Review

Why Economists Keep Backing Carbon Pricing? A Freshman's Guide

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Why Economists Keep Backing Carbon Pricing? A Freshman's Guide

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Abstract

We provide a short explanation of the concept of carbon pricing for a general audience and from an economic perspective. A general introduction describes how economists approach societal issues and how they think about markets, whether these markets are aligned with social welfare or not. This conceptual framework is then applied to climate change. Taking economic incentives into account we show why putting a price on carbon may be seen, in theory, as a highly efficient way to reduce greenhouse gas emissions. We then explain why, in practice, the implementation of carbon prices is fraught with difficulties.

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1. Arsonist or Firefighter?

In the climate debate, the economy often appears as the main culprit. In fact, economists have a number of important contributions to offer. This short paper sums up why. It is aimed at a non-specialist audience and requires no prior knowledge of economic concepts.

We start by recalling the advantages of well-functioning markets as well as the perverse consequences of market forces when they disfunction (or "fail") from a social point of view. We then apply the market failure approach to climate change. We explain why putting a price on carbon may help societies to be more efficient in coordinating mitigation efforts, and how they perform in reality.

2. Which Economy? The Company, the Expert or Materialism?

"We need to act quickly, drastically and in a coordinated way to reduce our greenhouse gas emissions, but the economy is standing in the way."

Anonymous

This anonymous citation reports a commonly held view of the dilemma in which our current societies seem to be caught, particularly in market-based economies. In fact, most economists will agree with the beginning of the citation. Either with regard to the objective of reducing emissions (which is crucial), or to the verb (to act) or to the complements used (quickly, drastically and in a coordinated way). These are undeniable truths. However, they will be less convinced by the end of the statement: "but the economy is standing in the way". This conclusion is imprecise, conveys preconceived ideas about economics and clouds the debate on the measures to be adopted in the face of climate change.

First of all, what do we mean by "the economy"? Business circles? In reality they are very diverse, and some of them are genuinely convinced by the urgency to transform business practice. Isn't it rather the ideology one has in mind when declaring that "the economy is standing in the way"? In other words, it is the discipline of economics that is being targeted, not the practice. It is true that, when it comes to climate change policy, economists tend to agree with each other - a rare occurrence, in fact (e.g., IPI, 2015). But precisely, not in the way implied by the citation. For over

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twenty years, it has not been laissez-faire that has been recommended by most experts, but rather massive state intervention, on basis of economic reasoning, to put a price on carbon. The aim of this paper is to explain why.

A final possible interpretation of this mistrust of "the economy" is that it is neither a criticism of business nor of the profession as such, but rather of the individual materialistic impulses that characterize the human species. Hence the calls for "another system", less favorable to these impulses, and more respectful of the environment. There is certainly some truth in this. Unless one suffers from a particularly acute form of climate skepticism, it is clear that the continuation of "business as usual" is no longer an option. The question is which alternative to choose, and how to manage the transition. Faced with these enormous challenges, the following sections illustrate how, sometimes against the odds, the economists' perspective may be a good one to take. The focus here is on climate change. For a more general presentation of the main sources of misunderstanding between economists and naturalists, see the brilliant summary by Fullerton and Stavins (1998).

3. Market Forces or Market Failures?

Beware of caricatures. In economic theory, we often work with caricatures of reality called "models", which help us to structure our thinking, by making our hypotheses explicit and ensuring the coherence of their implications. These models heavily emphasize the assumption of individual rationality, according to which every individual maximizes his or her satisfaction and every company maximizes its profit. This assumption is necessarily reductive, but has the crucial virtue of taking into account the materialistic impulses mentioned above. Rather than relegating them to the chapter of unworthy motivations, economists have integrated the pursuit of self-interest into the heart of their analysis of incentives, to get a better understanding of how human societies function.

Right or wrong? At first glance, a society based on selfish motives seems to have little future. Competition for resources and a failure to take collective issues into account will lead at best to a cacophony of opposing interests, at worst to permanent conflict, with no prospect of long-term development. And yet. Since the Industrial Revolution, economic development has been most pronounced in societies that have offered the best guarantees of individual economic freedoms, including private property (Glaeser et al., 2004). How can we explain this paradox of "the prosperity of vice", to use the title of Cohen's excellent introductory book (2008), that individual selfishness lead to economic progress?

