**Carbon pricing and inequality when interest rates are higher**

**Funke, Mattauch, Fabre**

**The political success of carbon pricing will be measured by how well it enables those on low income to switch towards green substitutes.**

The global resolve to meet the goals of the Paris Agreement on Climate Change has never been stronger: more and more governments commit to net-zero targets and the public agrees that climate change should be met with decisive action (Dechezleprêtre et al., 2022). However, this strengthened resolve is not adequately translated into stringent policy, and opposition to concrete climate policies is rampant – particularly for carbon pricing, which is if not sufficient, seen as an at least a necessary component of cost-effective decarbonization (Stern and Stiglitz, 2017). Much of this opposition seems to center around the question of how the burden of climate policies ought to be shared. How can be ensured that climate policies – and carbon pricing specifically – leave no one behind?

Due to post-pandemic disruptions of supply chains and the war in Ukraine, costs of living are increasing in many industrialized economies. That coincides with a shift in monetary policy towards higher costs for public and private lending to keep inflation in check. The tighter fiscal constraints, together with public pressure to alleviate the burden of inflation on vulnerable households, are drawing attention to the opportunity costs of carbon pricing and its revenue use.

Two fundamental principles are behind economists' predilection for carbon pricing: “getting the prices right” is efficient as the private cost will reflect the social costs. Also, carbon pricing embodies the “polluter pays principle”: damages should be paid for by those who cause them.

As a consequence, traditional climate economics is fairly agnostic towards the reaction that carbon pricing evokes in consumers – paying the higher price, switching to alternatives or reducing consumption – as long as it adequately reflects the preferences of consumers. This agnosticism, however, does not sit well with policy practitioners and citizens, who are less occupied with the theoretical efficiency of implementing the policy than with its real effects on emissions reductions and consumer budgets.

**Will carbon pricing incentivize people to switch, or force them to pay more?**

Indeed, in many countries, people doubt the effectiveness of carbon pricing, especially when its revenues are distributed back to the people, and prefer to see the proceeds go towards green spending (Baranzini and Carattini, 2017). One explanation is that citizens see carbon prices predominantly as a revenue-raising instrument and fear a rebound effect if revenues are distributed back to consumers. It is tempting to attribute this to a lack of economic literacy – the people simply have difficulties to grapple with the subtle logic of supply and demand when relative prices of clean and dirty goods change. Especially for low-income households, however, it is probably an accurate intuition, at least over the short run, that carbon prices on buildings and transport will do little but making heating and driving more expensive. Compared to the fossil alternative, green substitutes – heat pumps, electric vehicles – are usually associated with much higher up-front costs. While the capital costs of green substitutes are often more than compensated by lower operating costs in the long run, the high upfront costs can seem prohibitive for people without sufficient savings or access to affordable lending, especially as inflation and interest rates rise. While consumers have three options to respond to carbon prices – swallow the hike, switch to substitutes or scale down consumption – low-capital households with inelastic consumption needs for heating and transport often see no other way but to pay up.

Moreover, for consumers, being forced to swallow a price hike in heating and transport costs for lack of financial access to cost-competitive substitutes eventually amounts to a question of fairness. To many, the application of the polluter-pays principle only seems fair if they, as polluters, indeed have an economic choice not to pollute.

On balance, to secure sufficient support for carbon pricing policies, it seems like their design needs to be attuned more to enhancing people’s ability for switching towards low-carbon substitutes – especially in times of high inflation and high interest rates. For illustration, let us look at the current state of the largest and best studied geographical example of carbon pricing: the European Union.

**EU citizens embrace green investments from emissions trading revenues**

Securing sufficient support for carbon pricing and answering hard distributional questions has gained new urgency in European policy making. In May 2023, the European Union has reaffirmed its commitment to carbon pricing as a flagship decarbonization policy with a second emissions trading system, to be introduced in 2027-2028, covering emissions from buildings and road transport. These are two sectors in which the incidence of carbon pricing would predominantly fall on consumers. As a consequence, the European Union will complement the new trading system with a [“Social Climate Fund”](https://www.europarl.europa.eu/news/en/headlines/economy/20220519STO30401/social-climate-fund-parliament-s-ideas-for-a-just-energy-transition), where member states will collectively put a share of their auctioning revenues towards financing energy-efficiency related building renovations and sustainable transport, as well as providing direct income support to the most vulnerable. But is this policy mix attuned to the needs and preferences of the European citizenry?

