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IZA DP No. 16860

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## ABSTRACT

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# Gender Disparities in Inflation during the Cost-of-Living Crisis in Europe: A Novel Decomposition\*

This paper evaluates the gender-specific distributional impact of the recent cost-of-living crisis in six European countries using the Household Budget Survey to assess the degree of regressivity (affecting lower income households more) or progressivity (affecting higher income households more) of inflation experienced by households between April 2021 and July 2023. Despite a growing literature on the distributional impact of inflation, there is limited evidence on gender differentials. We innovate by applying distributional measures and a decomposition method adapted from the taxation literature extended with a gender dimension to assess gender differences in inflation regressivity or progressivity, isolate the average inflation rate from the inflation structure effect and identify the drivers of regressivity/progressivity by broad commodity groups (food, heating/electricity, motor fuels, other goods and services). The findings highlight the greater regressive inflation faced by female-headed households compared to men in middle-income countries like Portugal, Poland and Hungary and high-income countries like Ireland. In Germany overall inflation has a neutral impact on women, whereas Finland stands out with a progressive inflation, more pronounced for female-headed households. Consistent across countries, the burden of food and heating/electricity inflation is disproportionately borne by low-income households. Heating/electricity inflation has a larger regressive contribution to overall inflation for female-headed households in all countries, whereas for food this holds only in Poland and Hungary. The findings highlight the need for targeted policies to address potential inequalities arising from differential consumption patterns and protect the most vulnerable groups.

**JEL Classification:** D12, D31, E31, I30, J16

**Keywords:** distributional effect and gender, inflation and gender, regressive inflation, progressive inflation

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# 1 Introduction

Are women affected more by the ongoing cost-of-living crisis than men? Consumption is strongly correlated with income (Lise and Seitz, 2011). In a household setting, the relative income of household members is a strong determinant of how the household income is spent (Browning and Lusardi (1996), Lundberg et al. (1997)). Despite recent progress in women’s financial independence, there remains a stubbornly large gender income gap in all EU countries (Doorley and Keane, 2023), suggesting that decisions over household consumption are disproportionately skewed in favour of men. This has implications for aggregate consumption (Elborgh-Woytek et al., 2013), sustainable consumption (Bloodhart and Swim, 2020) and nutrition (Rosenfeld and Tomiyama, 2021) as there is much evidence that the consumption patterns of men and women are systematically different.

These empirical findings for consumption by gender have implications for the incidence of inflation. Despite a growing literature on the distributional impact of inflation both nationally (Curci et al., 2022; Flevotomou, 2023) and cross-nationally (Sologon et al., 2022; Amores et al., 2023; Chafwehe et al., 2024), there is limited evidence on gender differentials in the impact of inflation (Sologon et al., 2024).

This paper contributes with an assessment of the progressive/regressive impact of inflation differentiated by gender in Europe by adapting distributional and decomposition tools from taxation (Lambert, 2001). Decomposing the effect into an inflation rate and inflation structure effect, both overall and by commodity groups (food, heating/electricity, motor fuels and others) it provides new insights into gender differences and how these vary across countries.

## 2 Data and Method

We use the European Union Household Budget Survey (EU-HBS) for six countries with different economic environments, social policy frameworks and inflation profiles during the cost-of-living crisis: Germany, Finland, Ireland, Portugal and Poland. We use the 2015 wave to avoid Covid-19-related distortions. The HBS provides a representative sample of the population at the household level, distinguishing between households with a male or female head, where the head of the household is defined as the adult with the highest income in the household. This provides a proxy for the person with the most bargaining power over expenditure in the household.

We use disaggregated expenditures rather than the high level COICOP categories<sup>1</sup>. We estimate changes in the cost of living at the household level by applying price changes to each consumption item and re-estimating the cost of the consumption basket. Price changes reflect the Harmonised Consumer Price Index (HCPI) published by Eurostat for the period April 2021 to July 2023.

