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Policy Durability: Taxes versus Standards

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In the realm of economics, efficiency is king. However, the influence of politics is undeniable: It shapes economic intuition and strikes a delicate balance between economic efficiency and political motives (e.g., Frieden, 2020). To further investigate this claim and shed new light on the topic, we delve into environmental policy choices within democratic regimes, taking a political-dynamic perspective. In doing so, we aim to illustrate how political economy may influence decision making when designing policy.

While economics focuses on the efficient allocation and distribution of resources (Nordhaus, 2019), it aims to maximize efficiency and overall societal welfare. Economic analysis helps identify trade-offs and quantify the costs and benefits associated with different policy options, evaluating the efficiency and effectiveness of policies. As a result, economists often advocate for policies that promote economic growth, market competition, and resource allocation based on market forces (e.g., Birdsall et al., 1993).

Nonetheless, political actors like governments and policy makers have diverse objectives, including maintaining political power and promoting their ideologies. Considerations of public opinion, electoral cycles, and power distribution often drive these political decisions (e.g., Canovan, 2002; Adams et al., 2004). Policy makers face trade-offs when making decisions, which may lead to compromises between different groups and adopting policies that may not align with economic efficiency.

Although politics and economics are distinct fields, they are interconnected and influence each other in various ways. Political economy stems from the realization that political entities run the world and studies how political and economic forces interact and influence each other (e.g., Drazen, 2002; Anderson, Rausser, and Swinnen, 2013; Grossman and Helpman, 2020). It explores how political institutions, policies, and interests shape economic outcomes.

Political factors can shape economic policies and regulations. At the same time, economic conditions and outcomes–such as unemployment and economic growth–can influence political dynamics and electoral outcomes. Understanding the interplay between politics and economics is crucial because it helps policy makers navigate the complexities of decision-making and formulate policies that consider both political feasibility and economic efficiency. Below, we discuss balancing political objectives and economic realities, emphasizing the importance of policy durability. Policy durability refers to the ability of a policy to withstand political changes and remain effective over an extended period, achieving long-term stability of the policy approach. We focus on stability and consistency in policy design, implementation, and outcomes, implying that the policy framework remains intact and functions effectively despite changing political landscapes.

The Political-Economic Environment

To help organize the discussion and identify the critical variables and their relationships with each other, we make the following assumptions on the underlying beliefs and premises of the political-economic environment guiding the policy choices. That is, we make four key assumptions underpinning policy choices that facilitate transitioning the regulated industry toward cleaner technologies over time.

We first start with the Putty-Clay hypothesis, assuming a fixed input-to-output relation in the short run (Johansen, 1972) but a more flexible one in the long run. In the long run, firms may adopt new (more precise) technologies that reduce pollution and conserve resources but require investments (Caparros, Just, and Zilberman, 2015). Second, we assume that policy makers utilize policy instruments to facilitate the transition to cleaner technologies, which often necessitates irreversible investments in equipment—sunk costs that, once incurred, cannot be recovered if policy makers reverse a policy decision. Once firms invest in cleaner equipment that requires a substantial financial commitment, they are more inclined to persist with cleaner technologies

over time. For example, the California Air Resources Board imposed air quality regulation for decades, building technological capabilities, developing relationships with the state legislature, and increasing the number of those benefiting from the technology over time (Hanemann, 2008; Pahle et al., 2018). A policy initiated in the 1970s yielded coalitions supporting renewable energy manufacturing, installation, and renewable energy investments, which grew over time (Kelsey et al., 2013). Third, heterogeneity among firms, measured through the variability of the firms' technical coefficients, is inherent in any industry (Lyubich, Shapiro, and Walker, 2018), resulting in not all actors readily adopting new technologies to comply with environmental regulations. Some firms may choose to cease operations altogether. The fourth assumption, learning by doing, significantly reduces costs over time as firms gain experience and expertise in implementing cleaner technologies, reducing costs and thus making the cleaner technologies more economically viable in the long run (Way et al., 2022).

Basing the discussion that follows the above premise, we explore policy makers' policy choices over time, assuming a two-party democratic regime where one of the parties places more weight on the environment. We first focus on using a tax and how politics can lead to deviations from the economically efficient policy, such as the Pigouvian tax. The Pigouvian tax is a cost-efficient pollution tax. It aims to internalize the external pollution costs by taxing activities that generate negative environmental impacts. However, political considerations often influence the implementation and level of taxation. Next, we expand the policy choices faced by the incumbent government and delve into the selection of policy instruments, specifically the decision between taxes or standards. Here, we argue that political economy considerations are paramount in shaping the preference for standards over taxes.

