DISCUSSION NOTE

WE ARE ALL FACING THE SAME STORM, BUT NOT ALL ARE IN THE SAME BOAT

A DISTRIBUTIONAL PICTURE OF THE PURCHASING POWER EFFECTS OF THE 2021-22 ENERGY PRICE SHOCK AND COMPENSATING MEASURES.[*]

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1 INTRODUCTION

Belgian households are hit hard by the ongoing energy crisis. This was already the case before the Russian invasion of Ukraine, when energy prices increased because of a supply shock, exacerbated by the uplift in economic growth and accompanying higher demand for energy products. Year-on-year inflation stood at 8.0% in February 2022, the highest level in Belgium since August 1983 (Statbel 2022). The increase of the Consumer Price Index is driven by a price increase in electricity (+72.8%) and gas (+133.7%). However, not all households are faced with such a large price increase. Households with a fixed contract[1] are protected – at least temporarily – against the adverse price shocks. New energy contracts are generally flexible. The longer the inflated prices persist, the more fixed contracts will end and forcibly be renewed with higher, flexible rates. The duration of this crisis is therefore of importance for the impact of the price shock and the time window covered by the analysis will thus affect its assessment. The price shock is also asymmetric because of differences in household consumption patterns. While households in the bottom income decile spend 7.3% of their disposable income on electricity and gas, households in the top decile only spend 2.3%, and large differences within the deciles exist as well.

[*] The results presented here are based on EUROMOD version 3.4.8. Originally maintained, developed and managed by the Institute for Social and Economic Research (ISER), since 2021 EUROMOD is maintained, developed and managed by the Joint Research Centre (JRC) of the European Commission, in collaboration with EUROSTAT and national teams from the EU countries. We are indebted to the many people who have contributed to the development of EUROMOD. The results and their interpretation are the author's responsibility. We gratefully acknowledge funding by BELSPO (B2/191/P3/BE-PARADIS).

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[1] In 2020, 68% of all electricity contracts and 64% of all gas contracts, were fixed contracts (CREG, 2020).

In October 2021, the Belgian government announced a first package of measures to prevent families from getting into financial difficulties because of the increase in energy prices. The government agreed on the prolongation of the extended eligibility criteria for the social tariff on electricity and gas. This extension of the eligibility criteria was enacted as of February 2021 as a Covid-19 support measure. Households where at least one person is entitled to the so-called *increased reimbursement* ("verhoogde tegemoetkoming" in Dutch or "intervention majorée" in French) have since then been automatically eligible for the social tariff. This adjustment was intended to end on 31 December 2021, but was extended until 30 March 2022. On top of that, an energy cheque of 80 euros was handed out in January 2022 to all households eligible for the social tariff on 30 September 2021.[2]

On 1 February 2022, the Belgian government reached an agreement on a new package of measures to support consumers in the face of the energy price shock. The new eligibility conditions for the social tariff were again prolonged, this time until 30 June 2022. In addition, the government agreed on a temporary VAT cut on electricity from 21% to 6% (for the period of March 2022 until June 2022) and on a heating cheque of 100 euros per household. A VAT cut on electricity (and gas) was probably the most discussed proposal the last few months in the run-up to this decision. A VAT cut seems simple to implement and the effect on the consumer prices would manifest quickly as was the case with the temporary VAT reduction on electricity from April 2014 until September 2015. Hindriks and Serse (2022) showed that this temporary VAT cut was fully passed-on to consumer prices. While VAT on electricity is temporarily reduced, VAT on gas remains at the level of 21%. To cushion the price increase of gas, a heating cheque of 100 euros is granted to every household and will be settled via the electricity bill.

Households are hit differently by increases in (energy) prices for at least two reasons. First, expenditure patterns differ across households: some households spend relatively more of their budget on gas and electricity than others. Secondly, not all households face the same price shock. Especially the availability of fixed and flexible price contracts on the gas and electricity markets can make a big difference in times of rapidly increasing prices. The focus and main contribution of this note is to provide a distributional analysis of the consequences of the rise of gas and electricity prices and the impact of the compensating measures. In order to give a picture for the population as a whole, we use an arithmetic tax-benefit microsimulation model (EUROMOD) with an extension that has been developed to analyse indirect taxes[3] (Akoğuz et al. 2020; Capéau, Decoster, and Güner 2021). In our analysis of the distributional impact of compensating measures, we distinguish the effects of recently announced measures from those measures that were already in place (the social tariff and the automatic indexation of wages). Section 2 presents the methodology and the different policies we will analyse. Section 3 presents the results.

2 METHODOLOGY AND IMPLEMENTATION OF THE SHOCK AND COMPENSATING POLICIES

In our analysis we will focus on purchasing power effects. These are defined as the extra amount of money a household would need to be able to purchase the same amount of goods as before a price shock. Price reducing policies will increase purchasing power (less money is needed to buy the same

[2] This cheque is not covered by our analysis.

[3] Indirect taxes are here understood as (only) VAT and excises. Other energy levies are not included in our analysis.

goods). Income supporting measures are increasing purchasing power, as they allow to buy more goods.

In order to get a representative distributional picture of a price shock and countervailing policy measures, a microsimulation model that covers both direct and indirect taxes, and runs on a representative sample of the population, is needed. We use the EUROMOD microsimulation model, which calculates direct taxes, social security contributions and benefits (Sutherland and Figari 2013) and use the EU Survey on Income and Living Conditions (EU-SILC) as input dataset. The model has been expanded to cover consumption taxes (VAT and excises) as well. To this end, the SILC data were enriched with expenditure patterns derived from the Household Budget Survey (HBS), using a statistical matching method (Akoğuz et al. 2020; Capéau, Decoster, and Güner 2021).

Analyses in this note compare changes that occurred over the period January 2021 until January 2022 with a baseline. For constructing this baseline, we use the latest available match between these two micro-datasets, SILC 2010 and HBS 2010, but adjusted for 2019 incomes and prices. We also use tax and benefit rules of 2019. We do not account for demographic changes between 2010 and 2019, and assume unchanged heterogeneity in expenditure patterns. The Indirect Tax Tool of the EUROMOD model also allows to compute baseline quantities consumed by each of the households, based on 2019 prices.

We consider in our analysis consecutively the impact of the energy price shock, and a number of existing and new compensating measures: wage indexation and the existing social tariff, broadening of the group of households eligible for the social tariff, a VAT cut on electricity, and a heating cheque. Effects are evaluated in terms of purchasing power: additional disposable income or change in expenditures needed to buy the same bundle of goods as before the price shock.

To decompose the impact of the price shock and the compensating measures on the purchasing power of households, we model a set of counterfactual 'systems'. Such a system is a combination of tax rules and parameters, prices, and household incomes. Table 1 below shows for seven systems that will be used in our analysis (labelled A-G), which of the five policies or events are switched on (green) or off (white). Such a policy or event is a change to the system, for example a specific income compensation, a price shock, or a change to the tax and benefit system.

