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Household Inflation Inequality in the United States and Europe

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Abstract

Inflation rates differ across households depending on their sociodemographic characteristics. This paper calculates the inflation rates experienced by income quintiles in the US, the EU, France, Germany, Italy, Spain, and the UK between 2001 and 2021. The results indicate substantial inflation inequality between quintiles. Households with lower income experienced higher inflation rates than households with higher income. The aggregated inflation differential between the lowest and the highest quintile is always positive, with values up to 8.56 percentage points. One reason for this inequality is differing consumption baskets of households: essential goods, which exhibited above-average inflation, are more prevalent in the consumption baskets of lower quintiles, while non-essentials, which exhibited below-average inflation, are more relevant for higher quintiles. Upon examining inflation inequality across quintiles between January and June 2022, a similar pattern emerged in Europe. In the US, however, higher income quintiles experienced higher inflation rates in each month of 2022.

Keywords: Inflation Inequality, Household Heterogeneity, Inflation Differentials

JEL Classification: D12, D31, E31

I. Introduction

The inflation rate in an economy is an important macroeconomic indicator: central banks aim to stabilize inflation rates; households adjust their consumption/savings behavior according to price level changes. Inflation rates might also be important for studying economic inequality, especially if they differ across groups of households. This paper empirically investigates inflation inequality between income quintiles in the United States (US), the European Union (EU), and various European countries. I show that households with lower income experienced structurally higher inflation rates than households with higher in-

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come in the US and in Europe between 2001 and 2021. In the US, this relationship reversed between January and June 2022.

The analysis consists of two parts. First, the paper reports the annual inflation rate of each income quintile between 2001 and 2021 and investigates potential reasons for inflation inequality. Second, the inflation rate experiences of income quintiles between January and June 2022 are examined on a monthly basis. In order to calculate quintile-specific inflation rates, I create a data set for the US, the EU, France, Germany, Italy, Spain, and the United Kingdom (UK). The data set consists of quintile-specific consumption baskets and the inflation rates of each expenditure category within the consumption baskets. The results indicate considerable inflation inequality between income quintiles in all countries[1] between 2001 and 2021. In particular, the lowest income quintile experienced a higher average inflation rate than the highest income quintile in all countries. Furthermore, the aggregated inflation differential between lower quintiles and higher quintiles is always positive, with values up to 8.56 percentage points (pp). A main driver of this inflation inequality is the fact that lower income quintiles spend a higher share of their income on essential goods (like food or housing), as these goods exhibited above-average inflation. Conversely, non-essential goods (such as recreational activities), which exhibited below-average inflation rates, are more prevalent in the consumption basket of higher income quintiles.

When examining inflation inequality between January and June 2022, I find that households with lower income also experienced higher inflation rates than higher income quintiles in Europe in each month. In the United States, however, the relationship between income and inflation reversed: households with higher income experienced higher inflation rates in the first half of 2022. A main reason for this difference between European countries and the US are different inflation rate developments of certain expenditure categories. In particular, the highest average inflation rate of an expenditure category in the US – transportation – was 20.6 % in 2022, i. e., 12pp higher than the average inflation rate of the second highest expenditure category (food). Transportation plays a particularly large role in the consumption basket of higher income quintiles. Hence, they experienced higher inflation rates than lower quintiles in each month of 2022. While the costs for transportation also increased in Europe (average inflation rate in the EU in 2022: 13.4 %), the inflation rate of housing (including water, electricity, gas, and other fuels) increased even more (average inflation rate in the EU in 2022: 15.4 %). As housing is more relevant in the consumption basket of lower income quintiles, they experienced a higher inflation rate in each month of 2022 in all European countries.

[1] For simplicity, I subsume the European Union under countries.

This paper relates to the literature in the following ways. Various works examine potential differences in inflation rate experiences across groups of households. Works by *Michael* (1979), *Hagemann* (1982), or, more recently, by *Hobijn/Lagakos* (2005), *Hobijn* et al. (2009), *Kaplan/Schulhofer-Wohl* (2017), *Jaravel* (2019), and *Argente/Lee* (2021) document substantial inflation inequality across a variety of different sociodemographic groups of households in the United States. While the extent of reported inflation inequality differs between these studies, most of them find that households with lower income experience higher inflation rates. In the same vein, *Gürer/Weichenrieder* (2020) examine inflation inequality in Europe and its implications for the measurement of economic inequality. They find that between 2001 and 2015, the lowest income decile experienced substantially higher inflation rates than the highest income decile. Furthermore, they show that these differences in inflation experiences can (at least in parts) be explained by differences in the consumption basket of deciles. Similar to the results presented in this paper, they show that essential goods exhibited above-average inflation and were more prevalent in the consumption baskets of lower income deciles.

This paper contributes to this literature by providing annual income quintile-specific inflation rates in the past two decades for a multitude of countries: the EU, five European countries, and the US. Furthermore, this paper extends the analysis of inflation inequality to the first half of 2022 by calculating monthly quintile-specific inflation rates for these countries.

The remainder of this paper is organized as follows. Section II briefly describes the methodology, Section III the data. Section IV documents inflation inequality between 2001 and 2021 as well as between January and June 2022. It moreover discusses reasons for this inequality. Section V concludes.

II. Methodology

In order to examine inflation inequality between income quintiles, it is necessary to construct a measure for inflation on a quintile level. The inflation rate π of income quintile *i* in year *t* is calculated similar to a Young Index as

$$\pi_{i,t} = \sum_{j=1}^{J} \frac{p_{j,t}}{p_{j,t-1}} c_{i,j,t} \quad , \tag{1}$$

where *j* denotes a certain expenditure category (i. e., a specific consumption bundle of goods and services), *J* the overall amount of expenditure categories, $\frac{p_{j,t}}{p_{j,t-1}}$ the annual inflation rate of an expenditure category in year *t*, and $c_{i,j,t}$ the

share of expenditure category *j* in the consumption basket of *i* . In particular, the inflation rate of quintile *i* is calculated as a sum of the inflation rates of each expenditure category, weighted with the share of each category in the quintile's consumption basket.

Thus, inflation inequality only arises if two conditions are fulfilled: (i) quintiles differ in their consumption structures, i. e., the share of expenditure categories in the consumption baskets of quintiles differ, and (ii) expenditure categories differ in their inflation rates.