The Optimal Political Tax Is Different from the Cost-Efficient Pollution Tax

Policy makers realize that they may not get reelected and that future governments may reverse their policy decisions. Thus, policy makers strive to design policies that tie the hands of future governments. Focusing on executive orders in the United States between 1937 and 2013, Thrower (2017) showed that reversing policy is costly and that the higher the cost of switching policy, the less likely the reversal is. By establishing frameworks that limit subsequent administrations' discretion, policy makers provide the certainty and stability necessary for long-term planning and investment in cleaner technologies. Balancing the desire for reelection with the desire for a lasting legacy becomes a delicate task in shaping effective and enduring tax policies.

The framework highlights policy makers' craftsmanship of policy durability, referring to the ability of a policy to remain in effect and maintain its intended outcomes over an extended period. Policy durability encompasses a policy's stability, longevity, and resilience in the face of potential changes in political circumstances. The incumbent, pro-environment government enhances policy durability by providing a formal framework more resistant to immediate changes in political leadership.

The importance of policy durability in Western democracies striving to transition to cleaner technologies shows that uncertainty regarding future governments yields a higher pollution tax than otherwise—a pollution tax that is higher than the tax chosen when assuming no political uncertainty. Incumbent governments respond to political uncertainty by implementing policies incentivizing the early use of clean technologies (Hochman and Zilberman, 2021). Real Option Value theory predicts that, given irreversibility and uncertainty about demand and supply, firms will delay decisions involved in capital-intensive investments (e.g., Arrow and Fischer, 1974). However, we show the opposite to be true under political uncertainty. Political uncertainty leads governments to incentivize the early use of technologies. The pro-environment incumbent government favors policies that place more weight on the early adoption of cleaner technologies than those chosen by a central planner aiming to maximize social welfare.

However, it is essential to note that policy durability is not guaranteed. Political, economic, or social shifts can challenge the continuity of policies. Changes in political leadership, shifts in public opinion, or financial crises can lead to the reevaluation or even the abandonment of policies. Maintaining policy durability requires ongoing efforts to navigate changing circumstances, build coalitions, and adapt policies to new challenges while preserving their core objectives.

Dynamics and Policy Design

The dynamics of policy design over time require policy makers to navigate a complex landscape of policy instrument selection, where we limit the discussion to the factors affecting decisions over time. That is, we define dynamics over time. While considering the strengths and limitations of various instruments, politicians select the most appropriate for achieving the desired political outcomes, leading to an exciting trade-off over time when comparing a tax to a standard.

There are numerous successful examples of governments mandating technological change, including substitutes for chlorofluorocarbons (Ashford et al., 1985; McFarland, 1992), flue gas desulfurization systems for SO2 control in the power sector (Popp, 2003; Taylor et al., 2005), and automobile emissions (Lee et al., 2010). Other examples also led to government intervention and include concerns about climate change and the environment (Rajagopal et al., 2007; Collier, Conway, and Venables, 2008; Hellegers et al., 2008; Maibach et al., 2008; Bulte and Damania, 2008, among many

others), food security and resilience (Upton, Cissé, and Barrett, 2016), and the agricultural sector's economic viability (Sunding and Zilberman, 2001; Spicka et al., 2019). However, the economic literature usually criticizes the mandating of technological change, objecting to the effectiveness of command-and-control (Jaffe et al., 2002; Bansal and Gangopadhyay, 2005) and arguing that firms are often unclear on the cost of compliance (Miller, 1995; Kemp, 1997; Gerard and Lave, 2005) and the regulators' ability to enforce regulations (Lutz et al., 2000; Bansal and Gangopadhyay, 2005; Gerard and Lave, 2005; Mohr, 2006; Puller, 2006; Mickwitz et al., 2008). Although economists advocate for market incentives like a carbon tax, most of the policies ushered were through regulations and subsidies (Goulder et al., 1999).

Nonetheless, from a political perspective, using standards in the short run can provide distinct advantages over taxes, especially in transitioning industries toward cleaner technologies. The standard achieves a given pollution target with more employment than a tax. We extended Hochman and Zilberman's (2021) framework and concluded that policy makers opt for standards when advanced technologies are not readily available. By mandating specific equipment and practices, standards require investments that lead to irreversible outcomes. Once stakeholders commit to these investments, they are more likely to adhere to the standards. To this end, if both the standard and the tax lead firms to adopt the same pollution control technology, then a standard is preferred by the firms where the tax burden causes firms to exit in the long run and the surviving firms become more spatially concentrated (Wu, Segerson, and Wang, 2022).