Table 1: Systems and policies

		Systems						
		A	B	C	D	E	F	G
1	Price shock							
2	Indexation							
3	Extension of the social tariff							
4	VAT cut electricity							
5	Heating cheque							

This set-up allows to bring events, which in reality do not take place at the same time, to one moment in time. By comparing two systems, we can isolate the impact of the different policies or events on the purchasing power of households. The effects must be interpreted as a morning-after-effect: from one day to the other, households are faced with a change: a price shock and/or one or more policy measures. The simulation of a morning-after-effect assumes that households do not change their behaviour: they consume the same amount of gas and electricity (and other goods) and they do not change their labour activities.

Comparing system G with system A provides us with the total net purchasing power effect on Belgian households for one particular month.[4] The total impact on purchasing power is measured as the sum of changes in income minus the change in expenditures needed to buy the same bundle of goods as before the price shock.

1 BASELINE SYSTEM

Our **baseline system** (system A) is the Belgian tax-benefit system of 2019. We compute monthly household disposable income, expenditures, and consumption (quantities) for this baseline year. At that moment, one measure was already in place to mitigate and help disadvantaged household to face energy costs: the social tariff. The measure pre-dates the recent energy price hike, and is granted to households in which at least one person receives a low-income compensation benefit (e.g. social assistance), a guaranteed minimum income for elderly, or a compensation for a person with a disability.[5] Also social housing residents are entitled to the social tariff.

We model the social tariff as follows.[6] First, we identify eligible households. Households with people who receive benefits from social assistance and disability income are eligible for the social tariff in our set-up. Second, once eligible households are identified, their electricity or gas expenditures from EUROMOD are corrected as follows:

$$x_{after\ ST} = x_{EM} \frac{\bar{p}_{ST}}{\bar{p}_M}$$

where x_{EM} is the expenditure on gas or electricity obtained from the microsimulation model, and $\bar{p}_{ST}/\bar{p}_M$ reflects the price differential between the social tariff and market consumer price, computed as the ratio of the average social tariff before the price shock (averaged over 2020), $\bar{p}_{ST}$, and the average market price, $\bar{p}_M$, of the commodity (gas or electricity) over the same period. The result, $x_{after\ ST}$, is the expenditure needed to buy the baseline amount of gas or electricity at this average social tariff.

2 PRICE SHOCK AND POLICIES

In all subsequent analyses, we keep the quantities of goods and services consumed fixed at their baseline level and compute the impact as the change in disposable income or the change in expenditures needed to buy the same amount of goods at the new prices. All monetary values are expressed in 2019 euros.

2.1 PRICE SHOCK

Our first aim is to sketch an overnight picture of the distributional consequences of the rise in prices of electricity and gas at a particular point in time. More specifically we will model the effect of the price

[4] The analysis could be repeated for different months, taking into account the effect of the phase out of some of the policy measures and the further evolution of prices. This goes beyond the scope of this discussion note.

[5] The exact criteria can be found at: https://economie.fgov.be/nl/themas/energie/energieprijzen/sociaal-tarief/sociaal-tarief-voor.

[6] The architecture of the indirect tax component of the microsimulation model was not foreseen to take into account differential prices across households. Therefore we need to implement this policy outside the microsimulation model.

rise between January 2021 and January 2022 when this price rise is plugged in into our baseline. This is called system B in Table 1.

Energy prices are complex, and a wide variety of different contracts exists. The energy bill is composed of a pure energy component, contributions for transportation and transmission, and taxes and levies. The pure energy component is the sum of a fixed subscription cost and the charge for energy consumption. To compute prices per unit of consumption (expressed in kWh for both, electricity and gas) the energy regulator, CREG, and the national statistical office, compute the energy bill for standard household consumption profiles and divide it by consumption. This price will vary over different contract formulas and depends on the standard consumption profiles. The quoted prices are then based on different types of averages of these prices. These prices include all components of the energy bill: energy consumption, fixed charge, transport and transmission, taxes and levies. The energy component (including the fixed cost) composes about 50% of the total bill for electricity, and 70% for gas.[7] This explains why a rise in the price per kWh of energy does not translate one-to-one into a rise of the consumer price.

In our baseline, we assume all households face the same price, except for the households enjoying the social tariff. Neglecting price differentials across households in the baseline is of less importance for the exercise we want to do: charting the distributional picture of the price shock.

One issue can however not be neglected when depicting the overnight distributional effect of an energy price shock: the difference between fixed price and variable price contracts. With a fixed price contract, the price of the energy use component remains fixed for the duration of the contract (there exist one- , two- , and three-year contracts). Variable price contracts specify a price for the energy use component at the start of the contract and an indexing formula applied to part of the energy use component of the price.[8]

The existence of those two types of contracts has two important implications which we have to take into account in our exercise. First, obviously, when one looks at the effect of a price rise overnight, households with an ongoing fixed price contract are not affected at that moment. Households who have to renew their contract at that moment or have a variable price contract, face the full rise of the price at that moment.[9] But there is a second factor which is important too. Inflation figures which are amongst others used to index wages and replacement incomes (cf. Paragraph 2.2 below) reflect average price increases for an average consumer. In practice, price increases for consumers with a variable price contract will be larger than the consumer price index (CPI) of energy prices suggests, because the latter include social tariffs which increase much less (cf. Paragraph 2.2). Consequently, households with a variable price contract or who have to renew their contract at the moment we take the picture, will be under-compensated by automatic indexation.

The implications of this situation for prices are depicted in Figure 1. The dashed lines show the evolution of the prices of new contracts (CREG 2022). That is the average price increase faced by

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7 https://www.creg.be/nl/consumenten/prijzen-en-tarieven/hoe-de-energieprijs-opgebouwd.

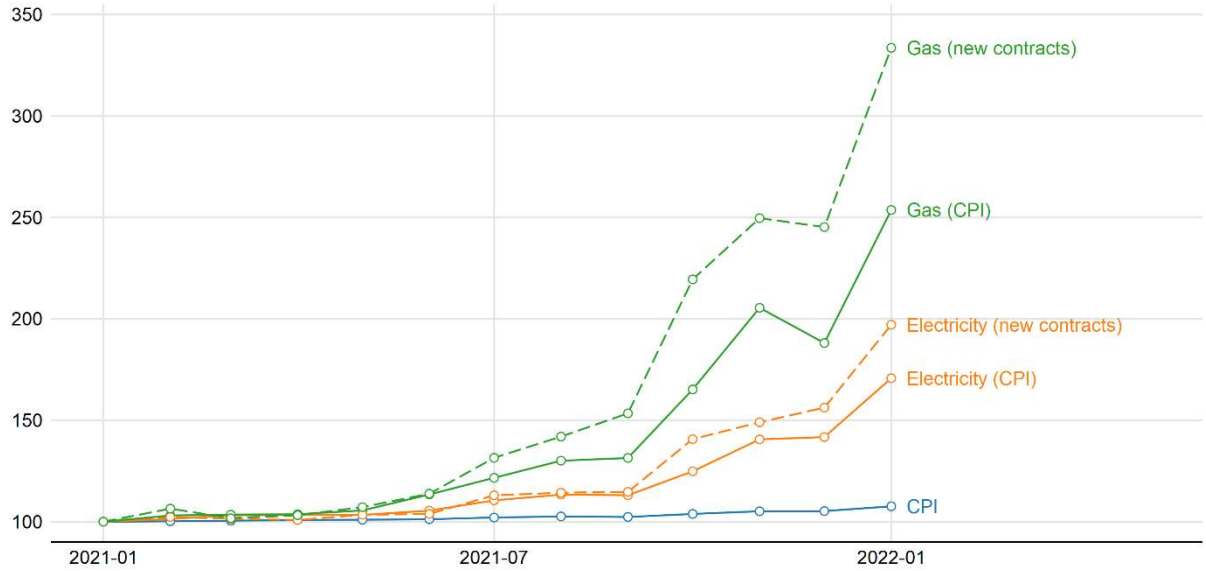
8 The formula is of the type “price per kWh=index * a + b”, where the contract stipulates the amounts of a, b, and the index used. This can be a spot index (current price) or a forward index (prices over the period of one or three months). Indexation can be monthly or quarterly.