III. Data

Reporting household inflation heterogeneity in the United States and Europe requires the gathering of household consumption and inflation data on an expenditure category level. In particular, I collect data on the share of (subsequently defined) expenditure categories in the overall consumption of income quintiles in the United States, the European Union[2], France, Germany, Italy, Spain, and the United Kingdom.[3]

United States. The Bureau of Labor Statistics (BLS) publishes the CPI[4] for several expenditure categories. Matching these categories with BLS data on the consumption of goods and services of income quintiles from the Consumer Expenditure Survey (CES), I create a data set containing the annual CPI inflation rate as well as the annual quintile-specific consumption share of eight expenditure categories between 2001 and 2022: Food and beverages; housing; apparel; transportation; medical care; recreation; education and communication; other goods and services. Note that these categories refer to the category-specific CPI inflation rates provided by the BLS. The expenditure categories reported by the CES are similar but not identical. In particular, the CES provides the consumption expenditures of income quintiles divided into the following categories: Food (including non-alcoholic beverages); alcoholic beverages; housing; apparel and services; transportation; health care; entertainment; personal care products and services; reading; education; tobacco products and smoking supplies; miscellaneous expenditures; cash contributions; personal insurance and pensions. In order to consistently match the consumption shares with the inflation rate of expenditure categories, alcoholic beverages are added to food, yielding a measure for food

[2] The 27 current member states of the EU are considered. Each member is weighted by its respective consumption share in overall consumption (*Eurostat*, 2022).

[3] Note that in the US both the CPI and consumption expenditures include imputed rent. In Europe, consumption expenditures include imputed rent (except from the UK) but the CPI does not.

[4] In particular, I use the standard CPI for all urban consumers, based on the US city average.

and beverages. Entertainment and reading are added to receive a consumption measure for recreation. Finally, the sum of personal care products and services, tobacco products, and miscellaneous provides a measure for other goods and services. This procedure ensures consistent measures of all expenditure categories as defined within the CPI.[5] Using the category-specific CPI inflation rate and the quintile-specific share of the respective category in the quintile's consumption basket, the experienced inflation rate of each quintile can be calculated on an annual basis using equation (1). As quintile-specific consumption data is only available until 2020, I use the expenditure shares of 2020 to weight the inflation rates of each expenditure category in 2021 and 2022. Section IV reports the average inflation rate of the expenditure categories as well as their respective average consumption share per quintile between 2001 and 2022 for the US.

Europe. The statistical office of the European Union (Eurostat) publishes the annual Harmonised Index of Consumer Prices (HICP; for symmetry, also abbreviated as CPI) of several expenditure categories for all European countries and the EU.[6] Furthermore, Eurostat reports the consumption share of identical categories in income quintile-specific consumption baskets ("structure of consumption expenditure by income quintile and COICOP[7] consumption purpose"). Hence, matching annual inflation and consumption share data per quintile for the EU, France, Germany, Italy, Spain, and the UK is straightforward. The reported categories are: Food and non-alcoholic beverages; alcoholic beverages, tobacco, and narcotics; clothing and footwear; housing, water, electricity, gas, and other fuels; furnishing, household equipment, and routine household maintenance; health; transport; communications; recreation and culture; education; restaurants and hotels; miscellaneous goods and services. However, the consumption shares of expenditure categories per quintile are not provided on a yearly basis but only for 1988, 1994, 1999, 2005, 2010, 2015, and 2020. Therefore, the annual inflation rate per quintile for each European country and the EU is calculated as the sum of the category-specific CPI inflation rate weighted by the quintile-specific share of each category closest to the respective year. In particular, for the considered time frame (2001 – 2022), the reported consumption share per quintile in 1999 is used for the year 2001, the reported share in 2005 for the years 2002 – 2007, the share in 2010 for 2008 – 2012, the share in 2015 for 2013 – 2017, and the share in 2020 for the remaining years.[8] Naturally, this procedure might

[5] Cash contributions as well as personal insurance and pensions cannot be subsumed unambiguously under one of the categories provided by the CPI. Thus, expenditures on these categories are not considered.

[6] Note that the UK data ends in 2019.

[7] Classification of individual consumption by purpose.

[8] For the EU, Eurostat only reports the value for 2015. For Italy, only the values for 1999 and 2005 are available. Data for the UK ends in 2015. The general procedure stays the same.

lead to inaccuracies in the results, which are addressed in the following section. However, the consistent data treatment for all quintiles ensures comparable inflation rates between quintiles for all European countries and the EU. Section IV reports the average inflation rate of the expenditure categories as well as their average consumption share per quintile between 2001 and 2022 for the EU. The corresponding data for all European countries is provided in the Appendix.

IV. Results

1. Household Inflation Inequality between 2001 and 2021

Figure 1 shows the calculated inflation rates for each quintile between 2001 and 2021 as well as the official CPI inflation rate in the US. In the vast majority of years, households in lower income quintiles experienced higher inflation rates than households with higher income, indicated by a positive inflation differential in 19 out of the 21 years considered. As shown in Table 1, the highest income quintile experienced the lowest average inflation rate, while the second lowest income quintile experienced the highest. In the time span considered, the aggregated inflation differential[9] between these two quintiles is 3.12pp. The aggregated inflation differentials between the highest income quintile and the remaining three quintiles lie between 1.6pp and 2.7pp. This implies that, ceteris paribus, lower income quintiles lost up to 3.12pp in purchasing power in comparison to higher quintiles solely due to differing inflation experiences.

These values likely understate the actual inflation differential between quintiles. For instance, consumption expenditures only indicate which type of products households consume but do not show the exact variety that is consumed of each product. For example, households with higher income might buy a more expensive variety of a product than households with lower income. If the price of that product increases, households with higher income can substitute the more expensive variety with a cheaper one, thereby avoiding an increase in their experienced inflation rate. This substitution might not be possible for households with lower income, as they already consume a less expensive variety. Thus, lower income quintiles fully experience the increase in prices due to lower substitution capabilities within expenditure categories (see also *Brainard*, 2022). Recent literature, such as *Kaplan/Schulhofer-Wohl* (2017), *Jaravel* (2019), or *Argente/Lee* (2021), aims to account for this effect by using scanner data, better capturing differing consumption and price developments of product varieties.

