Poor Households and the Weight of Inflation

Jan Schulz and Leonhard Ipsen

Working Paper No. 205

April 2025

BERG Working Paper Series

Bamberg Economic Research Group
Bamberg University
Feldkirchenstraße 21
D-96052 Bamberg
Telephone: (0951) 863 2687
felix.stuebben@uni-bamberg.de
http://www.uni-bamberg.de/vwl/forschung/berg/

https://doi.org/10.20378/irb-108327

Redaktion:
Dr. Felix Stübben*

* felix.stuebben@uni-bamberg.de

Poor Households and the Weight of Inflation

Jan Schulz[1] Leonhard Ipsen[1, 2]

jan.schulz-gebhard@uni-bamberg.de
leonhard.ipsen@uni-bamberg.de

[1]Economics Institute, University of Bamberg
[2]Bamberg Research Training Group on Bounded Rationality, Heterogeneity and Network Effects

Abstract

We argue that most of the existing literature on inflation inequality misses an essential source of disparity by focusing on differences in expenditures while ignoring the effect of a price change on the purchasing power of households' incomes. As a remedy, we propose weighting price changes by income rather than by expenditure, as is commonly done. We theoretically derive why, under income-weighting, lower-income households are disproportionately affected by any change in prices. This proposition is validated empirically for 21 EU countries using current sector-level input-output data. Our approach allows to reconcile the conflicting evidence in the literature on inflation inequality regarding structurally higher inflation perceptions and expectations of lower-income households. Ultimately, these findings call for a broad reassessment of current approaches to measuring inflation and income inequality.

Keywords: Inflation, Inequality, Input-output Analysis, Europe

JEL: E31, D31, C15, C67, D90

Acknowledgements: We thank Laura Egelmeers, Claudius Gräbner-Radkowitsch, Simon Grothe, Georg Maxton, Patrick Mokre, Calvin Röhl and Frank Westerhoff as well as the participants of the 2024 annual meeting of the Keynes Society in Bamberg, of the 36th EAEPE annual conference in Naples, the 2024 Young Economist Conference in Vienna, of the 2024 Workshop on Economics with Heterogeneous Interacting Agents in Bamberg and of the 5th Pluralumn* workshop in Duisburg for valuable comments at crucial junctions of this investigation. We also thank Luis Drechsel and Daniel Hilbinger for their excellent research assistance. Ipsen gratefully acknowledges funding by the Hans-Böckler-Foundation through grant PK045 and Schulz gratefully acknowledges funding by the German Federal Ministry of Education and Research through the grant DATIPilot for the project "e-lernen".

1. Introduction

We argue that most of the existing literature on inflation inequality misses an essential source of disparity by focusing on differences in *expenditures* while ignoring the effect of a price change on the purchasing power of households' *incomes*. In contrast, the income-weighting of price changes offers a unified explanation for two puzzles in the existing research on inflation inequality: First, the apparent gap between perceived inflation exposure of poorer households (Stantcheva 2024) relative to the ambiguous results in empirical studies (Garcimartín, Astudillo, and Martínez 2021). Second and relatedly, the structurally higher inflation expectations and perceived exposure of lower-income households (D'Acunto, Malmendier, and Weber 2023; Fofana, Patzelt, and Reis 2024). These perceptions and beliefs are hard to rationalize, since relative exposure should depend on the type of good that is affected by a price shock and should disproportionately affect higher-income households whenever prices of luxury goods increase disproportionately.

Empirical studies on inflation inequality commonly weight price changes by households' expenditure shares, reflecting income-dependent differences in consumption baskets. Consequently, expenditure weights only capture the loss of purchasing power of the share of income allocated to expenditures. Yet, expenditure weighting is employed to construct real wages, even though wages as *income* streams represent both realized and potential uses of this income. In contrast, the income-weighting of price changes reflects the loss of the purchasing power of a household's total income. Technically, income-weighting results from multiplying expenditure weights by the household's propensity to consume. Since lower-income households consistently exhibit higher propensities to consume out of current income, poorer households experience a more significant reduction in their potential uses of nominal income as consumption baskets become more expensive. Income-weighting thus rationalizes the structurally higher inflation perceptions and expectations of lower-income households.

We start by formally showing that, following a change in prices, the commonly applied expenditure-weighting only captures the loss of purchasing power of the share of income allocated to expenditures, while, contrastingly, income weights capture the purchasing power loss of a household's entire income. A direct corollary of this argument is that constructing real wages by deflating nominal wages with an expenditure-weighted price level — as is currently done — risks masking a substantial share of purchasing power loss (or gain), and thus obscuring realized income inequality. Technically, income-weighted inflation rates result from scaling price changes by the households (income-dependent) propensity to consume. We make use of this relationship by estimating how inflation rates vary along the income distribution for the expenditure- and income-weighted case, respectively. In doing so, we are able to separate the effects of the decision what to consume from the effects of the decision how much to consume out of current income –

addressing a major concern expressed in the literature about the use of income weights. The decomposition reveals that under income-weighting, lower-income households are disproportionally exposed to *every* change in prices. This is because the propensities to consume react much more strongly to income changes than the expenditure shares for specific products. We then empirically test our proposition, using a sector-level cost-push inflation framework proposed in Ipsen and Schulz (2024). Within this framework, we investigate the effects of income-weighted price shocks for a set of 21 EU countries. While Ipsen and Schulz (2024), based on expenditure-weights, find that the direction and magnitude of income-dependent inflation inequality is conditional on the sectoral origins of price shocks, we find that under income-weighting, lower-income households are systematically overexposed to price shocks irrespective of their sectoral origin. Even an adverse shock to the price of a luxury good thus disproportionately affects poorer-income households. This result is in line with our theoretical propositions. Our findings help reconcile the conflicting evidence in the literature on inflation inequality and call for a reassessment of previous findings in this area of research as well as the research on income inequality more generally.

The remainder of this paper proceeds as follows: Section 2 outlines the related literature. Section 3 discusses the relation of expenditure- versus income-weighted inflation rates and introduces a novel elasticity decomposition for income-weighted price shocks. Section 4 describes the data and model used for the empirical analysis. Section 5 presents the results while Section 6 concludes with final remarks and perspectives for future research.

2. Related Literature

Our study connects to several strands of research. Most critically, it aims to explain two puzzles in the existing literature on inflation inequality. That is first, the apparent gap between empirical findings on income-dependent inflation exposure to the perception of poorer households feeling the most exposed to price increases: While some studies do suggest a disproportional exposure of lower-income households (Claeys and Guetta-Jeanrenaud 2022; Gürer and Weichenrieder 2020; Kaplan and Schulhofer-Wohl 2017; Sologon et al. 2025), others report pro-poor inflation (Crawford and Oldfield 2002), or relatively insignificant differences on average (Hobijn and Lagakos 2005; Ipsen and Schulz 2024). The results in Ipsen and Schulz (2024) suggest that the direction and magnitude of inflation inequality dependents on the origin and propagation of a price shock. In line with these ambiguous results, some studies report a low persistence of income-dependent inflation inequality (Hobijn and Lagakos 2005; Strasser et al. 2023). Disagreement can also be found on whether higher inflation rates coincide with a wider dispersion of inflation across income classes (Claeys and Guetta-Jeanrenaud 2022; Crawford and Oldfield 2002; Hobijn and

Lagakos 2005). Garcimartín, Astudillo, and Martínez (2021) summarize the findings on income-dependent inflation inequality as being inconclusive. This is in marked contrast to the strong perception of poorer households to be the most exposed to inflation (Easterly and Fischer 2001; Stantcheva 2024).

Second, we offer an explanatory attempt for the structural differences in income-dependent inflation expectations and perceived exposure (D'Acunto, Malmendier, and Weber 2023). As pointed out by Fofana, Patzelt, and Reis (2024) these differences cannot satisfactorily be explained by income-dependent differences in consumption baskets. Previous explanations considered the greater focus of low-income households on actual expenses and prices paid, shorter financial planning horizons, or lower financial literacy (Bruin et al. 2010). However, the findings in Prati (2024) reveal a robust connection between households' inflation perceptions and their material satisfaction, suggesting that persistently higher inflation perceptions among lower-income households may indeed have an underlying economic rationale.

We propose that the structural bias in inflation perceptions and expectations can be explained by reflecting the effect of a change in prices on the purchasing power of the total income rather than focusing solely on the share spent on expenditures. While expenditure-based approaches capture inflation inequality arising from differences in consumption baskets (cf. Argente and Lee 2021; Gürer and Weichenrieder 2020; Hobijn and Lagakos 2005; Kaplan and Schulhofer-Wohl 2017, for example), they overlook that as consumption baskets become more expensive, poorer households experience a more significant reduction in their potential uses of nominal income. As such expenditure-based approaches risk masking a substantial gap of realized inflation inequality. As we show below, this gap can be closed by scaling expenditures by the households' propensities to consume. The resulting income weights reflect the total effect of a change in prices on the purchasing power of the households' income. Since lower-income households devote larger fractions of their income to expenditures, i.e. are characterized by larger propensities to consume (cf. Schulz and Mayerhoffer 2023, for a review), income-weights capture the structurally greater loss of lower incomes' purchasing power following a change in prices.

The proposition of income-weighting relates to the logic of Engel's Law (Engel 1857), which holds that as income increases, the share of income spent on necessities – especially food – declines (even if the absolute amount rises). While earlier studies on Engel's law are based on income weights (Engel and Kneip 1996; Hamilton 2001; Leser 1963), current empirical work mostly relies on expenditure-based weights (cf. Lewbel and Houthakker 2008, for a survey). This reflects the concern that using income weights might confound the estimates of expenditure decisions for different goods categories with the decision to spend or save at all (Barigozzi et al. 2012). As we show below, we are able to address this caveat by introducing a novel elasticity decomposition for income-weighted price shocks.

The following empirical analysis in this paper connects to recent attempts to explain cost-push inflation dynamics and their distributional dimensions (Ferreira, Abreu, and Louçã 2025). The foundational work of Weber et al. (2024) and subsequent research of Ipsen, Aminian, and Schulz (2023) first demonstrated that, for both the US and the EU, a small number of key sectors dominate price levels for consumers. Similar themes appear in Nikiforos, Grothe, and Weber (2024) and Cucignatto, Garbellini, and Fora Alcalde (2023), which highlight the sectoral and network effects for price shock transmission. Later, Ipsen and Schulz (2024) suggested the pivotal role of sectorial asymmetries and propagation effects in production networks for modulating inflation inequality. To account for this, we build on their cost-push inflation framework to contrast the inflation inequality arising from price shocks under expenditure- versus income-weighting. We show, using more recent data than Ipsen and Schulz (2024), that income-weighting shifts the ambiguous, origin-of-shock-dependent inflation exposure of households to a structural overexposure of lower-income households for any price change in the consumption baskets. By validating both structurally higher inflation perceptions and expectations of lower-income households, income-weighting present a unified explanation for the inflation-inequality puzzles regarding income-dependent inflation perceptions and expectations.

3. Weights of Inflation

We start this section by formally showing that the commonly applied expenditure-weighting only captures merely the loss of purchasing power of the share of income allocated to expenditures, while, income weights capture the loss of a household's purchasing power concerning its whole (current) income. Let the absolute expenditures C of a household be given by

$$C = \alpha \cdot Y, \tag{1}$$

with α as its average and marginal propensity to consume and Y as its current income. Then, the expenditures for good i are given by

$$C_i = \theta_i \cdot C, \tag{2}$$

with θ_i as the expenditure share of good i in the households consumption basket. Assuming no change in consumption, the additional necessary expenditures in percentage terms faced by the household following a price change of good i in percentage terms π_i are given by

$$\Delta\% C = C_i \cdot \pi_i, \tag{3}$$

with π_i as a price shock to good i. Accordingly, the loss of purchasing power of the household's *income* is then given by

$$\Delta\%PP^Y = \frac{\Delta\%C}{Y} \tag{4}$$

Substituting gives

$$\Delta\%PP^Y = \frac{\theta_i \cdot \alpha \cdot Y \cdot \pi_i}{Y} = \theta_i \cdot \alpha \cdot \pi_i. \tag{5}$$

Thus, the loss of purchasing power of the household's *income* is proportional to its propensity to consume, as well as the price shock and the expenditure share in good i. Contrast this to the loss of purchasing power relative to total *expenditures*:

$$\Delta\%PP^E = \frac{\theta_i \cdot \alpha \cdot Y \cdot \Delta\%P_i}{\alpha \cdot Y} = \frac{\theta_i \cdot C \cdot \Delta\%P_i}{C} = \theta_i \cdot \pi_i \tag{6}$$

This case corresponds to the expenditure weighting used typically employed in studies of inflation inequality but fails to consider the loss of purchasing power of a household's total income. The quantities $\Delta\%PP^Y$ and $\Delta\%PP^E$ thus answer two different questions: While the $\Delta\%PP^Y$ indicates how much income would need to grow to cover the increased expenditures resulting from a price shock, $\Delta\%PP^E$ shows how much *expenditures* would need to increase. Since expenditures and current income typically do not coincide, $\Delta\%PP^Y \neq \Delta\%PP^E$ in general.

Note that the assumption of a fixed α and θ_i, i.e., no change of consumption behavior in response to the price shock, leads to upwards-biased estimates of the inflationary impact (von Auer and Shumskikh 2024). This is because Laspeyres indices use base-period weights and thus cannot take any kind of substitution into account. Since we are interested in inflation inequality, this bias is unproblematic, though: As substitution possibilities are generally higher for richer households (Ipsen, Aminian, and Schulz 2023), we understate inflation inequality using base-period weights. Our estimates can thus be considered lower bounds for the actual impact on inflation inequality.