A bit of modeling can help. Let's consider an ideal world in which invisible, incorruptible and cost-free administrators guarantee respect for private property and contracts. The framework conditions are stable and transparent. Individual economic units (households and companies) are independent of each other, and too small to influence the prices of goods and factors of production. There is no pollution, no noise, no external effects whatsoever. That means that all costs generated by the exchange of a given good are fully and exclusively covered by the companies in place that produce it, and all profits are fully and exclusively recorded by the households in place that consume it.

Under these conditions of so-called perfect competition, it can be shown that the law of supply and demand operating simultaneously across all markets leads to the social optimum. For an example of a model developing these notions, see chapter 1 of Grether and Martinez-Zarzoso (2025). In other words, given technical constraints, available resources and preferences, generalized "laissez-faire" leads to the best possible set of decisions concerning: 1) sharing the production effort between firms, such that the most efficient ones produce more (cost minimization), 2) allocating consumption between households according to their willingness to pay (net benefit maximization) and 3) optimizing the quantity produced and consumed of each good (optimal choice of production-consumption mix). Adam Smith had this brilliant insight in mind when he articulated the famous "invisible hand" parable in 1776.

If, more than two centuries later, we continue to refer to the invisible hand, it is because this result is far from obvious. It also has a twofold merit. The first is to provide an explanation for the

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paradox of the prosperity of vice, by highlighting the crucial role played by prices as a coordination mechanism between different decision-making units. See the insightful introductory chapter of Seabright (2004). The second is to explain the conditions under which the parable is valid, i.e., the assumptions of perfect competition, which ensure the coincidence of individual and collective rationality. In reality, these conditions are often not fulfilled, and to a large extent. This brings us into the realm of market failures.

The first problem with market failures is that they are numerous. There are as many market failures as there are possibilities of not satisfying the assumptions of perfect competition. To give just a few examples linked to the issue of climate change, it may be that production is polluting and the firm is not taking responsibility for it, as in the case of steel production, which consumes a lot of fossil fuels. Or individual consumption may benefit the rest of society, such as the adoption of soft mobility. In this case, we speak of externalities, effects that impact third parties but are not reflected in market prices: negative in the first case, positive in the second.

Another example relates to the exploitation of a natural resource over which it is difficult to define property rights, such as a stable, predictable climate. There is a significant gap between the private nature of the benefits derived (e.g., users of private jets) and the public nature of the costs incurred (induced climate disruption, which is borne by society as a whole as well as future generations). In the absence of a collective arrangement, the pursuit of individual self-interest leads to overexploitation of the natural resource, or even its outright disappearance. This brings us to another parable, that of the “tragedy of the commons”, introduced by William Forster Lloyd (an economist) in 1833 and revived by Garett Hardin (an ecologist) in 1968.

The second problem with market failures is that there is no single remedy for them. This increases the degree of complexity, because even for a specific market failure (e.g., a polluting activity), various solutions are possible (a ban, a tax, or standards to be respected). The multiplicity of solutions found to mitigate the problems such as the tragedy of the commons earned Elinor Ostrom the Nobel Prize in Economics in 2009. Depending on the case, private negotiation may be sufficient. In other cases, more drastic state intervention may be required, but with costs to consider, along with new sources of inefficiencies, this time of an administrative nature.

To sum up, the ideal world of perfect competition provides economists with a fairly convenient analytical grid for framing the problems encountered in terms of economic efficiency (i.e., maximizing the size of the economic cake, leaving aside questions of equity, even if they are also fundamental). Either we find ourselves in a concrete situation that is sufficiently close to the ideal framework, such as the market for flower pots or pens, because their characteristics correspond well to those of perfect competition. In this case, "laissez-faire" becomes a recommendable proxy, with prices fluctuating in line with changes in fundamentals (e.g., consumer preferences or production technology). Changes in prices send the right signals to production and consumption units, and the state can confine itself to ensuring favorable framework conditions for private players (e.g., public infrastructure or the rule of law). Or there may be one or more relatively significant market failures, in which case the question of state intervention arises, and can take various forms.