To estimate the progressivity or regressivity of inflation by gender of the household head, we calculate distributional measures based on the taxation literature (Lambert, 2001; Sologon et al., 2022). The distribution of expenditure changes due to inflation is calculated using the Reynolds-Smolensky (RS) index:

$$RS = CI_{X+C} - CI_X. \tag{1}$$

$CI_X$  is the concentration index for pre-price change total expenditure (ranked by quintiles of household disposable income) and  $CI_{X+C}$  is the concentration index for post-price change total expenditure ( $X$  = initial expenditure,  $C$  = change in expenditure). The RS index captures how price changes affect the expenditure shares of households across the income distribution. A positive RS implies that higher income households have a relatively higher share of expenditure after the price increases, i.e. that the price changes are progressive. In

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<sup>1</sup>See Sologon et al. (2024) for a description of this disaggregation.

order to calculate the direct redistributive effect of inflation in each commodity group, we calculate the RS applying the price changes for the respective commodity, *ceteris paribus*:

$$RS_{C_i} = CI_{X+C_i} - CI_X. \quad (2)$$

We then adapt the Pfähler (1990) approach (see Sologon et al. (2022)) to decompose the RS index into an inflation rate effect and an inflation structure effect by gender. The inflation structure effect is the progressivity/regressivity of aggregate inflation, which can be measured with the Kakwani index (K) from taxation (Lambert, 2001). Here, K captures the base effect or the disproportionality between the structure of initial expenditure and the increase in expenditure due to price changes:

$$K = CI_C - CI_X. \quad (3)$$

$CI_C$  measures income-related inequality in changes in total expenditure (C) due to price changes and  $CI_X$  measures income-related inequality in total initial expenditure. A positive K indicates a progressive inflation rate structure i.e. expenditure increases due to price changes are more concentrated at the top of the income distribution. Following Pfähler (1990), the distributional effect of price changes is decomposed into an average inflation rate  $r$  and a disproportionality component K:

$$RS = \frac{r}{1+r} * K. \quad (4)$$

Using disaggregated inflation rates  $r_i$  by commodity groups and the disproportionality of the price changes in each commodity  $K_{C_i} = CI_{C_i} - CI_X$ , K is further decomposed into the contribution of each commodity:

$$K = \sum_i \frac{r_i}{r} * K_{C_i}. \quad (5)$$

### 3 Results

Figures 1 to 3 illustrate this decomposition<sup>2</sup>. The RS index for overall inflation (Figure 1) is negative for both male and female headed households in Hungary, Ireland, Poland and Portugal. It is positive for both household types in Finland, while in Germany it is negative for male-headed households and zero for female-headed households. These findings indicate that, in all countries but Finland, inflation increases the expenditure of low-income households by relatively more than high-income households, exerting a regressive impact.

Inflation was more regressive for female-headed households than for male-headed ones in most countries, except Germany, where it had a neutral impact on female-headed households, and Finland, where inflation was more progressive for female-headed households than for males.

Figure 1 identifies common patterns across countries also by sub-components. Food and heating/electricity inflation is regressive for both men and women-led households, with women experiencing a stronger regressivity in heating/electricity inflation in all countries (more pronounced in Hungary, Poland and Ireland) and a stronger regressivity in food inflation in Hungary and Poland.

Decomposing the RS index for overall inflation into components attributable to the structure of inflation (the progression of inflation along the income distribution) and the level of inflation in Figure 2, we estimate heterogeneous inflation rates by country, ranging from 11-12% in Finland to 34-35% in Hungary. These overall inflation rates tend to be higher for male than for female-headed households although the differences are small.

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<sup>2</sup>See corresponding tables in the Annex.

The structure of inflation (K index) drives the pattern of the RS index. It is progressive in Finland and regressive in the other countries, with higher regressivity observed for female-headed households (except in Germany) (Figure 2).

Considering the sub-components in Figure 3, some consistent patterns emerge across countries. For male-headed households, the structure of food and heating/electricity inflation is regressive, whereas the structure of other goods and services inflation, which make up a large component of inflation, is progressive. We observe a mixed pattern for motor fuels: their structure of inflation disproportionately affects higher income households in Hungary and Poland and lower income households in Finland and Ireland.

For female-headed households, similar to male-headed households, we find that the structure of inflation on food and heating/electricity is regressive while that of inflation on other goods and services is progressive (except Ireland). However, we notice a different pattern by gender for motor fuels inflation. Among female-headed households, its burden disproportionately falls on higher income households in all countries.