Equation 7 restates the above relationship for a single price shock to good i for the overall price level. As in the previous case, let θ_i be a households expenditure weight on good i, that is its expenditures C_i over the total expenditures C. The household's income is given by Y, while α describes its propensity to consume. π_i gives the growth rate of the price level of good i in a set of n goods. It follows that

$$\alpha\pi^e = \alpha \sum_{i=1}^{n} \theta_i \pi_i = \frac{C}{Y} \cdot \sum_{i=1}^{n} \frac{C_i}{C} \pi_i = \sum_{i=1}^{n} \frac{C_i}{Y} \pi_i = \pi^y. \tag{7}$$

Here, it is crucial to understand that income weights, – the weighting of price changes by the total income – result from scaling expenditure-weighted price changes by the household's propensity to consume. Our goal is to estimate how the income-dependent inflation rates vary for expenditure versus income weights. We start by relating income levels Y to the (expenditure-weighted) inflation rate π^e with the elasticity $\eta \in \mathbb{R}$:

$$\pi^e = \pi_0^e Y^\eta. \tag{8}$$

By logarithmizing (8),

$$\log(\pi^e) = \log(\pi_0^e) + \eta \log(Y) \tag{9}$$

it becomes obvious that η can be estimated via OLS using a log-log regression in form of[1]

$$\log(\pi^e) = \beta_0^e + \beta_1^e \log(Y) + \epsilon. \tag{10}$$

It follows that the slope estimate of the log-log OLS regression for expenditure weights corresponds to $\hat{\beta}_1^e \approx \eta$. Assume now further that the propensity to consume α decays in income by the scaling parameter $\kappa \leq 0$ as

$$\alpha = \alpha_0 Y^\kappa. \tag{11}$$

This assumption is reflected for data across five income quintiles in 21 EU countries, as Figure 1 demonstrates.

We can express the income-weighted inflation rate π^y as

$$\pi^y = \pi^e \cdot \alpha = \pi^e \cdot \alpha_0 Y^\kappa. \tag{12}$$

Estimating the same functional form for income weights yields

$$\log(\pi^y) = \beta_0^y + \beta_1^y \log(Y) + \epsilon \tag{13}$$

$$\log(\pi^e \cdot \alpha_0 Y^\kappa) = \beta_0^y + \beta_1^y \log(Y) + \epsilon \tag{14}$$

$$\log(\pi^e) = \beta_0^y - \log(\alpha_0) + (\beta_1^y - \kappa) \log(Y) + \epsilon \tag{15}$$

[1] Unit-level subscripts have been omitted for clarity of exposition.

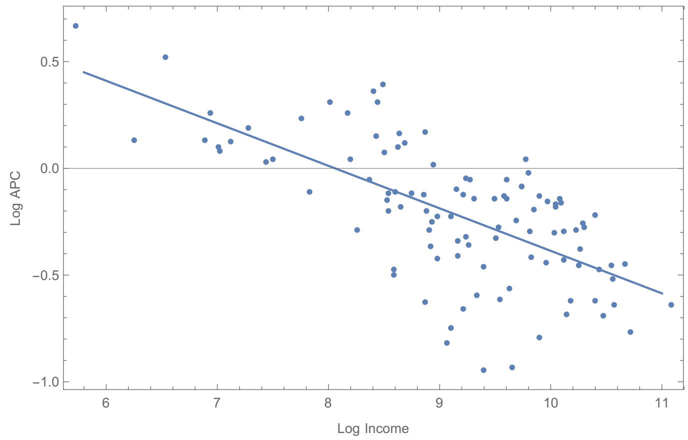


FIGURE 1. Scaling of logarithmic average propensities to consume with logarithmic income across five income quintiles in 21 EU countries based on Eurostat (2024a,d). See below for more details on the data sources. Elasticity estimate $\hat{\kappa}$ is −0.21, the adjusted R^2 = 0.28.

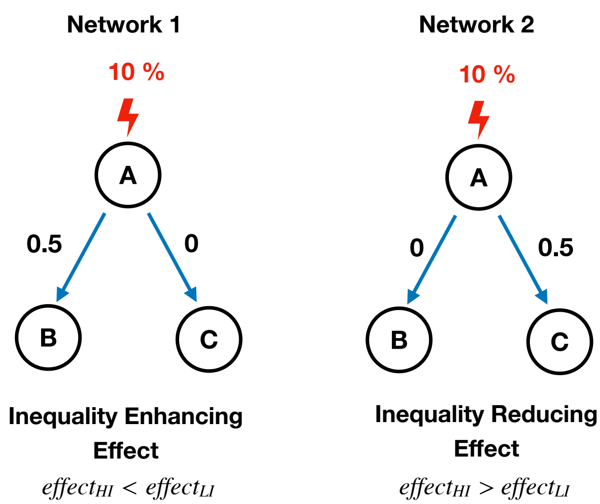
It follows that $\hat{\beta}_1^e = \hat{\beta}_1^y - \kappa$ or, since $\hat{\beta}_1^e \approx \eta$,

$$\hat{\beta}_1^y \approx \eta + \kappa. \tag{16}$$

The estimated income elasticity of income-weighted inflationary shocks is thus the sum of the income elasticity of the expenditure-weighted inflationary impact and the income elasticity of the propensity to consume. Equation (16) therefore relates the income-weighted effects of shocks on the income distribution to two behavioral parameters: How do expenditure-weighted inflation rates vary in income, and how strongly does the propensity to consume decay in income? In other words, comparing the estimated elasticities for expenditure- and income-shares, the coefficient estimates can be additively decomposed into the two elasticities without any interaction term. Therefore, we are indeed able to "separate the problem of allocating total consumption to various commodities from the decision of how much to save out of current income" (Barigozzi et al. 2012, p. 73), as the coefficient estimate can be additively decomposed into the two elasticities without any interaction term. This decomposition allows us to gauge the origin of the elasticity overall elasticity estimate for income weights.

4. Empirical Analysis: Data and Model

This section will discuss the model and data used for our empirical analysis of expenditure- and income-weighted exposure to price shocks. It has been shown by Ipsen and Schulz (2024) that network effects play a substantial role in mediating the inflation exposure between low- and high-income households. Figure 2 illustrates this by showing how a price shock can result in significant differences in inflation exposure simply due to a change in the underlying network topology.



$$C_{LI} = \begin{bmatrix} A \\ B \\ C \end{bmatrix} = \begin{bmatrix} 0.2 \\ 0.8 \\ 0 \end{bmatrix}$$

$$C_{HI} = \begin{bmatrix} A \\ B \\ C \end{bmatrix} = \begin{bmatrix} 0.2 \\ 0 \\ 0.8 \end{bmatrix}$$

FIGURE 2. Stylized example of how, for the same shock and consumption behavior (r.h.s.), different network topologies result in substantial differences of income-dependent inflation exposure. By manipulating the link weights – in our model the importance of inputs from sector A for output of sector B or C – the same input price shock either disproportionally affects low-income households (Network 1) or high-income households (Network 2).

If we were only to consider the direct effect of a price shock to sector A, we would observe no inflation inequality between the low-income *(LI)* and high-income *(HI)* households: $direct_{LI} = direct_{HI} = 0.1 \times 0.2 = 0.02$. However, the indirect propagation effects constitute a substantial source of inflation inequality: $indirect_{LI} = 0.1 \times 0.5 \times 0.8 = 0.4 > indirect_{HI} = 0.1 \times 0 \times 0.8 + 0.1 \times 0.5 \times 0 = 0$ (Calculation for Network 1). To capture these effects, we rely on global production network data and build upon a common cost-push inflation model similar to the ones used in Ipsen and Schulz (2024) or Weber et al. (2024).

In this model, building on the foundational work of Leontief (1986), sectors are interlinked through production and trade processes forming an interdependent production network. Provided that the linkages, their weights, and the final demand from households are known to us, this perspective allows to analyze the propagation of asymmetric shocks and dependencies in an economy (Miller and Blair 2009). The model assumes a linear downstream shock propagation.[2] Thus, the initial shock to a sector is passed through to

[2]While the assumption of a linear shock propagation might seem unrealistic, Duprez and Magerman (2018) show, using a Belgium dataset, that firms on average fully pass through common shocks. Moreover, we are

all its customers, whether these are households buying final goods (direct effect) or other sectors buying intermediate goods. In the latter case, the shock propagates across one or multiple sectors before reaching households' final demand (indirect or propagation effect). The sum of these two effects is the total inflationary exposure of a household towards a price shock in a given sector.

Now, in order to measure the inflation exposure of different income groups to a shock, we integrate data on income-dependent consumption with the production network data using matching matrices provided by Cai and Vandyck (2020). Appendix A provides the details of this process. We then expose every sector in our model to an empirically calibrated price shock and measure the direct, indirect and total effect of this shock on the different income groups. This exercise is conducted for both the expenditure-weighted baseline case as well as the income-weighted case incorporating the propensities to consume. While for the former, the resulting effects describe the loss of purchasing power of the share of income allocated to expenditures, for income-weighting, the results give the loss of purchasing power of a household's total income following a price shock in a sector. The full model derivation is presented in Appendix B. A graphical representation of the model framework can be found in Figure 3.

Following Ipsen and Schulz (2024), we take these results to estimate how the exposure towards a given sector j changes with income. The logarithmic effect $\log(\pi) \in \{\text{Direct Effect, Indirect Effect, Total Effect}\}$ constitutes our dependent variable. The logarithmic mean nominal income of country c's income group q is the independent variable, while δ_c is a dummy variable to account for cross-country differences in average inflation rates. $\epsilon_{q,c,j}$ represents the error term.

$$log(\pi^x)_{q,c,j} = \beta^x_{0,j} + \beta^x_{1,j} log(Y_{q,c}) + \delta_c + \epsilon^x_{q,c,j} \tag{17}$$

We estimate equation (17) using ordinary least squares (OLS), with the coefficient β_1 serving as our measure of the elasticity of the inflationary impact π with respect to income levels Y. The regression equation is estimated for both the expenditure- and the income-weighted case of the inflationary impact π^x, with the superscript x corresponding to expenditure weights (e) and income-weights (y), respectively. As shown in section 3, theory suggests that $\hat{\beta}^e_1 \approx \gamma$ and $\hat{\beta}^y_1 \approx \gamma + \kappa$.

Our empirical analysis is based on the following datasets: The "Full international and global accounts for research in input-output Analysis" (FIGARO) provide sector-level input-output linkages between all EU member states, 18 main EU trading partners as

primarily interested in the relative differences in the inflation exposure of low- and high-income households, rather than the absolute impacts of a price shock. Our results should therefore be relatively robust towards a systematic over- or underestimation of absolute impacts.

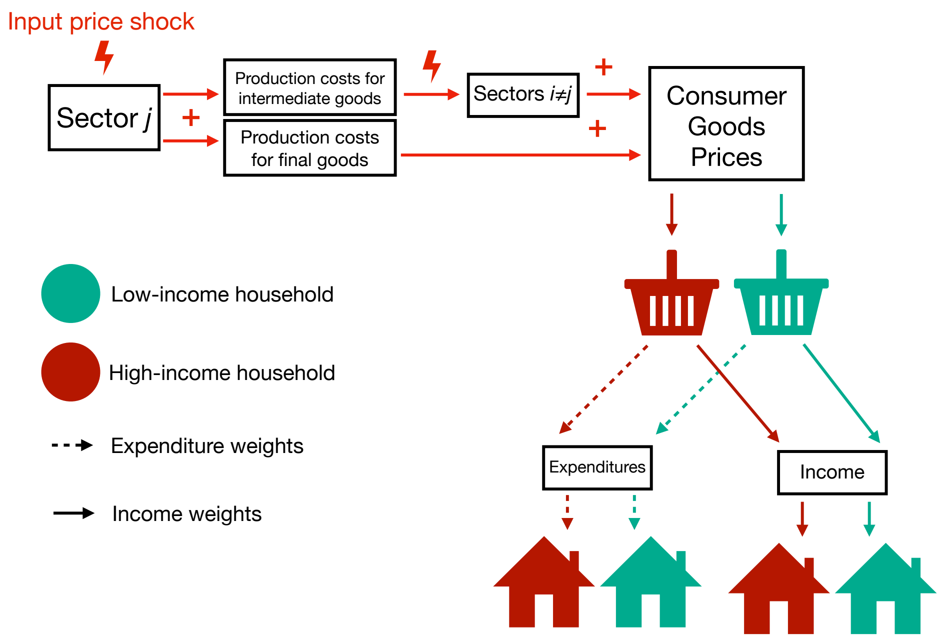


FIGURE 3. Causal flow of the cost-push inflation framework. The dashed arrows show the expenditure-based specification. In this case, inflation inequality can only arise out of differences in the consumption baskets. Meanwhile, solid arrows give the income-weighted specification. Here, the effect of a price shock on the income's purchasing power is accounted for.

well as a "rest of the world" region (Eurostat 2024c). Data on consumption by purpose for income quintiles Q1 (low) to Q5 (high) are taken from Eurostat (2024d). The propensities to consume are taken from Eurostat (2024a) estimates on the country-income specific average propensities to consume (APC). The dataset can be found in Appendix C). Country-level mean nominal income values are taken from Eurostat (2024b).[3] For all the above datasets, we use 2020 as the base year. Since Eurostat does not provide comprehensive data on sector-level price developments, data from the Socio-Economic Accounts (SEA) is used to inform the individual price shocks for every single sector in the production network (Timmer et al. 2015). These shocks are computed as the mean of a sector's yearly logarithmic price change over the years of 2000 to 2014 according to equation (18).[4] This approach accounts for the sector-specific price formation processes and aims for a general

[3] As a proxy for mean nominal income, we use the top cut-off point of the first income decile for Q1, the top cut-off point of the third income decile for Q2, up to the top cut-off point of the ninth income decile for Q5.

[4] The FIGARO database provides slightly more granular data of 64 sectors per country, while the SEA cover 56 sector classifications. To match these, we used the same price data of a parent class in the SEA for the more granular subclasses in the FIGARO. Namely, price data of SEA sector code N was used for Figaro sector codes N77, N78, N79, N80T82; data of SEA sector code Q was used for Q86, Q87_88 and data of SEA sector code R_S was used for R90T92, R93, S94, S95, S96. Also, the SEA does not provide price data for the "rest of the world" region as well as the following countries contained in FIGARO: Argentina, New Zealand and Saudi Arabia. This slightly reduces the number of sectors exposed to a shock in our model to 2688. These shocks still propagate globally.

assessment of inflation inequality, rather than for a specific scenario or period of high inflation (Weber et al. 2024). The price shock we feed into the model is calculated as the arithmetic mean of the observed input price shocks in percentage terms for all observation periods ΔP_j,[5] i.e.,

$$\Delta P_j = \frac{1}{T} \sum_{t=t_0}^{T} \Delta\% P_{t,j}. \tag{18}$$

In total, this setup allows us to leverage data for five income groups in 21 EU countries which we subject to globally originating and propagating price shocks in 2688 sectors. From the resulting direct and indirect inflationary effects, we estimate sector-level elasticity coefficients for inflation exposure of different income groups and contrast the results for the expenditure-weighted and income-weighted case.[6]

5. Empirical Analysis: Results

Figure 4 presents the estimated elasticities for expenditure weights (left) versus income weights (right). A negative (positive) elasticity indicates that exposure decreases (increases) with income and thus lower (higher) incomes are more affected by the price developments within this sector. We show the estimates using the direct (orange), production network (blue) and total (black) effects, where the latter corresponds to the sum of the direct and indirect effects.