4. What Is Climate Change from an Economic Perspective?

Climate change unfortunately brings together just about every conceivable market failure from an economic point of view. The CO_2 emissions from a multitude of production and consumption actions generate external costs that are clearly not reflected in the prices of inputs (fossil fuels) or goods and services consumed (air travel). The spatial scale (the globe) and temporal scale (centuries or even millennia) go far beyond the usual framework in which negotiations between private players sometimes enable external effects to be mitigated. Political decision-making at the national level is subject to strong tensions between those in favor of vigorous intervention and powerful lobbies which oppose them, mainly in the energy, construction and transport sectors. On top of that, at the international level, there is no dedicated organization with strong enforcement powers. This leaves

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us with international treaties (Kyoto, Paris), but their negotiations have proven very difficult, with mixed results, to say the least.

The difficulty of international negotiations on climate change is a perfect illustration of the bottlenecks that affect collective action in general, and the fight against climate change in particular. This is a textbook case of the prisoner's dilemma, borrowed from game theory, and dear to economists for pinpointing the consequences of strategic interactions. Let's consider a simple case (a model), where there are only two countries that are identical in every respect, China and the USA, and a single lever for action, either to contribute or not to contribute to the reduction of CO_2 emissions. The benefit of the contribution is public i.e., accrues to both players, each country winning 100, but the cost is private equal to 150. Collectively, it would be in the interest of both countries to agree so that each contributes and earns 50 (a benefit of 100+100 minus a cost of 150). But this situation is not stable, given that each country has an individual interest in "cheating", i.e., letting the other contribute, without contributing itself, and hoping to end up with a free-riding benefit of 100. Ultimately, the only stable equilibrium is one where neither country contributes, which is the worst outcome at the collective level. Although a caricature, the example is not that far from reality. It closely matches the behavior of the US administration under President Trump's two terms, with the withdrawal of the USA from the Paris Agreement and other decisions regarding carbon pricing which are further discussed below.

Of course, it would be wrong to conclude that all environmental treaties are doomed to failure. Some famous counter-examples exist, such as the Montreal Protocol (1987), which was negotiated in record time and led to a drastic reduction in chlorofluorocarbon (CFC) emissions worldwide in less than ten years, thus preserving the stratospheric ozone layer that protects the biosphere from UV radiation. As argued by Barrett (1999), this counter-example is edifying in many ways, as it shows how much more complex the situation is in the case of CO_2. The damage caused by CFCs (cancer) was immediate (and not to future generations) and directly affected the main emitters. The situation is much more heterogeneous for climate change. In the case of CFCs, the cost-benefit analysis was clearly favorable, even for unilateral national measures, which meant that national consensus was easy to achieve and there was no global prisoner's dilemma. Emission sources were limited to a few countries and a few sectors (mainly refrigeration and aerosols), and substitution technology was known and cost-effective. In the case of CO_2, emission sources are multiple, linked to the ubiquity of fossil fuel combustion, and the transition to sustainable energy substitutes is characterized by high levels of uncertainty. Finally, the USA played a leading role in the negotiation of the Montreal Protocol, whereas its leadership has been much more inconsistent in the case of climate policy.

5. Why Carbon Pricing? A Climate Policy Instrument

As a thought experiment, let us consider a different world where three conditions prevail. First, every single gram of carbon-equivalent greenhouse gas in the atmosphere can be traced back to its human origin i.e., a specific person. Second, the social cost is known with certainty i.e., a metric which encapsulates in a single number all present and future suffering on Earth generated by this additional gram of carbon in the atmosphere. Third, there is a magic button which converts this social cost into an immediate and proportional pain for the responsible person.

Imagine now that you press the button. What happens? All controversies, past and present, regarding climate change instantaneously disappear. They are replaced by myriad individual decisions from agents who suddenly and fully realize all the consequences of their carbon emissions. Now they logically seek to reduce emissions through the best available alternative. The magic button assures that individual incentives yield the best outcome at the aggregate level, i.e., for the whole society.

Let us come back to reality but keep in mind the three conditions of the thought experiment. The basic message is that building a mechanism which would make each person generating new carbon emissions bear the full cost of all consequences has the potential to turn the tables. The very market forces that are at the origin of climate change could be tamed to powerfully contribute to mitigation.