9 Providers currently cut back on their offer of fixed price contracts or even do not offer them anymore. The price per kWh of the energy use component a fixed price contract includes a risk premium and is therefore usually somewhat higher than a variable price contract. Our assumption of identical prices in the baseline neglects this price difference. In any case, this premium was small at the beginning of the price crisis, and negligible compared to the large price hike.

households who had to renew their contract in one of these months. We also use it as a proxy for the price increase faced by households with a variable contract.[10] Prices for electricity almost doubled between January 2021 and January 2022 (+98%), while those of gas even more than tripled (+233%). The full green and orange lines shows the price increase which is used to calculate the Consumer Price Index (Statbel 2022). The CPI is based on the price evolution of a representative basket of available energy contracts, including social tariff contracts. Households eligible to such a contract face a less strong price increase.

In order to reflect the big difference between consumers having an ongoing fixed price contract during the energy price crisis as compared to those with a variable price contract or had to renew their contract, we ran two sets of counterfactual simulations.

Figure 1: Evolution of consumer prices of electricity and gas (2021-01 = 100)



Source: Average market rates from CREG[11] and the CPI index from Statbel[12].

The first set of simulations, labelled as "**variable prices**" in the remainder of the text, calculates the implications for consumers if they were actually faced with a price increase between January 2021 and January 2022. It reflects the effect of such a price increase for households with a variable contract or for households who have to renew their contract at that moment, compared to the baseline (+97.6% for electricity and +232.7% for gas). Also households eligible to the social tariff face a (more limited) price increase (cf. Paragraph 2.3 below).

The second set of simulations, labelled as "**fixed prices**" in the remainder of the text, calculates the implications for households in case they would have a fixed price contract in the baseline that does

[10] The increase in prices faced by households with a variable price contract is determined by the indexing formula (see Note 8). This evolution might in general be different from the evolution of the prices set by the providers for new contracts, which is what is reflected by the dashed lines in Figure 1.

[11] Source for the market prices of new contracts: CREG monthly scorecard ("boordtabel" in Dutch) https://www.creg.be/nl/professionals/marktwerking-en-monitoring/boordtabel. Figures for residential customers of electricity (3 500 kWh/year, single tariff) and natural gas (23.260 kWh/year).

[12] Source for the CPI and indices of gas and electricity prices: Statbel "Indices by product group" https://statbel.fgov.be/sites/default/files/files/documents/Consumptieprijzen/3.1%20Consumptieprijsindex/Indexen%20per%20productgroep%20vanaf%202006.xls

not have to be renewed. Actually, those households do not face any price increase at the moment we take the distributional picture, and therefore we simulate a zero price shock.[13]

We run both types of simulations next to each other. They give the distributional effects of these two types of situations in which households can find themselves during the simulated phase of the energy price crisis. Over time, these differences will wash out, as fixed price contracts will be renewed, either by a variable price contract, or by a fixed price contract at higher price (if prices continue to increase or stabilize at a high level).

2.2 AUTOMATIC INDEXATION

The energy price increase leads to an increase of the Health Index, which is followed by an automatic indexation of the wages and benefits. In the private sector, the timing and modalities of indexation depend on sectoral agreements. In the public sector, indexation takes place when the rolling average of the health index of the latest 4 months increases by 2% or more.

In our simulation exercise only the prices of electricity and gas vary compared to the baseline. Hence, we calculated the effect of an increase of these prices solely on the Health Index. For this purpose, we used the price increase of the energy price component of the CPI (illustrated by the full lines in Figure 1), as it is this price increase which is used to calculated the Health Index. We thus estimate the Health Index to increase by 4.8%. We do not take into account the "spilindex" (i.e. the limit that has to be exceeded before public wages and benefits are indexed), causing a delay between actual price increases and indexation. We thus assume that wages and other indexable incomes are immediately adjusted when the price shock occurs. We implement this indexation by increasing all indexable components of disposable income, i.e. salaries and benefits and taxes paid on these incomes. Capital income is the main income source that is not indexed.

2.3 BROADENING THE GROUP OF PEOPLE ELIGIBLE FOR THE SOCIAL TARIFF

From February 2021 onwards, eligibility conditions for the allocation of the social tariff were broadened as a response to the Covid-19 crisis. Due to the energy price shock, the federal government decided to extend the period of these new eligibility conditions, at least until 30 June 2022. The broadening of eligibility criteria implies the social tariff being applicable to all household entitled to the "increased reimbursement" (*verhoogde tegemoetkoming* in Dutch or *intervention majorée* in French).[14]

The social tariff is determined every quarter on basis of the lowest price rate offered by commercial energy suppliers in the month prior to that quarter. To avoid sudden price shocks, the increase of the social tariff of electricity is capped to a maximum of 10% (15% for the gas tariff), compared to the social tariff of the previous quarter, and to a maximum of 20% (25% for gas) compared to the average social tariff of the four previous quarters. As a result, households enjoying the social tariff faced a lower increase in prices than the general price increase. Figure 2 illustrates this differential in price increases during 2021.

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[13] In this "fixed prices" simulations we assume that also households who are granted a social tariff in the baseline do not face a price increase.