Our survey of 2,251 individuals in France, Germany, and Spain on the support of European Emissions Trading under different forms of revenue recycling indeed affirms that the public cares about providing low-carbon alternatives: Channeling the revenues from carbon pricing towards low-carbon investment yields the highest approval for a new emissions trading system (see Figure 1), while combining low-carbon investment with direct cash transfers to vulnerable households is the next preferred option. Distributing the revenues back as uniform cash transfers, either at the European or the country level, yields significantly less support. Notably, these results robustly hold when the data is disaggregated according to several socio-economic characteristics (e.g., age, education, income) and political preferences. While voting preferences are more strongly correlated with policy support than socio-economic characteristics, political leanings only seem to impact on support levels overall, while the recycling option of low-carbon investments maximizes support across all groups of the political spectrum (see Supplementary Information).

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***Figure 1:*** *Support for carbon pricing in the EU with different revenue recycling mechanisms*

In sum, it seems that for winning the public over to carbon pricing in road transport and buildings, the European Union ought to highlight its complementary efforts to provide low-carbon investments in these sectors.

***What follows for climate policy design more broadly?***

Given the challenging macroeconomic circumstances, there is good reason to critically re-assess policy recommendation on the use of revenues – perhaps most urgently in the context of the pending EU ETS II. While the Social Climate Fund broadly aligns with the public’s preference for providing green alternatives, both the effectiveness and fairness of such a policy would be enhanced by targeting investment to benefit especially capital-constrained households. Direct subsidies for green substitutes or subsidized loans could be effective at allowing low-income households to make the switch towards low-emission heating systems and vehicles. Targeting loan subsidies to low-income earners and finding a sweet spot where to stop subsidizing is crucial. For example, in the past subsidies for electric vehicles were a double-edged sword from a distributional perspective, as they were mainly attractive to higher income earners who could afford new vehicles rather than purchasing through the secondary market.

This approach could solve the competing fiscal objectives of providing inflation relief and support for low-carbon technologies, while managing public debt.

At the same time, the relative neglect of consumer’s ability to switch may explain why lump-sum recycling of carbon revenues has turned out far from a silver bullet for making carbon pricing appealing to the public. Over the past few years, researchers and policy institutions had identified recycling revenues from carbon pricing as a per-capita “climate dividend” as a complementary feature that could both render the measure distributionally progressive and strengthen the public appetite for pricing carbon (Klenert et al., 2018). One appeal of the fee-and-dividend approach is that different political camps can recognize favorable properties in this policy respectively: while liberals and egalitarians appreciate the progressive distributional effect and find appeal in the simple idea that “everyone gets the same” (much akin to a universal basic income that is widely popular among people on the left), conservatives and libertarians get on board with the idea that fee-and-dividend approaches do not increase the government budget. As a result, the policy has received endorsement from conservatives (Climate Leadership Council, 2017), and progressive groups alike. However, where fee-and-dividend schemes already exist, such as Switzerland and Canada, the public is largely unaware of them (Mildenberger et al., 2022). Moreover, direct cash transfers are not sufficient to solve people’s capital constraints for investing in green substitutes. Fee-and-dividend approaches have the potential to be an equitable and progressive recycling method whenever high-carbon consumption is a choice rather than a necessity. Given the current upfront costs of green substitutes, and the financial constraints posed by the challenging new economic situation, using revenues directly to enable “switching” and insulating the worst-off from adverse impacts seems more urgent.

Beyond the direct policy implication, people’s preferences on using the proceeds from emissions trading should invite a reckoning on how theoretical economics ought to conceive of revenues from corrective taxation. Certainly, the view that revenues are welfare-neutral is no longer tenable. New economic thinking is required to grapple with what these viewpoints mean for welfare-economic policy evaluation (e.g., Kotchen, 2022).