In line with earlier results in Ipsen and Schulz (2024), the elasticities vary substantially between sectors. Lower-income households experience significant overexposure in sectors such as “real estate activities”, “water collection”, “manufacturing of food products”, “construction” and “health services”. However, most sectors disproportionally affect higher-income households, with “manufacturing of motor vehicles”, “air transport” and “travel agency” as the three sectors with the highest elasticities.[7] This finding adds to the

[5] To differentiate the input price shocks from the price shocks used to calculate consumer inflation that might also depend on propagation within the network, we use different notation here and refer to the input price shock to ΔP.

[6] We provide a set of robustness checks in the Appendix E: Using production and consumption data for 2010 and 2015, we find that the elasticity estimates of inflation exposure for different income groups are remarkably stable over time. The same holds for substituting the empirically validated sector shocks for unit shocks.

[7] The interested reader will note that income-dependent inflation exposure does not merely hinge on the income elasticity of cost-push shocks, but on the relative importance of these sectors in affecting the overall price level. We show the effect sizes in Appendix F, G and H which report the average sector-level inflation effects for the expenditure-weighted and income-weighted specification. The figures show that in the expenditure-weighted specification price shocks to the eight sectors for which we find a disproportional exposure of lower incomes account on average for 54 percent of the total inflation exposure for Q1 households in our model. By contrast, the 48 sectors for which we find price shocks to disproportionately affect higher-income households account for only 51 percent of the total inflationary impact for Q5 households on average.

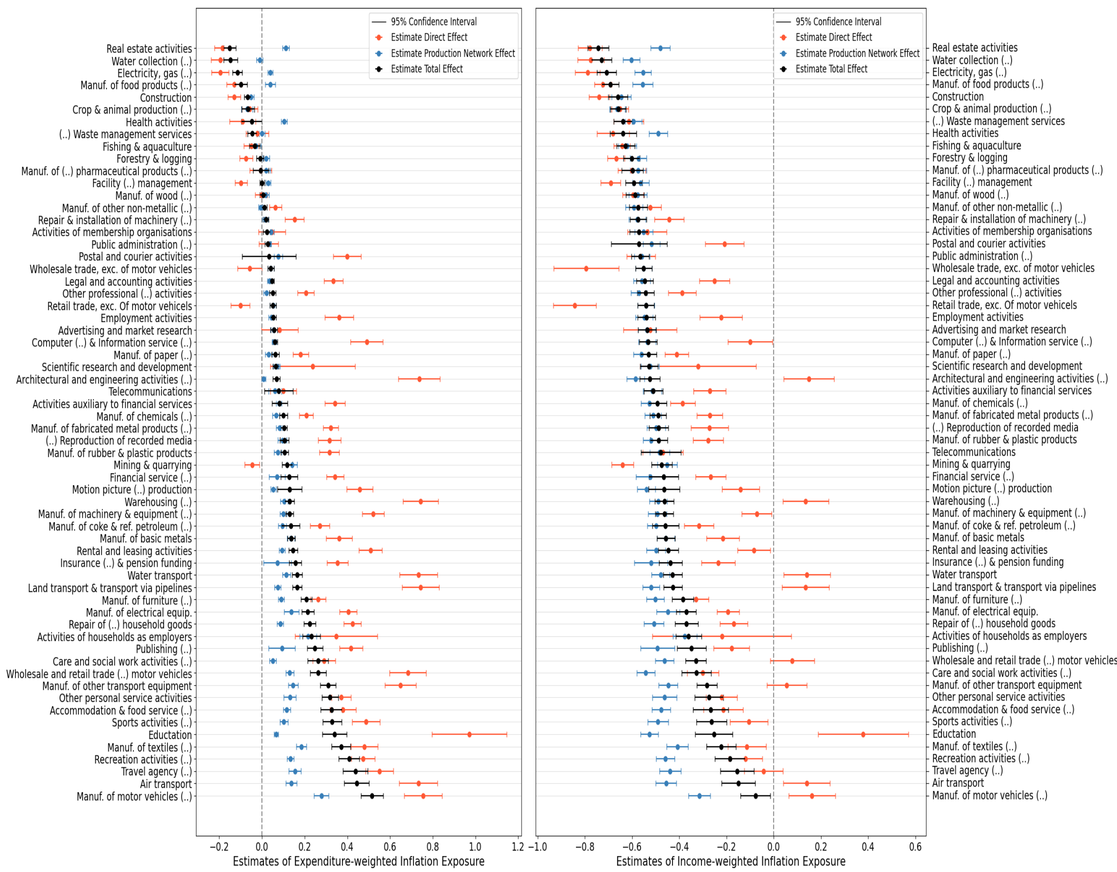


FIGURE 4. Elasticity estimates for expenditure-weighted (left) and income-weighted price shocks for the sectoral categories in the FIGARO database for 2020 based on regression equation 17 with a country dummy.

plausibility of our approach, as the greatest exposure of lower-income households stems from the categories of necessities. At the same time, the highest elasticities can be found for luxury items. Furthermore, and in line with the results of (Ipsen and Schulz 2024), we find the heterogeneity in the production network effect to be much smaller than for the direct effects. Technically, this implies that substantial inflationary pressures propagate from sectors with larger income-dependent differences in consumption to sectors with smaller differences (cf. section 3). As a consequence of this diffusion process, the possibilities of substituting away from sectors with price increases might be severely more limited than what one might initially expect looking only at differences in expenditure shares.

The right-hand side of Figure 4 reports the corresponding elasticity estimates for the income-weighted specification. It shows that, following a price shock, the purchasing power of lower incomes declines disproportionally no matter the sector of origin. The numbers suggest that elasticities are shifted towards a greater exposure of lower incomes by a constant factor. This is in line with our theoretical derivation in section 3, where we suggested that the estimate $\hat{\beta}_1^y \approx \gamma + \kappa$, i.e., the estimated elasticity coefficient can be additively decomposed into the income elasticity of the respective expenditure share γ and of the income elasticity of the propensity to consume κ. A negative $\hat{\beta}_1^y < 0$ for all sector classes implies that even for $\gamma > 0$, $\kappa < 0$ and $|\kappa| >> |\gamma|$. Technically, lower incomes are disproportionally exposed under income weighting since the propensities to consume react much more strongly to income changes than the expenditure shares for specific products (even for luxury goods).

To substantiate this claim and to examine whether there exists e.g. some unanticipated interaction between κ and γ, we estimate $\hat{\kappa}$ separately from the below equation to see, if the estimates indeed correspond to $\hat{\beta}_1^y - \hat{\beta}_1^e$, as the theory outlined in section 3 would suggest. The regression equation to be estimated by OLS for $\hat{\kappa}$ is given by

$$\log(\alpha_{c,q}) = \beta_0 + \kappa \log(Y_c, q) + \delta_c + \epsilon_{c,q}, \tag{19}$$

with c as the country and q as the quintile of the income distribution in c for the APC α and income Y and again using a country-dummy δ_c for consistency with the basic regression equation (17). We estimate that $\hat{\kappa} \approx -0.5932$.

The results are shown in Figure 5. The estimate for $\hat{\kappa}$ is given as a line, while the difference in estimates for all sectors $\hat{\beta}_1^y - \hat{\beta}_1^e$ is given as points. The theory aligns with the estimated difference remarkably well, with the highest downwards deviation being 0.01 for

For the income-weighted specification, the relative importance of sectors remains asymmetric. However, for income-weighting, the average exposure of Q1 households to any price shock is larger than the exposure faced by Q5, in line with our core argument.

FIGURE 5. Differences in elasticity estimates for expenditure and income weights (for the total effect) for each sector compared to the estimate for the income elasticity of the average propensity to consume $\hat{\kappa} \approx -0.5932$.

the elasticity difference for Postal and courier services and the highest upwards deviation of 0.04 for the elasticity difference in Telecommunications. An immediate corollary to this is that the relative ranks of estimates based on income weights (almost fully) correspond to the relative ranks for estimates based on expenditure weights with e.g. the real estate sector having the most negative elasticity in both cases. Income-weighting is therefore consistent with both the notion that cost-push shocks affect the poor disproportionately in general and that this differential exposure is highest for necessities. Figure 5 indicates that it is indeed the higher income elasticity of the APC that drives pro-rich inflation for income-weights. Neglecting the consumption and savings decisions of households might thus underestimate the extent to which poor households experience inflation exposure.

6. Conclusion

The extant literature on income-dependent inflation inequality provides two empirical puzzles: First, it continues to yield conflicting findings regarding its direction, magnitude, and persistence, while, at the same time, poorer households consistently perceive themselves as the most affected by rising prices. Second and relatedly, it fails to satisfactorily explain the consistently higher inflation expectations of lower-income households. We argue that the income-weighting of price changes presents a unified explanation for these puzzles. In contrast to the common expenditure-based approaches to inflation inequality, income weighting reflects the loss of purchasing power of a household's total income as opposed to considering only the share of income allocated to expenditures.

In this paper, we showed that income-weighting results from scaling expenditure weights by the household's propensity to consume. We made use of this relationship to estimate how the impact of price shocks varies along the income distribution for the expenditure-weighted versus income-weighted case. In doing so, we were able to separate the effects of the decision on what to consume from the effects of the decision on how much to consume from current income. Since, empirically, the propensities to consume react much more strongly to income changes than the expenditure shares for specific products, the decomposition revealed that under income-weighting, lower-income households are disproportionally exposed to every cost-push price shock. Using a sector-level cost-push inflation framework, we showed the empirical effects of income-weighting using recent data for 21 EU countries. The analysis confirmed our proposition of a systematic overexposure of lower incomes, reconciling conflicting results in the literature on income-dependent inflation inequality. Our results validate the inflation perception and expectation biases of lower-income households, casting doubt on explanatory approaches based merely on cognitive differences such as financial illiteracy or shorter financial planning horizons of poorer households. On the contrary, these results call for a reevaluation of previous empirical findings on inflation and income inequality as well as policies to address the distributional hardships in times of higher inflation. Moreover, next to differences in the capacities to substitute, the propensities to consume constitute a second and often overlooked explanatory factor of inflation exposure (see Sologon et al., 2025, for a notable exception). Just as wealthier households are characterized by greater flexibility to switch to cheaper goods, they can decrease their inflationary exposure by reducing their consumption propensity. Meanwhile, poorer households exhibit lower or even negative substitution, i.e. they are increasing their relative spending on a good as its price rises (Hobijn and Lagakos 2005; Kaplan and Schulhofer-Wohl 2017; Strasser et al. 2023) and simultaneously have to dig into savings to meet their necessities (Bobasu, Charalampakis, and Kouvavas 2024; Sologon et al. 2025). This, in turn, increases their propensity to consume and thus their exposure to inflationary shocks. Since we are using a Laspeyres index, our elasticity estimates thus constitute a lower bound, as we cannot account for these substitution responses in direct response to a price shock by construction that are more prevalent for richer households.

This study comes with a set of limitations. One complicating factor in our empirical model is the assumption of a Leontief price model as in Weber et al. (2024). The model presupposes a 1:1 pass-through of price shocks to customers, potentially overstating shock propagation if firms adjust their margins or modify production processes (cf. Pichler et al. 2022). Recent scholarship further indicates that within-industry consumption differences and substitution behavior can play a substantial role for inflation asymmetries across households (Jaravel 2021; Strasser et al. 2023; Argente and Lee 2021). At the industry level, ignoring substitution effects may not dramatically inflate aggregate shock propagation (Duprez and Magerman 2018), but it can mask important cross-sectoral heterogeneities. Future advances could draw on methods such as Pichler et al. (2022), who incorporate modified Leontief production functions to reflect varying input dependencies. Moreover, our empirical analysis addresses only cost-push inflation, thus neglecting other potential drivers, such as demand-led inflation. A desirable path for future research would, therefore, be to address the effects of income-weighting for different inflationary dynamics. Finally, our analysis does not account for the wealth channel of inflation (e.g., the effects on asset holdings), which can also contribute to unequal inflation outcomes (Adam and Zhu 2016; Bobasu, Di Nino, and Osbat 2023; Doepke and Schneider 2006). Despite these limitations, income weighting appears to be a promising explanation for the discrepancy between scholarship and public perceptions regarding inflation inequality. Even more critically, income-weighting suggests that the current practice of constructing real wages by deflating nominal wages with an expenditure-weighted price level risks masking a substantial share of purchasing power loss (or gain). Ultimately, this calls for a broad reassessment of current approaches to measuring inflation and income inequality.

References

Adam, Klaus, and Jun Zhu. 2016. "Price level changes and the redistribution of nominal wealth across the Euro Area." *Journal of the European Economic Association* 14 (4): 871–906.

Argente, David, and Munseob Lee. 2021. "Cost of Living Inequality During the Great Recession." *Journal of the European Economic Association* 19 (2): 913–952.

von Auer, Ludwig, and Alena Shumskikh. 2024. "Retrospective computations of price index numbers: Theory and application." *Review of Income and Wealth* 70 (1): 60–79.

Barigozzi, Matteo, Lucia Alessi, Marco Capasso, and Giorgio Fagiolo. 2012. "The distribution of household consumption-expenditure budget shares." *Structural Change and Economic Dynamics* 23 (1): 69–91.

Bobasu, Andreea, Emmanouil Charalampakis, and Omiros Kouvavas. 2024. "How have households adjusted their spending and saving behaviour to cope with high inflation?." *Economic Bulletin Articles* (2).

Bobasu, Andreea, Virginia Di Nino, and Chiara Osbat. 2023. "The impact of the recent inflation surge across households." *Economic Bulletin Articles* (3).

Bruine de Bruin, Wändi, Wilbert Vanderklaauw, Julie S Downs, Baruch Fischhoff, Giorgio Topa, and Olivier Armantier. 2010. "Expectations of inflation: The role of demographic variables, expectation formation, and financial literacy." *Journal of Consumer Affairs* 44 (2): 381–402.