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And the good news is that two mechanisms do exist to perform such a task: carbon taxes and emission trading systems (ETS).

Carbon taxes are – if a political consensus existed - administratively quite simple. They consist of estimating the carbon content of a given production or consumption and making the producer or consumer pay for it using an appropriate carbon price. As in our thought experiment, the tax generates incentives to curb down carbon emissions at the individual level. One conceptual difficulty is to find the appropriate carbon price, i.e., the level of the tax (practical difficulties also exist and are listed below).

ETS follow a different logic. They consist of attributing a limited number of transferrable emission permits (TEP) for a given period to the emitters. Each emitter can then either buy or sell TEPs on a newly created carbon market where the price fluctuates according to supply and demand. Over time, the total number of attributed TEPs is reduced corresponding to the objectives of emission-curbing, leading to a price increase. Unlike a tax, the carbon price does not need to be set in advance, but it can fluctuate significantly depending on economic conditions. On paper, the TEP system generates similar incentives as the tax, but through a different institutional setting.

Although the rationale behind these two instruments is well sound, there are a number of important caveats in practice. First, to assure political acceptance, efficiency objectives must be complemented by equity concerns. This is particularly true for the carbon tax, which is often accused of falling disproportionately on the poor, and which implies delicate equity-efficiency concerns regarding the redistribution of the tax income (e.g., Baranzini and Carratini, 2017, or Känzig, 2023). Second, actual policies are influenced by lobbies and the most powerful of them are not necessarily representative of the population. Incentives are stronger for smaller groups, because net benefits per individual player are larger, as famously advanced by Olson (1965). As a result, important sectors (e.g., transport) are often exempted from stringent carbon policy, undermining the efficiency of the policy (e.g., Thalmann and Thalmann, 2025). Third, not only is carbon pricing heterogenous across sectors, it differs also between countries. This generates fears of unfair competition by countries with lower carbon prices and may motivate the adoption of border tax adjustments by importers (e.g., Fontagné and Schubert, 2023). Preserving the environment may thus be on a collision course with the defence of an open and rule-based multilateral trading system, as analysed by the 2022 report of the World Trade Organisation (WTO, 2022).

Given these shortcomings, carbon pricing as a policy instrument is both praised and debated. On the one hand, it is recommended by experts and international organizations (e.g., HCCP, 2017) and has probably contributed to curb down European greenhouse gas emissions in recent years (The Economist, 2024). On the other hand, its application is far from universal and other policy measures exist to achieve national targets. Technical requirements, green subsidies or climate funds (e.g., Nick and Thalmann, 2022) are also considered and discussed. As we shall see below, even if not associated with taxes or ETS, setting a price on carbon remains crucial in this discussion.

6. Why Carbon Pricing? A Social Accounting Yardstick

A key assumption of the above thought experiment is that it is possible to measure the cost of an additional unit of carbon released in the atmosphere. Given that effects span worldwide and across centuries, this may seem unfeasible. It is not. For decades, complex simulation models called Integrated Assessment Models (IAMs) have allowed researchers to estimate the monetary value (in USD or local monetary units) of damages generated by the release of one additional ton of carbon equivalent into the atmosphere, in principle covering all damages worldwide and across all present and future generations. This metric is called the social cost of carbon (SCC). It is not an infinite number, because future costs are reduced using an appropriate discount rate to account for expected future growth and time preference (e.g., Gollier, 2024).

IAMs are complex algorithms which include modules to simulate the evolution of the climate under alternative scenarios, to convert climate change into damages to human populations and to convert those damages into costs. The pioneering contributions of William Nordhaus in this domain

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have earned him the 2018 Nobel Memorial Prize in economics. Given the significant uncertainty, IAMs typically generate a distribution of SCC values around a central case. In spite of some controversies (e.g., Aldy et al., 2021, and Stern and Stiglitz, 2022) it is fair to say that IAM methodology has greatly improved over time. Recent IAMs, such as the Greenhouse gas Impact Value Estimator (GIVE) model of RFF-Berkeley, generate up-to-date and science-based SCC estimates. The recent survey by Rennert et al. (2022) puts a central value of the SCC at USD 185 per ton of CO2, well within the range of the recommended levels of the US Biden administration (between USD 120 and 340 per ton, see EPA, 2022).