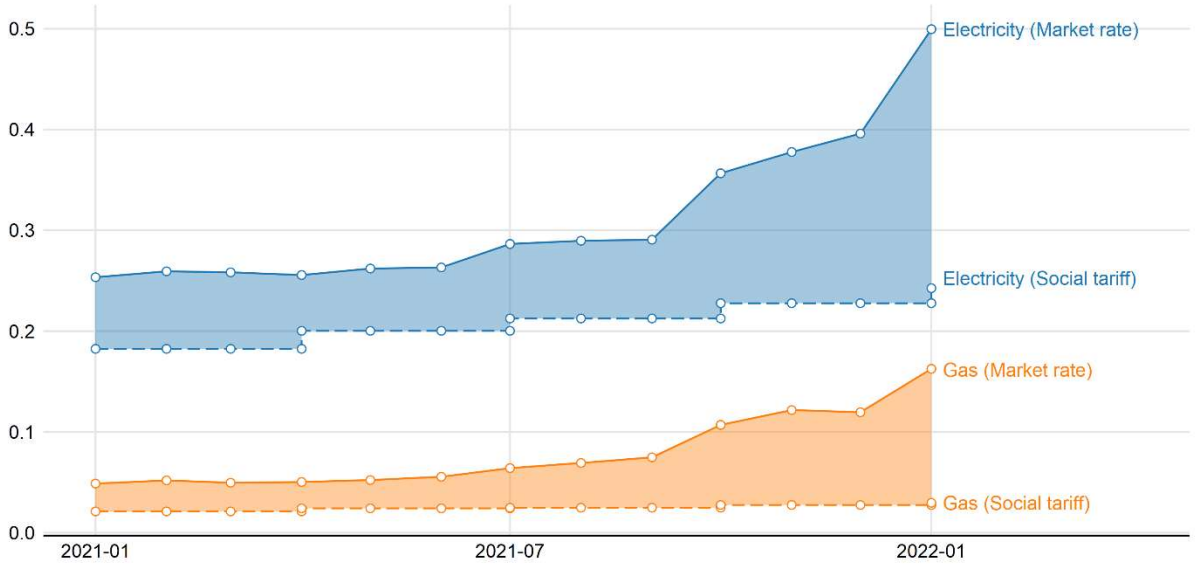
[14] This "increased reimbursement" is a reduction on the out-of-pocket payments for widow(er)s, pensioners, orphans, invalid persons, and older unemployed people with low incomes or persons who get social assistance.

In our simulations, the impact of enjoying the social tariff is calculated in a similar way as the implementation of the social tariff in the baseline (see Paragraph 1 of this section). After determining the group of newly eligible households, their baseline expenditures on energy are reduced by a ratio reflecting the price differential between social tariff and average market prices. As the price differential is higher at the moment we take the picture after the price increases, compared to the baseline, we adapt this ratio in the simulations. So, for the simulations where households are facing the full impact of the price shock, we first calculate the increase in expenditures necessary to buy the same bundle of goods as in the baseline, at the increased market prices (increase between January 2021 and January 2022). We then calculate the price differential between social tariff and market price as the ratio of the social tariff in January 2022 and the average market price at the same moment. The difference in expenditures before and after the correction for social tariff is the gain in purchasing power from the reduced tariff, which will be higher than the baseline gain from the social tariff as the gap between market price and social tariff increased during the energy price crisis, which is shown in Figure 2.

For the simulations referring to the impact on households not facing a price increase ("fixed prices"), we use the differential between the January 2022 social tariff and the January 2021 market rates to calculate the reduced expenditures of the newly eligible households (the old eligible households' expenditures are kept at the baseline level). In this way we isolate the effect of the new policy.

The one-off reimbursement in January 2022 of 80 euro to households who were enjoying the social tariff in September 2021 is not included in our simulations.

Figure 2: Electricity and gas prices for new contracts: average market rate vs. the social tariffs (euro per kWh)



Source: CREG monthly scorecards https://www.creg.be/nl/professionals/marktwerking-en-monitoring/boordtabel. Figures for residential customers of electricity (3 500 kWh/year, single) and natural gas (23.260 kWh/year).

2.4 VAT CUT FOR ELECTRICITY

On 1 February 2022, the federal government decided for a VAT reduction on electricity from 21% to 6%, between 1 March 2022 and 30 June 2022.

We simulated the impact of a VAT cut on electricity from 21% to 6% using the Indirect Tax Tool of the microsimulation model EUROMOD. Besides the adjustment of the VAT tax parameter, we also take

into account the effect of these reduced prices on the Health Index used to adjust the disposable incomes (see Paragraph 2.2).

2.5 HEATING CHEQUE

On 1 February 2022, the federal government decided to grant a heating cheque of 100 euro to each household with an active registered electricity meter. This net benefit will be settled by the electricity provider via the bill.

We model the impact of this policy by converting this one-off premium into a monthly benefit of 8.3 euro received during the whole year, assuming the cheque is meant to dampen increased expenses on gas for one year. This choice implies that the purchasing power impact of this measure in our simulations will be exactly 8.3 euro per household.

3 SYSTEMS

As outlined in Table 1 we developed 7 systems.

- **System A** is the **baseline** and consists of the default 2019 EUROMOD system for Belgium (see Section 2 Paragraph 1).
- **System B** is the baseline **modified by a price shock** for electricity and gas. Comparing system B with system A, allows to assess the distributional impact of a price shock, taking into account the old social tariff already implemented and applied.
- **System C** is System B, whereby we implement the **automatic indexation of incomes**. Comparing system C with System B allows us to consider the distributional impact of the income indexation separately.
- **System D** is system C with a **broadening of eligibility criteria for the social tariff**. Comparing this system with system B will give us information about how (1) the January 2022 differential between social tariffs and market rates and (2) the broadening of the eligibility criteria of the social tariff affects household budgets.
- **System E** is system C with a **VAT cut on electricity from 21% to 6%**. In this system the VAT rate for electricity is lowered. This reduction implies that prices did not rise as much as under System C. Consequently, the Health Index increased only by 4.5% instead of 4.8%. The indexation of incomes is adjusted accordingly. Comparing incomes and expenditures from System E with those from system C provides us with the net effects of this measure.
- **System F** is system C including the **household energy cheque**.
- **System G** is system C with all the three new policies (implemented in systems D, E, F) combined.

3 RESULTS

We first present the distribution of disposable incomes and expenditures in the baseline system. We then present the distributive effects of the price shocks and the policies aimed at countering the shock. The change in income due to a policy (or a set of policies) minus the change in expenditures necessary to buy the baseline commodity basket is our measure for the impact on purchasing power.

Results are expressed on a monthly basis in 2019 euros. All changes are compared to baseline income and expenditures. These baseline values are shown in the top panel of Table 2. The baseline includes

the pre-shock social tariff. The bottom panel shows the impact of this social tariff on expenditure. In the absence of the social tariff, monthly energy expenditures would be -on average- 19 euros higher in the bottom decile and 4 euros higher for the top decile.

The budget share of energy decrease from almost 6% for lower deciles to less than 4% for the higher deciles. As a percentage of disposable income these figures are respectively 7.3% and 2.3%.

Table 2: Baseline incomes and expenditures by income decile (euros per month)

	1	2	3	4	5	6	7	8	9	10	All
Baseline (with social tariff at pre-crisis prices)											
Disposable income	1645	2204	2597	3274	3705	3999	4415	4742	5143	7007	3872
Total expenditure	2137	2151	2516	3078	3501	3605	4073	3969	4059	4509	3359
Expenditure on electricity	69	70	73	85	77	82	89	81	84	86	80
Expenditure on gas	51	57	54	55	65	64	72	73	72	78	64
Effect of social tariff (included in the baseline)											
Δ Total expenditures	-19	-15	-15	-14	-9	-8	-8	-7	-4	-4	-10
Δ Exp. on electricity	-9	-7	-7	-7	-4	-4	-4	-3	-2	-2	-5
Δ Exp. on gas	-9	-8	-8	-8	-5	-5	-4	-4	-2	-2	-6
Δ Income - Δ Expenditures	19	15	15	14	9	8	8	7	4	4	10

Note: Income deciles are determined using equivalized household disposable incomes, with modified OECD equivalence scales. Income and expenditures are measured at the household level and reported means are averages over households.