Cai, Min, and Thijs Vandyck. 2020. "Bridging between economy-wide activity and household-level consumption data: Matrices for European countries." *Data in Brief* 30: 105395.

Claeys, Grégory, and Lionel Guetta-Jeanrenaud. 2022. "Who is suffering most from rising inflation?." Bruegel-Blogs.

Crawford, Ian, and Zoe Oldfield. 2002. "Distributional aspects of inflation." *Inst. Fisc. Stud., London* (90).

Cucignatto, Giacomo, Nadia Garbellini, and Francisco Fora Alcalde. 2023. "Profit-led or cost-led inflation? Propagation effects through the EU inter-industry network." *PSL Quarterly Review*: 261–276.

D'Acunto, Francesco, Ulrike Malmendier, and Michael Weber. 2023. "What do the data tell us about inflation expectations?" In *Handbook of economic expectations*, 133–161: Elsevier.

Doepke, Matthias, and Martin Schneider. 2006. "Inflation and the redistribution of nominal wealth." *Journal of Political Economy* 114 (6): 1069–1097.

Duprez, Christophe, and Glenn Magerman. 2018. "Price updating in production networks." 352, NBB Working Paper.

Easterly, William, and Stanley Fischer. 2001. "Inflation and the Poor." *Journal of Money, Credit and Banking*: 160–178.

Engel, Ernst. 1857. "Die Produktions- und Consumtionsverhältnisse des Königreichs Sachsen." *Zeitschrift des Statistischen Bureaus des Königlich Sächsischen Ministeriums des Innern* 8: 1–54.

Engel, Jan, and Alois Kneip. 1996. "Recent approaches to estimating Engel curves." *Journal of Economics* 63: 187–212.

Eurostat. 2024a. "Aggregate propensity to consume by income quintile [Data set].". `https://ec.europa.eu/eurostat/databrowser/view/icw_sr_10/default/table?lang=en&category=icw.icw_sr`.

Eurostat. 2024b. "Distribution of income by quantiles [Data set].". `https://ec.europa.eu/`

eurostat/databrowser/view/ilc_di01/default/table?lang=en&category=livcon.ilc.ilc_ip.ilc_di.

Eurostat. 2024c. "FIGARO tables (2024 edition): annual EU inter-country supply use and input-output tables." https://ec.europa.eu/eurostat/web/esa-supply-use-input-tables/database#Input-output%20tables%20industry%20by%20industry. Accessed: 2024-12-28.

Eurostat. 2024d. "Structure of consumption expenditure by income quintile and COICOP consumption purpose [Data set].". https://ec.europa.eu/eurostat/databrowser/view/hbs_str_t223/default/table?lang=en&category=livcon.hbs.hbs_struc.

Eurostat. n.d.. "ESA supply, use and input-output tables methodology." https://ec.europa.eu/eurostat/web/esa-supply-use-input-tables/methodology#Classifications. Retrieved January 6, 2025.

Ferreira, Vicente, Alexandre Abreu, and Francisco Louçã. 2025. "The rise and fall of inflation in the Euro Area (2021-2024): A heterodox perspective." *Structural Change and Economic Dynamics* 72: 103–110.

Fofana, Salomé, Paula Patzelt, and Ricardo Reis. 2024. "Household disagreement about expected inflation."

Garcimartín, Carlos, Juan Astudillo, and Antonio Martínez. 2021. "Inflation and income distribution in Central America, Mexico, Panama, and the Dominican Republic." *Review of Development Economics* 25 (1): 315–339.

Gürer, Eren, and Alfons Weichenrieder. 2020. "Pro-rich inflation in Europe: Implications for the measurement of inequality." *German Economic Review* 21 (1): 107–138.

Hamilton, Bruce W. 2001. "Using Engel's Law to estimate CPI bias." *American Economic Review* 91 (3): 619–630.

Hobijn, Bart, and David Lagakos. 2005. "Inflation inequality in the United States." *Review of Income and Wealth* 51 (4): 581–606.

Ipsen, Leonhard, Armin Aminian, and Jan Schulz. 2023. "Stress-testing Inflation Exposure: Systemically Significant Prices and Asymmetric Shock Propagation in the EU28." 188, BERG Working Paper Series.

Ipsen, Leonhard, and Jan Schulz. 2024. "The (Dis)Equalizing Effects of Production Networks." *Applied Economics Letters* forthcoming: 1 – 5.

Jaravel, Xavier. 2021. "Inflation inequality: Measurement, causes, and policy implications." *Annual Review of Economics* 13 (1): 599–629.

Kaplan, Greg, and Sam Schulhofer-Wohl. 2017. "Inflation at the household level." *Journal of Monetary Economics* 91: 19–38.

Leontief, W. 1986. "Input-output economics."

Leser, C. E. V. 1963. "Forms of Engel functions." *Econometrica* 31 (4): 694–703.

Lewbel, Arthur, and Hendrik S. Houthakker. 2008. "Engel Curve." In *The New Palgrave Dictionary of Economics*, edited by Steven N. Durlauf and Lawrence E. Blume, 1–4: Palgrave Macmillan UK.

Miller, Ronald E, and Peter D Blair. 2009. *Input-output analysis: foundations and extensions.*: Cambridge university press.

Nikiforos, Michalis, Simon Grothe, and Jan David Weber. 2024. "Markups, profit shares, and cost-push-profit-led inflation." *Industrial and Corporate Change* 33 (2): 342–362.

Pichler, Anton, Marco Pangallo, R Maria del Rio-Chanona, François Lafond, and J Doyne Farmer. 2022. "Forecasting the propagation of pandemic shocks with a dynamic input-output model." *Journal of Economic Dynamics and Control* 144: 104527.

Prati, Alberto. 2024. "The well-being cost of inflation inequalities." *Review of Income and Wealth* 70 (1): 213–238.

Schulz, Jan, and Daniel M Mayerhoffer. 2023. "A Network Approach to Expenditure Cascades." *Review of Behavioral Economics* 10 (3): 229–262.

Sologon, Denisa M, Cathal O'Donoghue, Iryna Kyzyma, Jason Loughrey, and Jules Linden. 2025. "Distributional Impact of Soaring Prices in Europe: A Cross-National Decomposition of Inflation's Regressivity and Progressivity." *Review of Income and Wealth* 71 (2): e70010.

Stantcheva, Stefanie. 2024. "Why do we dislike inflation?." *Brookings Papers on Economic Activity* Spring: 1 – 45.

Strasser, Georg, Thomas Messner, Florian Rumler, and Miguel Ampudia. 2023. "Inflation heterogeneity at the household level." *ECB Occasional Paper* (2023/325).

Timmer, Marcel P, Erik Dietzenbacher, Bart Los, Robert Stehrer, and Gaaitzen J De Vries. 2015. "An illustrated user guide to the world input–output database: the case of global automotive production." *Review of International Economics* 23 (3): 575–605.

Valadkhani, Abbas, and William F Mitchell. 2002. "Assessing the impact of changes in petroleum prices on inflation and household expenditures in Australia." *Australian Economic Review* 35 (2): 122–132.

Weber, Isabella, Juan Lara, Lucas Teixeira, and Leandro Nassif Pires. 2024. "Inflation in times of overlapping emergencies: Systemically significant prices from an input–output perspective." *Industrial and Corporate Change* 33 (2): 297–341.

Appendix A. Bridging Input-output and Consumption Data

In this section, the process of mapping COICOP consumption by purpose data (Eurostat) to FIGARO Input-output data (Eurostat) is described. This process is based on bridging matrices provided by Cai and Vandyck (2020). Using input data for the base year of 2015, the authors construct bridging tables between 35 consumption by purpose categories and 63 products by activity (CPA) categories for 30 European countries.[8] The 63 CPA categories are fully aligned with the classification of economic activities (NACE Rev. 2) used in the FIGARO industry-by-industry Input-output tables (Eurostat n.d.).[9] Therefore, we can use these bridging matrices to integrate the consumption expenditure by income quintile based on COICOP categories with the FIGARO Input-output data (both Eurostat).

The country specific bridging tables are structured as follows:
Rows (63): CPA categories
Columns (35): COICOP categories of consumption by purpose
Cells: Final consumption expenditure of households by consumption purpose in million Euro, current prices

In the first step, the three-digit level COICOP categories in the country-specific bridging tables were reduced to the two-digit level by summing over the columns belonging to a parent two-digit category. This was done to match the two-digit granularity of the income-dependent consumption data and reduces the initial 35x63 table to 12x63. In the next step, entries in the country-specific bridging tables were multiplied pairwise with the corresponding country-quintile-specific expenditure shares for each COICOP category taken from the Eurostat data on consumption expenditure by income quintiles. Afterward, row sums were taken, before normalizing these to one. This yielded a 1x63 vector of sector-level country-quintile specific expenditure shares: $\theta_{q,c,j}$. Each entry of this vector corresponds to the expenditure share of quintile q of country c in sector j.

Now, to integrate these into the FIGARO Input-output data, we first computed country-sector-specific expenditure shares based on the demand vector in the FIGARO data. This gives $\theta_{c,j,d}$: the share of total expenditures C by households of country c in sector j of country d, relative to their total expenditures in all sectors j over all countries in the FIGARO data:

[8] Due to missing data, the input data for Bulgaria and Ireland is based on the year of 2014, while for Malta it is 2011.

[9] FIGARO Input-output data initially distinguishes 64 categories. However, the product / industry category relating to extraterritorial organizations and bodies (Code U) usually contains no entries and is therefore of no relevance for this process.

$$\theta_{c,j,d} = \frac{C_{c,j,d}}{\sum_{d=1}^{n} C_{c,j,d}} \tag{A1}$$

Finally, multiplying the sector-level country-quintile specific expenditure shares $\theta_{q,c,j}$ with the country-sector specific demand shares $\theta_{c,j,d}$ yields a demand vector containing the country-quintile specific expenditure share in sector j of country d: $\theta_{q,c,j,d}$.

Note that a necessary assumption underlying this process is that income quintiles differ in their relative consumption in sector j versus sector i, but do not differ in their relative consumption in sector j of country d to sector j in country c. More specifically, in our model, asymmetries between income quintiles arise due to households consuming differently (e.g., having different expenditure shares for food products), and not because of how much of the food products come from domestic versus foreign sectors of food production. For example, in our model, both low- and high-income households in Spain spend the same percentage of their expenditures on food in the French sector of manufacturing food products. However, since low-income households in Spain spend a greater share of their total expenditures on food products, their exposure to the French sector of manufacturing food products is greater (as is their exposure to the respective domestic sector). Thus, exposure to foreign versus domestic sectors might still differ across income groups in our model. To see this, consider another example: Naturally, in the sector of real estate activities the share of domestic relative to foreign “consumption” by households is greater than for textile products. While lower-income households have a relatively higher expenditure share in the sector of real estate activities, higher-income households have a relatively higher expenditure share in textile products. Therefore, the exposure to (inter)national shocks in our model will still be asymmetric.

Appendix B. Cost-push Inflation Framework

We base this section on the Leontief price models used in Ipsen and Schulz (2024), Valadkhani and Mitchell (2002), and Weber et al. (2024). Equation A2 illustrates the model's principal case, where the price P_j of sector j is represented as a linear function of the prices of inputs P_i, weighted by the technical coefficients a_{ij}, plus the value added per unit of output v_j. Since our data comprises global trade data, there is no need for additional import or export variables. The technical coefficients a_{ij} are computed as the ratio of the value of inputs from sector i to the overall value of output of sector j. By normalizing the output of sector j, Equation A2 gives the price per unit of output. Consequently, any change in prices is to be interpreted as a percentage change.

$$P_j = a_{1j} P_1 + \ldots + a_{ij} P_i + \ldots + a_{nj} P_n + v_j \tag{A2}$$

For n sectors, this becomes a system of linear equations:

$$\begin{bmatrix} P_1 \\ P_2 \\ \vdots \\ P_n \end{bmatrix} = \begin{bmatrix} a_{11} & a_{21} & \cdots & a_{n1} \\ a_{12} & a_{22} & \cdots & a_{n2} \\ \vdots & \vdots & \ddots & \vdots \\ a_{1n} & a_{2n} & \cdots & a_{nn} \end{bmatrix} \begin{bmatrix} P_1 \\ P_2 \\ \vdots \\ P_n \end{bmatrix} + \begin{bmatrix} v_1 \\ v_2 \\ \vdots \\ v_n \end{bmatrix} \tag{A3}$$

Since we aim to simulate the down-stream propagation of shocks, we take the transpose of the technical coefficient matrix A. In matrix notation, this gives:

$$P = A' P + v\,. \tag{A4}$$

Next, we single out the sector getting exposed to an exogenous price shock. This splits A5 into:

$$\begin{bmatrix} P_X \\ P_E \end{bmatrix} = \begin{bmatrix} A'_{XX} & A'_{EX} \\ A'_{XE} & A'_{EE} \end{bmatrix} \begin{bmatrix} P_X \\ P_E \end{bmatrix} + \begin{bmatrix} v_X \\ v_E \end{bmatrix} \tag{A5}$$

with P_X as the price vector of the shocked sector and P_E as the price vectors of the remaining endogenous sectors. Since P_X is determined by the exogenous shock, we are interested in the price formation of the remaining sectors:

(A6) $$P_E = A'_{XE}P_X + A'_{EE}P_E + \nu_E \,.$$

$A'_{XE}P_X$ captures how the prices in the endogenous sectors depend on the price of the exogenous sector. $A'_{EE}P_E$ captures how the prices in the endogenous sectors depend on each other. Solving for P_E, we get

(A7) $$P_E = (I - A'_{EE})^{-1}A'_{XE}P_X + (I - A'_{EE})^{-1}\nu_E \,.$$

Assuming no substitution, the quantity of inputs remains unchanged following a price change in the exogenous sector. Thus, following a change in prices in the exogenous sector ΔP_X, the price change in the remaining sectors, ΔP_E,is given by:

(A8) $$\Delta P_E = (I - A'_{EE})^{-1}\, A'_{XE}\Delta P_X \,.$$

At this point, we introduce the expenditure weights used in our baseline specification. $\theta_{q,c,x}$ represents the expenditure share of quintile q of country c in the exogenous sector x. $\theta_{q,c,x}$ represents the expenditure share of quintile q of country c in the endogenous sector $e \neq x$. This allows the decomposition of the total effect of a price shock to a sector into the direct effect on final consumption:

(A9) $$\pi^{direct}_{q,c,x} = \theta_{q,c,x}\Delta P_x$$

and the indirect propagation effect:

(A10) $$\pi^{indirect}_{q,c,x} = \sum_{e \neq x} \theta_{q,c,e}\,\Delta P_e \,.$$

The total effect of a price shock to a sector is given by:

(A11) $$\pi^{total}_{q,c,x} = \theta_{q,c,x}\Delta P_x + \sum_{e \neq x} \theta_{q,c,e}\,\Delta P_e \,.$$

To get to the income-weighted specification, we compute $i_{q,c,j}$ which is the share of expenditures in a given sector j as a ratio of the total income as opposed to the total expenditures:

(A12)
$$i_{q,c,j} = \theta_{q,c,j} \times \alpha_{q,c} = \left(\frac{C_{q,c,j}}{\sum\limits_{j=1}^{n} C_{q,c,j}} \right) \times \left(\frac{\sum\limits_{j=1}^{n} C_{q,c,j}}{Y_{q,c}} \right) = \frac{e_{q,c,j}}{Y_{q,c}},$$

with $\theta_{q,c,j}$ as the expenditure share of quintile q of country c in sector j, $C_{q,c,j}$ as the absolute expenditures of quintile q of country c in sector j and $Y_{q,c}$ as the mean absolute income of quintile q of country c.