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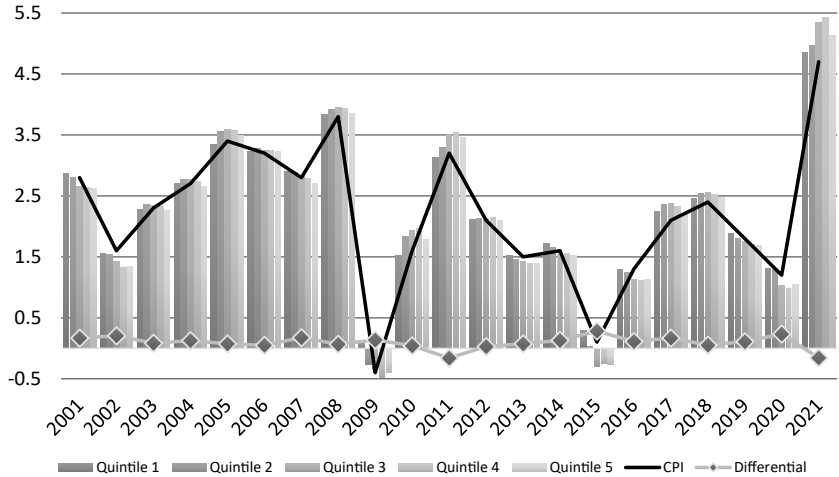
[9] The aggregated inflation rate of a quintile is defined as $\pi_i^{aggr} = \prod_{t=1}^{T} \pi_{i,t}$, with T being defined as the last year in the data set. The aggregated inflation rate differential is the difference between the aggregated inflation rates of two quintiles.



Note: Differential refers to the inflation rate differential between the second lowest income quintile and the highest income quintile.

Figure 1: Inflation Rate (in Percent) per Income Quintile in the United States, 2001 – 2021

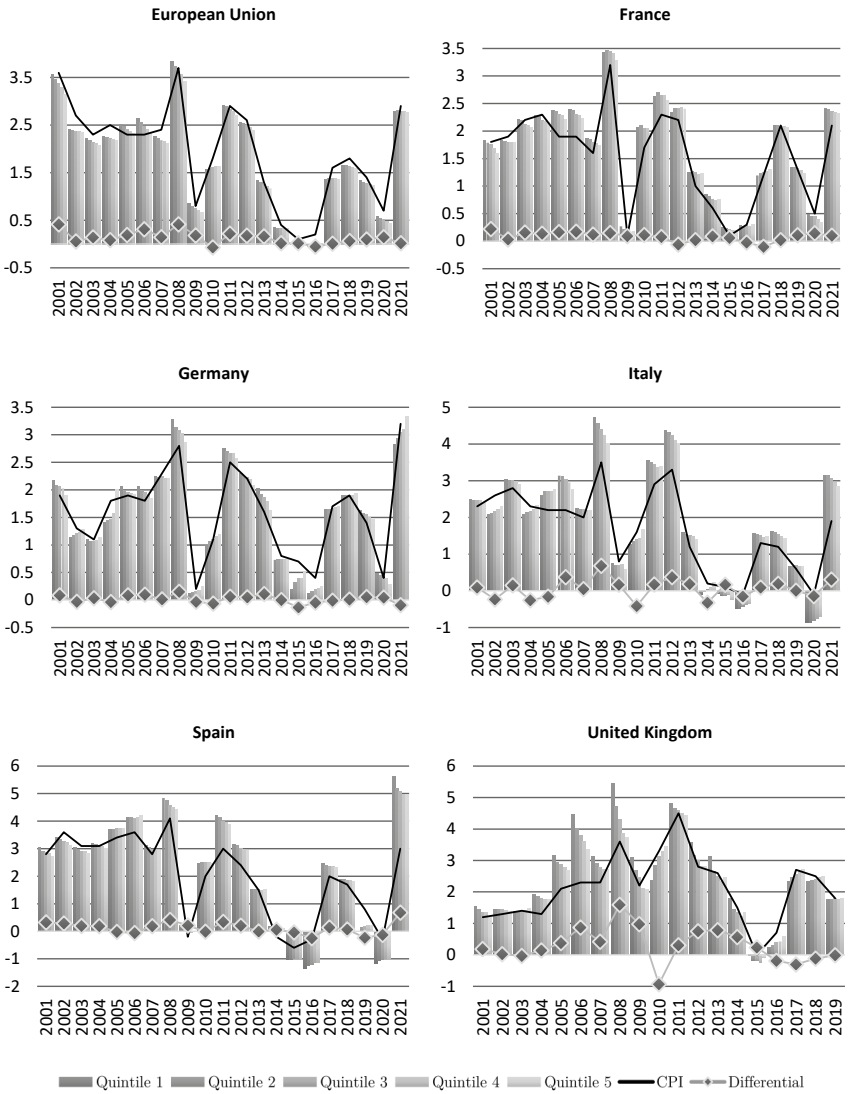
Table 1

Average Annual Inflation Rate per Income Quintile and Aggregated Inflation Rate Differential in the United States, 2001 – 2021

	Quintile				
	1	*2*	*3*	*4*	*5*
Inflation Rate	2.24 %	2.26 %	2.23 %	2.21 %	2.16 %
Differential	2.67pp	3.12pp	2.22pp	1.63pp	–

Note: Differential refers to the aggregated inflation rate differential between the respective quintile and the quintile with the lowest inflation rate.

The aforementioned example tallies with findings from *Gürer/Weichenrieder* (2020) and *Argente/Lee* (2021), which show that households with higher income substitute goods more effectively than households with lower income. This effect is likely to be strengthened by the broad categorization of expenditures and the use of income quintiles, as the consideration of more heterogeneity in terms of expenditure category inflation rates and of household income is likely to lead to larger household inflation inequality. In particular, *Gürer/Weichenrieder* (2020) show that inflation differentials between income deciles are considerably greater than the reported differentials between quintiles in this paper.



Note: Differential refers to the inflation rate differential between the lowest income quintile and the quintile experiencing the lowest inflation rate (highest income quintile in the EU, France, Italy, and Spain; second highest income quintile in the UK; second lowest income quintile in Germany).

