Support measures in the face of the energy crisis and the rise in inflation: an analysis of the cost and distributional effects of some of the measures rolled out based on their degree of targeting

Rationale

A variety of policy measures have been put in place in recent months to support households and firms through the upswing in prices. Analysing the design of these measures, as well as their distributional and budgetary impact, is crucial in any economic context, but even more so at the current juncture, characterised by the presence of fiscal imbalances.

Takeaways

- Most of the fiscal measures recently implemented in Spain to tackle the energy crisis and surging prices are largely non-targeted measures, rather than measures targeted at the most vulnerable households and firms.

- According to calculations, the reductions in VAT on basic foodstuffs and on electricity and gas resulted in greater savings for low-income households as a percentage of their total expenditure, while the fuel subsidy may have benefited high-income households relatively more.

- Alternative measures targeting vulnerable households based on their income could provide protection at a level that is comparable to the actual measures but at a lower cost and without distorting price signals.

Keywords

Fiscal measures, inflation, energy crisis, targeting vulnerable households, microsimulation.

JEL classification

H23, D12, E31.

Author:

Esteban García-Miralles
Economic Developments Department

Introduction

Since late 2021 several measures have been put in place in Spain and other European countries in an attempt to counter the adverse impact of the current energy crisis and high inflation on households and firms. For the euro area as a whole, the European Commission (2022) estimated that the measures put in place up to October 2022 had a budgetary cost of around 1.3% of GDP in 2022 and nearly 1% in 2023. Furthermore, in recent months some of these measures have been extended and new ones rolled out, which means that the total expected impact may be even greater.

The design of these measures was heterogeneous, with differences both between countries and over time. In particular, measures could be either temporary or permanent and they differed in their size, in their impact on households' incomes or the prices of products, and in the degree to which they targeted the most vulnerable groups.

Given the nature of the current period of high inflation, several bodies and institutions have highlighted the importance of designing these policies to target the people who most need them. This would avert a broad-based surge in demand that could exacerbate inflationary pressures[1] and harm the sustainability of public finances at a time when countries like Spain have limited fiscal room for manoeuvre.[2]

However, according to available calculations, most of these measures were relatively broad, affecting most or all of the population. According to the calculations in European Commission (2022), 30% of the measures approved in the European Union up to October 2022 were targeted.[3]

Table 1 shows the measures approved in Spain since 2021 to support households and firms along with their estimated budgetary impact and planned duration as of January 2023. The table also identifies them as being either targeted or non-targeted. It is calculated that, as a whole, the budgetary impact of the measures would amount to between €34 billion and €40 billion over the 2021-2025 time horizon – concentrated mostly in 2022 (1.3% to 1.4% of GDP) and 2023 (0.8% to 1.0% of GDP). However, it must be noted that estimations of these measures' budgetary impact are subject to a high degree of uncertainty and are regularly

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1 Examples of recommendations along these lines can be found in Ari et al. (2022), Hernández de Cos (2022) and Schnabel (2022). These recommendations stand in contrast to those made during the pandemic, when sweeping expansionary policies were recommended to shore up incomes.

2 As stated in the Spain-specific recommendations of the Council of the European Union as part of the European Semester programme.

3 Previous calculations put forward by Checherita-Westphal, Freir and Muggenthaler (2022) for the euro area up to June point to a slightly lower degree of targeting. In particular, these figures suggest that 12% of the measures approved seem to have targeted low-income households, while 54% represented non-targeted support for households. The remaining 34% were transfers to firms and were generally non-targeted.

Support measures for households and firms in response to the energy crisis and high inflation (a)

	Expected end date	Targeted	Budgetary cost (€m)				
			2021	2022	2023	2024	2025
(1) Income measures			-1,300	[-4,000, -3,600]	[-7,200, -5,900]	[-2,800, -2,300]	[-2,500, -2,100]
VAT: temporary rate reductions for electricity and gas	31.12.2023	No	-800	[-2,200, -2,000]	[-3,300, -2,700]	—	—
IEE: temporary rate reductions of the electricity excise duty	31.12.2023	No	-500	[-1,800, -1,600]	[-1,000, -800]	—	—
VAT: temporary rate reduction for selected food products	1.6.2023 (b)	No	—	—	[-700, -600]	—	—
IRPF: labour income tax credit, rebates for the self employed and regional reductions	Permanent (c)	No	—	—	[-2,200, -1,800]	[-2,800, -2,300]	[-2,500, -2,100]
(2) Expenditure measures			—	[13,320, 14,975]	[5,500, 6,675]	[150, 225]	[150, 225]
Fuel subsidy for households and transportation professionals (d)	31.12.2022	No	—	[4,900, 5,500]	—	—	—
Extension of fuel subsidy for transportation professionals	30.6.2023	No	—	—	[400, 500]	—	—
Transfer to firms affected by the rise in energy prices	31.12.2022	Yes	—	[2,100, 2,300]	—	—	—
Transfers to specific sectors	31.12.2023	Yes	—	—	[1,000, 1,200]	—	—
€200 transfer to vulnerable households (both packages)	31.12.2023	Yes	—	[120, 300]	[800, 1200]	—	—
15% raise in non-contributory social benefits (including MIS)	31.12.2022	Yes	—	[400, 500]	[250, 350]	—	—
Public transport subsidy (e)	31.12.2023	No	—	[500, 600]	[1,200, 1,400]	—	—
Broadened scholarship programme	31.12.2022	Yes	—	[350, 450]	—	—	—
Subsidies to the electricity/gas sector aimed at lowering bills (f)	31.12.2022	No	—	[4,800, 5,100]	[1,700, 1,800]	—	—
Heating subsidies	Permanent	Yes	—	[150, 225]	[150, 225]	[150, 225]	[150, 225]
(2-1) Total funds			1,300	[16,920, 18,975]	[11,400, 13,875]	[2,450, 3,025]	[2,250, 2,725]