Now, the effect of a price shock in the exogenous sector x are given by the direct effect:

(A13)
$$\tilde{\pi}_{q,c,x}^{direct} = i_{q,c,x} \Delta P_x$$

and the indirect propagation effect:

(A14)
$$\tilde{\pi}_{q,c,x}^{indirect} = \sum_{e \neq x} i_{q,c,e} \, \Delta P_e \, ,$$

summing to the total effect

(A15)
$$\tilde{\pi}_{q,c,x}^{total} = i_{q,c,x} \Delta P_x + \sum_{e \neq x} i_{q,c,e} \, \Delta P_e \, .$$

Appendix C. Average Propensitites to Consume by Country and Income Quintile

GEO	Q1 (%)	Q2 (%)	Q3 (%)	Q4 (%)	Q5 (%)
Austria	129.8	97.9	85	75.9	59.4
Belgium	118.9	92.1	73.8	63.3	50
Bulgaria	113.9	89.6	75	62.2	44.1
Croatia	121	107.7	88.4	80	63
Cyprus	89.3	87	86.5	82.6	65.2
Denmark	117.5	85.6	74.8	62.3	46.5
Estonia	108.3	81.9	69.9	54	45.3
France	114.1	84.9	78.7	72	55.3
Germany	143.4	91.6	84.4	77.5	63.4
Greece	168	110.4	101.5	88.6	72
Hungary	113.4	94.8	83.3	74.8	66.2
Latvia	114	88.7	78	72.4	56.9
Lithuania	110.7	82.1	69.5	51.8	39.4
Luxembourg	112.9	86.8	80.4	63.8	52.8
Malta	136.2	94.6	87.6	74.4	53.9
Netherlands	148.2	104.3	83.6	68.3	52.9
Poland	104.1	60.6	53.5	47.2	38.8
Romania	195.4	126.6	104.1	86	65.6
Slovakia	103	89.2	79.6	71.3	55
Slovenia	116.5	95.7	87	78.2	64.3
Spain	129.3	90.6	76	65.8	50.6

TABLE A1. Based on Eurostat (2024a) in percent of current nominal disposable income.

Appendix D. Data on Absolute Income per Country and Income Quintile

GEO	Q1 (€)	Q2 (€)	Q3 (€)	Q4 (€)	Q5 (€)
Austria	13889	21261	26555	33153	47298
Belgium	14014	19817	25672	31239	42347
Bulgaria	1845	3168	4612	6334	10613
Cyprus	9093	12951	16704	21388	31676
Germany	12867	20081	26008	33450	49329
Denmark	17264	24539	30681	37796	50949
Estonia	5677	8806	12228	16056	24287
Greece	4064	6598	8781	11568	16472
Spain	6600	11686	16043	21453	31521
France	11702	17500	22143	27797	40362
Croatia	3504	5999	7770	10066	13908
Hungary	3706	5000	6478	8288	11157
Lithuania	3912	6175	8606	11712	18964
Luxembourg	19348	28099	37844	50051	73946
Latvia	3667	6329	8827	11824	18269
Malta	8491	12641	16240	21285	31847
Netherlands	14322	20443	25801	32189	45120
Poland	4200	6304	8022	10114	14272
Romania	1596	2971	4267	5895	8774
Slovenia	8371	11841	14774	17940	23662
Slovakia	5032	7142	8703	10497	13393

TABLE A2. Based on Eurostat (2024b). Values show top cut-off point of the first, third, fifth, seventh and ninth income decile, which are used as proxies for mean nominal income of Quintile 1 to 5.

Appendix E. Robustness Checks

E.1. Elasticity Estimates for Empirical Shocks

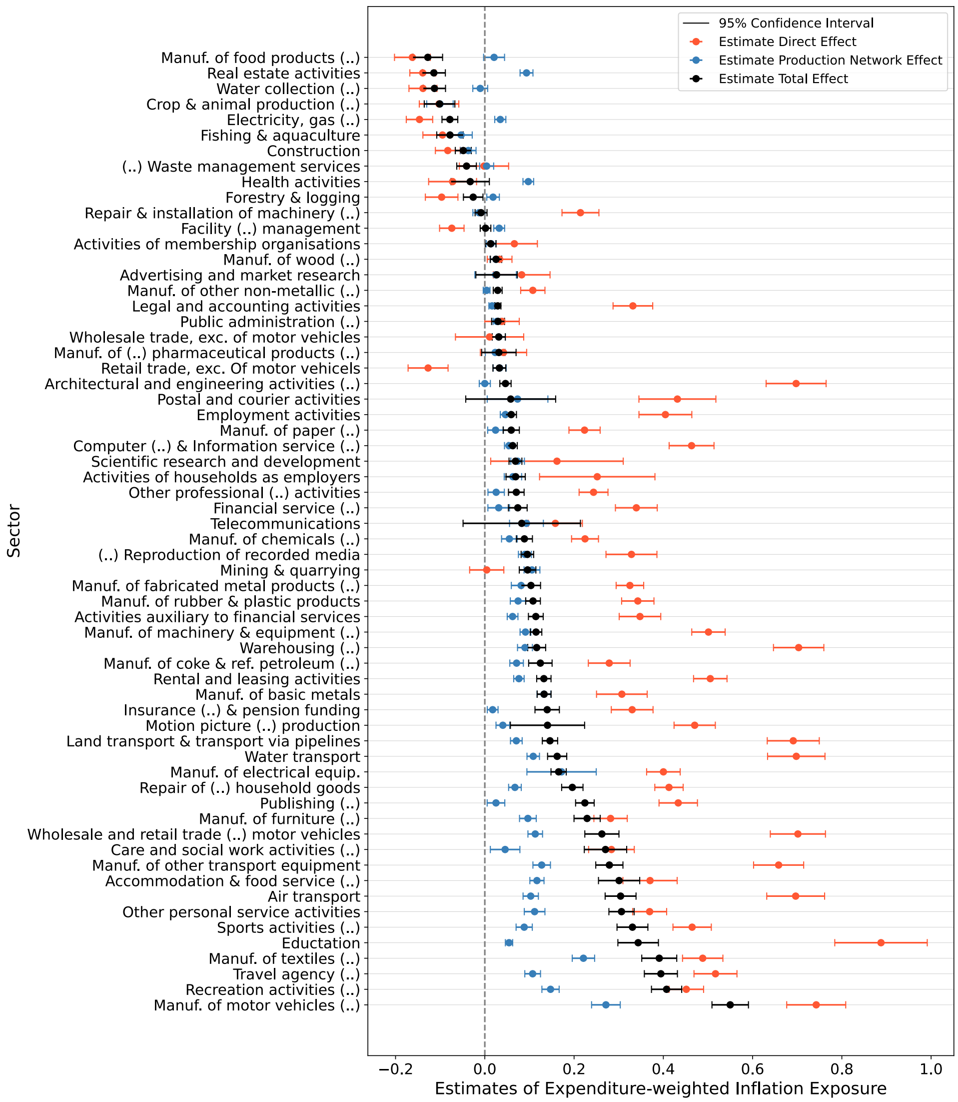


FIGURE A1. Elasticity estimates for expenditure-weighted empirical price shocks for the sectoral categories in the FIGARO database for 2010 based on regression equation 17 with a country dummy.

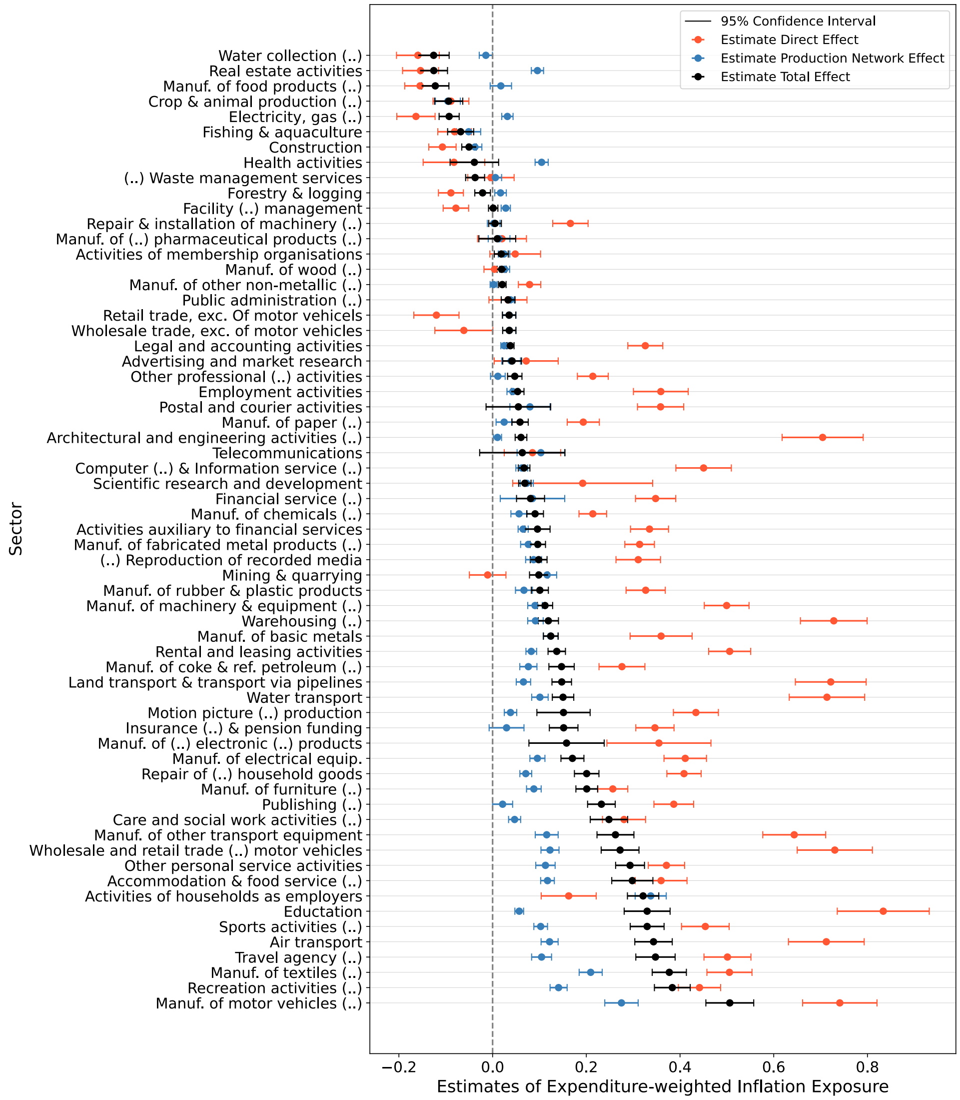


FIGURE A2. Elasticity estimates for expenditure-weighted empirical price shocks for the sectoral categories in the FIGARO database for 2015 based on regression equation 17 with a country dummy.

E.2. Elasticity Estimates for Unit Shocks

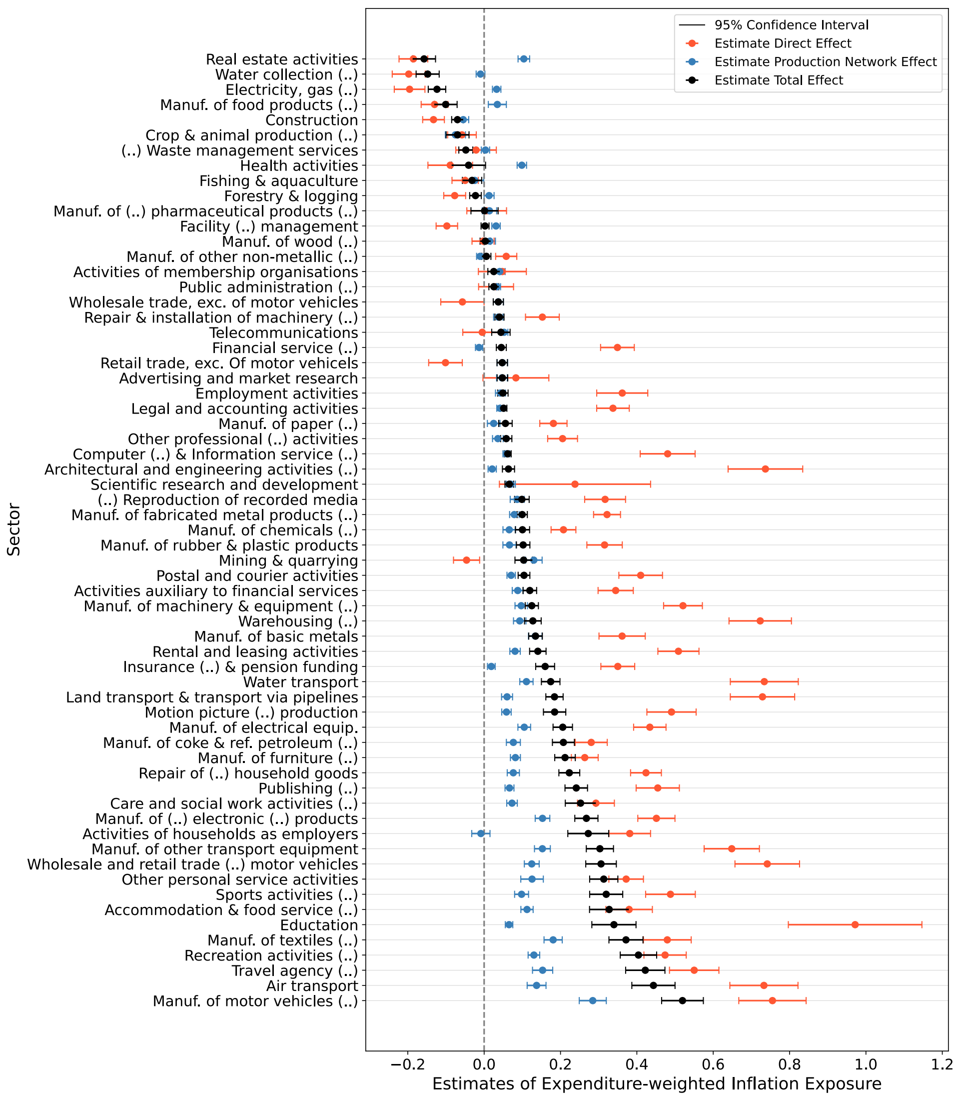


FIGURE A3. Elasticity estimates for expenditure-weighted unit price shocks for the sectoral categories in the FIGARO database for 2020 based on regression equation 17 with a country dummy.

