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Can the EU ETS and Its Revenues Tackle the Impact of High Carbon Prices?*

KEY MESSAGES

- **The EU ETS with companion policies is more robust than relying solely on either regulatory or carbon-pricing interventions**
- **Policies should be developed to account for the disparate impacts of the EU ETS across firms and regions**
- **Acceptability of carbon pricing depends on how the carbon price is communicated and revenues used**
- **The EU ETS revenues might decrease at higher carbon prices following a carbon Laffer curve**
- **Beyond revenues, policymakers may have to consider additional sources for funding distributional compensations in the long run**

Emissions trading systems (ETS) have been around for a while and are spreading. Today, 28 ETS are in force, 12 are under development, and 8 are under consideration (ICAP 2023). Altogether, they cover 17 percent of the world's emissions of greenhouse gases (GHG).

The first one established, the European Union Emissions Trading System (EU ETS), has officially come to adulthood: it started in January 2005 and so is now 18 years old. The EU ETS is the cornerstone of European climate policy. Until the European Green Deal, its scope included power, heat generation, industrial manufacturing and, since 2012, aviation. It covers 40 percent of the EU's GHG emissions.

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The EU is often considered a role model for its innovative and ambitious climate policies. At this age of majority in the era of the European Green Deal, it is worth taking stock of the features and place of the EU ETS in the policy mix, its economic and social impacts,[1] and the role of revenues as a support policy for carbon pricing.

THE MATURITY OF THE EU ETS

Maturing Prices in the European Green Deal

In the early stages, the price of the EU ETS allowances was low due to the overallocation of permits. During Phase 2 (2008–2012), prices fluctuated but increased, particularly during the latter half, as the market started to respond to regulatory adjustments and improved understanding of the system. During Phase 3 (2013–2020), prices saw significant fluctuations. Initially, prices were low due to a surplus of allowances, the inclusion of international credits, and the economic downturn. Then, prices started to increase over the years thanks to market reforms and reduced surplus: in 2021. The EU ETS entered Phase 4 with more ambitious emissions reduction targets, fluctuating between EUR 81 and EUR 105 in 2023. Although the price-increasing trend is global, the era of high carbon prices is mainly limited to Europe so far.

Prices in the EU ETS are expected to rise further due to measures aimed at tightening the cap and aligning with the EU's long-term climate goals. After two years of negotiations of the Fit for 55 Package (FF55), in 2023 the EU ETS is set to accompany the EU in reaching carbon neutrality by 2050. This is in line with the legal objective of the EU Climate Law of reducing emissions by 55 percent by 2030 compared to 1990. Notably, the system is expanding its coverage to include new sectors, reaching 75 percent of EU emissions.

The scope of the existing EU ETS will be expanded to the maritime sector, and the cap will be reduced by 62 percent by 2030 compared to 2005. This is to be supplemented by the creation of a second EU ETS (EU ETS 2) for buildings, road transport, and small non-ETS industries. Its aim is to reduce emissions of these sectors by 42 percent in

[1] Economic and social impacts of the ETS are explored by EUI in LIFE COASE, a project assessing the performance and impacts of the EU ETS co-financed by the EU Life Programme (see https://lifecoase.eui.eu).

2030 compared to 2005. It will be operational as of 2027. Moreover, there are plans to include methane and nitrous oxide for shipping starting in 2026.

The EU ETS in a Net Zero Policy Mix

The most effective and efficient policy mix includes carbon pricing in the form of a market or tax (van den Bergh et al. 2021). This is aligned with what the European Commission found when developing the European Green Deal. According to its impact assessment (European Commission 2020), the impact of the European Green Deal on real GDP was projected to be relatively limited. The models conveyed a consistent message: the type of policies implemented to achieve greater GHG reductions determine the overall impact on GDP. Economy-wide impacts are the smallest if policies that put a price on the externality address and reduce distortionary taxes in other fields through support policies like revenues.

The expansion of emissions trading is accompanied by a series of complementary policies, notably the Carbon Border Adjustment Mechanism, but also a series of support policies like the Modernisation, Innovation, and Social Climate Funds and regulatory policies such as emissions standards or the ban on internal combustion engines sales by 2035 (FSR 2023). In sum, the EU ETS and its companion policies is more robust than relying solely on regulatory or carbon-pricing interventions.

THE IMPACTS OF HIGHER CARBON PRICES

Disparate Economic Impacts

Before the scope extension of the EU ETS and price increase, the primary group directly affected by carbon prices were firms that saw an impact on their competitiveness. In that respect, one of the EU priorities was and still is mitigating the risk of carbon leakage by carefully considering the competitiveness of industries within the EU, preventing the shift of emissions to regions with weaker climate regulations.