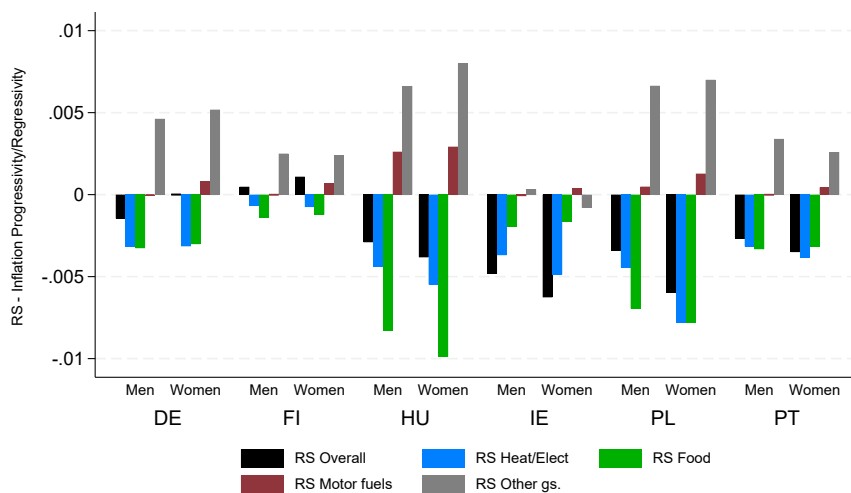


Figure 1: Regressivity/Progressivity of inflation overall and by main commodity sub-components

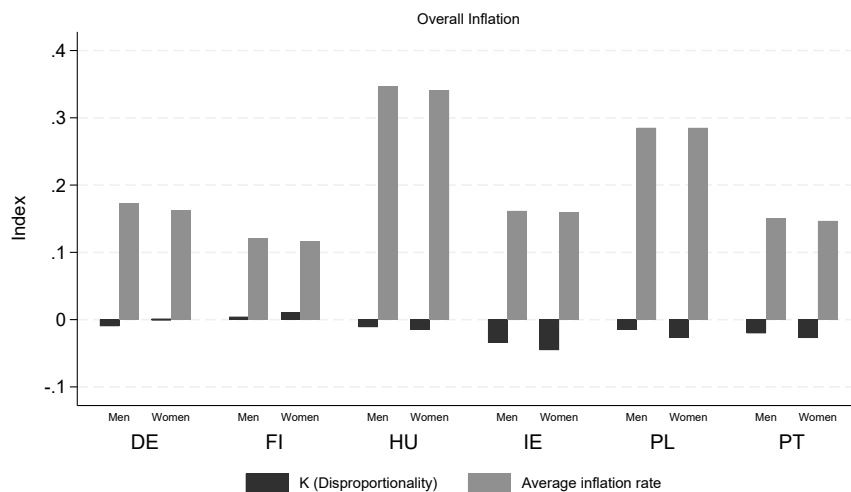


Figure 2: Disproportionality (K) and average inflation rate (r) - Overall Inflation