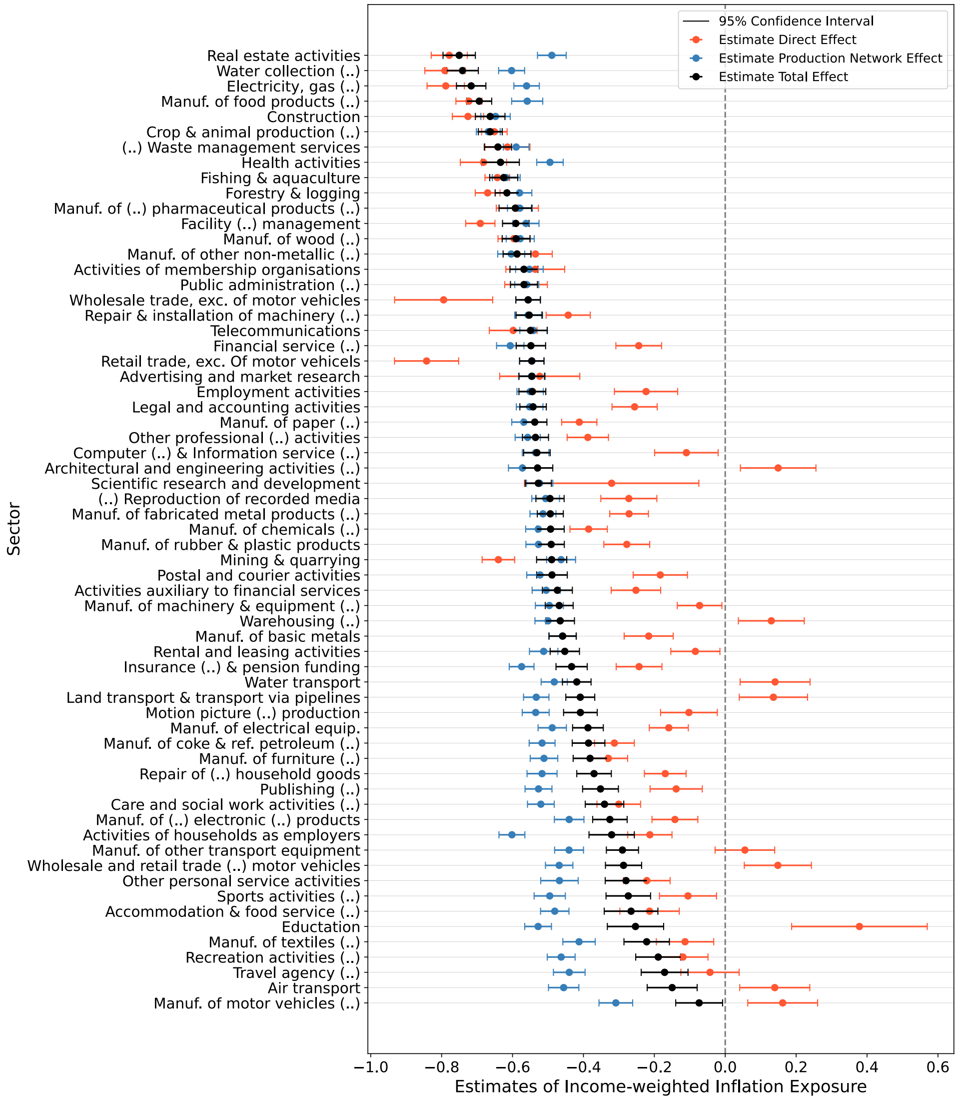


FIGURE A4. Elasticity estimates for income-weighted unit price shocks for the sectoral categories in the FIGARO database for 2020 based on regression equation 17 with a country dummy.

Appendix F. Average Effects per Sector Class for Quintile 1 & 5

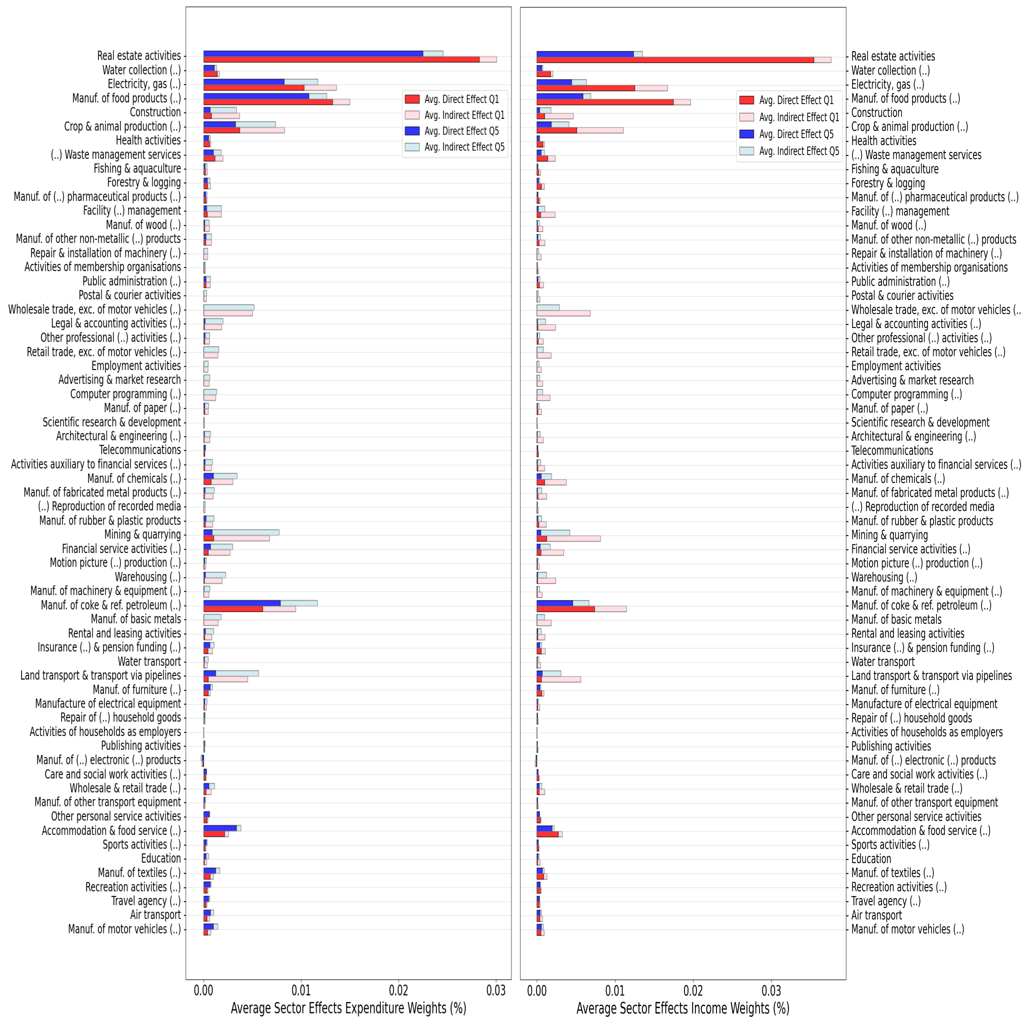


FIGURE A5. Average direct and indirect sector effects (%) for quintile 1 and 5 for the expenditure-weighted (left) and income-weighted case (right). Averages are taken over 21 EU countries.

Appendix G. Average Effects per Sector Class for Quintile 1 & 5 – Expenditure Weights

Sector Code	Direct Effect (Q1)	Direct Effect (Q5)	Indirect Effect (Q1)	Indirect Effect (Q5)	Average Price Shock (%)
A01	3.7×10^{-3}	3.3×10^{-3}	4.6×10^{-3}	4.1×10^{-3}	0.036
A02	424.8×10^{-6}	370.9×10^{-6}	277.9×10^{-6}	267.4×10^{-6}	0.032
A03	174.9×10^{-6}	157.3×10^{-6}	202.7×10^{-6}	178.0×10^{-6}	0.033
B	1.0×10^{-3}	880.5×10^{-6}	5.7×10^{-3}	6.9×10^{-3}	0.048
C10T12	13.2×10^{-3}	10.8×10^{-3}	1.8×10^{-3}	1.8×10^{-3}	0.032
C13T15	682.7×10^{-6}	1.2×10^{-3}	321.3×10^{-6}	407.8×10^{-6}	0.025
C16	120.2×10^{-6}	115.8×10^{-6}	489.6×10^{-6}	466.5×10^{-6}	0.029
C17	97.5×10^{-6}	126.9×10^{-6}	369.7×10^{-6}	378.1×10^{-6}	0.026
C18	21.3×10^{-6}	27.7×10^{-6}	130.0×10^{-6}	149.1×10^{-6}	0.021
C19	6.1×10^{-3}	7.9×10^{-3}	3.4×10^{-3}	3.8×10^{-3}	0.056
C20	762.0×10^{-6}	1.0×10^{-3}	2.3×10^{-3}	2.4×10^{-3}	0.036
C21	230.8×10^{-6}	205.3×10^{-6}	128.0×10^{-6}	129.6×10^{-6}	0.029
C22	169.4×10^{-6}	232.6×10^{-6}	764.2×10^{-6}	838.2×10^{-6}	0.027
C23	217.6×10^{-6}	233.8×10^{-6}	572.2×10^{-6}	569.7×10^{-6}	0.031
C24	3.2×10^{-6}	5.7×10^{-6}	1.5×10^{-3}	1.8×10^{-3}	0.041
C25	96.6×10^{-6}	140.9×10^{-6}	880.9×10^{-6}	974.3×10^{-6}	0.031
C26	-88.2×10^{-6}	-161.9×10^{-6}	-109.8×10^{-6}	-134.6×10^{-6}	0.003
C27	76.5×10^{-6}	124.4×10^{-6}	203.5×10^{-6}	229.8×10^{-6}	0.019
C28	29.6×10^{-6}	58.9×10^{-6}	520.1×10^{-6}	591.2×10^{-6}	0.030
C29	421.1×10^{-6}	1.0×10^{-3}	308.6×10^{-6}	437.5×10^{-6}	0.024
C30	49.7×10^{-6}	106.9×10^{-6}	94.1×10^{-6}	111.1×10^{-6}	0.025
C31_32	481.2×10^{-6}	677.6×10^{-6}	206.0×10^{-6}	229.2×10^{-6}	0.032
C33	9.1×10^{-6}	11.6×10^{-6}	398.4×10^{-6}	398.7×10^{-6}	0.020
D35	10.3×10^{-3}	8.3×10^{-3}	3.3×10^{-3}	3.5×10^{-3}	0.049
E36	1.4×10^{-3}	1.1×10^{-3}	251.0×10^{-6}	240.6×10^{-6}	0.042
E37T39	1.2×10^{-3}	1.0×10^{-3}	800.6×10^{-6}	775.9×10^{-6}	0.038
F	806.4×10^{-6}	679.6×10^{-6}	2.9×10^{-3}	2.7×10^{-3}	0.038
G45	241.8×10^{-6}	530.2×10^{-6}	522.0×10^{-6}	606.6×10^{-6}	0.028
G46	326.3×10^{-9}	301.5×10^{-9}	5.0×10^{-3}	5.2×10^{-3}	0.032
G47	5.4×10^{-6}	4.8×10^{-6}	1.5×10^{-3}	1.5×10^{-3}	0.032
H49	467.9×10^{-6}	1.2×10^{-3}	4.0×10^{-3}	4.4×10^{-3}	0.043
H50	35.8×10^{-6}	83.7×10^{-6}	331.1×10^{-6}	378.3×10^{-6}	0.044
H51	328.4×10^{-6}	705.1×10^{-6}	271.9×10^{-6}	324.1×10^{-6}	0.046
$H52$	69.4×10^{-6}	179.0×10^{-6}	1.8×10^{-3}	2.1×10^{-3}	0.040
$H53$	13.1×10^{-6}	21.7×10^{-6}	275.3×10^{-6}	298.8×10^{-6}	0.030
I	2.1×10^{-3}	3.4×10^{-3}	399.2×10^{-6}	461.1×10^{-6}	0.036
$J58$	46.5×10^{-6}	81.4×10^{-6}	57.1×10^{-6}	60.3×10^{-6}	0.018
$J59\_60$	58.2×10^{-6}	97.6×10^{-6}	159.1×10^{-6}	171.0×10^{-6}	0.021
$J61$	124.1×10^{-6}	179.1×10^{-6}	-38.7×10^{-6}	-40.1×10^{-6}	0.001
$J62\_63$	8.6×10^{-6}	20.3×10^{-6}	1.2×10^{-3}	1.3×10^{-3}	0.029
$K64$	458.9×10^{-6}	715.3×10^{-6}	2.3×10^{-3}	2.3×10^{-3}	0.027
$K65$	456.9×10^{-6}	648.4×10^{-6}	434.4×10^{-6}	431.4×10^{-6}	0.024
$K66$	97.8×10^{-6}	133.6×10^{-6}	692.2×10^{-6}	760.1×10^{-6}	0.025
L	28.3×10^{-3}	22.5×10^{-3}	1.8×10^{-3}	2.1×10^{-3}	0.037

