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Feature

Lessons Learned from the German Double Whammy: The Importance of Price Incentives and Targeted Compensation for the Design of Energy and Climate Policy

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Introduction

Russia's invasion of Ukraine has led to substantial energy price increases in European countries that are heavily reliant on Russian natural gas. As a reaction, member states implemented a cornucopia of measures to comply with an EU directive aiming at a voluntary reduction of demand for natural gas by 15 percent (Council of the European Union 2022).[1] In addition, many countries committed to large-scale relief packages. The German policy response consisted of measures to stabilize the heating and energy sectors, as well as to cushion the impact of energy price hikes on private households, business, and industries. The package was dubbed a "double whammy" by Chancellor Scholz because it tries to simultaneously reduce energy demand *and* reduce energy bills. With a budget of €200 billion, it is not only one of the largest spending programs in Germany since World War II, but it also by far exceeds any other European country's reaction (Sgaravatti et al. 2023).

Its centerpiece—the so-called natural gas price brake (BGBl 2022), accounting for around €56 billion of the total budget—was devised by an expert commission in October 2022. The

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[1]This includes mostly regulatory instruments, e.g., temperature limits for heating and air conditioning in public places or offices, bans on heating swimming pools, and forbidding electricity production from gas-fired power plants outside of peak load hours.

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objective was to alleviate the pressure on households caused by rising energy prices while maintaining strong incentives to reduce consumption. Remarkably, even though the stage had already been set for a price cap by political rhetoric before the commission first convened, the commission was able to convince policy makers to maintain price incentives as part of the relief measure. As such, it marks a unique success for economic policy advice; economists usually set out with first-best proposals that, more often than not, wind up as second- or third-best legislation. Despite its designation as a "price brake," the policy did not interfere with market prices but constituted an indirect lump-sum transfer based on historical energy consumption. It was the first time in Germany that a financial transfer to cover energy-related expenditures was administered automatically and unconditionally to all natural gas consumers.[2] The German policy reaction stands out because the "price brake" did not impair the ability of market prices to efficiently allocate resources in a time of severe supply shortages, which would have been the case, for example, for price ceilings or consumption-based subsidies.[3]

Key Features of the German "Natural Gas Price Brake"

Private households benefit from a two-step transfer.[4] First, in December 2022, each household received a one-off payment equal to its average monthly natural gas consumption in the *previous* billing period at *current* prices. By tethering the transfer to historical consumption, the one-off payment did not diminish the incentive to reduce energy consumption caused by rising prices. The lump-sum payment was intended to provide immediate relief from increasing energy prices before a more complex system could be implemented. This quick and easy measure came at the cost that it was paid universally, including to households that were not affected by increasing prices.

As of March 2023, the actual "price brake" took effect. Despite its name, this measure does not act as a cap on market prices but guarantees households a financial allotment of 80 percent of their natural gas consumption in the previous billing period at a maximum rate of 12 cts per kWh. Effectively, the price brake is a lump-sum transfer that depends on the difference between the current kWh rate and the 12 cts threshold, as well as on each household's historic consumption.[5]

Figure 1 illustrates the key features of the German gas price brake for an average German household with natural gas consumption of 2,000 kWh. For the precrisis natural gas price of 7 cts per kWh, column 1 of figure 1 shows the total monthly natural gas costs, which amount to €152 (black bar). These costs consist of a fixed monthly installment of €12 (dark gray bar) and a variable installment of €140 = 7 cts per kWh × 2,000 kWh (light gray bar). Column 2 of figure 1 illustrates how the price increase to 20 cts per kWh due to the energy price crisis results in total

[2]Natural gas is the main source of heating for private households in Germany, accounting for 44 percent of energy supply in the German heating market (BMWK 2023), 55 percent of which was imported from Russia until February 2022 (Bundesregierung 2023).

[3]The German policy package also drew criticism domestically because payments are not conditional on income. In Europe, it was perceived as a protectionist move at the expense of other member states.

[4]Besides households, small- and medium-sized enterprises were covered by the price brake. Industries with larger energy demand were subject to a system with modified parameters and voluntary opt-in.