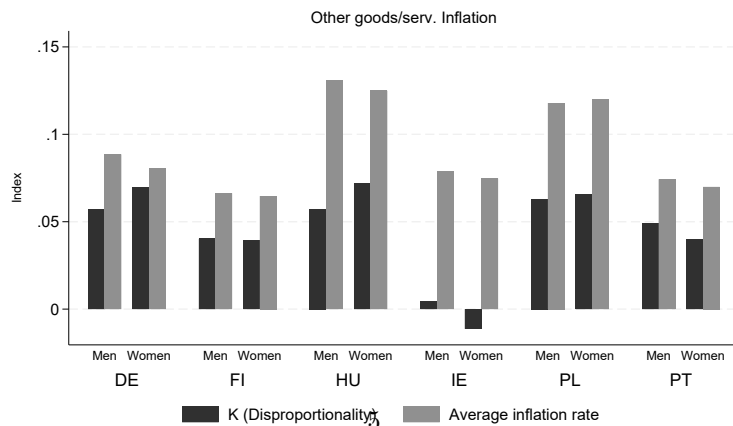
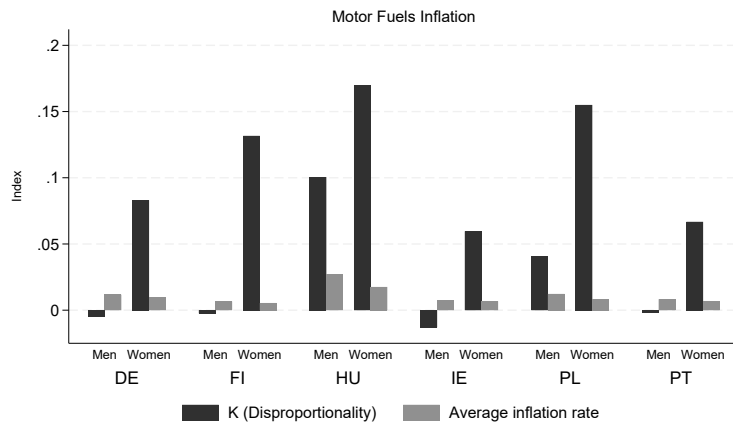
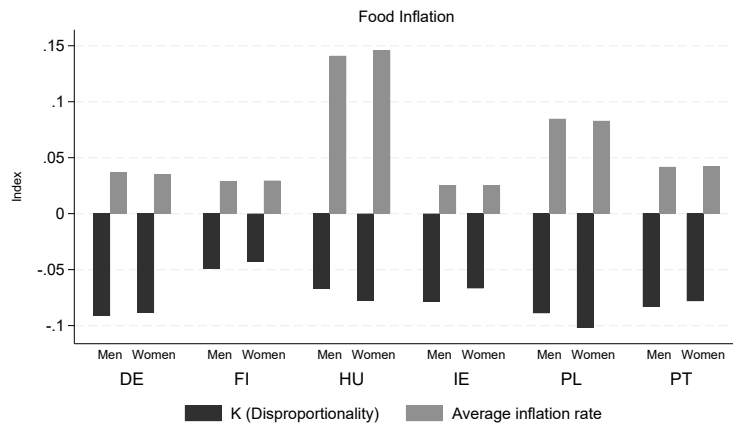
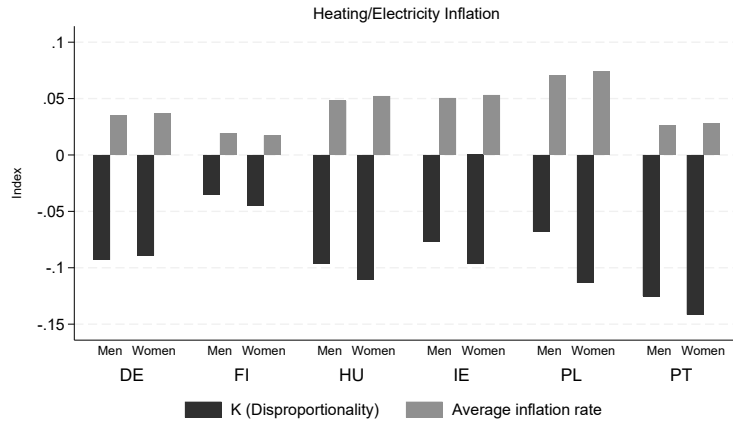


Figure 3: Disproportionality (K) and average inflation rate (r)

Table 1 concludes by decomposing the overall regressivity/regressivity of inflation into its drivers (eq(5)). In all countries with regressive inflation, the effect is more pronounced for female-headed households. In Hungary, Poland and Portugal, this is driven by a stronger regressive contribution from food and heating/electricity which dominates the progressive contribution from motor fuels and other goods/services. In Ireland, inflation from other goods/services reinforces the regressive effect for women.

The regressivity of inflation for male-headed households in Germany is driven by the structure of inflation from food, heating/electricity and motor fuels. In contrast, for women, the regressivity of inflation on food and heating/electricity is counterbalanced by the progressivity of inflation on motor fuels and other goods/services. Finland stands out with a progressive inflation. The effect is more pronounced for women than for men and is driven by inflation from motor fuels and other goods/services, which dominates the regressive contribution from necessities.

Table 1: Decomposition of K into subcomponents

Component	DE	FI	HU	IE	PL	PT
Men						
Food	-0.0196	-0.0118	-0.0273	-0.0123	-0.0264	-0.0231
Heating/Electricity	-0.0191	-0.0056	-0.0133	-0.0240	-0.0167	-0.0216
Motor fuels	-0.0003	-0.0001	0.0078	-0.0006	0.0017	-0.0001
Other goods/services	0.0292	0.0220	0.0216	0.0022	0.0260	0.0243
K	-0.0099	0.0044	-0.0113	-0.0347	-0.0154	-0.0204
Women						
Food	-0.0193	-0.0108	-0.0332	-0.0105	-0.0296	-0.0224
Heating/Electricity	-0.0201	-0.0066	-0.0169	-0.0321	-0.0294	-0.0270
Motor fuels	0.0050	0.0061	0.0087	0.0025	0.0045	0.0031
Other goods/services	0.0345	0.0218	0.0264	-0.0053	0.0275	0.0190
K	0.0000	0.0105	-0.0150	-0.0454	-0.0270	-0.0274

Notes: K=Kakwani index; the contribution of each component is  $\frac{r_i}{r} * K_{C_i}$ , i=expenditure.