Figure 2: Inflation Rate (in Percent) per Income Quintile in Europe, 2001 – 2021

As Figure 2 shows, I find qualitatively similar results as for the US when analyzing inflation differentials between income quintiles in Europe. In the vast majority of years, households with lower income experienced higher inflation rates than households with higher income. In the EU, the inflation rate differential is positive in 19 out of 21 years, in France in 18, in Italy in 14, in Spain in 13, in the UK in 13 out of 19 years. A notable exception is Germany: the differential is negative in 9 years and positive in 12 years.

This finding is underscored by Table 2. In the EU, France, Italy, and Spain, the highest income quintile experienced the lowest average inflation rate; in the UK the second-highest income quintile did. In Germany the average experienced inflation rate barely differs across quintiles. In all countries, however, the lowest income quintile experienced the highest average inflation rate.

Generally, the extent of inflation heterogeneity differs across countries: in the EU, the aggregated inflation differential between the lowest quintile and the quintile experiencing the highest inflation rate is 3.87pp, in France 2.49pp, in Germany 0.44pp, in Italy 1.86pp, in Spain 3.79pp, and in the UK 8.56pp. As previously discussed, these inflation differentials constitute a lower bound due to higher substitution capabilities of households with higher income. In addition, consumption shares are not available on a yearly basis for Europe. Hence, the results are likely to understate actual inflation inequality between households even more in Europe than the US, as substitution across expenditure categories is only partly captured. Nevertheless, the results depict considerable inflation differentials between income quintiles in the US and Europe. In the following, drivers of this inflation inequality are discussed.

Table 2

Average Annual Inflation Rate per Income Quintile and Aggregated Inflation Rate Differential in Europe, 2001 – 2021

	Quintile				
	1	*2*	*3*	*4*	*5*
			European Union		
Inflation Rate	1.85 %	1.82 %	1.74 %	1.76 %	1.72 %
Differential	3.87pp	2.88pp	1.96pp	1.19pp	–
			France		
Inflation Rate	1.70 %	1.70 %	1.66 %	1.65 %	1.61 %
Differential	2.49pp	2.42pp	1.45pp	0.92pp	–

(continue next page)

(Table 2 continued)

	Quintile 1	2	3	4	5
			Germany		
Inflation Rate	1.58 %	1.56 %	1.57 %	1.56 %	1.58 %
Differential	0.44pp	–	0.12pp	0.01pp	0.34pp
			Italy		
Inflation Rate	1.88 %	1.87 %	1.85 %	1.83 %	1.81 %
Differential	1.86pp	1.54pp	1.07pp	0.48pp	–
			Spain		
Inflation Rate	2.22 %	2.18 %	2.14 %	2.12 %	2.09 %
Differential	3.79pp	2.64pp	1.39pp	0.77pp	–
			United Kingdom		
Inflation Rate	2.52 %	2.36 %	2.30 %	2.22 %	2.23 %
Differential	8.56pp	3.77pp	2.15pp	–	0.26pp

Note: Differential refers to the aggregated inflation rate differential between the respective quintile and the quintile with the lowest average inflation rate.

2. Reasons for Household Inflation Inequality

One main reason for the reported inequality of inflation rates is the difference in the structure of household expenditures: in the US, households with lower income consume a larger share of goods and services that exhibit high inflation rates, as shown in Table 3.

In particular, higher expenditures on food, housing, and medical care (essential goods, which exhibited above-average inflation) by lower quintiles and a larger share of spending on transportation and recreation (non-essential goods, which exhibited below-average inflation) by higher quintiles seem to be main drivers of these inflation differentials. These results tally with the studies conducted by *Hobijn* et al. (2009), *Portillo* et al. (2016), or *Gürer/Weichenrieder* (2020). *Jaravel* (2019) shows that a reason for lower inflation rates of goods that are predominantly consumed by households with higher income are product innovations that occur due to larger relative demand for goods by higher income quintiles.

Table 3

Average Inflation Rate and Share of Consumption per Quintile of Expenditure Categories in the United States, 2001 – 2021

	Average Inflation Rate	*Average Share of Quintile*				
		1	*2*	*3*	*4*	*5*
Food	2.4 %	17.53 %	16.64 %	16.30 %	16.34 %	15.27 %
Housing	2.4 %	41.72 %	39.71 %	38.69 %	37.78 %	38.52 %
Apparel	–0.3 %	3.98 %	3.86 %	3.87 %	4.03 %	4.48 %
Transportation	2.1 %	15.78 %	18.95 %	20.94 %	21.54 %	20.28 %
Medical Care	3.4 %	8.41 %	9.54 %	8.77 %	8.15 %	6.80 %
Recreation	0.9 %	5.00 %	5.51 %	5.71 %	6.28 %	7.17 %
Education	1.6 %	3.15 %	1.35 %	1.38 %	1.81 %	3.68 %
Other	2.7 %	4.42 %	4.45 %	4.35 %	4.08 %	3.79 %
Average CPI	2.2 %					

Notes: Average inflation rate refers to the average, annual percentage change in the price level of an expenditure category between 2001 and 2021. Average share indicates the average percentage share of an expenditure category in overall consumption per quintile between 2001 and 2021. Food refers to the category food and beverages; education to education and communication; other to other goods and services.

Considering the inflation differentials in Europe, I also find that a main driver of these differentials are heterogeneous consumption shares of expenditure categories, as shown in Table 4 for the EU (Tables A.1 – A.5 in the Appendix provide the data for the remaining European countries). In particular, essential goods (such as food and non-alcoholic beverages and housing), which exhibited above-average inflation in all countries considered and the EU, play a more prevalent role in the consumption basket of households with lower income, while the share of non-essentials goods (clothing and footwear, recreation and culture), which exhibited below-average inflation, is higher in the consumption basket of households with higher income. Overall, the differences in the consumption baskets in the EU are more pronounced than in the US. The share of food and non-alcoholic beverages differs by 4.3pp between the highest and the lowest quintile in the EU, as opposed to only 2.3pp in the US. The differences in the share of housing expenditures are even greater: in the EU, the highest income quintile spends 10.5pp less on housing than the lowest income quintile; in the US, the difference is only 3.2pp. This explains the larger inflation differential between households in the EU compared to the US between 2001 and 2021.