SOURCE: Banco de España, based on data from the Spanish Government, IGAE, the Spanish tax authorities, the EPF (INE) and the Spanish Survey of Household Finances.

a Estimations of the budgetary impact of these measures are subject to a high degree of uncertainty and are regularly revised as new information becomes available. Only measures with a budgetary impact are included, which means that the temporary suspension of the tax on electricity generation is not, because the funds raised thereby are allocated by law to covering the electricity sector's costs.
b This measure will expire on 1 May 2023 if underlying inflation in March 2023 is below 5.5%.
c Including the reduction in personal income tax for the self-employed, which is set to expire on 31 December 2024.
d It is estimated that housholds will receive around 60% of this subsidy.
e Free public transport on suburban trains was extended for the whole year. The regional transport subsidy lasts until 30 June 2023.
f Including a one-off subsidy to the electricity sector, and subsidies to compensate energy firms for additional flexibility in customers' contracts.

revised as new information becomes available regarding changes in consumption and the prices of affected products.[4]

According to this classification, the measures approved since late 2021 to tackle the energy crisis and high inflation have mostly been non-targeted. In particular, it is estimated that between 15%

4 The calculations in Banco de España (2022a) show that general inflation in November 2022 would have been reduced by approximately 2 percentage points owing to these measures, in comparison with a hypothetical alternative scenario in which they had not been approved.

and 20%[5] of the anticipated fiscal costs for all these measures over the 2021-2025 time horizon relate to actions targeted at specific groups of firms and households that have been particularly affected by the current complex macro-financial environment. This would encompass, for example, certain reductions in personal income tax, income and wealth-based transfers to households, and the one-off increase in non-contributory pensions and the minimum income scheme (MIS).

By contrast, around 80% to 85% of the fiscal cost anticipated for all the measures shown in Table 1 relate to initiatives that are relatively broad in scope. This is the case, for example, of the reduction in VAT on electricity and gas and on food, the fuel subsidy and some subsidies for specific sectors.

In this context, the aim of this paper is to calculate the distributional effects of some of the main fiscal support measures for households, as well as their budgetary impact. In particular, three measures are examined especially closely, given their size and their impact on prices borne by households: the reduction of VAT on electricity and gas, the reduction of VAT on basic foodstuffs, and the fuel subsidy. To that end, the varying patterns of household expenditure on these goods as a function of their income is analysed, as well as how these patterns of expenditure affect the inflation rate experienced by different households. Second, the impact of these fiscal measures on each household is calculated using microsimulation exercises based on the Spanish Household Budget Survey (HBS) *(Encuesta de Presupuestos Familiares – EPF),* which provides detailed and representative information on Spanish households' consumption.[6] The paper concludes with a stylised simulation of the fiscal and redistributive effect of replacing the three measures under consideration with a hypothetical income-based transfer targeted at vulnerable households, similar to other measures already in place, such as the €200 transfer targeted at vulnerable households (Royal Decree-Law (RDL) 11/2022 and RDL 20/2022).[7]

Varying patterns of household expenditure and their effect on the inflation experienced

Households consume goods and services in varying proportions. If a household spends more of its budget on goods whose price has increased more, those households will perceive higher rates of inflation. Given the nature of the current period of inflation, in which the price of some goods

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5 This range is calculated on the basis of two possible scenarios: one where targeted measures have a budget cost at the bottom of their estimated range while non-targeted measures come in at the top and one where the opposite is true.