[5]After peaking at 22 cts per kWh in September 2022, the average consumer price for natural gas has steadily decreased and reached 12 cts in September 2023, i.e., the level at which the price brake is no longer effective and transfers become zero.

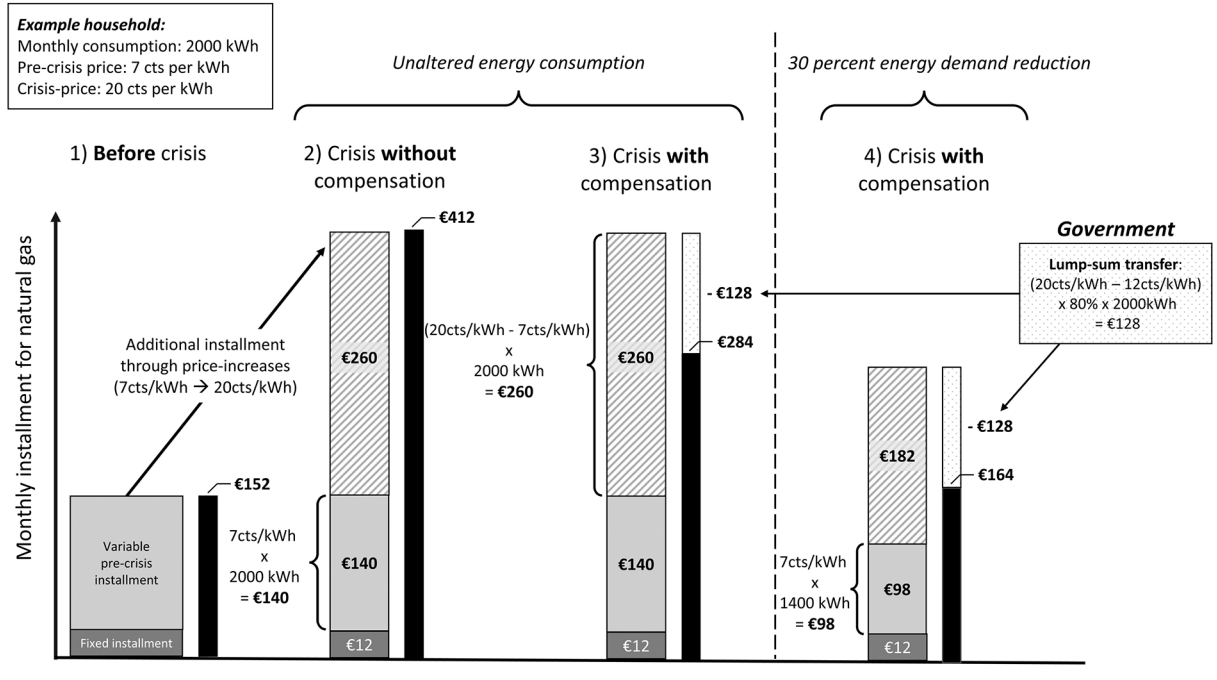

Figure 1 Key features of the German gas price brake illustrated for the average gas-consuming household with an example of 30 percent demand reduction. Source: Own illustration.

monthly natural gas costs of €412 if natural gas consumption stays constant and in the absence of any compensation. Column 3 then introduces compensation via a monthly lump-sum transfer of €128 per household, calculated as 80 percent of its natural gas consumption multiplied by the difference between the market price (20 cts) and the transfer threshold (12 cts). Crucially, column 4 in figure 1 shows that the natural gas "price brake" is not contingent on current consumption. This is different from a block tariff, which guarantees an electricity price up to a threshold, beyond which an extra amount is charged to encourage the household to reduce its total energy demand. In our case, households receive the transfer of €128 regardless of whether their demand for natural gas increases or decreases. For example, a demand reduction of 30 percent leads to an additional €120 (€284 − €164) monetary saving for the household on top of the transfer.