Table 4

Average Inflation Rate and Share of Consumption per Quintile of Expenditure Categories in the European Union, 2001 – 2021

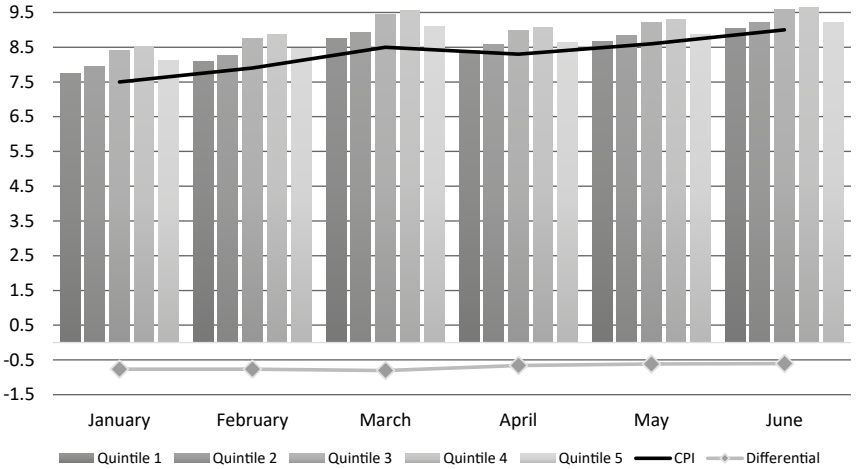
	Average Inflation Rate	*Average Share of Quintile*				
		1	*2*	*3*	*4*	*5*
Food	2.3 %	16.20 %	15.20 %	14.60 %	13.80 %	11.90 %
Alcohol and Tobacco	4.0 %	2.50 %	2.30 %	2.20 %	2.10 %	1.80 %
Clothing	0.5 %	3.10 %	3.30 %	3.60 %	4.00 %	4.50 %
Housing	2.8 %	33.80 %	31.00 %	28.50 %	26.10 %	23.30 %
Household Equipment	1.0 %	3.00 %	3.50 %	3.80 %	4.00 %	4.70 %
Health	1.9 %	2.90 %	3.00 %	3.00 %	2.90 %	3.00 %
Transport	2.1 %	6.10 %	8.00 %	9.10 %	10.70 %	12.00 %
Communications	–1.4 %	3.20 %	3.00 %	2.90 %	2.80 %	2.40 %
Recreation	0.7 %	5.20 %	5.60 %	6.20 %	6.50 %	7.60 %
Education	2.2 %	0.60 %	0.50 %	0.60 %	0.70 %	1.20 %
Restaurants and Hotels	2.5 %	3.40 %	3.70 %	4.20 %	4.80 %	5.80 %
Miscellaneous	2.0 %	6.40 %	7.20 %	7.60 %	7.90 %	8.10 %
Average CPI	1.9 %					

Notes: Average inflation rate refers to the average annual percentage change in the price level of an expenditure category between 2001 and 2021. Average share indicates the average percentage share of an expenditure category in overall consumption per quintile between 2001 and 2021. Food refers to the category food and non-alcoholic beverages; alcohol and tobacco to alcoholic beverages, tobacco, and narcotics; clothing to clothing and footwear; housing to housing, water, electricity, gas, and other fuels; recreation to recreation and culture; miscellaneous to miscellaneous goods and services.

3. Inflation Rate Developments in 2022

In the first half of 2022, inflation rates recorded enormous increases both in the US and in Europe due to a multitude of reasons. On the one hand, supply chain issues (due to the restrictive "Zero-Covid" strategy in China, for instance) prompted inflation to increase: the increase in aggregate demand caused by fiscal stimulus related to Covid-19 and the economic recovery from the pandemic could not be met by a simultaneous increase in aggregate supply. Thus, inflation increased more strongly than already expected from base effects. On the other hand, the Russian war against Ukraine led to increases in energy prices, which caused inflation to rise even further.

Naturally, the increase in inflation did not affect all households in an equal manner. Based on the expenditure shares of the latest available year (see Section II), I utilize BLS (for the US) and Eurostat (for Europe) data of annual inflation



Note: Differential refers to the inflation rate differential between the lowest income quintile and the second highest income quintile.

Figure 3: Inflation Rate (in Percent) per Income Quintile in the United States, 2022

rates of each expenditure category for each available month of 2022 (January – June) to calculate the experienced inflation rate by each income quintile between January 2022 and June 2022. Note that the UK is precluded from this part of the analysis, as consistent inflation data is only available until 2019.

Figure 3 shows that, in the US, households with higher income experienced higher inflation rates in all months of 2022. In particular, the second highest income quintile experienced the highest inflation rate within each month of 2022, while the lowest income quintile experienced the lowest. Note that due to potentially neglected substitution effects as well as the higher substitution capabilities of high-income households, the actual inflation rate of higher income quintiles might be lower, i. e., the reported differential might overstate the actual difference. Nevertheless, the data for the US indicates higher experienced inflation rates by households with higher income.

The reason for the particularly high inflation rates of households with higher income is the high inflation rate of transportation, as shown in Table 5. The average price increases in transportation were higher than the price increases in any other expenditure category in 2022, surpassing the second highest inflation rate (food and beverages) by 12pp. In particular, high gasoline prices prompted the inflation rate of transportation to increase. In addition, increases in prices for vehicles led transportation costs to increase. As these types of goods are more relevant for the consumption basket of higher income quintiles, households in these quintiles experienced a higher inflation rate in 2022.