Sector Code	Direct Effect (Q1)	Direct Effect (Q5)	Indirect Effect (Q1)	Indirect Effect (Q5)	Average Price Shock (%)
$M69\_70$	88.4×10^{-6}	134.7×10^{-6}	1.8×10^{-3}	1.8×10^{-3}	0.026
$M71$	32.0×10^{-6}	88.3×10^{-6}	610.5×10^{-6}	611.9×10^{-6}	0.020
$M72$	981.1×10^{-9}	947.2×10^{-9}	66.7×10^{-6}	71.0×10^{-6}	0.033
$M73$	6.5×10^{-6}	8.8×10^{-6}	570.7×10^{-6}	622.5×10^{-6}	0.022
$M74\_75$	117.8×10^{-6}	142.4×10^{-6}	477.7×10^{-6}	477.3×10^{-6}	0.028
$N77$	100.8×10^{-6}	192.9×10^{-6}	735.8×10^{-6}	832.7×10^{-6}	0.038
$N78$	7.3×10^{-6}	13.0×10^{-6}	443.0×10^{-6}	470.2×10^{-6}	0.038
$N79$	231.9×10^{-6}	523.5×10^{-6}	100.2×10^{-6}	122.4×10^{-6}	0.038
$N80T82$	375.2×10^{-6}	320.1×10^{-6}	1.5×10^{-3}	1.5×10^{-3}	0.038
$O84$	249.9×10^{-6}	252.4×10^{-6}	419.9×10^{-6}	438.4×10^{-6}	0.037
$P85$	81.5×10^{-6}	251.4×10^{-6}	230.5×10^{-6}	250.4×10^{-6}	0.040
$Q86$	605.0×10^{-6}	517.3×10^{-6}	134.0×10^{-6}	153.0×10^{-6}	0.034
$Q87\_88$	213.7×10^{-6}	288.2×10^{-6}	15.0×10^{-6}	15.9×10^{-6}	0.034
$R90T92$	353.1×10^{-6}	684.7×10^{-6}	77.6×10^{-6}	92.9×10^{-6}	0.035
$R93$	161.8×10^{-6}	286.1×10^{-6}	69.5×10^{-6}	79.3×10^{-6}	0.035
$S94$	50.1×10^{-6}	45.6×10^{-6}	118.1×10^{-6}	123.3×10^{-6}	0.035
$S95$	54.2×10^{-6}	96.7×10^{-6}	81.8×10^{-6}	89.0×10^{-6}	0.035
$S96$	349.3×10^{-6}	557.4×10^{-6}	78.4×10^{-6}	94.7×10^{-6}	0.035
T	4.1×10^{-6}	5.2×10^{-6}	1.3×10^{-9}	1.7×10^{-9}	0.001
U	0	0	0	0	0.001

TABLE A3. Averages over all sector effects for a sector class for income quintile 1 and 5 based on expenditure weights (%). Last column gives average price shock of a sector class.

Appendix H. Average Effects per Sector Class for Quintile 1 & 5 – Income Weights

Sector Code	Direct Effect (Q1)	Direct Effect (Q5)	Indirect Effect (Q1)	Indirect Effect (Q5)	Average Price Shock (%)
$A01$	5.1×10^{-3}	1.8×10^{-3}	6.0×10^{-3}	2.3×10^{-3}	0.036
$A02$	589.5×10^{-6}	215.4×10^{-6}	361.9×10^{-6}	146.9×10^{-6}	0.032
$A03$	230.4×10^{-6}	90.2×10^{-6}	238.4×10^{-6}	89.9×10^{-6}	0.033
B	1.3×10^{-3}	498.9×10^{-6}	6.9×10^{-3}	3.7×10^{-3}	0.048
$C10T12$	17.5×10^{-3}	5.9×10^{-3}	2.2×10^{-3}	1.0×10^{-3}	0.032
$C13T15$	877.7×10^{-6}	702.2×10^{-6}	416.7×10^{-6}	227.9×10^{-6}	0.025
$C16$	163.0×10^{-6}	62.0×10^{-6}	596.4×10^{-6}	252.0×10^{-6}	0.029
$C17$	130.0×10^{-6}	71.5×10^{-6}	456.6×10^{-6}	207.2×10^{-6}	0.026
$C18$	34.5×10^{-6}	16.9×10^{-6}	169.6×10^{-6}	83.4×10^{-6}	0.021
$C19$	7.4×10^{-3}	4.6×10^{-3}	4.1×10^{-3}	2.1×10^{-3}	0.056
$C20$	989.3×10^{-6}	558.2×10^{-6}	2.8×10^{-3}	1.3×10^{-3}	0.036
$C21$	270.4×10^{-6}	103.0×10^{-6}	154.7×10^{-6}	71.8×10^{-6}	0.029
$C22$	236.9×10^{-6}	129.0×10^{-6}	963.8×10^{-6}	462.8×10^{-6}	0.027
$C23$	286.8×10^{-6}	127.6×10^{-6}	733.8×10^{-6}	318.3×10^{-6}	0.031
$C24$	4.2×10^{-6}	3.1×10^{-6}	1.8×10^{-3}	981.4×10^{-6}	0.041
$C25$	139.7×10^{-6}	80.3×10^{-6}	1.1×10^{-3}	540.9×10^{-6}	0.031
$C26$	-102.5×10^{-6}	-84.3×10^{-6}	-131.5×10^{-6}	-72.5×10^{-6}	0.003
$C27$	101.1×10^{-6}	72.8×10^{-6}	259.8×10^{-6}	128.7×10^{-6}	0.019
$C28$	38.8×10^{-6}	33.1×10^{-6}	633.4×10^{-6}	321.0×10^{-6}	0.030
$C29$	520.8×10^{-6}	570.7×10^{-6}	412.7×10^{-6}	246.6×10^{-6}	0.024
$C30$	63.9×10^{-6}	58.5×10^{-6}	116.7×10^{-6}	60.2×10^{-6}	0.025
$C31\_32$	619.9×10^{-6}	375.7×10^{-6}	275.6×10^{-6}	129.2×10^{-6}	0.032
$C33$	11.3×10^{-6}	5.9×10^{-6}	513.8×10^{-6}	220.3×10^{-6}	0.020
$D35$	12.5×10^{-3}	4.4×10^{-3}	4.2×10^{-3}	1.9×10^{-3}	0.049
$E36$	1.7×10^{-3}	631.9×10^{-6}	301.9×10^{-6}	131.7×10^{-6}	0.042
$E37T39$	1.4×10^{-3}	544.0×10^{-6}	981.5×10^{-6}	420.0×10^{-6}	0.038
F	988.7×10^{-6}	347.0×10^{-6}	3.7×10^{-3}	1.5×10^{-3}	0.038
$G45$	295.3×10^{-6}	290.1×10^{-6}	694.2×10^{-6}	338.0×10^{-6}	0.028
$G46$	403.7×10^{-9}	147.4×10^{-9}	6.8×10^{-3}	2.9×10^{-3}	0.032
$G47$	5.7×10^{-6}	2.6×10^{-6}	1.8×10^{-3}	848.0×10^{-6}	0.032
$H49$	586.3×10^{-6}	680.8×10^{-6}	5.0×10^{-3}	2.4×10^{-3}	0.043
$H50$	46.2×10^{-6}	45.9×10^{-6}	424.8×10^{-6}	206.6×10^{-6}	0.044
$H51$	380.5×10^{-6}	403.7×10^{-6}	330.5×10^{-6}	176.8×10^{-6}	0.046
$H52$	86.4×10^{-6}	102.5×10^{-6}	2.3×10^{-3}	1.1×10^{-3}	0.040
$H53$	17.7×10^{-6}	11.1×10^{-6}	355.2×10^{-6}	165.1×10^{-6}	0.030
I	2.7×10^{-3}	1.9×10^{-3}	511.6×10^{-6}	258.6×10^{-6}	0.036
$J58$	58.5×10^{-6}	47.3×10^{-6}	83.4×10^{-6}	35.0×10^{-6}	0.018
$J59\_60$	70.4×10^{-6}	52.1×10^{-6}	210.5×10^{-6}	95.9×10^{-6}	0.021
$J61$	183.6×10^{-6}	118.2×10^{-6}	-25.9×10^{-6}	-14.0×10^{-6}	0.001
$J62\_63$	12.7×10^{-6}	12.2×10^{-6}	1.7×10^{-3}	730.7×10^{-6}	0.029
$K64$	527.2×10^{-6}	421.4×10^{-6}	2.9×10^{-3}	1.3×10^{-3}	0.027
$K65$	559.3×10^{-6}	364.6×10^{-6}	535.9×10^{-6}	237.1×10^{-6}	0.024
$K66$	132.5×10^{-6}	71.3×10^{-6}	854.2×10^{-6}	411.4×10^{-6}	0.025
L	35.4×10^{-3}	12.4×10^{-3}	2.2×10^{-3}	1.2×10^{-3}	0.037

Sector Code	Direct Effect (Q1)	Direct Effect (Q5)	Indirect Effect (Q1)	Indirect Effect (Q5)	Average Price Shock (%)
*M*69_70	128.6×10^{-6}	76.8×10^{-6}	2.3×10^{-3}	1.0×10^{-3}	0.026
*M*71	37.3×10^{-6}	50.2×10^{-6}	777.8×10^{-6}	349.9×10^{-6}	0.020
*M*72	1.6×10^{-6}	667.2×10^{-9}	79.1×10^{-6}	38.8×10^{-6}	0.033
*M*73	9.0×10^{-6}	4.9×10^{-6}	741.7×10^{-6}	354.2×10^{-6}	0.022
*M*74_75	166.8×10^{-6}	81.6×10^{-6}	642.4×10^{-6}	269.0×10^{-6}	0.028
*N*77	124.2×10^{-6}	105.7×10^{-6}	894.7×10^{-6}	453.2×10^{-6}	0.038
*N*78	8.6×10^{-6}	7.1×10^{-6}	562.4×10^{-6}	259.7×10^{-6}	0.038
*N*79	289.5×10^{-6}	294.5×10^{-6}	130.9×10^{-6}	73.3×10^{-6}	0.038
*N*80*T*82	471.8×10^{-6}	178.1×10^{-6}	1.9×10^{-3}	832.0×10^{-6}	0.038
*O*84	320.2×10^{-6}	142.9×10^{-6}	530.5×10^{-6}	248.1×10^{-6}	0.037
*P*85	95.7×10^{-6}	143.9×10^{-6}	311.7×10^{-6}	141.3×10^{-6}	0.040
*Q*86	782.8×10^{-6}	296.2×10^{-6}	185.7×10^{-6}	84.6×10^{-6}	0.034
*Q*87_88	260.4×10^{-6}	157.3×10^{-6}	17.7×10^{-6}	8.7×10^{-6}	0.034
*R*90*T*92	437.1×10^{-6}	388.6×10^{-6}	101.1×10^{-6}	53.4×10^{-6}	0.035
*R*93	196.9×10^{-6}	162.1×10^{-6}	89.8×10^{-6}	44.6×10^{-6}	0.035
*S*94	57.8×10^{-6}	23.4×10^{-6}	150.5×10^{-6}	68.7×10^{-6}	0.035
*S*95	67.1×10^{-6}	52.6×10^{-6}	106.7×10^{-6}	49.5×10^{-6}	0.035
*S*96	431.7×10^{-6}	316.6×10^{-6}	98.6×10^{-6}	52.9×10^{-6}	0.035
T	5.5×10^{-6}	2.9×10^{-6}	1.7×10^{-9}	925.9×10^{-12}	0.001
U	0	0	0	0	0.001

TABLE A4. Averages over all sector effects for a sector class for income quintile 1 and 5 based on income weights (%). Last column gives average price shock of a sector class. See Appendix K for corresponding sector labels.

Appendix I. Elasticity Estimates of Expenditure-weighted Inflation Inequality

Sector Code	Direct		Indirect		Total	
	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
A01	-0.058	(0.037)	-0.069	(0.026)	-0.066	(0.030)
A02	-0.074	(0.030)	0.020	(0.015)	-0.009	(0.017)
A03	-0.050	(0.034)	-0.027	(0.023)	-0.034	(0.025)
B	-0.046	(0.034)	0.141	(0.024)	0.118	(0.025)
C10T12	-0.130	(0.035)	0.039	(0.023)	-0.099	(0.030)
C13T15	0.480	(0.063)	0.185	(0.023)	0.371	(0.043)
C16	-0.003	(0.029)	0.017	(0.016)	0.006	(0.015)
C17	0.181	(0.036)	0.032	(0.017)	0.063	(0.017)
C18	0.317	(0.054)	0.095	(0.020)	0.106	(0.020)
C19	0.271	(0.045)	0.095	(0.019)	0.135	(0.042)
C20	0.208	(0.032)	0.066	(0.017)	0.101	(0.019)
C21	-0.006	(0.051)	0.019	(0.020)	-0.005	(0.036)
C22	0.315	(0.046)	0.074	(0.017)	0.107	(0.018)
C23	0.063	(0.028)	-0.006	(0.010)	0.011	(0.012)
C24	0.361	(0.061)	0.136	(0.018)	0.137	(0.018)
C25	0.322	(0.035)	0.082	(0.014)	0.103	(0.014)
C27	0.404	(0.040)	0.138	(0.035)	0.215	(0.028)
C28	0.521	(0.051)	0.100	(0.016)	0.130	(0.017)
C29	0.755	(0.088)	0.278	(0.035)	0.516	(0.053)
C30	0.649	(0.072)	0.146	(0.023)	0.310	(0.037)
C31_32	0.264	(0.035)	0.091	(0.014)	0.208	(0.026)
C33	0.153	(0.044)	0.016	(0.013)	0.019	(0.013)
D35	-0.195	(0.040)	0.039	(0.012)	-0.115	(0.022)
E36	-0.194	(0.045)	-0.011	(0.014)	-0.147	(0.032)
E37T39	-0.021	(0.053)	0.000	(0.013)	-0.045	(0.021)
F	-0.131	(0.029)	-0.052	(0.015)	-0.067	(0.016)
G45	0.683	(0.085)	0.130	(0.019)	0.263	(0.037)
G46	-0.057	(0.057)	0.042	(0.014)	0.042	(0.014)
G47	-0.101	(0.044)	0.052	(0.015)	0.052	(0.014)
H49	0.743	(0.087)	0.074	(0.015)	0.166	(0.021)
H50	0.734	(0.089)	0.114	(0.019)	0.165	(0.023)
H51	0.733	(0.089)	0.137	(0.026)	0.444	(0.058)
H52	0.744	(0.082)	0.104	(0.017)	0.130	(0.022)
H53	0.399	(0.065)	0.076	(0.020)	0.034	(0.126)
I	0.380	(0.061)	0.117	(0.016)	0.326	(0.050)
J58	0.417	(0.054)	0.093	(0.062)	0.248	(0.036)
J59_60	0.457	(0.061)	0.053	(0.013)	0.129	(0.057)
J61	0.100	(0.062)	0.062	(0.031)	0.078	(0.066)
J62_63	0.491	(0.075)	0.057	(0.011)	0.061	(0.011)
K64	0.343	(0.040)	0.070	(0.038)	0.127	(0.039)
K65	0.353	(0.049)	0.073	(0.065)	0.157	(0.029)
K66	0.342	(0.048)	0.079	(0.012)	0.083	(0.036)
L	-0.185	(0.038)	0.113	(0.016)	-0.151	(0.028)
M69_70	0.335	(0.044)	0.035	(0.009)	0.047	(0.009)
M71	0.737	(0.098)	0.008	(0.010)	0.068	(0.016)

