process. While there has recently been a convergence and growing compatibility between absolute and relative indicators, considerable conceptual differences and practical challenges remain – especially when it comes to international measurement. Table A provides a summary of the various measurement approaches ([4]).

Table A: Schematic overview of the main approaches to poverty measurement

POSSIBLE DIMENSIONS				EXAMPLES
Uni-dimensional	Monetary	Absolute	National	ISTAT poverty thresholds in Italy
			International	International Poverty Line (IPL) Absolute poverty thresholds for the EU (ABSPO)
		Relative	National	At-risk-of-poverty (AROP) indicator
			International	EU-wide AROP measures
		Subjective		Subjective poverty lines (SPL)
	Non-monetary			Poverty lines based on food energy intake (FEI) Thematic poverty concepts (e.g. energy poverty)
Multi-dimensional				Material and social deprivation (MSD) Global Multidimensional Poverty Index (MPI)

Notes: Own illustration based on United Nations (2018) and Menyhért et al. (2021)
Source: European Commission

Despite the multitude of existing social indicators, only a selected few are directly affected by inflation and changing living costs. This also holds for the EU's headline social indicator, the share of the total population at risk of poverty or social exclusion (AROPE) – a composite of both uni-dimensional and multi-dimensional

([1]) For further details, see Atkinson, A. B., A-C. Guio and E. Marlier (eds.) (2017). Monitoring Social Inclusion in Europe
([2]) For further details, see the dedicated Commission and Eurostat websites.
([3]) For further details, see United Nations (2018). Guide on Poverty Measurement and OECD (2019). Society at Glance.
([4]) For further details and discussion, see Ravallion M. (2016). The Economics of Poverty: History, Measurement, and Policy, or see Menyhért, B., Zs. Cseres-Gergely, V. Kvedaras, B. Mina, F. Pericoli and S. Zec (2021.) Measuring and monitoring absolute poverty (ABSPO) – Final Report, JRC127444.

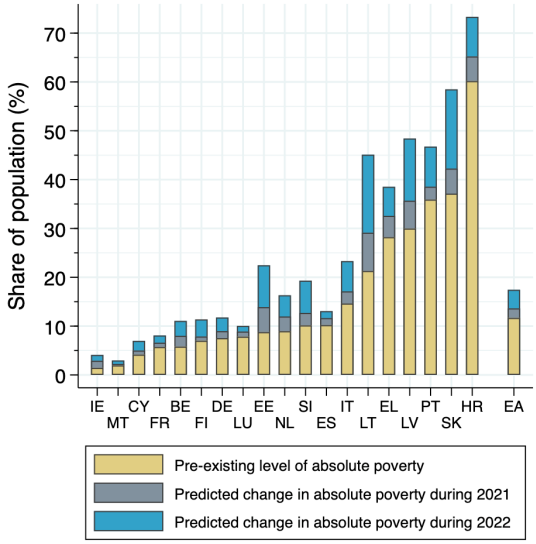
(Continued on the next page)

Box (continued)

elements. Its first component, the at-risk-of-poverty (AROP) rate, is based on a relative threshold (i.e. 60% of the national median equivalised income) and is unaffected by purchasing power considerations. Its second (non-monetary) component of low-work-intensity is driven by changes in individuals' and households' labour force participation. The third AROPE component, the multi-dimensional indicator of (severe) material and social deprivation, refers to an absolute minimum standard and responds (indirectly) to shifts in households' living costs.

The positive correlation between the pre-existing MSD rates and the predicted changes suggests that current inflation is widening existing social inequalities within the euro area.

Graph I.6: **The potential effect of inflation on absolute monetary poverty by country**



(1) The bars represent the pre-existing level and predicted change in the absolute poverty (ABSPO) rate (see Menyhért et al. (2021) for details), as calculated on the basis of households' living cost adjustments.
Source: Analysis of microdata from the 2019 wave of the EU-SILC based on Menyhért (2022).