## 4 Conclusion

This paper proposes a novel distributional decomposition approach from the taxation literature extended with a gender dimension applied to household survey data to assess gender differences in inflation regressivity/progressivity across six European countries with different inflation profiles and economic environments.

It highlights the greater regressive inflation faced by female-headed households compared to men in middle-income countries like Portugal, Poland and Hungary. In high-income countries, the effect varies. Ireland's findings align with middle-income countries, whereas in Germany overall inflation has a neutral impact on women; Finland stands out with a progressive inflation, more pronounced for female-headed households. Consistent across countries, we find that the burden of food and heating/electricity inflation is disproportionately borne by low-income households. Heating/electricity inflation has a larger regressive contribution to overall inflation on female-headed households in all countries, whereas for food this holds only in Poland and Hungary.

Looking at the burden of total inflation somewhat masks this effect as inflation on other goods and services and motor fuels (for some countries) was disproportionately borne by high-income households.

These findings have implications for inflation mitigation measures, which many countries enacted during the cost-of-living crisis to cushion households from the shock. Looking beyond the average incidence of inflation at potential inequalities arising from differential consumption patterns is crucial to inform the targeting of such



policies.

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## A Online Appendix

Table A-1: Decomposition on distributional impact into base and rate effects: DE FI HU

	CI pre-change exp (X)	CI cost increase (C)	CI X+C	RS Red	K Base effect	Average rate
<b>DE Men</b>						
Total expenditure	0.1898	0.1799	0.1883	-0.0015	-0.0099	0.1726
Food		0.0985	0.1865	-0.0033	-0.0913	0.0371
Heating and Electricity		0.0967	0.1866	-0.0032	-0.0931	0.0353
Motor fuels		0.1847	0.1897	-0.0001	-0.0051	0.0117
Other goods and services		0.2467	0.1944	0.0046	0.0569	0.0885
<b>DE Women</b>						
Total expenditure	0.1976	0.1977	0.1976	0.0000	0.0000	0.1622
Food		0.1091	0.1946	-0.0030	-0.0885	0.0353
Heating and Electricity		0.1087	0.1945	-0.0032	-0.0890	0.0367
Motor fuels		0.2807	0.1984	0.0008	0.0831	0.0097
Other goods and services		0.2672	0.2028	0.0052	0.0696	0.0805
<b>FI Men</b>						
Total expenditure	0.1894	0.1938	0.1898	0.0005	0.0044	0.1213
Food		0.1400	0.1880	-0.0014	-0.0494	0.0291
Heating and Electricity		0.1547	0.1887	-0.0007	-0.0347	0.0194
Motor fuels		0.1870	0.1893	-0.0000	-0.0024	0.0065
Other goods and services		0.2296	0.1919	0.0025	0.0402	0.0663
<b>FI Women</b>						
Total expenditure	0.1874	0.1978	0.1884	0.0011	0.0105	0.1168
Food		0.1446	0.1861	-0.0012	-0.0428	0.0295
Heating and Electricity		0.1428	0.1866	-0.0008	-0.0446	0.0173
Motor fuels		0.3190	0.1881	0.0007	0.1316	0.0054
Other goods and services		0.2266	0.1897	0.0024	0.0393	0.0647
<b>HU Men</b>						
Total expenditure	0.1412	0.1299	0.1383	-0.0029	-0.0113	0.3466
Food		0.0740	0.1329	-0.0083	-0.0672	0.1410
Heating and Electricity		0.0449	0.1368	-0.0044	-0.0963	0.0480
Motor fuels		0.2417	0.1438	0.0026	0.1005	0.0267
Other goods and services		0.1985	0.1478	0.0066	0.0573	0.1309
<b>HU Women</b>						
Total expenditure	0.1754	0.1604	0.1716	-0.0038	-0.0150	0.3409
Food		0.0979	0.1656	-0.0099	-0.0775	0.1462
Heating and Electricity		0.0651	0.1700	-0.0055	-0.1104	0.0523
Motor fuels		0.3453	0.1784	0.0029	0.1699	0.0175
Other goods and services		0.2475	0.1834	0.0080	0.0720	0.1249