When considering the choice between implementing taxes or standards as policy instruments, it is essential to understand the dynamics and implications of each approach. While taxes, such as Pigouvian taxes, aim to internalize the external costs of pollution by imposing a financial burden on activities that generate negative environmental impacts, they incentivize firms to reduce emissions or adopt cleaner technologies to minimize the tax burden and encourage cost-effective pollution reduction. On the other hand, standards set specific requirements or limits on emissions and pollution levels or technological specifications that firms must meet, driving the adoption of cleaner technologies by mandating specific equipment or practices. Thus, regulation encourages irreversible investments in cleaner technologies. Standards achieve this goal while having less of an impact on employment than a tax would (Hochman and Zilberman, 1978).

We argue that the choice between taxes and standards is not a one-size-fits-all decision and depends on various factors, including the specific context and stage of technological development, and that political economy considerations often come into play in this choice. When advanced clean technologies are not yet widely available, standards that require irreversible investments may be more effective. The initial cost of adopting cleaner technologies may reduce short-term profits. Still, the commitment to these investments promotes long-term adherence to the standards with a lower employment price tag. However, as technology advances and adoption rates increase, financial incentives such as taxes may become more viable. Over time, larger coalitions supporting the transition to cleaner technologies can influence the political landscape, making it easier to implement a tax policy as firms have more economically viable alternatives.

Policy Choices

To understand better policy choices and their effect on adoption rates, we introduce two terms, intensive and extensive margins. Intensive margins refer to the level of effort or investment per unit of output of an active firm. In contrast, extensive margins refer to the change in the overall production level due to new firms entering the industry or other firms becoming idle and exiting the industry. Environmental policies, taxes, and standards can affect the intensive and extensive margins differently. A tax on emissions, for example, would increase the cost of production and reduce the profit margin per unit of output, encouraging firms to reduce their production levels and lower the extensive margin. When firms can invest in cleaner technologies, the tax would incentivize them to invest in technologies that reduce emissions and improve efficiency, which would increase the intensive margin. On the other hand, standards would require firms to meet a specific emissions target or efficiency standard, which may incentivize firms to invest in cleaner technologies to meet these standards. However, it may also force firms to exit the industry. To this end, under a broad and plausible set of conditions (Hochman and Zilberman, 2023), the standard’s effect on forcing firms to exit the industry is more pronounced than the effect of a tax.

The differences between a tax and a standard affect the choice of the policy instrument over time. The dynamics of technological change and uncertainty about political outcomes lead the pro-environmental incumbent government to select stricter policies, thus increasing the adoption of capital-intensive technologies and establishing results that are difficult to reverse. Although in the short run, when conservation and abatement technologies are either unavailable or in their infancy with only the prototypes and pilot projects introduced, the standard is preferred to a tax from a political vantage point, even though efficiency strongly recommends using market-mediated policies such as a carbon tax. However, as innovations yield more conservation and abatement technologies, taxes also become the preferable policy from a political-economic perspective.

The analysis suggests using standards to control pollution, especially at the early stages of regulation, and

emphasizes investment in research and development (R&D) to develop abatement technologies. Besides, the research indicates a transition to pollution taxes likely in the long run when new cleaner technologies are more effective. Crucial from a political-economic vantage point is the ushering of policy that minimizes effects leading to reducing the industry's capacity yet achieving the needed switch to cleaner technologies with less loss in employment and consumer welfare.

Concluding Remarks

This article highlights the importance of introducing technological innovations that enable modifications of existing assets. Societies with infrastructure capabilities that can develop technologies that allow fixed asset changes will have lower costs over time and experience less difficulty when introducing environmental regulations. For example, policy design should consider advancements in information technologies and harness these technologies to introduce precision technologies that can reduce pollution emitted by existing units (Khanna and Zilberman, 1997). Precision technologies reduce waste and minimize agriculture's environmental footprints, thus alleviating environmental degradation. Some examples of precision technologies include precision sprays and weeding robots. These technologies may lead to a less painful transition to a greener economy. These concepts also address other considerations, such as providing credit incentivizes investment in new technologies and their adoption in the early stages of development, thus enhancing learning by doing. The diffusion of the technology that supports the advancement of new conservation technologies needs to subsidize R&D and incentivize adoption to become socially impactful (Zilberman et al., 2022).

For More Information

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