The second measure is that of absolute monetary poverty. Here we could rely on the set of novel explorative cross-country comparable absolute poverty thresholds that a recent European Commission initiative ('Measuring and monitoring of absolute poverty – ABSPO') produced for EU countries ([17]) at the analytical level. Since the relevant ABSPO poverty lines are explicitly designed and constructed to reflect households' basic needs and minimum living costs, they can be easily adjusted to capture real or hypothetical changes in households' financial position and poverty status due to inflation. Graph I.6 shows the pre-existing level and predicted change due to inflation in absolute poverty across the euro area. Absolute poverty is estimated to have increased by 3.4 pps on average during 2022, and by 5.7 pps during the 2021-2022 period. The relevant national figures for 2021-2022 vary between an increase by 1 p.p. (in Malta) and by 23.8 pps (in Lithuania – light blue bars), reflecting large differences in the size of the population with financial resources only slightly above the pre-existing ABSPO thresholds. The graph also shows that the polarisation between Member States with below-average and above-average poverty rates is considerably larger when compared to material and social deprivation. This implies that more than 11 million more people across the euro area would have been at risk of failing to attain the minimum standards for a decent living in the absence of support measures.

([17]) Menyhért, B., Zs. Cseres-Gergely, V. Kvedaras, B. Mina, F. Pericoli and S. Zec (2021). Measuring and monitoring absolute poverty (ABSPO) – Final Report, JRC127444. The ABSPO poverty lies are derived from the existing deprivation index by assigning a monetary value to each item used to compute deprivation. The (severe) material deprivation rate measures the percentage of the population that cannot afford at least three (four) of the following nine items: (i) to pay their rent, mortgage or utility bills; (ii) to keep their home adequately warm; (iii) to face unexpected expenses; (iv) to eat meat or proteins regularly; (v) to go on holiday; (vi) a television set; (vii) a washing machine; (viii) a car; (ix) a telephone. Note that in the ABSPO families that cannot afford one of those items are below the threshold, which tends to increase the poverty rate.

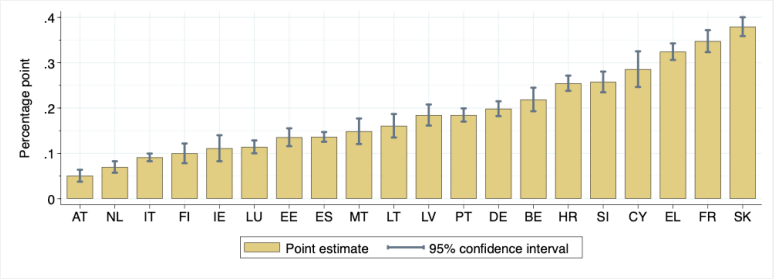
Box I.2: **Modelling the effect of inflation on material and social deprivation**

Empirical evidence from EU-SILC microdata indicates a strong and stable statistical relationship between the level of household income and the incidence of material and social deprivation (MSD) in EU countries ([1]). MSD is highly concentrated among low-income households and decreases exponentially from one income decile to the next, at a constant rate of around one third on average.

Using these insights, we can assess the impact of rising prices on the deprivation rate by focusing on the corresponding change in households' purchasing power and real income. As it is not possible to observe within-household changes in real income over the recent inflationary period due to the lack of available data, using cross-sectional comparisons appears to be the only feasible option. In fact, we could identify the deprivation effects of real income changes from a single EU-SILC wave using cross-sectional elasticities. Instead of observing the same households (or household types) and documenting their MSD status repeatedly during the recent inflationary period, we can focus on the historical difference in deprivation rates across households with different real (and nominal) income positions at a single point in time as a suitable proxy.

For this strategy to work, three conditions need to hold. First, the deprivation probability of a given household type should be determined (primarily) by its level of current income (rather than, e.g., wealth or past savings). Second, conditional on real disposable income, changes in relative prices should not (substantially) affect the deprivation likelihood of a given household. Third, the institutional framework should remain (relatively) stable so that a given level of real income corresponds to similar levels of deprivation incidence over time ([2]).

Figure A: Predicted increase in MSD associated with 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 MSD on a separate national sub-sample of households with below-median income, and denote the predicted percentage point change in MSD associated with 1% decrease in real household income. The figure also shows the 95% confidence bands around the point estimates.
Source: EU-SILC

Assuming that these conditions hold ([3]), we can estimate the income elasticity of MSD using a simple (sample-weighted) OLS techniques on household-level microdata from the latest pre-COVID and pre-inflation EU-SILC wave (2019). The regression specification features the binary indicator variables of MSD (or severe MSD) as the dependent variable, with household income and socio-demographic controls (on settlement type, household size and composition) on the right-hand side:

$$y_h = \alpha + \beta \log(income_h) + \gamma^T X_h + \varepsilon_h$$

([1]) See Menyhért, B., Zs. Cseres-Gergely, V. Kvedaras, B. Mina, F. Pericoli and S. Zec (2021). Measuring and monitoring absolute poverty (ABSPO) – Final Report, JRC127444.
([2]) These conditions are not specific to the cross-sectional identification proposed above, and would need to hold equally for a longitudinal analysis of dynamic within-household deprivation patterns over time.
([3]) Ascertaining the empirical validity of these conditions goes beyond the scope of this analysis. Based on available empirical evidence, they appear rather realistic: the saving rate among financially-constrained households is very low, and most households with deprivation have limited means to substitute demand in the wake of changes in relative prices.