Distributional Consequences of the German "Price Brake"

Recent research shows that, in addition to vertical income differences (between income groups), the horizontal variation in energy expenditures *within* income groups is decisive for a household's vulnerability to energy price increases (Fischer and Pizer 2019; Hänsel et al. 2022). The burden of rising prices can differ significantly between households even if they earn identical incomes (Pizer and Sexton 2019). In the following, we disentangle vertical and horizontal distributional effects of the German "price brake" and summarize our analysis in figure 2.

Vertical Distributional Effects

The lump-sum transfer that is implied by the price brake is proportional to historic natural gas consumption, which increases with income on average. Based on the German sample survey on income and consumption (EVS),[6] we compute that, for a price of 20 cts per kWh, the top income decile will receive a lump-sum transfer that is almost five times the transfer to the lowest decile. In addition, low-income households face a considerably higher average relative burden, represented by the additional energy costs divided by the total household expenditures and indicated by the black dots in figure 2. Absent transfers and demand reductions, the poorest income decile would have to forfeit 9.5 percent of its total consumption to afford the energy price increase, and the price brake reduces this burden by 4.3 percentage points (pp) via the lump-sum compensation. In contrast, the richest decile's uncompensated burden equals 4.2 percent but shrinks by only 1.5 pp due to the transfer. Thus, in relative terms, the lump-sum transfer reduces vertical inequality even though richer households receive higher absolute compensation.

Horizontal Distributional Effects

Even though the average demand for natural gas increases with income, we observe considerable variation within income groups. The white bars and black "whiskers" in figure 2 depict the range of relative burdens experienced by 90 percent of the population in each income decile. This spread is most pronounced in the lowest income bracket: without the price brake, the relative burden ranges from 1.4 percent to 20 percent for the majority of households in

[6]See Roolfs et al. (2021) for a detailed documentation of the underlying data and simulation tool.

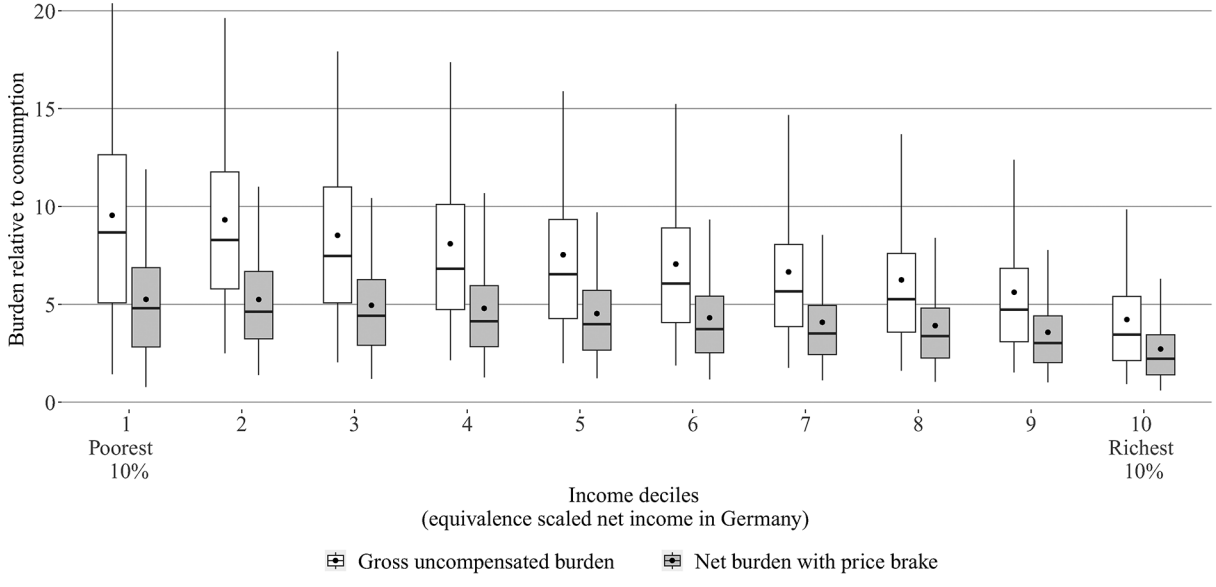

Figure 2 Relative burden on gas-heating private households in Germany due to a price shock on natural gas, increasing average consumer price from 7 to 20 cts per kWh. Dots represent decile averages, white/gray bars include 50 percent of the population, adding to 90 percent when combined with black vertical lines. Source: Kellner et al., 2022, based on data from the German sample survey on income and consumption, EVS, in 2018.