1 DISTRIBUTIVE IMPACT OF THE PRICE INCREASE OF GAS AND ELECTRICITY

In Table 3 we present the impact of the price shock. Assuming away the eligibility for social tariffs, the 98% increase in electricity prices and the 233% increase in gas prices cause an average increase of monthly expenditures of 226 euros for households with variable price contracts or those who had to renew their contract in the month we consider. The 1st decile needs on average an additional 186 euros to afford the same energy consumption as before, while the price shock amounts to an average extra expenditure of 265 euros for the 10th decile. The increase in electricity expenditures amounts to around 30% of the loss in purchasing power, the increase in gas prices to the other 70%.

Households who benefited from a social tariff were largely protected by the increase in market rates. As shown in Figure 2, the social tariff does increase, but the gap between average market rates and the social tariff increased much more, implying an increased subsidy in comparison to the market rate. This extra subsidy lowers expenditures necessary to buy the same bundle as in the baseline, on average by 21 euros. The 1st decile gains the most, 37 euros, the 10th only 9 euros on average. The net effect of the price shock in terms of increased expenditures then amounts to an extra 205 euros per month on average, ranging from 149 for decile 1 to 256 for decile 10.

Households not facing the price shock at the moment we take the distributional picture, because they have an ongoing fixed price contract, can afford the same bundle of goods at baseline expenditures (as shown in the bottom panel of Table 3).

Table 3: Effect of the price shock by income decile (euros per month)

	1	2	3	4	5	6	7	8	9	10	All
Effects for (1) variable prices											
A 98% increase of electricity price and a 233% increase of gas price, assuming pre-crisis social tariffs											
Δ Total expenditures	186	200	196	210	227	228	254	248	249	265	226
Δ Exp. on electricity	68	68	71	83	76	80	87	79	82	84	78
Δ Exp. on gas	118	132	125	127	152	148	167	169	167	181	149
Δ Income - Δ Expenditures	-186	-200	-196	-210	-227	-228	-254	-248	-249	-265	-226
… but households with social tariff receive a greater subsidy (comparison with top panel)											
Δ Total expenditures	-37	-31	-30	-30	-20	-17	-15	-15	-8	-9	-21
Δ Exp. on electricity	-14	-11	-11	-10	-7	-5	-5	-4	-3	-3	-7
Δ Exp. on gas	-23	-20	-19	-20	-14	-12	-10	-10	-6	-6	-14
Δ Income - Δ Expenditures	37	31	30	30	20	17	15	15	8	9	21
= net effect of increased electricity and gas prices and increased subsidy											
Δ Total expenditures	149	169	166	180	207	211	239	233	241	256	205
Δ Exp. on electricity	54	57	60	73	69	75	82	75	79	81	71
Δ Exp. on gas	95	112	106	107	138	136	157	159	161	175	135
Δ Income - Δ Expenditures	-149	-169	-166	-180	-207	-211	-239	-233	-241	-256	-205
Effect for (2) fixed prices											
Δ Income - Δ Expenditures	0	0	0	0	0	0	0	0	0	0	0

Note: Income deciles are determined using equivalized household disposable incomes, with modified OECD equivalence scales. Income and expenditures are measured at the household level and reported means are averages over households.

2 DISTRIBUTIVE IMPACT OF THE AUTOMATIC INDEXATION, AFTER THE PRICE SHOCK

When using the January 2021 to January 2022 Health Index to increase incomes subject to indexation, monthly household disposable income increases by – on average – 71 euros in the bottom decile, 273 euros in the top decile. The overall average increase in disposable income is 165 euros per month. Increases in percentage of baseline disposable income are between 4.1% and 4.5%, except for decile 10, which has a slightly lower income increase of +3.9%.[15]

Table 4: Impact of indexation, by income decile (euros per month)

	1	2	3	4	5	6	7	8	9	10	All
Δ Income	71	93	117	135	162	171	193	210	229	273	165
Δ Income (% of baseline inc.)	*4.3*	*4.2*	*4.5*	*4.1*	*4.4*	*4.3*	*4.4*	*4.4*	*4.5*	*3.9*	*4.3*

Note: Income deciles are determined using equivalized household disposable incomes, with modified OECD equivalence scales. Income and expenditures are measured at the household level and reported means are averages over households.

3 DISTRIBUTIVE IMPACT OF THE NEW POLICY MEASURES

We first discuss the effects of the measures separately by looking at how much each measure saves on monthly household expenditure or increases monthly household disposable income.

The first is the **broadening of the eligibility criteria for the social tariff** (measure n°1). This effect concerns only those households who are newly eligible, not the ones already eligible prior to this government measure. The effects are resumed in Table 5. The newly eligible households purchase their electricity and gas at the January 2022 social tariffs, which are far lower than the market rates for that period. The effects of this measure are – by design – highly pro-poor. In the bottom two deciles

[15] It is known that in EU-SILC data capital income is underreported. Hence, the share of non-indexed income will be underestimated in our analysis as well.

households with variable price contracts or households who had to renew their contract, gain on average 152 and 128 euros per month because of this measure. The average benefit quickly tapers off to almost zero euro in decile 4 and beyond. For households with ongoing fixed price contracts, the gains are about 1/3 of this amount, as for them the gain is calculated by applying the ratio of the January 2022 social tariff to the still-prevailing fixed price of January 2021 (55 and 45 euros monthly for decile 1 and 2). The reason for the very strong income gradient is that the increased eligibility is tied to gross taxable household income, which in turn is highly correlated with disposable income.

Table 5: Impact of policy measure n°1 broadening of social tariff, by income decile (euros per month)

		1	2	3	4	5	6	7	8	9	10	All
(1) Var.	Δ Total expenditures	-152	-128	-27	-1	0	0	0	0	0	0	-31
	Δ Exp. on electricity	-46	-33	-9	0	0	0	0	0	0	0	-9
	Δ Exp. on gas	-108	-95	-18	-1	0	0	0	0	0	0	-22
	Δ Income - Δ Expenditures	152	128	27	1	0	0	0	0	0	0	31
(2) Fixed	Δ Total expenditures	-55	-45	-11	0	0	0	0	0	0	0	-12
	Δ Exp. on electricity	-23	-17	-5	0	0	0	0	0	0	0	-5
	Δ Exp. on gas	-32	-28	-6	0	0	0	0	0	0	0	-7
	Δ Income - Δ Expenditures	55	45	11	0	0	0	0	0	0	0	12

Note: Income deciles are determined using equivalized household disposable incomes, with modified OECD equivalence scales. Income and expenditures are measured at the household level and reported means are averages over households.