(Continued on the next page)

Box (continued)

where $y_h \equiv \mathrm{I}(MSD_h)$ is an indicator of the MSD status of household h, income denotes total equivalised disposable household income, and X_h represents the vector of controls. The main elasticities ($\hat{\beta}$) are obtained by estimating this model separately on the sub-sample of households with below-median (equivalised) income in each country.

This setup can therefore be considered as a standard linear probability model that identifies the percentage point change in deprivation associated with a proportionate (1%) increase in household income across different household types. The relevant elasticities are highly robust, statistically significant, and vary considerably between 0.05 (in Austria) and 0.36 (in Slovakia). This demonstrates divergent degrees of deprivation sensitivity to income shocks across the euro area (Figure A) ([4]). Scaling up these elasticities proportionally by the observed change in households' living costs yields the partial effect of inflation on MSD in a country.

([4]) The country-level differences are mostly driven by differences in the overall level and income concentration of material and social deprivation in a country.

I.6. Concluding remarks and policy implications

The main conclusions of this analysis are robust: the negative welfare and social effects of current inflation can be substantial for low-income households in the euro area in the absence of policy measures. Given the large cross-country differences in price developments and household consumption patterns, the social implications are rather different across Member States. Low-income or vulnerable segments of national populations face particularly high risks of financial distress and poverty – especially in Italy, the Baltic states and Central and Eastern Europe. In the euro area, inflation has increased households' cost of living by 9.7% on average in 2022, and by about 16.3% since the beginning of 2021. In the absence of income growth, government support and demand substitution, this would have raised the MSD rate by up to 3 pps and the incidence of absolute poverty by up to 6 pps in the euro area in 2022. The large and uneven social effects of inflation put vulnerable groups in an even more precarious position, risks increasing inequality and eroding social cohesion across the euro area.

This called for a strong and multi-faceted policy response. In response to the spiking energy prices in 2022, Member States have implemented emergency policy measure to support vulnerable households and companies. While incoming empirical evidence suggests that these have been effective at offsetting the immediate negative social consequences of high inflation ([18]). However, the measures adopted have been poorly targeted and have proven costly. In addition, about two-third of the amounts consist in price measures which distort the price signal and reduce incentives for energy savings ([19]).

Over the medium term, a key social policy challenge lies in ensuring that social protection systems effectively address the high inflation. Absent renewed energy price shocks, emergency support measures should be gradually phased out and, in any case, their design, shoud be improved to ensure that they are targeted to the most vulnerable ([20]). The broader and long-term policy objective is to align protective measures with the strategic EU priorities of the twin transitions, the climate objectives of the European Green Deal, and the social fairness agenda of the European Pillar of Social Rights – which requires large social investments, structural reforms and coordinated policy initiatives across a wide range of policy areas.

([18]) See, among many, Amores A., S. Barrios, R. Speitmann and D. Stoehlker (2023). Price Effects of Temporary VAT Rate Cuts: Evidence from Spanish Supermarkets, JRC Science for Policy Brief, JRC132542, or OECD (2022). Minimum wages in times of rising inflation.

([19]) See Bethuyne, G., Cima, A., Döhring, B., Johannesson Lindén, A. Kasdorp, R. and J. Varga, "Targeted income support is the most social and climate-friendly measure for mitigating the impact of high energy prices", VoxEU.org, 6 June 2022.

([20]) For a discussion on income support measures taken recently by national governments to the energy and living cost crisis, as well as their potential social effects, see OECD (2022). Income support for working-age individuals and their families; OECD (2022). Minimum wages in times of rising inflation; ; Sgaravatti, G., S. Tagliapietra and G. Zachmann. (2021). National policies to shield consumers from rising energy prices, Bruegel Datasets; as well as the EU PolicyWatch dataset by Eurofound.