the first decile. When introducing the price brake mechanism (which is coupled to previous-year demand for natural gas), it is not only the *average* richer households that benefit, but, crucially, there is a benefit for *each* household with above-average energy demand within any income decile. Households with above-average demand could include, for example, the elderly, homes with poor insulation, or people working from home.[7] The price brake compresses this variation within the poorest decile to 0.8–12 percent. This compressing effect is present in all income deciles, although to a decreasing extent as horizontal inequality becomes less pronounced with higher income.

Overall Assessment and Lessons Learned

The central strength of the German "natural gas price brake"—tying transfers to the previous year's consumption—enables price incentives to reduce the consumption of natural gas while addressing distributional concerns without a complex system of application and approval. Although the transfer mechanism implied by the price brake can actually reduce both vertical and horizontal inequality, it does not excel in either category. Low-income households still incur the highest relative cost of the energy price crisis, some of them spending more than 12 percent of their total household expenditures on natural gas. This imposes a severe burden, especially on income-constrained households.

Thus, a key weakness of the price brake is the absence of household-specific transfers contingent on both income and energy needs. Recent research shows that such individual compensation would be socially optimal for the case of climate policy if household-specific information on both income and energy consumption were publicly available (Hänsel et al. 2022). The administrative capacity to directly pay targeted transfers to households is still lacking in Germany. As a result, the design and timing of the price brake were shaped by the willingness and ability of private utility companies to act as intermediaries for the relief measure. A shotgun-style compensation, with high total payments that included high-income households, was necessary to enable a swift response. This implies that fiscal costs, financed through additional public debt, became unnecessarily high. These costs could have been reduced by almost 20 percent at a price of 20 cts per kWh if the transfer had been taxable at the marginal income tax rate; this would have, at least, targeted household-specific income.[8] The German experience, therefore, underlines the importance of establishing flexible direct transfer channels. Public administration should be made ready to identify those households that carry a disproportionate burden and to pay appropriate, individualized direct transfers.

An additional weakness stems from referring to the transfer as a price *brake*, which suggested that the government capped or throttled prices, when in fact every single unit of consumption is still priced at the current market rate. Official communication and media coverage often neglected to mention that the allotment is actually a lump-sum transfer. To date, it is unclear

[7] In addition to these exogenous factors, there is also an endogenous margin to horizontal inequality, e.g., voluntary energy-intensive behavior or preferences. Exogenous factors—those outside a household's control—ideally should be taken into account by targeted compensation (Hänsel et al. 2022). However, there hardly is a case for redistribution to account for factors endogenous to a household's own choices.

[8] In that case, monthly payments to the richest decile would have been down to €143 million from €221 million at a price of 20 cts per kWh, reducing the total fiscal cost of the policy by almost 20 percent (Kellner et al. 2022). Restricting transfer eligibility to the first eight deciles would have the same fiscal impact.

whether consumers really understand the incentive-compatible mechanism of lump-sum transfers, which might have weakened the energy saving incentives of the "price brake."

This effect could also be exaggerated by the fact that the financial transfer is not salient—it is not noticed by consumers when they are making daily or hourly energy consumption decisions. This is because the transfer is not a separate payment but is hidden in energy bills. Hence, many households might not be aware of the compensation. Existing evidence on nonlinear pricing or taxing schemes suggests that many consumers focus on average costs rather than marginal costs (e.g., Ito 2014). Thus, nonrational consumers face a smaller incentive to save energy.

Overall, the German double whammy can be considered as a successful case where policy makers relied on price mechanisms to reduce fossil energy demand and on financial transfers to compensate for costs faced by consumers. Policy makers should clearly communicate how their policies work so that consumers actually observe price signals. Pending modifications that address these criticisms, the price brake may be used as a blueprint for climate policy, where policy makers often struggle with carbon pricing due to its distributional impacts.

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