6 Other papers that analyse the uneven impact of different measures on households are Labandeira, Labeaga and López-Otero (2022), on the fuel subsidy, Autoridad Independiente de Responsabilidad Fiscal (2020a) and Badenes Plá (2023), on a wide range of measures approved up to October 2022 (analysing the budgetary impact and the impact on households relative to their total spending, respectively), and López Laborda, Martín González and Onrubia (2023), on the reduction of VAT on food. This paper covers the raft of measures in RDL 20/2022 that approved the reduction of VAT on food and extended the period of application of the reduction of VAT on electricity and gas. The results of this paper appear to be consistent with the literature to date.

7 Note that eligibility for the recently approved €200 transfer depends not only on income, but also on household wealth, and that the calculation of a household's income and wealth varies depending on the cohabitation arrangements of the household's members. This hampers the precise simulation of the distributional effects of this measure based on the HBS data used in this paper. However, the models put forward in this paper of a hypothetical targeted transfer based solely on household income could serve as a provisional approximation to the possible effects of the recently approved €200 transfer.

1.a Inflation rate for households calculated according to their consumption patterns
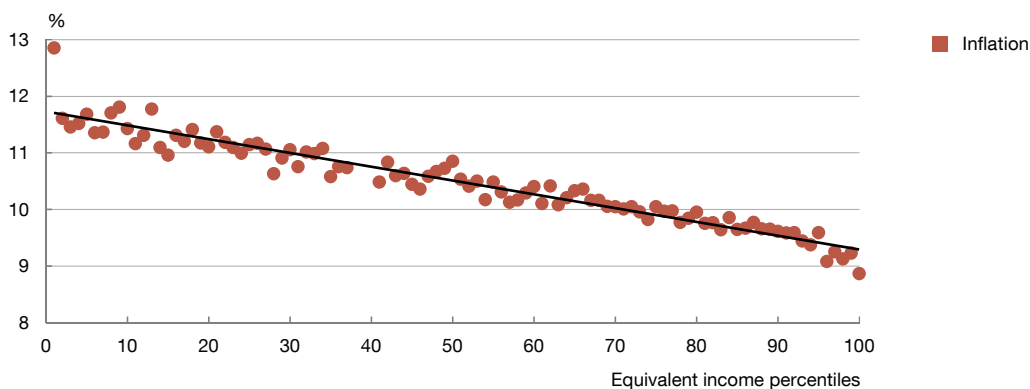
SOURCE: Banco de España drawing on the ICP and EPF (INE) data.

has surged, these changes can give rise to significant differences in terms of the inflation borne by different households depending on their consumption basket.[8]

Chart 1 shows the inflation experienced by households given their consumption basket, according to their income. It combines information on households' expenditure in 2021, drawn from the HBS, with the price growth rates recorded between August 2021 and September 2022, disaggregated according to the European Classification of Individual Consumption according to Purpose (ECOICOP).[9] Households are grouped into percentiles of equivalent income (that is, the population is divided into 100 equal-sized groups ranked from lowest to highest equivalent income).[10] The results show that lower-income households were exposed to a higher rate of inflation. For example, the inflation borne by the bottom 30% of households by income was around 11.3%, compared with the 9.7% borne by the top 30%.

Next, the role that some of the goods that have seen the highest levels of inflation play in explaining the higher inflation borne by lower-income households is explored. To this end, Chart 2 shows the proportion of household expenditure on each of these goods, once again grouping households

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8 See Basso, Dimakou and Pidkuyko (2023) and Banco de España (2022b) for a detailed analysis of the heterogeneity of inflation in Spain and a breakdown by household spending category. Similarly, see Charalampakis, Fagandini, Henkel and Osbat (2022) on the case of the European Union. It should be understood that the distributional effect of inflation is multifaceted. Therefore, while this paper focuses on heterogeneity as a result of varying patterns of households' expenditure, another relevant area of study is the differing effect of inflation depending on whether economic agent are net lenders or borrowers (Doepke and Schneider, 2006; Nuño and Thomas, 2002).

9 85% of HBS expenditure categories can be related to four-digit ECOICOP categories, while a lower degree of disaggregation is used for the remaining groups. For more details on integrating HBS data and price data in the context of fiscal policy micro-simulations, see Bover, Casado, García-Miralles, Labeaga and Ramos (2017).