SCC values are crucial for policy guidance. In the climate policy domain, they can be used to evaluate the cost of inaction (i.e., keeping on with business-as-usual trends), to identify the most cost-effective policy measures and to select their optimal mix under a variety of scenarios. They are also useful for cost-benefit analysis of other policies that involve changes in greenhouse gas emissions, e.g., in the energy and transport sectors. This explains why they are increasingly used in a variety of countries.

Probably the best proof of the relevance of SCC figures is a negative one i.e., the relentless efforts by the two Trump administrations to downplay those figures. In both cases, it started by disbanding the Interagency Working Group in charge of SCC estimates. In 2017, it twisted the rules as much as possible to generate a very low level of the SCC. The central value reference dropped from USD 50 to less than 10 per ton. In 2025, it opted for an even more radical approach, instructing federal agencies to “not monetize” climate impacts at all, claiming that there was too much uncertainty involved. This is quite ironic, as most experts will concur that greater uncertainty calls for more stringent climate regulation, not less (Moore et al., 2024, or Howard et al., 2025).

7. Why Carbon Pricing? A Way to Look Ahead

Given the extent of the problem and the lack of commitment of the major players, it is tempting to give up any hope of serious measures undertaken on a significant scale to mitigate climate change. However, even if economists are sometimes called “dismal scientists”, most of them would still agree that such a dire vision is misplaced for at least three reasons.

First, coming back to our thought experiment, it is not only the second condition, i.e., the possibility to measure the costs, which is partially fulfilled in reality (through SCC estimates). The other two conditions are not completely out of reach either. Even if it is not possible to attribute precisely the responsibility for every single gram of carbon released into the atmosphere, the widespread adoption of greenhouse gases inventory standards since the 90s has greatly improved our perception of the problem and our understanding of the most appropriate ways to tackle it, which earned Al Gore and the Intergovernmental Panel on Climate Change the Noble Peace Prize in 2007. Besides, in spite of many practical difficulties, climate policy is now a recognized part of the national and international agendas, and carbon pricing is core in the set of related instruments.

Second, beyond the stop-and-go nature of US politics and the outrage of climate activists, recent trends at the global level are towards more, not less climate action. According to the last World Bank report (World Bank, 2025), the share of global emissions directly covered by carbon pricing has risen from 12% to 28% in the last ten years, and their price has roughly doubled, even if it remains way below the central value of the above-mentioned recent SCC estimates. Sadly, these efforts - which are challenged by the present US administration - are insufficient to reverse present trends in GHG emissions. But this mechanically implies that future estimated values of the SCC are bound to increase, raising the stakes for urgent climate action and strengthening research of all types to cope with our complicated future.

Third, this is a complex and long-term game in which it is crucial to stick to fundamental economic principles, i.e., concepts that have been validated over time, even when they appear counter-intuitive. Economists are well experienced in that. It took a century for most observers to admit that centrally-planned economies, which looked sound on paper, often led to economic fiascos because they failed to nurture the positive aspects of market mechanisms. Likewise, it took fifty years

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after World War II to create the World Trade Organization and its non-discriminatory framework, even if the process has stalled and protectionism is now back with a vengeance. This does not mean that the underlying concepts were flawed, but rather that they have become progressively misaligned with national politics and proved unable to be applied at a global scale, at least in their present form.

Unfortunately for those calling for urgent action, global climate policy will likely face a similar fate, as illustrated by the disillusionment following the Paris Agreement. Yet, the lack of an ambitious and binding agreement at the global level should not be seen as proof of definitive failure. Rather, in line with the "polycentric view" of Elinor Ostrom (see Ostrom, 2014, or Milinski and Marotske, 2022) or the "climate clubs" of William Nordhaus (2015), the attention should focus on those limited initiatives that do exist. As long as these initiatives are based on solid evidence and incentives, such as carbon pricing, they will flourish and may develop into a substantive tool for mitigation.

To conclude and in other words economists have no magic button to address climate change. However, there is an economic prism through which one can look at the future to spot what really matters in the long run. Because prices are powerful indicators, and in line with Blanchard et al. (2023), most economists believe that carbon pricing will be part of the solution.

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