Notes: X = initial expenditure;  $CI_{C_i}$  = concentration index of the cost increase in item  $i$ ;  $C_i$ ;  
 $CI_{X+C_i}$  = CI of the increase in total expenditure due to the cost increase in item  $i$ ;  $C_i$ ;  
 $RS_{C_i}, K_{C_i}$  = Reynolds-Smolensky and Kakwani of  $C_i$ ;  $r$  = average inflation rate;  $RS = (3)-(1)$ ;  $K = (2)-(1)$ .

Table A-2: Decomposition on distributional impact into base and rate effects: IE PL PT

	CI pre-change exp (X)	CI cost increase (C)	CI X+C	RS Red	K Base effect	Average rate
<b>IE Men</b>						
Total expenditure	0.1636	0.1288	0.1587	-0.0048	-0.0347	0.1617
Food		0.0850	0.1616	-0.0019	-0.0785	0.0254
Heating and Electricity		0.0868	0.1599	-0.0037	-0.0768	0.0505
Motor fuels		0.1506	0.1635	-0.0001	-0.0129	0.0072
Other goods and services		0.1680	0.1639	0.0003	0.0045	0.0785
<b>IE Women</b>						
Total expenditure	0.1727	0.1273	0.1664	-0.0063	-0.0454	0.1600
Food		0.1060	0.1710	-0.0016	-0.0667	0.0253
Heating and Electricity		0.0761	0.1678	-0.0049	-0.0966	0.0532
Motor fuels		0.2322	0.1731	0.0004	0.0595	0.0068
Other goods and services		0.1614	0.1719	-0.0008	-0.0113	0.0747
<b>PL Men</b>						
Total expenditure	0.1435	0.1281	0.1401	-0.0034	-0.0154	0.2852
Food		0.0546	0.1365	-0.0069	-0.0889	0.0847
Heating and Electricity		0.0757	0.1390	-0.0045	-0.0678	0.0703
Motor fuels		0.1838	0.1440	0.0005	0.0403	0.0123
Other goods and services		0.2065	0.1501	0.0066	0.0630	0.1179
<b>PL Women</b>						
Total expenditure	0.1985	0.1715	0.1925	-0.0060	-0.0270	0.2851
Food		0.0966	0.1907	-0.0078	-0.1019	0.0829
Heating and Electricity		0.0852	0.1907	-0.0078	-0.1133	0.0741
Motor fuels		0.3535	0.1998	0.0013	0.1550	0.0083
Other goods and services		0.2640	0.2055	0.0070	0.0655	0.1198
<b>PT Men</b>						
Total expenditure	0.1884	0.1680	0.1857	-0.0027	-0.0204	0.1502
Food		0.1053	0.1851	-0.0033	-0.0831	0.0417
Heating and Electricity		0.0633	0.1853	-0.0032	-0.1251	0.0259
Motor fuels		0.1865	0.1884	-0.0000	-0.0019	0.0083
Other goods and services		0.2376	0.1918	0.0034	0.0492	0.0743
<b>PT Women</b>						
Total expenditure	0.2106	0.1832	0.2071	-0.0035	-0.0274	0.1468
Food		0.1325	0.2074	-0.0032	-0.0781	0.0422
Heating and Electricity		0.0691	0.2067	-0.0039	-0.1414	0.0280
Motor fuels		0.2773	0.2110	0.0004	0.0667	0.0067
Other goods and services		0.2504	0.2132	0.0026	0.0398	0.0699

Notes: X = initial expenditure;  $CI_{C_i}$  = concentration index of the cost increase in item  $i$ ;  $C_i$ ;  
 $CI_{X+C_i}$  = CI of the increase in total expenditure due to the cost increase in item  $i$ ;  $C_i$ ;  
 $RS_{C_i}$ ;  $K_{C_i}$  = Reynolds-Smolensky and Kakwani of  $C_i$ ; r = average inflation rate; RS = (3)-(1); K = (2)-(1).