Until then, and given the current macroeconomic circumstances, combining carbon pricing with targeted (loan) subsidies for low-carbon investment could be an apt approach to deal with the new inequalities in financial access to capital-intensive green substitutes.

**Literature**

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**Supplementary Information**

As a background to the above comment, we analyzed data from a survey of 2,251 individuals[[1]](#footnote-1) in France, Germany, and Spain on the support of European Emissions Trading (here called “European Climate Scheme”) under different forms of revenue recycling. This dataset originates from a larger survey on international attitudes towards global policies (Fabre, Douenne & Mattauch, 2023), conducted between February and March 2023 and implemented by the survey company Respondi. The survey was designed to ensure representativeness along key dimensions such as gender, income, age, highest diploma, and degree of urbanization (see Table S.1).

1. **Survey Structure & Methods**

The underlying survey explores citizens’ attitudes towards global policies, including a hypothetical “Global Climate Scheme” – a global emissions trading system with redistribution of revenues. For the above comment, we drew from a subset of data that elicited support for such a Climate Scheme at the level of the European Union under different revenue recycling options.

Respondents were first presented with detailed descriptions of the Global Climate Scheme and associated redistributive mechanisms, including projected carbon price levels and cash transfers (see Questionnaire in Section 4). To enhance and assess understanding, summaries were provided at several stages of the survey, and comprehension was tested with incentivized questions. In a subsequent step of the survey, respondents were asked to indicate their support for a European Union version of such an emissions trading scheme, contingent on the following options of EU-wide revenue redistribution:

* Equal cash transfers
* Cash transfers in proportion to national emissions
* Low-carbon investments (e.g., thermal insulation of buildings, clean sources of heating, public transportation, and charging stations for electric vehicles).
* Transfers targeted to the most vulnerable & low-carbon investments

The above options were deliberately framed to allude to the European Union’s plans on a second emissions trading system in the transport and building sectors with redistribution of revenues via an EU-wide Social Climate Fund. For consistency with the survey-wide hypothetical framing of policies, and to reduce complexity/technicality, we refrained from mentioning the European Commission proposals on ETS-2 and the Social Climate Fund explicitly.

Support for the above options was elicited on a five-point Likert scale. Among the subset of respondents that indicated opposition to the policy (i.e., “somewhat oppose” and “strongly oppose” on the respective five-points Likert scale), we tested their (binary) agreement with potential reasons for their disapproval.

1. **Results**
   1. ***Support for different revenue recycling options***

Across all three surveyed countries, the option of channeling revenues from the European Climate Scheme towards low-carbon investments yielded the highest level of support (more than 60%) and thereby surpasses the option of combining low-carbon investments with targeted transfers to the most vulnerable. Providing equal cash transfers to everyone in Europe was the least approved option (30-40%). Notably, these findings are specific to revenue recycling at the *European* level and differ substantially from the main findings on attitudes towards *global* policies (Fabre, Douenne & Mattauch, 2023): while there seems to be appetite for redistributive policies at the global level, including majority support of a global fee-and-dividend scheme with equal cash transfers between high-income and low-income countries, this is not the case in Europe. Possible interpretations are that European citizens are satisfied (or even saturated) with the level of fiscal integration and redistribution at the European level, or that mitigation results, enhanced by low-carbon spending, are prioritized over further redistribution in the European context.

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***Figure S.1:*** *Support for the European Climate Scheme with different revenue recycling mechanisms*

* 1. ***Reasons for policy rejection***

Among the subset of respondents that did not approve of the European Climate Scheme, more than a quarter of respondents stated that they rejected the policy because they did not fully comprehend how the European Climate Scheme was supposed to work (see Figure S.2). Less than a fifth of respondents stated a preference for other means of regulation of carbon emissions as a reason for rejecting the European Climate Scheme.

There are three noteworthy variations between the sampled countries: In Germany, more people (28%) rejected the policy on the grounds that they preferred regulation and redistribution of revenues at the national rather than the European level, while this was a lesser reason in Spain (18%). Two potential interpretations of this variation are, on the one hand, national self-interest: respondents intuitively comprehend the fact that people in Spain would benefit on average from redistribution while people in Germany would lose out. On the other hand, the variation might point to differences in the general attitude towards transferring fiscal competencies towards the European Union. Further, significantly more people in Germany (29%) were generally opposed to more ambitious climate policy compared to the other two countries (Spain: 17%; France: 11%). In France, a substantially larger share (33%) stated “I don’t know”, compared to respondents in Germany and Spain (19%).