The EU ETS appears to be effective in reducing emissions. ETS installations reduced emissions by 37 percent between 2005 and 2022, while sectors under the effort-sharing legislation reduced theirs by only 10 percent between 2005 and 2021 (EEA 2023). The overall impact of reducing industrial emissions is often praised and may give a misleading impression. Research shows an evident heterogeneity across firms in emissions reduction (Vieira et al. 2021). Many installations have not started their decarbonization journey.

Moreover, Vieira et al. (2021) identified the existence of so-called “super polluters”: most emissions are caused by just a few installations. For instance, 1.9 percent of companies’ accounts in the EU ETS emit 42.5 percent of emissions in the industrial manufacturing sectors. From a competition perspective, this may be a sign of concentration in the EU ETS market.

Within the EU, sustainability transition pathways vary from region to region. According to Mura et al. (2021), the EU ETS was instrumental in triggering a reduction in carbon emissions intensity among the regions. Still, the policy impact seems to differ across areas if simulated across NUTS 1, 2, or 3. Furthermore, data indicates that a significant portion, around 56 percent of the regions, are moving toward a trajectory characterized by green growth, showcasing a positive correlation between economic expansion and reduced emissions (Mura et al. 2023). However, 24 percent of regions are experiencing economic growth while simultaneously witnessing an increase in CO_2 emissions, highlighting a disconnect between economic progress and sustainability efforts. A smaller fraction, 6 percent, represents regions following a black degrowth pattern, where economic output and emissions are declining. In contrast, 15 percent of regions exemplify a path of green degrowth, demonstrating a simultaneous reduction in economic activity and carbon emissions. These divergent pathways underscore EU regions’ complexity and diverse impacts and strategies in pursuing sustainability goals.

It appears fundamental to address the diversified impacts of the EU ETS on different firms and regions. Policies are to be developed in such a way as to account for these differences.

Social Impacts and Acceptability

The literature shows that, without redistributional policies, higher energy and carbon prices are likely to have regressive effects. Domestically, the social ecosystem around firms is also impacted: workers facing the costs of the economic transition and associated job loss, and local communities sharing a fair distribution of pollution and co-benefits. In addition, lower-income households spend a more significant share of their income on energy- and carbon-intensive goods, and they face higher financial constraints on adopting low-energy and low-carbon technologies.

The acceleration of decarbonization, scope extension to new sectors (e.g., EU ETS 2), and high carbon prices risk exacerbating the impact of carbon pricing on households. Tackling the distributional effects of carbon pricing puts much pressure on the success of the EU’s carbon neutrality ambition. On the one hand, the increase in energy prices shows the need to accelerate the transition process to move away from the current energy dependence. On the other hand, energy price records may hinder climate policies that tend to increase carbon prices. If not tackled properly, the energy price hikes combined with the high carbon prices would affect the acceptability of climate policies. To increase acceptability, it is fundamental to communicate to the broad audience how carbon pricing works and what it can bring.

THE USE OF AUCTION REVENUES ACROSS THE WORLD

General Considerations on the Use of Carbon Revenues

Revenues can build political support among the public and other constituencies. Acceptability of carbon pricing depends also on how revenues are used and how the carbon price is communicated (Baranzini and Carattini 2017).

Spending priorities will depend on the policy objectives of the jurisdiction. Auction proceeds can be used in different ways: 1) funding climate action by investing in renewable energy, low-carbon technologies, adaptation, energy efficiency, forestry, or transport; 2) contributing to the public budget by reducing other taxes, financing other public priorities, or reducing debts; and 3) financial assistance to disadvantaged groups. In this last case, governments can support low-income households to counter rising energy costs and facilitate the transition to a low-carbon economy. This spending can be targeted at the local, statewide, national, and international levels.

In general, revenues are reinvested to further climate action but are not necessarily earmarked (Borghesi and Ferrari 2023). From an economic point of view, the optimal use of revenues would be toward the general budget. Still, the political economy finds green earmarking and ad hoc funds appealing from a regulator's point of view.

Within social expenditures, although direct rebates and compensation to consumers could be seen as the most visible option and are critical at the early stages of a carbon market, they are considered non-efficient as they tend to mute price signals. Instead, support for equipping households with green and efficient appliances has a great long-lasting benefit. Some studies (e.g., Berry 2018) estimate that only a limited share of carbon pricing revenues would be sufficient to compensate for the negative distribution impacts on households.

Different Practices Worldwide

High carbon prices and new revenue streams raised a record USD 63 billion globally in 2022 (ICAP 2023). Among the total revenues raised by ETS since 2008 (USD 224 billion), more than half were collected in 2021 and 2022. The way auction proceeds are used across countries varies.

The Regional Greenhouse Gas Initiative (RGGI) operates under a cap-and-invest framework, strongly emphasizing investment. Approximately 80 percent of the proceeds have been directed toward consumer benefit programs. This approach underscores the program's dedication to leveraging funds for initiatives that benefit communities and individuals affected by climate and environmental efforts.