10 A household's equivalent income is its total income adjusted by the size of the household based on the modified equivalence scale of the Organisation for Economic Co-operation and Development. This adjustment is standard in distributional analyses of fiscal policies (Navas Román and Villazán Pellejero, 2020). Moreover, the analysis uses total household expenditure as an approximation for total household income. This is because, while the HBS measures total expenditure very precisely (that being the survey's core purpose), its income measurement is subject to a higher degree of uncertainty.
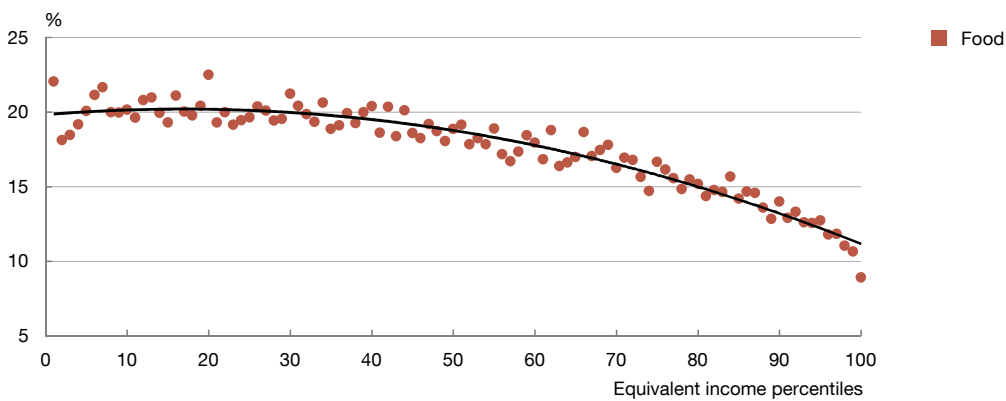
Chart 2

Lower-income households devote a larger share of their spending to food and electricity, while higher-income
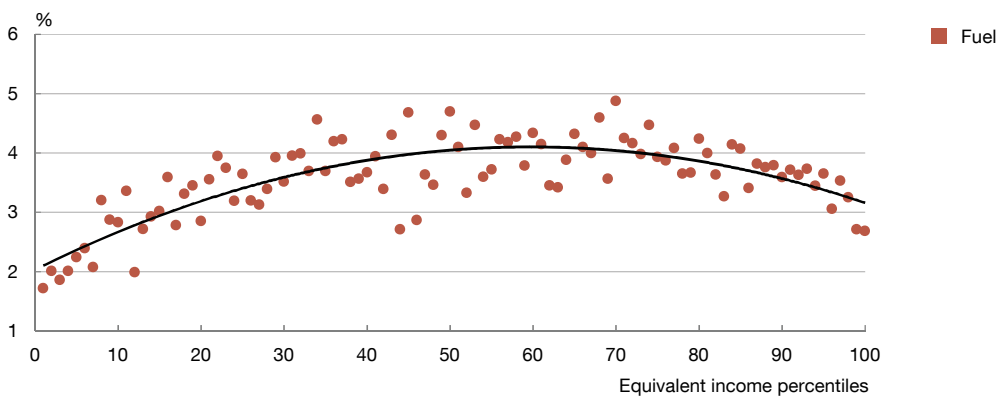
2.a Share of spending on electricity and gas
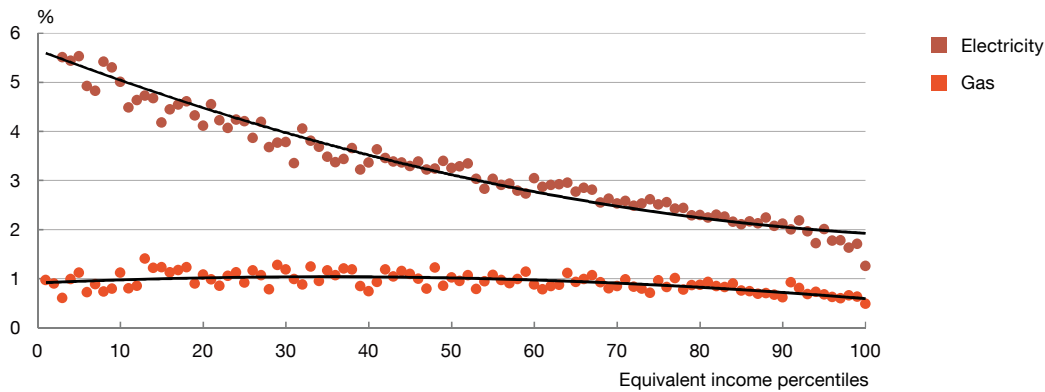
%

■ Electricity

■ Gas

Equivalent income percentiles

2.b Share of spending on food

%

■ Food

Equivalent income percentiles

2.c Share of spending on fuel

%

■ Fuel

Equivalent income percentiles

SOURCE: Banco de España, drawing on the EPF (INE).

into equivalent income percentiles.[11] Chart 2.a shows that lower-income households devote a greater proportion of their total expenditure to electricity consumption, a homogeneous good

11   The fit of a quadratic function of consumption against household equivalent income is shown for each good.

whose consumption is relatively inelastic with respect to its price. Conversely, consumption of natural gas is consumed at a proportional rate with respect to income. Chart 2.b shows that the proportion of spending on food is higher in lower and middle-income households but falls for higher-income households. Lastly, Chart 2.c shows that spending on fuel, unlike the previous goods, is proportionately greater among higher-income households (although it does fall somewhat for the upper percentiles). Consequently, it can be seen that the higher rates of inflation borne by lower-income households are a result of the rising prices of electricity and food, but not of fuel.