Table 5

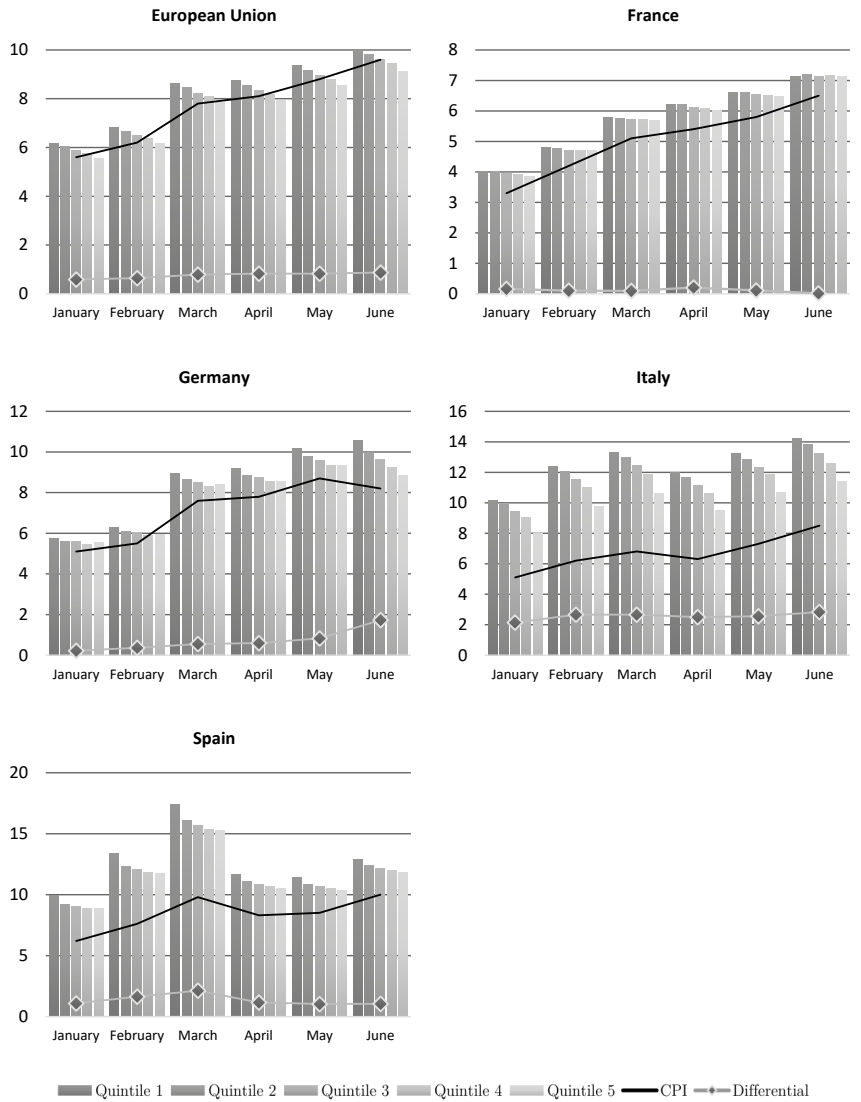
Average Inflation Rate of Expenditure Categories in the United States, 2022

	Average Inflation Rate
Food	8.6 %
Housing	6.5 %
Apparel	5.7 %
Transportation	20.6 %
Medical Care	3.2 %
Recreation	4.7 %
Education	1.2 %
Other	5.8 %
Average CPI	8.3 %

Notes: Average inflation rate refers to the average, annual percentage change in the price level of an expenditure category between January and June 2022. Food refers to the category food and beverages; education to education and communication; other to other goods and services.

Figure 4 shows that the opposite holds true for the EU and European countries. In each month of 2022 considered and in each country considered, the lowest income quintile experienced the highest inflation rate, while the highest quintile experienced the lowest inflation rate. Inflation differentials are large and always positive in each country.

Table 6 reveals the reason for the higher inflation rates of households with lower income in Europe. The average inflation rates in 2022 for housing, water, electricity, gas, and other fuels (housing) were exceptionally high in the EU and all European countries considered (up to 26.3 % in Italy, 15.4 % EU-wide). The share of this expenditure category is significantly larger in the consumption basket of households with lower income (Tables 4 and A.1–A.4). Note that as in the US, the inflation rate of transport was also elevated and considerably higher than the average CPI inflation rate in all countries, which disproportionally affected households with higher income. However, the disproportional effect of the inflation rate of housing on the inflation rate of lower income quintiles is greater than the disproportional effect of the inflation rate of transport on the inflation rates of households with higher income. This holds true for three reasons: (i) the inflation rate of housing was higher than the inflation rate of transport (Italy and Spain), (ii) the relative importance of housing in the consumption basket of lower income quintiles compared to higher quintiles is greater than the relative importance of transport in the consumption basket of higher quintiles compared to lower quintiles (France and Germany), or (iii) both (EU).



Note: Differential refers to the inflation rate between the lowest income quintile and the highest income quintile.

Figure 4: Inflation Rate (in Percent) per Income Quintile in Europe, 2022

Table 6

Average Inflation Rate of Expenditure Categories in Europe, 2022

	Average Inflation Rate in				
	EU	*FR*	*DE*	*IT*	*ES*
Food	7.9 %	3.7 %	7.6 %	6.3 %	8.5 %
Alcohol and Tobacco	3.3 %	0.5 %	3.7 %	0.6 %	3.0 %
Clothing	2.2 %	3.0 %	1.3 %	0.7 %	0.3 %
Housing	15.4 %	9.0 %	10.9 %	26.3 %	21.7 %
Household Equipment	5.4 %	3.9 %	5.2 %	3.7 %	4.8 %
Health	1.9 %	0.9 %	0.9 %	8.2 %	1.1 %
Transport	13.4 %	10.5 %	13.4 %	10.3 %	14.6 %
Communications	0.1 %	1.1 %	0.1 %	–3.4 %	–0.4 %
Recreation	4.0 %	2.3 %	5.1 %	0.9 %	2.7 %
Education	0.5 %	2.4 %	1.6 %	-0.5 %	1.2 %
Restaurants and Hotels	6.6 %	3.8 %	5.9 %	5.0 %	6.2 %
Miscellaneous	2.9 %	2.8 %	2.1 %	1.3 %	3.1 %
Average CPI	7.7 %	5.1 %	7.2 %	6.7 %	8.4 %

Notes: Average inflation rate refers to the average, annual percentage change in the price level of an expenditure category between January and June 2022. EU: European Union; FR: France; DE: Germany; IT: Italy; ES: Spain. Food refers to the category food and non-alcoholic beverages; alcohol and tobacco to alcoholic beverages, tobacco, and narcotics; clothing to clothing and footwear; housing to housing, water, electricity, gas, and other fuels; recreation to recreation and culture; miscellaneous to miscellaneous goods and services.