The second measure, the **VAT reduction from 21% to 6% for electricity**, has two main effects, reported separately in Table 6. Firstly, it lowers the consumer price of electricity. The primary effect is proportional to the expenditures on electricity in the scenario after the price shock.[16] Therefore the gain is bigger for households spending more on electricity. As expenditures are on average higher in the richest decile as compared to the poorest (see the expenditure and change in expenditure lines in Table 2 and Table 3), the gains are higher for the richest decile as compared to the lowest. For the same reason, the benefits of this policy are felt more (in absolute terms) by households with a variable price contracts (on average -19 euros) than by households with fixed price contracts (-10 euros). A secondary effect is that the VAT reduction is deflationary, and will therefore reduce the indexation of salaries and benefits in comparison to the scenario with the full price shock. This effect lowers the gain in purchasing power due to the primary effect of lower expenditures, and affects households independently of their expenditure pattern or contract type. Combining the two effects, we find that the VAT reduction benefits lower incomes more than higher incomes, largely because the lower indexation rate decreases incomes of poorer households by less (in absolute terms) than that of the rich. Notice also that the gain in purchasing power of the VAT reduction *per* se for those not hit by the price shock due to an ongoing fixed price contract, is lower than for those facing the price shock. Combined with the reduced income indexation, this leads to an actual loss overall and especially for the richer deciles.

[16] We consider here the effect of the VAT reduction per se, that is taking into account expenditures when households face the full impact of the price increase. When we calculate the combined effect in Table 8, we also take into account that households eligible for the social tariff actually have to spend less than when facing the full price shock, because social tariffs have risen less than market prices, which dampens the effect of the VAT reduction somewhat.

Table 6: Impact of policy n°2 VAT cut on electricity, by income decile (euros per month)

		1	2	3	4	5	6	7	8	9	10	All
(1) Var.	Δ Disposable income	-4	-6	-7	-8	-10	-10	-12	-13	-14	-17	-10
	Δ Total expenditures	-17	-17	-18	-21	-19	-20	-22	-20	-21	-21	-19
	Δ Exp. On electricity	-17	-17	-18	-21	-19	-20	-22	-20	-21	-21	-19
	Δ Exp. On gas	0	0	0	0	0	0	0	0	0	0	0
	Δ Income – Δ Expenditures	13	12	11	13	9	10	10	7	7	4	10
(2) Fixed	Δ Disposable income	-4	-6	-7	-8	-10	-10	-12	-13	-14	-17	-10
	Δ Total expenditures	-9	-9	-9	-10	-10	-10	-11	-10	-10	-11	-10
	Δ Exp. On electricity	-9	-9	-9	-10	-10	-10	-11	-10	-10	-11	-10
	Δ Exp. On gas	0	0	0	0	0	0	0	0	0	0	0
	Δ Income – Δ Expenditures	4	3	2	2	0	0	-1	-3	-4	-6	0

Note: Income deciles are determined using equivalized household disposable incomes, with modified OECD equivalence scales. Income and expenditures are measured at the household level and reported means are averages over households.

The effects of the **third policy measure**, the **household cheque**, are straightforward in so far that it is a uniform lump sum grant per household and therefore evenly spread across the income distribution. The results are reported in Table 7. We stress that for this measure, our decision to spread the benefit over one year impacts the relative size of the measure, compared to other measures.

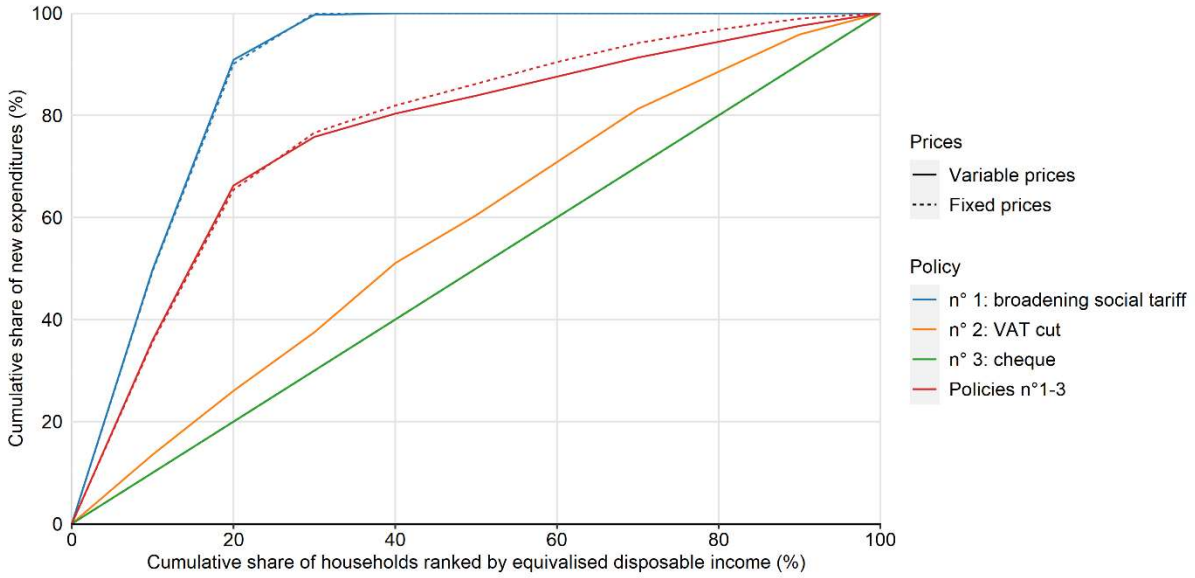
Table 7: Impact of policy n°3 household cheque, by income decile (euros per month)

	1	2	3	4	5	6	7	8	9	10	All
Δ Disposable income	8	8	8	8	8	8	8	8	8	8	8

Note: Income deciles are determined using equivalized household disposable incomes, with modified OECD equivalence scales. Income and expenditures are measured at the household level and reported means are averages over households.

We analyse the distributional impact of each new measure by means of concentration curves, which plot the cumulative share of the total budget of each new policy for households, ranked by equivalised disposable income (see Figure 3). The broadening of the social tariff is highly pro-poor as almost the entire budget accrues to the bottom 30%. The VAT cut, including the effect of reduced indexation, is mildly more accruing to poorer households. The cheque is spread equally across the income distribution. All new measures combined are strongly pro-poor, largely driven by the broadening of the social tariff.

Figure 3: Concentration curves of the measures with households ranked by equivalised disposable income



Note: Household disposable incomes are equivalized using modified OECD equivalence scales. The curve for the VAT cut for old contracts is not portrayed since overall there is an average loss so that cumulative shares have no meaning.

4 PUTTING EVERYTHING TOGETHER

When calculating the net effect of the price shock and the existing and new measures, we generate an image in which all effects coincide. This picture differs from the actual net effect households experience at a given moment in time, as the price chock evolves over time, and the policy measures only take effect after a certain date and are expected to end at a certain point. Furthermore, the values portrayed per decile are averages and so do not contain information on the heterogeneity within each decile. In the next paragraph we give a more detailed picture.

