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Political economy constraints on carbon pricing policies: What are the implications for economic efficiency, environmental efficacy, and climate policy design?

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HIGHLIGHTS

- Political economy constraints can bind carbon pricing policies.
- These constraints can prevent implementation of theoretically optimal carbon prices.
- U.S. household willingness-to-pay for climate policy likely falls in the range of $80–$200 per year.
- U.S. carbon prices may be politically constrained to as low as $2–$8 per ton of CO_2.
- An opportunity space exists for improvements in climate policy design and outcomes.

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ABSTRACT

Economists traditionally view a Pigouvian fee on carbon dioxide and other greenhouse gas emissions, either via carbon taxes or emissions caps and permit trading ("cap-and-trade"), as the economically optimal or "first-best" policy to address climate change-related externalities. Yet several political economy factors can severely constrain the implementation of these carbon pricing policies, including opposition of industrial sectors with a concentration of assets that would lose considerable value under such policies; the collective action nature of climate mitigation efforts; principal agent failures; and a low willingness-to-pay for climate mitigation by citizens. Real-world implementations of carbon pricing policies can thus fall short of the economically optimal outcomes envisioned in theory. Consistent with the general theory of the second-best, the presence of binding political economy constraints opens a significant "opportunity space" for the design of creative climate policy instruments with superior political feasibility, economic efficiency, and environmental efficacy relative to the constrained implementation of carbon pricing policies. This paper presents theoretical political economy frameworks relevant to climate policy design and provides corroborating evidence from the United States context. It concludes with a series of implications for climate policy making and argues for the creative pursuit of a mix of second-best policy instruments.

1. Introduction

Climate change presents a pressing and wide reaching environmental risk requiring a proactive response. Yet policy and market responses to address the external damages associated with greenhouse gas (GHG) emissions have been piecemeal and insufficient to date. As such, the carbon intensity of the global energy supply has remained essentially static since 1990, despite increased policy action intended to address climate change (IEA, 2013).

Economists have traditionally conceptualized climate change as a conventional environmental externality, albeit one with complex causes and damages that are particularly dispersed by timing, geography, and magnitude (Nordhaus, 1992; Stavins, 1997; Stern, 2007). As such, the traditional economic prescription for climate externalities involves establishing a Pigouvian fee (Pigou, 1932) on the sources of GHG emissions that corrects for the un-priced externality, either via a tax on carbon dioxide (CO_2) and other GHGs (a "carbon tax") (Metcalf and Weisbach, 2009) or via a market-based emissions cap and permit trading mechanism ("cap-and-trade") (Stavins, 2008).[1] If these instruments successfully establish a carbon price equal to the full climate change-related external costs associated with emissions of CO_2 and other

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GHGs (the so-called "social cost of carbon"), they will equalize the marginal social and private costs of GHG emitting activities, restoring a Pareto optimal level of emissions (see Online Supplement 1 for more).

Considerable debate has been devoted to the relative advantages and disadvantages of carbon taxes versus cap-and-trade given the particular nature of climate-related externalities. Yet both market-based policy instruments rest upon a common economic foundation and in practice can be designed to yield equivalent results (Aldy et al., 2010). This paper thus refers to carbon taxes and cap-and-trade instruments collectively as "carbon pricing policies."

The economic literature on climate policy and instrument choice is substantial. The bulk of this literature has assessed single instruments or compared two or more instruments against one another, including carbon pricing policies (carbon taxes, cap-and-trade programs, or hybrid approaches), traditional "command-and-control" regulations, and production quotas and subsidies for low-carbon energy sources (Bennear and Stavins, 2007). These analyses regularly find carbon pricing policies to be the most economically efficient or "first-best" response to climate-related externalities or the most cost-effective way to accomplish a given emissions mitigation objective (Aldy and Stavins, 2012; Metcalf and Weisbach, 2009; Nordhaus, 1992, 1994, 2008; Stavins, 1997, 2008). Most economists therefore typically favor carbon pricing policies over other prescriptions and generally argue against a mix of overlapping policy instruments, such as carbon pricing alongside subsidies or mandates for renewable energy sources or sector-specific emissions regulations (e.g., Fankhauser et al., 2010). See Lehmann and Gawel (2013) for a summary of economic critiques of overlapping climate policy instruments.