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***Figure S.2:*** *Agreement with reasons why the European Climate Scheme is not supported (subset of “strongly oppose” and “somewhat oppose” from Figure S.1)*

1. **Disaggregated Results/Heterogeneity Analysis**

Additional insights can be gained from disaggregating the sample along key dimensions (see Tables S.2). As key take-aways, voting preferences are more strongly correlated with policy support than socio-economic characteristics. However, political leaning only influence the broader level of support across policy options, while the recycling option of channeling revenues towards low-carbon investment maximizes support within all voting groups (see Figure S.4). Similarly, low-carbon investments dominate all other policy options, followed by targeted transfers + low-carbon investments when the data is disaggregated according to socio-economic characteristics (age, gender, education, income, employment status and level of urbanity).

* 1. ***Which respondents support climate policies?***

Socio-economic characteristics are much more weakly correlated with support for redistributive climate schemes than political leanings (see Figure S.3). Most notably among the socio-economic characteristics, attainment of tertiary education makes respondents more likely, and being among the bottom 25% earners makes respondents less likely to support redistributing revenue in the form of low-carbon investments. Among the older population strata (50+), respondents are more likely to support low-carbon investments + targeted transfers but less inclined to support equal cash transfers at the European level. Voting left on the political spectrum is robustly associated with more support for all combinations of climate policy and revenue redistribution schemes, while voting on the far right is associated with diminished support for all policy proposals except for equal cash transfers at the European level (likely due to similarly low support levels for this option among conservative voters and non-voters in Germany and France, see Table S.2).

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***Figure S.3: Correlation between support for revenue recycling options and socio-economic characteristics and voting preferences.*** *Note: the two panels show the coefficients from a single regression, where support for the different policy options is regressed on socio-economic indicators and voting preferences, as well as country-fixed effects (not shown).*

* 1. ***Disaggregation by socio-economic characteristics and voting preferences***

As a recurrent pattern across all three countries, recycling revenues towards *low-carbon investments* dominates the other policy options, even when the data is disaggregated to socio-economic characteristics (age, gender, income, employment status, education level, degree of urbanity) and voting preferences. Notable exception are the lowest-income quartile and lowest age group (18-25 years) in France, where support is maximized with *targeted transfers + low-carbon investments*.

*Targeted transfers + low-carbon investments* are recurrently the second preferred option across socio-economic and political groups. Notable exceptions include far-right voters in France and Germany. Among far-right voters in Germany, support for this option is even cut in half (17%), compared to low-carbon investments (32%).

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***Figure S.4:*** *Difference in support for revenue recycling mechanisms between far-right voters and other voters*

1. **Summary and Discussion**

Support for a European Union Climate Scheme among respondents in France, Germany and Spain is strongest when combined with low-carbon investments. The result is robust across different socio-economic characteristics and voting preferences. With low-carbon investments dominating other policy combinations with more distributionally-geared elements – targeted relief for vulnerable households and uniform redistribution at the European or national level – effective mitigation and financial support in the transition towards green substitutes seems to be the highest priority for climate policy among the European citizenries.

1. **Additional Material**

**Questionnaire** [To Do: double check and potentially add more on survey structure]

***Global Climate Scheme***

“The GCS consists of global emissions trading with emission rights being auctioned each year to polluting firms, and of a global basic income, funded by the auction revenues. Using the price and emissions trajectories from the report by Stern & Stiglitz (2017), and in particular a carbon price of $90/tCO2 in 2030, we estimate that the basic income would amount to $30 per month for each human above 15 (see details in Appendix E). We describe the GCS to the respondents as a “climate club” and we specify its redistributive effects: The 700 million people with less than $2/day would be lifted out of extreme poverty, and fossil fuel price increases would cost the typical person in their country a specified amount (see Appendix D for details). This median net cost is $85 in the U.S., e10 in France, e25 in Germany, e5 in Spain, £20 in the UK”