In addition, note that the average increase in inflation in the EU and most European countries was lower than in the United States. One reason for this development is differences in the extent of fiscal stimulus during the Covid-19 pandemic. As the Federal Reserve notes, domestic fiscal stimulus accounts for 2.5pp of excess inflation[10] in the US but only for 1.8pp of excess inflation in the euro area until February 2022. Accounting for spillover effects, i. e., the impact of foreign fiscal stimulus on domestic inflation, fiscal stimulus contributes over 3pp to excess inflation in the US, while it accounts for around 2.5pp in the euro area (*de Soyres* et al., 2022).

[10] The authors define excess inflation as the difference between the annual inflation in the examined quarter and the average inflation rate in the country examined between 2015 and 2019.

V. Conclusion

Inflation rates differ across households, depending on their income. This paper creates a data set for the United States, the European Union, France, Germany, Italy, Spain, and the United Kingdom and first reports the annual inflation rates experienced per income quintile between 2001 and 2021. The results indicate considerable inflation inequality between quintiles in all countries. On average, lower income quintiles experienced higher inflation rates than higher income quintiles. The aggregated inflation differential between the lowest and the highest quintile is positive in all countries, reaching values of 8.56pp in the UK. One important reason for these differentials is the different consumption baskets of households: while lower quintiles spend a higher share of their income on necessities (such as food or housing), which exhibited above-average inflation, non-essentials (like recreational activities), which exhibited below-average inflation, are more prevalent in the consumption basket of higher income quintiles. The paper continues with reporting the inflation rates experienced by quintiles in the first half of 2022. In Europe, a similar pattern can be observed: households with lower income experienced higher inflation rates in each month between January and June 2022, especially due to stark increases in prices for housing, water, electricity, gas, and other fuels. Conversely, households with higher income experienced higher inflation rates in the US between January and June 2022 due to the disproportional increase in the inflation rate of transportation.

These results have several policy implications. First, fiscal policy aimed at reducing the burden of households in times of rising inflation rates are likely to have strong distributional effects, especially when the policies target certain expenditure categories. For instance, the tax cuts on gasoline introduced in Germany in June are likely to benefit higher income quintiles the most, as this decreases the inflation rate of transportation. This should be taken into account when designing appropriate policies. Second, differing inflation experiences should be considered when measuring economic inequality. In particular, income inequality might change due to differing changes in the income of households but is additionally affected by differing changes in households' purchasing power.

Appendix

Table A.1

Average Inflation Rate and Share of Consumption per Quintile of Expenditure Categories in France, 2001 – 2021

	Average Inflation Rate	*Average Share of Quintile*				
		1	*2*	*3*	*4*	*5*
Food	1.7 %	15.71 %	15.67 %	15.69 %	14.84 %	12.89 %
Alcohol and Tobacco	4.2 %	3.36 %	2.95 %	2.62 %	2.40 %	2.06 %
Clothing	0.3 %	5.03 %	4.57 %	4.62 %	4.81 %	5.16 %
Housing	2.4 %	33.26 %	31.06 %	28.63 %	26.62 %	24.53 %
Household Equipment	0.9 %	3.97 %	4.32 %	4.75 %	5.11 %	6.43 %
Health	0.9 %	2.32 %	2.69 %	2.72 %	2.49 %	2.56 %
Transport	1.9 %	10.01 %	11.83 %	13.16 %	14.76 %	14.98 %
Communications	–1.9 %	3.68 %	3.06 %	2.77 %	2.56 %	2.13 %
Recreation	–0.2 %	6.27 %	6.45 %	7.06 %	7.53 %	8.62 %
Education	2.6 %	0.72 %	0.38 %	0.37 %	0.43 %	0.71 %
Restaurants and Hotels	2.1 %	4.05 %	4.13 %	4.55 %	5.32 %	6.84 %
Miscellaneous	1.9 %	11.64 %	12.86 %	13.06 %	13.10 %	13.10 %
Average CPI	1.5 %					

Notes: Average inflation rate refers to the average annual percentage change in the price level of an expenditure category between 2001 and 2021. Average share indicates the average percentage share of an expenditure category in overall consumption per quintile between 2001 and 2021. Food refers to the category food and non-alcoholic beverages; alcohol and tobacco to alcoholic beverages, tobacco, and narcotics; clothing to clothing and footwear; housing to housing, water, electricity, gas, and other fuels; recreation to recreation and culture; miscellaneous to miscellaneous goods and services.

Table A.2

Average Inflation Rate and Share of Consumption per Quintile of Expenditure Categories in Germany, 2001-2021

	Average Inflation Rate	*Average Share of Quintile*				
		1	*2*	*3*	*4*	*5*
Food	1.9 %	14.29 %	12.81 %	11.95 %	11.09 %	8.99 %
Alcohol and Tobacco	3.2 %	2.47 %	2.15 %	2.00 %	1.82 %	1.43 %
Clothing	0.6 %	4.02 %	4.43 %	4.60 %	4.79 %	4.89 %
Housing	1.9 %	42.06 %	36.95 %	34.58 %	32.28 %	27.47 %
Household Equipment	0.7 %	3.88 %	4.75 %	5.35 %	5.51 %	6.00 %
Health	1.8 %	2.54 %	2.88 %	3.15 %	3.58 %	4.89 %
Transport	2.0 %	7.85 %	10.28 %	11.81 %	13.24 %	16.66 %
Communications	–1.3 %	3.71 %	3.13 %	2.74 %	2.48 %	2.02 %
Recreation	0.9 %	8.73 %	10.33 %	10.77 %	10.91 %	11.15 %
Education	1.7 %	0.59 %	0.64 %	0.70 %	0.80 %	0.88 %
Restaurants and Hotels	2.2 %	3.38 %	4.16 %	4.63 %	4.95 %	5.53 %
Miscellaneous	1.5 %	6.44 %	7.43 %	7.83 %	8.52 %	10.00 %
Average CPI	1.6 %					

Notes: Average inflation rate refers to the average annual percentage change in the price level of an expenditure category between 2001 and 2021. Average share indicates the average percentage share of an expenditure category in overall consumption per quintile between 2001 and 2021. Food refers to the category food and non-alcoholic beverages; alcohol and tobacco to alcoholic beverages, tobacco, and narcotics; clothing to clothing and footwear; housing to housing, water, electricity, gas, and other fuels; recreation to recreation and culture; miscellaneous to miscellaneous goods and services.