Budgetary and distributional impact of the fiscal measures implemented in response to the energy crisis

This section contains a detailed analysis of three relevant measures that were adopted in the context of the current energy crisis and upswing in inflation. The aim is to report the distributional and budgetary effects of these measures in order to assess their impact on different types of households and compare them to one another and against other alternative measures.

The first measure analysed is the reduction of VAT on electricity and gas. In July 2021 VAT on electricity was reduced from 21% to 5% (RDL 12/2021) and the cut was later extended to December 2023 (RDL 29/2021, RDL 6/2022, and RDL 11/2022). VAT on gas was also lowered from 21% to 5% between October 2022 and December 2023 (RDL 17/2022).[12, 13]

The second measure analysed is the reduction of VAT on basic foodstuffs. Specifically, the VAT rate was reduced from 10% to 5% for some products, and from 4% to 0% for others. This measure was approved for a six-month duration, beginning in January 2023, but could end in April 2023 if underlying inflation in March were to drop below 5.5% (RDL 20/2022). In line with the most recent forecasts, a duration of six months is assumed for this analysis.

The third measure analysed is the fuel subsidy for households, in effect from April to December 2022 (RDL 6/2022). This subsidy amounted to €0.20 per litre of fuel consumed, although it was enacted such that if the fuel was sold by a vertically integrated operator, the operator should contribute €0.05, with the Government topping up the remainder.[14, 15]

The methodology involves conducting several microsimulation exercises that allow a per-household calculation of the fiscal impact of each of the different measures under consideration.

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12 The fiscal effect of the reduction in the excise duty on electricity is not simulated, but this excise is taken into account for the simulation of the fiscal effect of the VAT cuts. This allows the multiplicative component of these two taxes to be isolated.

13 See Herrera, Lacuesta and Matea (2022) for a recent study of the sensitivity of natural gas and electricity consumption to prices and temperature.

14 For this reason, this paper calculates the subsidy per household using the following formula: subsidy = $litres_{diesel}$ x (0.2 x (1 − 0.71) + 0.15 x 0.71) + $litres_{petrol}$ x (0.2 x (1 − 0.74) + 0.15 x 0.74), using data from the National Commission on Markets and Competition on the relative amounts of diesel (71%) and petrol (74%) that were distributed by vertically integrated operators (operators that have processing capacity in Spain and an annual turnover in excess of €750 million).

15 To calculate the subsidy received by each household for its fuel consumption, data were drawn from the HBS on petrol and diesel consumption in litres and adjusted for comparison in aggregate terms with 2021 consumption as reported in CORES (2022). Non-residential consumption was excluded based on MITECO (2021) data.

The analysis is based on Spanish households' consumption in 2021, the latest available year of the HBS. It should be noted that using 2021 data in the current context of high inflation presents some limitations, given that patterns of consumption may have changed significantly. These changes could affect both the aggregate level of consumption as well as the heterogeneity in households' consumption patterns. However, the resulting budgetary impact of the simulation exercises does align with the most up-to-date calculations based on budget outturn data, which suggests that aggregated spending in 2021 did not significantly differ from that of 2022.

Chart 3 shows the distributional impact on households of each of the simulated measures, according to their equivalent income decile (i.e. dividing households into ten equal-sized groups ranked by income). To this end, two metrics reflecting the impact of the measures on households are estimated: the budgetary impact, that is, the total cost of the measure that has benefited each income decile, and the relative impact on household expenditure, defined as the tax savings enjoyed by each decile of households relative to their total expenditure.

Chart 3.a shows the impact of the reduction of VAT on electricity and gas. The total budgetary impact for households as a whole is estimated at €5,871 million.[16] This resulted in tax savings of €2,055 million for the top three income deciles (i.e. the 30% of households with the highest income) and of €1,484 million for the bottom three deciles. This 39% difference is explained by the fact that higher-income households spend more on these goods in absolute terms. However, in line with the spending patterns documented above, the relative benefit, defined as tax savings relative to total expenditure, appears to have been higher for lower-income households.

Chart 3.b illustrates the budgetary impact of the reduced VAT on food, estimated at €645 million (which is also consistent with Table 1) and shows that it also has a higher impact on households in the top three deciles (€240 million) compared with households in the bottom three deciles (€142 million). This 70% difference is larger than in the case of the reduction of VAT on gas and electricity. While both reforms have a greater relative impact on lower-income households, which then decreases with income, the slope is more moderate in the case of the reduction of VAT on food. This is consistent with the consumption patterns documented above, in which both food and, particularly, electricity are consumed in higher proportions by lower-income households.