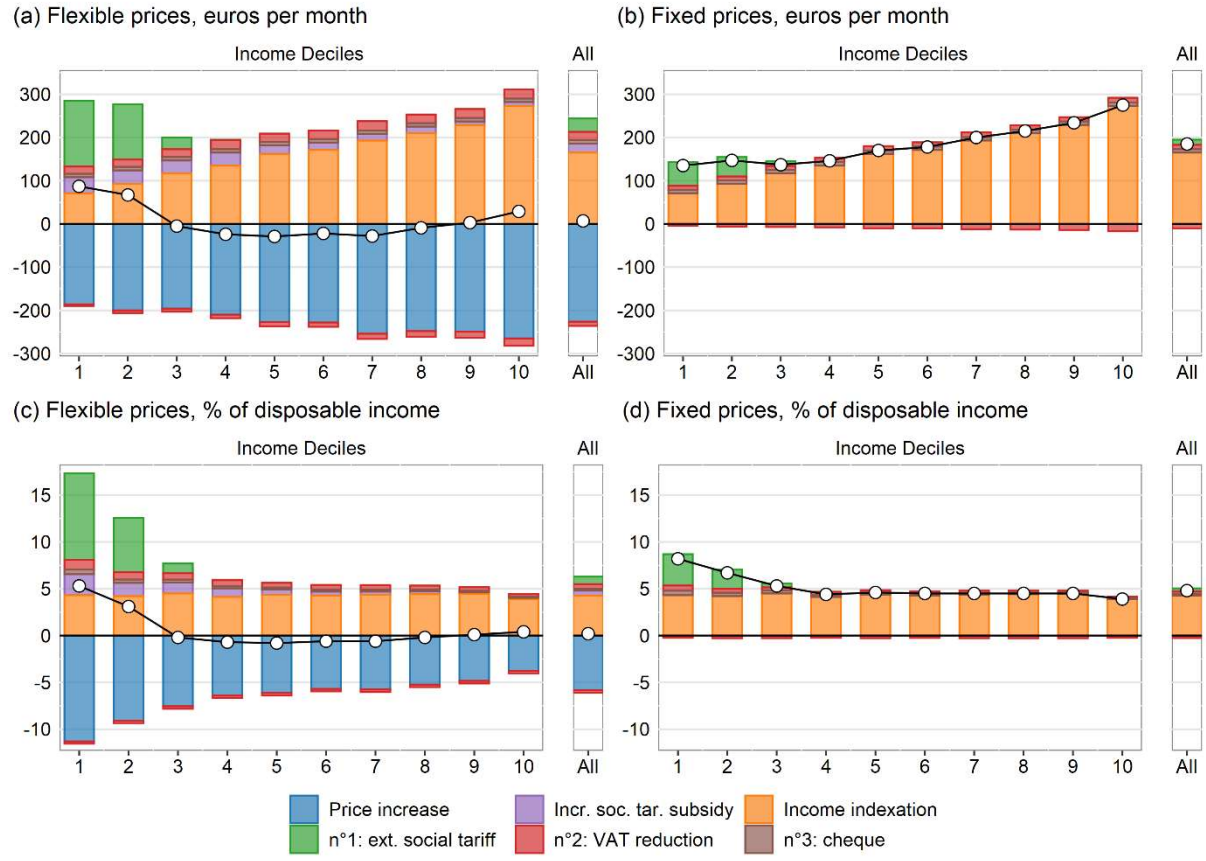
Constructing the combined image allows us to compare the overall size of the different measures, and their distribution across income groups and contract types.

Table 8 presents an overview of the price shock and the different measures, while Figure 4 gives a graphical representation of the gains and losses, in euros per month and percentage of disposable income.

- Households with new or variable price contracts in the middle-income deciles are the ones least compensated by the compensating measures. That said, they too – on average – see a large part of the shock compensated.
- The measure that compensates the most for the loss in purchasing power, with a wide margin, is the automatic indexation of incomes. It compensates the higher incomes more than the lower incomes.
- At least in the short term, there is an important difference in how households with fixed and variable price contracts are affected. Households with fixed price contracts do not experience any negative impact on their purchasing power as long as their contract has not expired , while benefiting from automatic indexation, and from two of the three new government measures: the extension of the social tariff to a broader group and the heating cheque. The VAT reduction is on net slightly beneficial for low incomes, while slightly negatively impacting higher incomes, but overall very small.

- The social tariff and the broadening of the eligibility criteria for this tariff are key in compensating the bottom deciles.
- The VAT reduction's effect on purchasing power seems rather small, especially when considering the secondary effect on the indexation of incomes.

Figure 4: Change in disposable income and in expenditures per measure (euros per month and % of income)



Note: Income deciles are determined using equivalized household disposable incomes, with modified OECD equivalence scales. Policy "n°2: "VAT reduction" shows below and above the x-axis, as it contains the primary effect of lower consumer expenditures on electricity, but also the secondary effect of a deferred income indexation.

Table 8: All effects by equivalised disposable income decile (euros per month)

		1	2	3	4	5	6	7	8	9	10	All
Baseline (with social tariff, at pre-crisis levels)												
Household disposable income		1645	2204	2597	3274	3705	3999	4415	4742	5143	7007	3872
Total expenditure		2137	2151	2516	3078	3501	3605	4073	3969	4059	4509	3359
Expenditure on electricity		69	70	73	85	77	82	89	81	84	86	80
Expenditure on gas		51	57	54	55	65	64	72	73	72	78	64
Δ Income - Δ Expenditures, euros per month												
Variable prices	Price increase	-186	-200	-196	-210	-227	-228	-254	-248	-249	-265	-226
	Existing policies											
	Increase social tariff subsidy	37	31	30	30	20	17	15	15	8	9	21
	Automatic indexation[1]	71	93	117	135	162	171	193	210	229	273	165
	New policy measures											
	n°1 broadening social tariff	152	128	27	1	0	0	0	0	0	0	31
	n°2 VAT cut	13	12	11	13	9	10	10	7	7	4	10
	n°3 cheque	8	8	8	8	8	8	8	8	8	8	8
	Combined effect[2]	87	67	-5	-24	-29	-22	-28	-9	3	29	7
Fixed prices	Price increase	0	0	0	0	0	0	0	0	0	0	0
	Existing policies											
	Increase social tariff subsidy	0	0	0	0	0	0	0	0	0	0	0
	Automatic indexation[1]	71	93	117	135	162	171	193	210	229	273	165
	New policy measures											
	n°1 broadening social tariff	55	45	11	0	0	0	0	0	0	0	12
	n°2 VAT cut	4	3	2	2	0	0	-1	-3	-4	-6	0
	n°3 cheque	8	8	8	8	8	8	8	8	8	8	8
	Combined effect[2]	135	147	137	146	170	178	200	215	234	275	185
Δ Income - Δ Expenditures, % of income												
Variable prices	Price increase	-11.3	-9.1	-7.5	-6.4	-6.1	-5.7	-5.8	-5.2	-4.8	-3.8	-5.8
	Existing policies											
	Increase social tariff subsidy	2.2	1.4	1.2	0.9	0.5	0.4	0.3	0.3	0.2	0.1	0.5
	Automatic indexation[1]	4.3	4.2	4.5	4.1	4.4	4.3	4.4	4.4	4.5	3.9	4.3
	New policy measures											
	n°1 broadening social tariff	9.3	5.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
	n°2 VAT cut	0.8	0.5	0.4	0.4	0.2	0.3	0.2	0.1	0.1	0.1	0.3
	n°3 cheque	0.5	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2
	Combined effect	5.3	3.1	-0.2	-0.7	-0.8	-0.6	-0.6	-0.2	0.1	0.4	0.2
Fixed prices	Price increase	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Existing policies											
	Increase social tariff subsidy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Automatic indexation[1]	4.3	4.2	4.5	4.1	4.4	4.3	4.4	4.4	4.5	3.9	4.3
	New policy measures											
	n°1 broadening social tariff	3.3	2.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
	n°2 VAT cut	0.2	0.1	0.1	0.1	0.0	0.0	0.0	-0.1	-0.1	-0.1	0.0
	n°3 cheque	0.5	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2
	Combined effect	8.2	6.7	5.3	4.4	4.6	4.5	4.5	4.5	4.5	3.9	4.8

Note: Income deciles are determined using equivalized household disposable incomes, with modified OECD equivalence scales. Income and expenditures are measured at the household level and reported means are averages over households.