Table A.3

Average Inflation Rate and Share of Consumption per Quintile of Expenditure Categories in Italy, 2001 – 2021

	Average Inflation Rate	*Average Share of Quintile*				
		1	*2*	*3*	*4*	*5*
Food	1.9 %	26.66 %	22.98 %	20.63 %	18.36 %	13.67 %
Alcohol and Tobacco	3.3 %	2.38 %	2.01 %	1.92 %	1.80 %	1.43 %
Clothing	0.9 %	6.15 %	6.57 %	7.21 %	7.42 %	7.74 %
Housing	2.4 %	29.33 %	29.51 %	28.83 %	27.89 %	24.79 %
Household Equipment	1.3 %	5.06 %	5.40 %	5.47 %	6.36 %	8.47 %
Health	1.7 %	3.79 %	4.15 %	4.12 %	4.10 %	4.23 %
Transport	2.2 %	9.93 %	10.66 %	11.37 %	11.93 %	15.78 %
Communications	–3.3 %	3.03 %	2.71 %	2.45 %	2.27 %	1.87 %
Recreation	0.9 %	4.04 %	4.85 %	5.74 %	6.23 %	7.25 %
Education	0.8 %	0.52 %	0.65 %	0.74 %	0.78 %	0.81 %
Restaurants and Hotels	2.0 %	2.25 %	3.26 %	3.97 %	5.22 %	6.41 %
Miscellaneous	2.1 %	6.93 %	7.27 %	7.56 %	7.62 %	7.59 %
Average CPI	1.7 %					

Notes: Average inflation rate refers to the average annual percentage change in the price level of an expenditure category between 2001 and 2021. Average share indicates the average percentage share of an expenditure category in overall consumption per quintile between 2001 and 2021. Food refers to the category food and non-alcoholic beverages; alcohol and tobacco to alcoholic beverages, tobacco, and narcotics; clothing to clothing and footwear; housing to housing, water, electricity, gas, and other fuels; recreation to recreation and culture; miscellaneous to miscellaneous goods and services.

Table A.4

Average Inflation Rate and Share of Consumption per Quintile of Expenditure Categories in Spain, 2001 – 2021

	Average Inflation Rate	*Average Share of Quintile*				
		1	*2*	*3*	*4*	*5*
Food	2.4 %	21.69 %	19.29 %	17.52 %	16.04 %	12.95 %
Alcohol and Tobacco	4.0 %	2.86 %	2.57 %	2.30 %	2.13 %	1.65 %
Clothing	1.1 %	5.28 %	5.57 %	5.85 %	5.88 %	5.84 %
Housing	2.8 %	34.03 %	31.92 %	31.02 %	30.00 %	30.70 %
Household Equipment	1.1 %	3.88 %	4.12 %	4.20 %	4.47 %	5.49 %
Health	0.9 %	2.77 %	3.05 %	3.24 %	3.09 %	2.88 %
Transport	2.3 %	9.26 %	10.76 %	11.54 %	12.05 %	11.90 %
Communications	–1.2 %	3.14 %	3.09 %	2.99 %	2.90 %	2.53 %
Recreation	0.1 %	4.17 %	4.91 %	5.56 %	6.13 %	6.85 %
Education	2.9 %	0.58 %	0.79 %	0.97 %	1.24 %	2.09 %
Restaurants and Hotels	2.5 %	6.43 %	7.54 %	8.18 %	9.06 %	9.95 %
Miscellaneous	2.2 %	5.85 %	6.38 %	6.71 %	6.92 %	7.18 %
Average CPI	2.0 %					

Notes: Average inflation rate refers to the average annual percentage change in the price level of an expenditure category between 2001 and 2021. Average share indicates the average percentage share of an expenditure category in overall consumption per quintile between 2001 and 2021. Food refers to the category food and non-alcoholic beverages; alcohol and tobacco to alcoholic beverages, tobacco, and narcotics; clothing to clothing and footwear; housing to housing, water, electricity, gas, and other fuels; recreation to recreation and culture; miscellaneous to miscellaneous goods and services.

Table A.5

Average Inflation Rate and Share of Consumption per Quintile of Expenditure Categories in the United Kingdom, 2001 – 2019

	Average Inflation Rate	*Average Share of Quintile*				
		1	*2*	*3*	*4*	*5*
Food	2.4 %	13.71 %	13.20 %	12.28 %	11.20 %	9.10 %
Alcohol and Tobacco	3.8 %	3.61 %	3.12 %	2.84 %	2.53 %	2.09 %
Clothing	–2.3 %	4.26 %	4.75 %	5.06 %	5.52 %	5.71 %
Housing	3.6 %	37.74 %	29.55 %	24.34 %	21.26 %	17.91 %
Household Equipment	1.2 %	5.97 %	6.90 %	6.94 %	7.03 %	8.04 %
Health	2.8 %	0.92 %	1.16 %	1.28 %	1.24 %	1.44 %
Transport	2.8 %	8.56 %	11.03 %	13.65 %	15.54 %	17.66 %
Communications	0.8 %	3.17 %	3.22 %	3.01 %	2.93 %	2.43 %
Recreation	0.5 %	9.70 %	11.89 %	13.37 %	14.29 %	14.77 %
Education	7.3 %	1.13 %	0.82 %	1.15 %	1.22 %	2.74 %
Restaurants and Hotels	3.0 %	5.94 %	7.23 %	8.38 %	9.44 %	9.90 %
Miscellaneous	2.0 %	5.36 %	7.15 %	7.72 %	7.84 %	8.24 %
Average CPI	2.1 %					

Notes: Average inflation rate refers to the average annual percentage change in the price level of an expenditure category between 2001 and 2019. Average share indicates the average percentage share of an expenditure category in overall consumption per quintile between 2001 and 2019. Food refers to the category food and non-alcoholic beverages; alcohol and tobacco to alcoholic beverages, tobacco, and narcotics; clothing to clothing and footwear; housing to housing, water, electricity, gas, and other fuels; recreation to recreation and culture; miscellaneous to miscellaneous goods and services.

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