(Fabre, Douenne & Mattauch, 2023)

***Questionnaire***

*In the following, we describe two policies, on which we will survey your opinion. To check that you have attentively read the descriptions, we will ask some understanding questions afterwards: those who get correct answers can win up to $150.*

*At the Paris agreement in 2015, all countries have agreed to contain global warming “well below +2 ◦C”. To limit global warming to this level, there is a maximum amount of greenhouse gases we can emit globally. To meet the climate target, a limited number of permits to emit greenhouse gases can be created globally. Polluting firms would be required to buy permits to cover their emissions. Such a policy would make fossil fuel companies pay for their emissions and progressively raise the price of fossil fuels. Higher prices would encourage people and companies to use less fossil fuels, reducing greenhouse gas emissions.*

*In accordance with the principle that each human has an equal right to pollute, the revenues generated by the sale of permits could finance a global basic income. Each adult in the world would receive [US1, US2: $30/month; UK: $30 (that is £25) per month; FR, DE, ES: e30/month], thereby lifting out of extreme poverty the 700 million people who earn less than $2/day. The typical [American] would lose out financially [US1, US2: $85, FR: e10, DE: e25, ES: e5, UK: £20] per month (as he or she would face [$115] per month in price increases, which is higher than the [$30] they would receive). The policy could be put in place as soon as countries totaling more than 60% of global emissions agree on it. Countries that would refuse to take part in the policy could face sanctions (like tariffs) from the rest of the World and would be excluded from the basic income.*

*Who would win or lose financially in the Global climate scheme? Three respondents with the expected answer will get [$]50 in points.*

*Typical [Americans] would win and the 700 million poorest humans would win.;*

*Typical [Americans] would win and the 700 million poorest humans would lose.;*

*Typical [Americans] would lose and the 700 million poorest humans would win.;*

*Typical [Americans] would lose and the 700 million poorest humans would lose.*

*[new page] For your information, the expected answer was Typical [Americans] would lose and 82 the 700 million poorest humans would win from the Global climate scheme.*

*(…)*

*Similar to the Global Climate Scheme, the European Climate Scheme would impose a maximum amount of greenhouse gases we can emit across the EU. It would make polluters pay for their emissions, which in turn would increase fossil fuel prices and discourage polluting activities. Several options are possible regarding the use of the scheme’s revenues in the buildings and transport sectors:*

* *Provide an equal cash transfer of €105/year to each European adult.*
* *Provide a country-specific cash transfer to each European, proportional to their country’s emissions: people in countries with higher emissions per person (like Germany) would receive more than people in countries with lower emissions (like Romania). For information, people in [Germany/Spain] would receive [130/90]€/year.*
* *Finance low-carbon investments: the thermal insulation of buildings, the switch to clean sources of heating, public transportation, and charging stations for electric vehicles.*
* *Provide cash transfers to the most vulnerable half of Europeans and finance low-carbon investments.*

***Do you support or oppose the European Climate Scheme in case the revenue is used to… ?*** *(5-point Likert scale)*

* *Provide an equal cash transfer to each European*
* *Provide a country-specific cash transfer to each European*
* *Finance low-carbon investments*
* *Provide cash transfers for the most vulnerable Europeans and low-carbon investments*

***Conditional on: If there is little support (1 or 2 or 3 on 5-likert scale on all four options above):***

***Why do you not support a European Climate Scheme? (Multiple answers possible)***

* *I am opposed to climate policy being decided at the EU level, it should be decided at the national level.*
* *I would prefer if the revenues were used in a different way than previously suggested*
* *I would prefer if decreasing carbon emissions were regulated by other climate policies.*
* *I am generally opposed to additional, or more ambitious, climate policies.*
* *I do not fully understand how the European Climate Scheme is supposed to work.*
* *Don't know*

***Figure S.5:*** *Disaggregation of support for recycling options by voting preferences*

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**Further Tables**

***Table S.1:*** *Representativeness across sampled countries*

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**Table S.2:** [To Do: Mean support for all policy options, disaggregated by socio-economic characteristics and voting preferences]

1. FR = 729, DE = 979, ES = 543 [↑](#footnote-ref-1)