Chart 3.c shows that the budgetary impact of the fuel subsidy, which amounts to €3,065 million,[17] was heavily concentrated in higher-income households, with the top three deciles accumulating savings of €1,377 million compared to €472 million in the bottom deciles (192% more). Unlike with the two previous measures, the relative impact was also greater for higher-income households, in line with the consumption patterns documented above, which show that lower-income households devote a smaller share of their expenditure to fuel.[18]

16 This estimate is in line with the budgetary impact reported in Table 1, of between €5.5 billion and €6.3 billion, based on budget outturn information and on a simple model that incorporates gas price developments on the futures market.

17 Assuming that households account for 60% of the cost of the subsidy, this amount would lie between the estimate in Autoridad Independiente de Responsablida Fiscal (2022b) and the preliminary outturn figures of the National Audit Office (IGAE) (€2.7 billion and €3.2 billion, respectively) and is consistent with Table 1 (between €2.9 billion and €3.3 billion).

18 In 2022 fuel consumption appears to have declined slightly compared with 2021, with a more marked reduction in lower-income households than in higher-income households (Lacuesta, López Rodríguez and Matea, 2022, and CaixaBank, 2022).
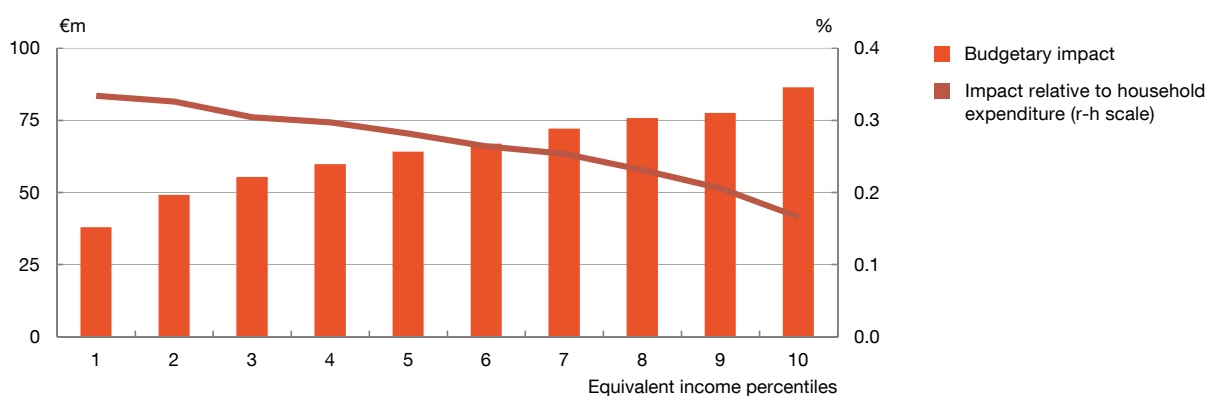
Chart 3
Budgetary and distributional impact of certain fiscal measures implemented in response to the energy crisis
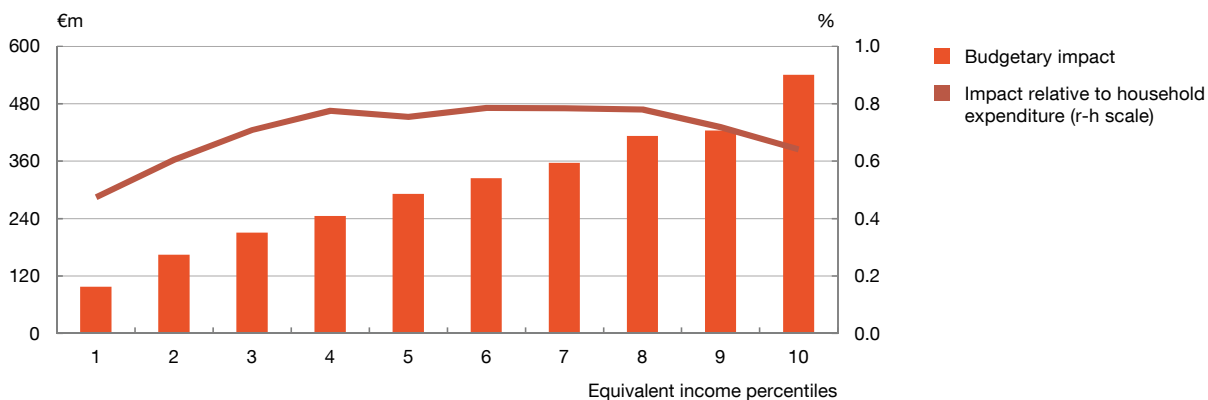
3.a Reduction of VAT on electricity and gas (a)
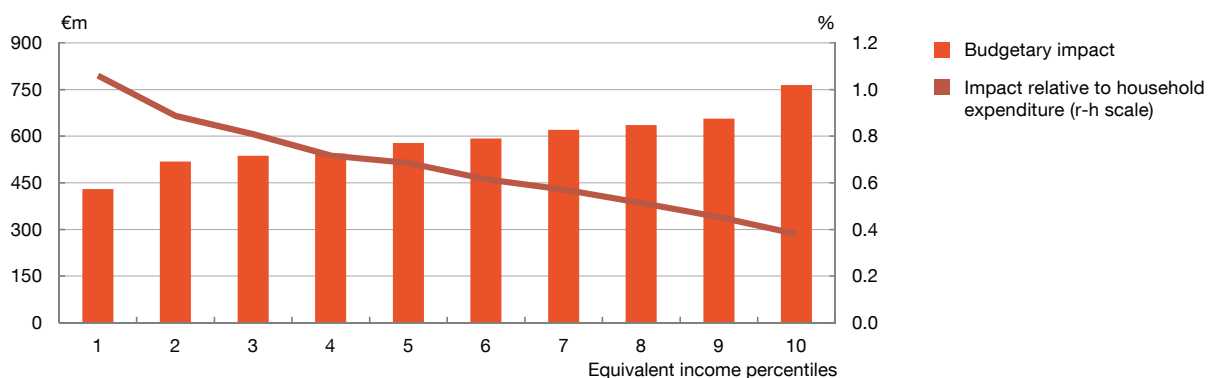
3.b Reduction of VAT on food (b)