Sector Code	Direct		Indirect		Total	
	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
M72	0.238	(0.198)	0.070	(0.015)	0.065	(0.014)
M73	0.083	(0.086)	0.056	(0.016)	0.057	(0.016)
M74_75	0.205	(0.039)	0.022	(0.014)	0.050	(0.015)
N77	0.509	(0.054)	0.094	(0.014)	0.146	(0.021)
N78	0.362	(0.067)	0.045	(0.013)	0.054	(0.014)
N79	0.550	(0.065)	0.154	(0.029)	0.438	(0.058)
N80T82	-0.098	(0.028)	0.030	(0.012)	0.000	(0.011)
O84	0.031	(0.046)	0.035	(0.007)	0.028	(0.014)
P85	0.972	(0.175)	0.066	(0.010)	0.340	(0.057)
Q86	-0.091	(0.061)	0.104	(0.014)	-0.048	(0.048)
Q87_88	0.290	(0.053)	0.051	(0.016)	0.262	(0.048)
R90T92	0.474	(0.055)	0.134	(0.016)	0.408	(0.048)
R93	0.488	(0.065)	0.103	(0.018)	0.329	(0.044)
S94	0.048	(0.063)	0.043	(0.014)	0.023	(0.016)
S95	0.424	(0.040)	0.085	(0.016)	0.224	(0.028)
S96	0.372	(0.045)	0.131	(0.029)	0.319	(0.039)
T	0.349	(0.193)	0.217	(0.040)	0.232	(0.042)

TABLE A5. Elasticity estimates with 95% confidence intervals for expenditure-weighted inflation inequality.

Appendix J. Elasticity Estimates of Income-weighted Inflation Inequality

Sector Code	Direct		Indirect		Total	
	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
A01	-0.651	(0.036)	-0.663	(0.033)	-0.659	(0.034)
A02	-0.668	(0.037)	-0.573	(0.034)	-0.602	(0.035)
A03	-0.643	(0.035)	-0.620	(0.038)	-0.627	(0.038)
B	-0.640	(0.046)	-0.452	(0.042)	-0.475	(0.043)
C10T12	-0.723	(0.037)	-0.555	(0.043)	-0.692	(0.035)
C13T15	-0.113	(0.081)	-0.408	(0.045)	-0.223	(0.063)
C16	-0.596	(0.045)	-0.576	(0.038)	-0.587	(0.038)
C17	-0.412	(0.050)	-0.561	(0.034)	-0.530	(0.035)
C18	-0.272	(0.079)	-0.498	(0.039)	-0.488	(0.040)
C19	-0.317	(0.062)	-0.498	(0.038)	-0.458	(0.056)
C20	-0.385	(0.053)	-0.527	(0.036)	-0.493	(0.038)
C21	-0.601	(0.059)	-0.574	(0.035)	-0.598	(0.045)
C22	-0.278	(0.065)	-0.519	(0.035)	-0.487	(0.036)
C23	-0.522	(0.046)	-0.592	(0.037)	-0.574	(0.038)
C24	-0.216	(0.069)	-0.457	(0.038)	-0.456	(0.038)
C25	-0.271	(0.055)	-0.511	(0.034)	-0.490	(0.034)
C27	-0.194	(0.047)	-0.448	(0.049)	-0.371	(0.042)
C28	-0.072	(0.063)	-0.493	(0.039)	-0.463	(0.039)
C29	0.162	(0.099)	-0.315	(0.046)	-0.077	(0.063)
C30	0.055	(0.084)	-0.447	(0.040)	-0.283	(0.043)
C31_32	-0.330	(0.054)	-0.502	(0.037)	-0.385	(0.046)
C33	-0.443	(0.062)	-0.577	(0.035)	-0.574	(0.035)
D35	-0.788	(0.053)	-0.554	(0.035)	-0.708	(0.041)
E36	-0.775	(0.056)	-0.604	(0.035)	-0.729	(0.043)
E37T39	-0.614	(0.063)	-0.593	(0.036)	-0.638	(0.039)
F	-0.739	(0.044)	-0.645	(0.041)	-0.660	(0.041)
G45	0.078	(0.094)	-0.463	(0.040)	-0.330	(0.043)
G46	-0.794	(0.138)	-0.551	(0.034)	-0.551	(0.034)
G47	-0.842	(0.091)	-0.541	(0.035)	-0.541	(0.035)
H49	0.135	(0.100)	-0.519	(0.036)	-0.428	(0.039)
H50	0.141	(0.099)	-0.479	(0.038)	-0.428	(0.040)
H51	0.140	(0.099)	-0.456	(0.044)	-0.149	(0.071)
H52	0.135	(0.097)	-0.489	(0.038)	-0.463	(0.040)
H53	-0.208	(0.082)	-0.517	(0.035)	-0.570	(0.119)
I	-0.213	(0.084)	-0.476	(0.039)	-0.267	(0.074)
J58	-0.179	(0.075)	-0.492	(0.072)	-0.348	(0.062)
J59_60	-0.140	(0.079)	-0.540	(0.038)	-0.464	(0.065)
J61	-0.470	(0.085)	-0.483	(0.042)	-0.478	(0.085)
J62_63	-0.100	(0.094)	-0.536	(0.037)	-0.532	(0.037)
K64	-0.266	(0.064)	-0.523	(0.060)	-0.466	(0.062)
K65	-0.235	(0.071)	-0.520	(0.071)	-0.437	(0.049)
K66	-0.271	(0.069)	-0.514	(0.039)	-0.510	(0.040)
L	-0.778	(0.051)	-0.481	(0.041)	-0.744	(0.044)
M69_70	-0.251	(0.064)	-0.558	(0.036)	-0.546	(0.036)
M71	0.149	(0.107)	-0.585	(0.038)	-0.525	(0.043)

Sector Code	**Direct**		**Indirect**		**Total**	
	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
M72	-0.320	(0.246)	-0.523	(0.038)	-0.528	(0.038)
M73	-0.523	(0.113)	-0.538	(0.038)	-0.536	(0.038)
M74_75	-0.388	(0.058)	-0.571	(0.033)	-0.543	(0.036)
N77	-0.084	(0.069)	-0.499	(0.040)	-0.447	(0.042)
N78	-0.223	(0.089)	-0.549	(0.036)	-0.539	(0.038)
N79	-0.043	(0.082)	-0.439	(0.046)	-0.156	(0.071)
N80T82	-0.691	(0.041)	-0.563	(0.035)	-0.593	(0.035)
O84	-0.562	(0.060)	-0.558	(0.032)	-0.566	(0.038)
P85	0.379	(0.191)	-0.527	(0.037)	-0.253	(0.079)
Q86	-0.681	(0.068)	-0.489	(0.038)	-0.638	(0.056)
Q87_88	-0.300	(0.067)	-0.542	(0.038)	-0.328	(0.063)
R90T92	-0.119	(0.071)	-0.459	(0.040)	-0.185	(0.064)
R93	-0.105	(0.081)	-0.490	(0.044)	-0.264	(0.064)
S94	-0.536	(0.083)	-0.551	(0.039)	-0.570	(0.039)
S95	-0.169	(0.059)	-0.508	(0.041)	-0.369	(0.049)
S96	-0.221	(0.066)	-0.462	(0.052)	-0.274	(0.060)
T	-0.219	(0.294)	-0.377	(0.050)	-0.361	(0.054)

TABLE A6. Elasticity estimates with 95% confidence intervals for income-weighted inflation inequality.

Appendix K. Industry Codes and Labels NACE Rev. 2

Code	Label
A01	Crop and animal production, hunting and related service activities
A02	Forestry and logging
A03	Fishing and aquaculture
B	Mining and quarrying
C10T12	Manufacture of food products; beverages and tobacco products
C13T15	Manufacture of textiles, wearing apparel, leather and related products
C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
C17	Manufacture of paper and paper products
C18	Printing and reproduction of recorded media
C19	Manufacture of coke and refined petroleum products
C20	Manufacture of chemicals and chemical products
C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
C22	Manufacture of rubber and plastic products
C23	Manufacture of other non-metallic mineral products
C24	Manufacture of basic metals
C25	Manufacture of fabricated metal products, except machinery and equipment
C26	Manufacture of computer, electronic and optical products
C27	Manufacture of electrical equipment
C28	Manufacture of machinery and equipment n.e.c.
C29	Manufacture of motor vehicles, trailers and semi-trailers
C30	Manufacture of other transport equipment
C31_32	Manufacture of furniture; other manufacturing
C33	Repair and installation of machinery and equipment
D35	Electricity, gas, steam and air conditioning supply
E36	Water collection, treatment and supply
E37T39	Sewerage, waste management, remediation activities
F	Construction
G45	Wholesale and retail trade and repair of motor vehicles and motorcycles
G46	Wholesale trade, except of motor vehicles and motorcycles
G47	Retail trade, except of motor vehicles and motorcycles
H49	Land transport and transport via pipelines
H50	Water transport
H51	Air transport

Code	Label
H52	Warehousing and support activities for transportation
H53	Postal and courier activities
I	Accommodation and food service activities
J58	Publishing activities
J59_60	Motion picture, video, television programme production; programming and broadcasting activities
J61	Telecommunications
J62_63	Computer programming, consultancy, and information service activities
K64	Financial service activities, except insurance and pension funding
K65	Insurance, reinsurance and pension funding, except compulsory social security
K66	Activities auxiliary to financial services and insurance activities
L	Real estate activities
M69_70	Legal and accounting activities; activities of head offices; management consultancy activities
M71	Architectural and engineering activities; technical testing and analysis
M72	Scientific research and development
M73	Advertising and market research
M74_75	Other professional, scientific and technical activities; veterinary activities
N77	Rental and leasing activities
N78	Employment activities
N79	Travel agency, tour operator and other reservation service and related activities
N80T82	Security and investigation, service and landscape, office administrative and support activities
O84	Public administration and defence; compulsory social security
P85	Education
Q86	Human health activities
Q87_88	Residential care activities and social work activities without accommodation
R90T92	Creative, arts and entertainment activities; libraries, archives, museums and other cultural activities; gambling and betting activities
R93	Sports activities and amusement and recreation activities
S94	Activities of membership organisations
S95	Repair of computers and personal and household goods
S96	Other personal service activities
T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
U	Activities of extraterritorial organisations and bodies

TABLE A7. Sector codes and labels according to NACE Rev. 2 classification.

BERG Working Paper Series (most recent publications)

189 Sarah **Mignot** and Frank **Westerhoff**, *Explaining the stylized facts of foreign exchange markets with a simple agent-based version of Paul de Grauwe's chaotic exchange rate model*

190 Roberto **Rozzi** and Stefanie Y. **Schmitt**, *Vertical product differentiation, prominence, and costly search*

191 Florian **Herold** and Christoph **Kuzmics**, *Farkas' Lemma and Complete Indifference*

192 Sarah **Mignot**, Paolo **Pellizzari**, and Frank **Westerhoff**, *Fake News and Asset Price Dynamics*

193 Fabian **Dietz** and Marco **Sahm**, *Fairness in Round-Robin Tournaments with Four Players and Endogenous Sequences*

194 Jan **Schulz**, Caleb **Agoha**, Anna **Gebhard**, Bettina **Gregg** and Daniel M. **Mayerhoffer**, *Excessive White Male Privilege Biases the Measurement of Intersectional Wage Discrimination*

195 Leonhard **Ipsen** and Jan **Schulz**, *The (Dis-)Equalizing Effects of Production Networks*

196 Ivan **Savin**, Philipp **Mundt** and Margherita **Bellanca**, *The paradox of climate policy diffusion*

197 Dominik **Bruckner** and Marco **Sahm**, *Party Politics: A Contest Perspective*

198 Lasare **Samartzidis**, Philipp **Mundt** and Jan **Schulz**, *Input specificity and labor's bargaining power: A production tree approach to functional income distribution*

199 Maybrit **Wächter**, Christian R. **Proaño**, and Juan Carlos **Peña**, *How Fitting is "one-size-fits-all"? Revisiting the Dynamic Effects of ECB's Interest Policy on Euro Area Countries*

200 Sarah **Mignot**, *Coevolution of stock prices and their perceived fundamental value*

201 Arne **Lauber**, Christoph **March** and Marco **Sahm**, *Round-Robin Tournaments in the Lab: Lottery Contests vs. All-Pay Auctions*

202 Stefanie Y. **Schmitt**, *Investments in environmental quality under limited attention*

203 Jan **Schulz** and Jan David **Weber**, *Power Laws in Socio-Economics*

204 Rafael **Kothe**, *Connecting the Dots: How Social Networks Shape Expectations Through Economic Narratives*

205 Jan **Schulz** and Leonhard **Ipsen**, *Poor Households and the Weight of Inflation*

Free access to all publications at: www.uni-bamberg.de/en/economics/research/wp/