Despite the substantial volume of economic literature arguing for carbon pricing as the "first-best" or optimal response to climate externalities, policy makers have in practice routinely implement a mix of multiple, overlapping instruments. This may include carbon pricing instruments, other energy or output taxes, subsidies, command-and-control regulations, as well as a variety of voluntary programs or information measures (Bennear and Stavins, 2007; Lehmann, 2012; Sorrell and Sijm, 2003). For example, EU member states are subject to the EU Emissions Trading Scheme, a major carbon cap and permit trading program, as well as national targets for renewable energy adoption and energy efficiency, which have been implemented via a variety of domestic support policies (i.e., feed-in tariffs and other subsidies, standards, and production quotas). Furthermore, most EU member states have implemented additional carbon or energy taxes in a variety of sectors. Similarly, policy makers in California have responded to statewide GHG emissions reduction targets established by Assembly Bill 32 by establishing a portfolio of frequently overlapping policies, including renewable energy support schemes, renewable transportation fuels standards, energy efficiency incentives, an emissions portfolio standard for new power plants, and a cap-and-trade program for major emitters. The real-world prevalence of multiple policy instruments is by no means limited to climate policy and is in fact the norm in environmental and natural resource management domains (Bennear and Stavins, 2007).

While the use of multiple, overlapping environmental policy instruments often seems to economists to be an unfortunate and inefficient departure from economic principles, a growing body of research has explored a variety of potential rationales for a mix of climate policies (Bennear and Stavins, 2007; Fischer and Newell, 2008; Fischer, 2008; Jaffe et al., 2005; Lehmann and Gawel, 2013; Lehmann, 2012; Sorrell and Sijm, 2003; Twomey, 2012). In general, this research justifies the use of multiple policy instruments in a "second-best" world in which one or more constraints within the general equilibrium system prevent attainment of the Pareto optimal conditions (Lipsey and Lancaster, 1956; Bennear and Stavins, 2007). In the context of climate policy, this body of second-best theory implies that addressing climate-related externalities with a carbon pricing instrument alone may be suboptimal in the presence of one or more binding constraints. These constraints may include additional market failures, policy failures, institutional capacity limitations, prohibitive transaction costs, or political economy constraints (Bennear and Stavins, 2007; Lehmann, 2012).

To date, the literature extending second-best theory to climate policy design has focused predominately on the presence of multiple market and private coordination failures that may necessitate additional policy instruments alongside Pigouvian carbon pricing policies (Lehmann, 2012). For example, knowledge spillovers inhibiting low-carbon technology innovation may justify additional R&D subsidies or early deployment policies to induce learning-by-doing (Fischer and Newell, 2008; Fischer, 2008; Jaffe et al., 2005; Lehmann, 2013; Nemet, 2013) while information asymmetries and principle agent failures may necessitate additional energy efficiency standards or labeling measures (Bennear and Stavins, 2007; Jaffe et al., 2005). Other research has focused on institutional capacity limitations or transaction costs that may prohibit efficient implementation of first-best policy instruments (Bennear and Stavins, 2007; Lehmann, 2012).

While these constraints are critical factors in climate policy design, comparatively little research has focused on the presence of powerful political economy constraints that routinely impact efforts to implement carbon pricing policies.[2] Social welfare can be maximized under an efficiently implemented carbon tax or cap-and-trade system and government revenues may theoretically be recycled in a manner that maximizes overall welfare (Goulder, 1998). Nevertheless, the imposition of a carbon price causes consumers and producers alike to experience both a private welfare loss and a transfer of surplus to government tax revenues (see Online Supplement 1). By design, pricing carbon will increase factor prices for carbon-intensive energy products and other intermediate and end-use products that involve GHG emissions during production or distribution. This increase in factor prices will cause a redistribution of economic resources as production and consumption shift to a new, less carbon-intensive equilibrium. While general equilibrium analysis traditionally assumes the transition from one market equilibrium to another is costless or "frictionless," such transitions in reality can impose substantial private costs, even if social welfare is maximized in the end. Several industrial sectors possess a high concentration of assets that would lose considerable value under carbon pricing policies. These sectors are thus likely to mount vociferous opposition to such policies (Murphy, 2002). Capture of the regulatory process by industrial interests (Stigler, 1971) may also result in suboptimal instrument choice or design (Keohane et al., 1998). The diffuse nature of the climate externality also presents a classic collective action challenge (Olson, 1984) and principal agent failure (Eisenhardt, 1989), resulting in a relatively low willingness-to-

[1] The notion of a tax to correct environmental externalities is generally traced back to Pigou (1932), while much of the literature on tradable permits to address externalities traces back to Coase (1960), with further formal development of a system of tradable permits to address environmental pollution credited to Dales (1968) and Montgomery (1972).

[2] Notable exceptions include Del Rio and Labandeira (2009) who use institutional path dependence and public choice frameworks to explore barriers to the introduction of carbon pricing policies in the Spanish context and Gawel et al. (2014) who develop a public choice framework to analyze the rationales for a mix of emissions trading and renewable energy support policies in the EU context.

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