3.c Fuel price subsidy (c)

SOURCE: Banco de España, drawing on the EPF (INE).

a Simulation of a reduction of VAT on electricity and gas from 21% to 5%, assuming it applies from July 2021 to December 2023 for electricity and from October 2022 to December 2023 for gas.
b Simulation of a reduction of VAT on certain basic foodstuffs from 10% to 5% and from 4% to 0%, assuming it applies from January 2023 to June 2023.
c Simulation of a €0.15 or €0.20 subsidy per litre of fuel consumed by households, applied over the period April 2022 to December 2022.

Thus, significant differences are observed in the distributional impact of the three measures. The reduction of VAT on electricity and gas is the measure that allocates the largest share of its budgetary cost to lower-income households, which benefit more than higher-income households relative to their total expenditure. It should be noted that this relative benefit is due more to the rebate on electricity than to the rebate on gas, as shown in Chart 2.a. The reduction of VAT on food would come second, as its relative impact also decreases with income, albeit with a more moderate slope. Lastly, the fuel subsidy benefits vulnerable households the least. Only a small part of its budgetary cost is channelled to lower-income households, which, unlike in the other two measures, also benefit less relative to their total expenditure.

Simulation of the distributional and budgetary effects of alternative targeted measures

Despite their heterogeneous distributional impact, the three measures analysed can be considered non-targeted measures, since their budgetary cost is distributed across all income groups, with higher-income households accounting for a larger share. Even the measures affecting goods consumed to a greater extent by lower-income households, such as food and electricity, benefit in absolute terms higher-income households, whose total consumption is higher.

Thus, two hypothetical alternatives are considered below, based on making a one-off income transfer to the most vulnerable households that compensates for the elimination of the three non-targeted measures considered, but with a lower total budgetary cost thanks to the exclusion of higher-income households from the measures. It should be emphasised that designing this kind of targeted measures is complex, insofar as vulnerable households need to be identified and the funds delivered to them effectively. However, there are recent examples of measures that have moved in this direction, such as the one-off increases of the MIS or the €200 transfers to households shown in Table 1.

Chart 4 presents the two hypothetical simulations based on one-off transfers to vulnerable households, which for the purposes of these simulations are defined as those whose income is lower than 60% of the median household income.[19] These households coincide almost entirely with those in the first three income deciles. Chart 4.a shows the distributional effect of making a €375 transfer to each vulnerable household. This amount is equivalent to the average benefit received by the bottom three deciles under the three non-targeted measures that would be eliminated. These transfers would have a total budgetary cost of €2,095 million and would represent a budgetary saving of €7,484 million compared with the total budgetary cost of the previous three measures. It should be noted that this hypothetical exercise would not affect all vulnerable households in the same way, since not all of them benefit equally from the three measures eliminated: around 37% of the households would see an average loss of €229, while the remaining vulnerable households would see an average gain of €154. Chart 4.b shows a second simulation in which the transfer to vulnerable households is increased to €860. This