In California, stringent statutory requirements dictate the allocation of revenues. Revenues generated are channeled into a fund that supports a range of initiatives, including clean transportation, sustainable communities, clean energy, energy efficiency, natural resources, and waste diversion. It demonstrates California's commitment to funding projects that align with its environmental and sustainability objectives.

In Quebec, auctioning revenues are directed to a dedicated fund, pivotal in supporting climate change programs and aligning with the goals outlined in the Climate Change Action Plan. The allocation of revenues to the fund reinforces the province's dedication to achieving its climate objectives and implementing strategic initiatives to combat climate change effectively.

These examples highlight the adaptability and innovation in revenue allocation, tailored to specific regional needs and priorities, in the global pursuit of unique environmental goals.

USE AND EXPECTATIONS OF REVENUES IN EUROPE

The Use of Revenues in the Fit for 55 Package

The EU ETS alone, with USD 40.8 billion in 2022, represents two-thirds of the total ETS revenues raised globally and is split between EU funds and member states (MS). The Innovation Fund, funded by 530 million allowances, aims to propel innovation in low-carbon technologies throughout MS. Additionally, the Modernisation Fund, fueled by 4.5 percent of total allowances from 2021 to 2030, finances innovation in low-carbon technologies, modernization of energy systems, and energy efficiency, with a focus on lower-income MS. The Social Climate Fund (SCF), to be established in 2026, will address the social impacts stemming from the EU ETS 2. This fund will provide temporary, direct income support for vulnerable households and support measures to reduce emissions in road transport and buildings. The SCF will be financed to the tune of EUR 86.7 billion (EUR 65 billion from auctions, plus 25 percent from MS) between 2026 and 2032.

Once proceeds for these European funds are deducted, the rest of the allowances (approx. EUR 400–500 billion) are expected to be allocated to MS. MS possess autonomy in deciding how to allocate auction revenues. With the FF55, the MS are more bound to use EU ETS revenues toward climate action: the new legal phrasing transforms the "50 percent [of the revenues] should be used" into "100 percent shall be used" for climate and energy purposes. This intricate framework illustrates the EU's dedication to supporting policies fostering innovation, social progress, and climate resilience.

Of the total revenues generated between 2013 and 2021, 75 percent was used for climate and energy-related purposes. However, additionality cannot

be assessed when MS do not earmark their revenues. Tracking the use of revenues is challenging in most countries because of the lack of available data across different systems.

Are Auction Proceeds a Real Panacea?

Auction revenues are expected to increase with higher prices. At the same time, the tightening of the cap reduces the number of allowances and pushes regulated entities to abate their emissions rather than purchase additional allowances. This questions how revenues are linked to ETS prices and the number of allowances in circulation.

It is worth noting that the EU ETS data could indicate a possible stabilization of the revenues. Mazzarano and Borghesi (2023) investigate the current trend of price evolution in the auctions and raise the possibility of a carbon Laffer curve. If confirmed, a Laffer curve applied to carbon pricing would demonstrate that there is an optimal carbon pricing that maximizes government revenues. Initially, as price rates increase, revenues also increase. However, beyond a certain point, higher rates can discourage economic activity and ultimately reduce revenues. The challenge lies in finding the most effective design of a carbon pricing policy – setting a carbon price aimed at achieving environmental goals while considering economic implications.

A stabilization or decline of revenues in the long run may not always be problematic. First, a reasonable revenue pool can be preserved by extending the scope of the EU ETS, such as to buildings, transports, and small industries. Second, as decarbonization occurs, one could argue that a lower number of allowances will be needed, eventually reducing the impact on firms' costs. Still, decarbonization will also increase the price of allowances, thus leaving the overall effect on firms' costs a priori ambiguous.

Auction revenues should not be the sole source for financing the EU's decarbonization or social compensation. The EUR 400–500 billion allocated to MS is significant compared to the EU's coronavirus aid package worth EUR 750 billion, but still insufficient. For instance, the additional public and private green investment needs in the EU are estimated to be around EUR 520 billion per year over the 2021–2030 period (European Commission 2021).

POLICY CONCLUSIONS

Because the EU ETS is more mature, prices are more significant and substantially impact firms and regions. Policy design and actions should be implemented differently to reflect the differences in those impacts. The presence of super polluters may require policymakers to reconsider the influence of such players in the markets, and across regions, different levels of governance show disparate impacts of specific policies. All this means it is imperative to identify the right policy mix accompanying the EU ETS, including support measures, so as to assist the various actors in their decarbonization efforts.

High carbon prices can raise distributional and social acceptability concerns, but effective redistribution policies can play a pivotal role in ensuring the acceptability and success of ETS. Nonetheless, it is important to consider potential limits to this revenue growth, as revenues may plateau or decline at higher carbon price levels, following a pattern akin to the carbon Laffer curve. If that is confirmed, researchers and policymakers should investigate alternatives to carbon revenues for financing domestic and international climate action in the long run.

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