[1] "Automatic indexation" only captures the indexation, which is the direct result of the price increase, not the effect of the VAT reduction on indexation. The latter is included in the lines for "n°2 VAT cut".

[2] Due to interaction of the different measures, the total combined effect is not equal to the sum of the different isolated effects. See Note 16.

5 LOOKING BEHIND THE VEIL OF MEANS

The mean net effects of the price shock and compensating policy measures hide a lot of heterogeneity within and across deciles. In Table 9 we report the percentage of households for whom the loss in purchasing power due to the price shock is larger than the combined effect of the new and old policy measures. They are not fully compensated by these measures. Not surprisingly, there are no losers among households with a fixed price contract, as their purchasing power is not affected by the price shock.

For those facing the full impact of the price shock, the slightly positive average net effect hides the fact that about 38% of the households bear a loss after fully taking into account the effect of the compensating policy measures. Despite the social tariff and its extension being targeted towards the lower income deciles, still 2.5% of the households in the lowest decile, and 14% in the poorest decile, face a net loss. This percentage rapidly increases to about 50% in the 5th to 8th decile.

Figure 5 gives an even more detailed picture of the distribution of gains and losses in purchasing power within each decile. The lines in these figures connect quantile values of the distribution of the net purchasing power effect of the price shock, after taking into account the combined effect of all policy measures covered in this analysis. For those who bear the full impact of the price shock (left hand panels of the figure) 25% of the households face a net loss of more than 81 euro, and 10% face a net loss of more than 218 euro. In the middle of the income distribution, 10% of the households even lose more than 300 euro. That the median value is above the mean for all deciles, except for the 1st decile, indicates that, generally, losers suffer large losses, or at least some of them lose severely. It is true that in the 1st decile the number of losers is limited, but of course for these households (with an average disposable household income of about 1645), losses may be generally harder to bear.

The bottom panels of the figure represent the distribution of the net losses or gains in purchasing power as a percentage of income. We concentrate again on the population who faces the full impact of the price shock (bottom left-hand panel). A quarter of the households lose net more than 2% of their disposable income, and for 10% of the households this loss is even more than 6% of their income. In the 2nd decile, 10% of the households face a net loss of more than 3% of their income, and in the 3rd decile this income loss of the 10% largest losers is even more than 10% of the income.

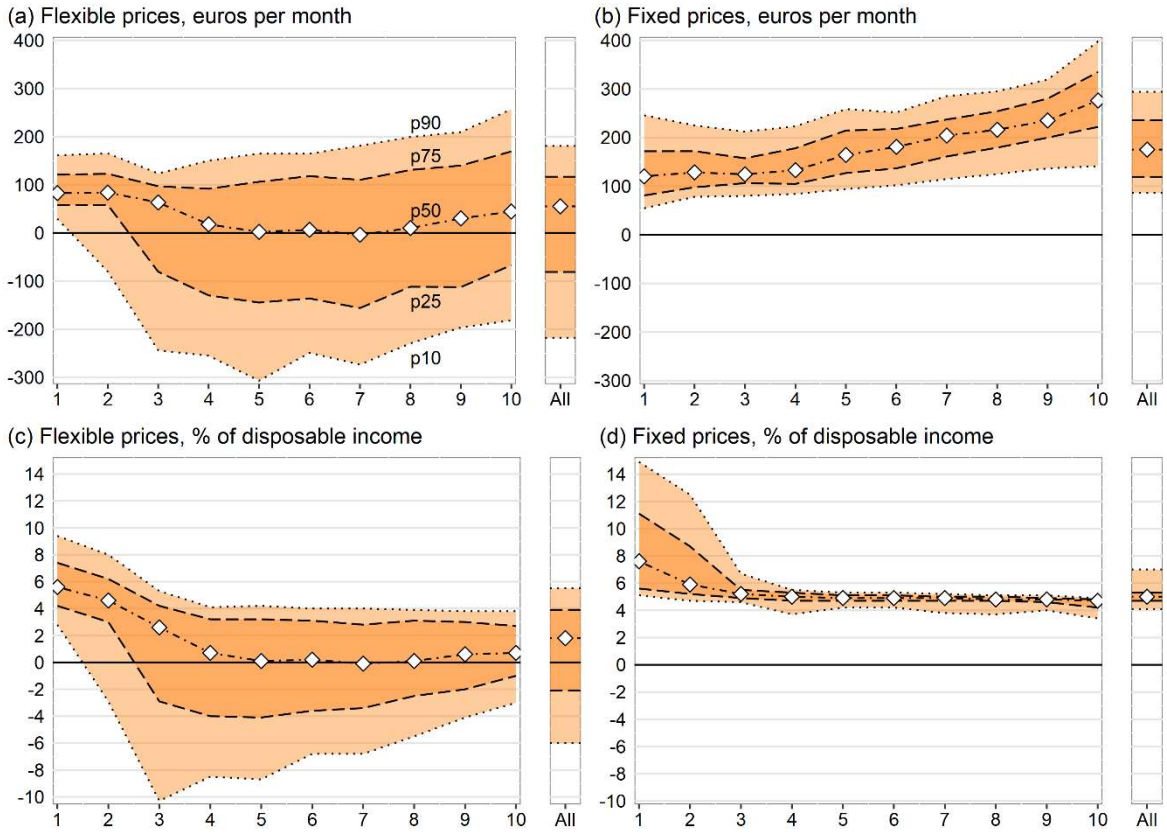
The more detailed picture of this paragraph shows first that our distributional analysis indeed covers the drastic impact of the price shock for some households covered by the media. Secondly, it illustrates once more that a distributional analysis has to go beyond the reporting of means in order to get a picture of what happens with those who fall almost, or completely, out of the boat of policy interventions.

Table 9: Percentages of losers within each decile, for households with flexible contracts

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**All**
Flexible prices	2.5	14.0	36.1	45.9	49.9	47.9	50.6	48.7	45.4	38.7	38.0

Note: A loser is a person living in a household for whom the purchasing power reducing effect of the price shock is greater than the income and purchasing power increasing effects of all compensating policies combined. Income deciles are determined using equivalized household disposable incomes, with modified OECD equivalence scales.

Figure 5 Distribution of the net purchasing power effect within each decile



Note: Income deciles are determined using equivalized household disposable incomes, with modified OECD equivalence scales. The lines connect the quantile values of the net effect distribution (P90, third quartile, median, first quartile, and P10) within each decile.

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