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19   This is the European Commission's definition of households at risk of poverty (Eurostat, 2010).
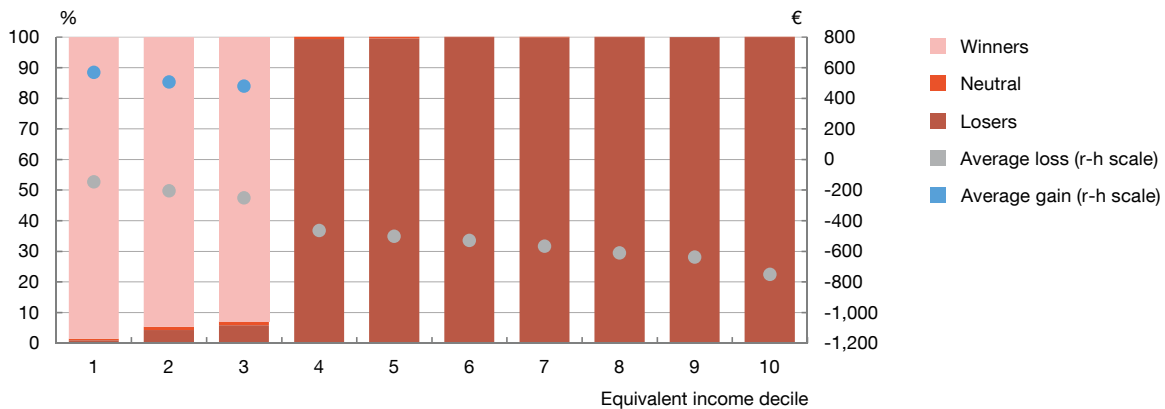
Chart 4
Distributional effects of hypothetically replacing the three measures analysed with a transfer targeting vulnerable households

4.a Replacing the three non-targeted measures with a targeted transfer of €375 per household (a)
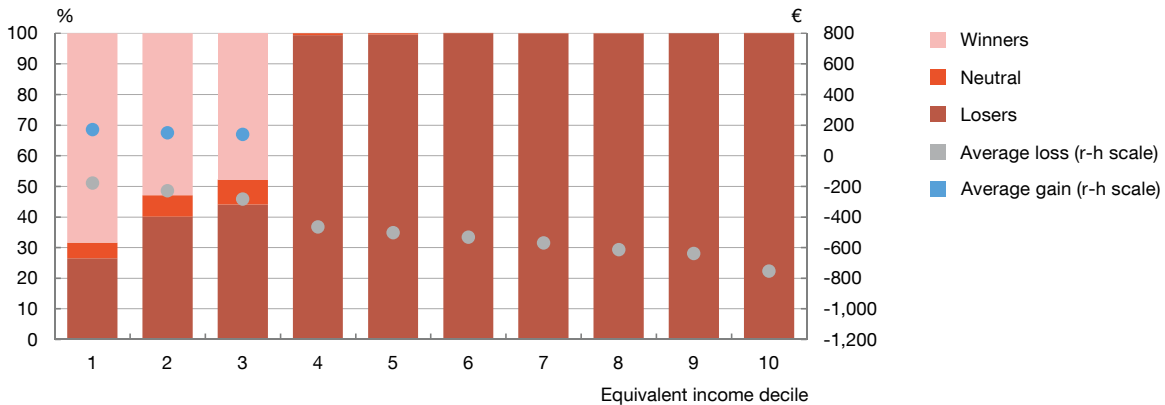
4.b Replacing the three non-targeted measures with a targeted transfer of €860 per household (b)

SOURCE: Own calculations drawing on data from the EPF (INE).

a The amount of €375 is the result of calculating the average benefit received by the bottom three income deciles under the three non-targeted measures that would be eliminated.
b The amount of €860 is the result of distributing half the total budgetary cost of the three non-targeted measures that would be eliminated among the households in the bottom three deciles.

amount is the result of distributing half of the budgetary savings arising from the elimination of the three non-targeted measures considered (€4.7 billion) to the households in the bottom three income deciles. In this case, the number of negatively affected vulnerable households would fall to less than 4%, meaning that almost all vulnerable households would maintain a similar degree of protection at half the budgetary cost.

Conclusions

In response to the energy crisis and high inflation, Spain and most European countries have implemented various fiscal measures aimed at supporting households and firms. The design of

these measures has been very heterogeneous. In particular, some measures were temporary and others permanent, they differed in size, in their impact on agents' incomes or the prices of products, and in the degree to which they target the most vulnerable groups.

This article estimates that in Spain around 80% to 85% of the budgetary impact of the measures rolled out to address the energy crisis and the upswing in inflation benefits corresponds to non-targeted measures, rather than measures targeted at the most vulnerable groups.

The article analyses in detail the distributional and fiscal impact of three measures that are particularly relevant in the current episode: the reduction of VAT on electricity and gas, the reduction of VAT on basic foodstuffs and the fuel subsidy. While all three measures are designed as non-targeted measures, which affect most or all households, there are significant differences in their distributional impact. While the reduction in VAT on electricity and gas and on food resulted in greater savings relative to total spending for lower-income households, the fuel subsidy led to higher savings for higher-income households.

By way of illustration, simulations are presented in which the three non-targeted measures analysed are replaced by targeted transfers to the most vulnerable households according to their income. These simulations show that these alternative actions could achieve a similar degree of protection for the most vulnerable households to that provided by the three measures analysed, but at a lower budgetary cost.

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