From negative to positive carbon pricing in Mexico

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1. Motivations underlying the research

Over the course of a decade, Mexico transitioned from a peak of 1.8% of GDP given as fuel subsidies in 2008 to generating positive fuel tax revenues equivalent to 1.6% of its GDP in 2018. In this paper, we analyze Mexico's carbon pricing experience and its effects on the country's carbon emissions. The policy changes that were embedded in its mid 2010s energy and fiscal reforms have been described as containing "valuable lessons for other emerging countries wishing to carry out a broad-based reform of the energy sector" (OECD 2017; OECD/IEA 2021). Yet, scholarly work on Mexico's experience with graduality, fiscal innovation, and market structural changes in the transition from negative to positive carbon pricing, is scarce, especially the one linking it to their effects on reducing greenhouse gas emissions and advancing its Climate Change goals and commitments. This paper seeks to find out what are precisely those lessons that can help other countries overcome their fuel subsidy challenges, using politically feasible and resilient strategies, and then transition to a robust positive carbon pricing policy that supports a decoupling of GHG emissions from economic growth.

This paper contributes to the literature in three ways: First, it describes a subsidy reform that was followed by a strong positive carbon pricing in an emerging economy in Latin America. Given that the success of reforms elsewhere has been mixed (Clements, et al. 2019), Mexico stands out as a relevant example of how to circumvent its challenges (OECD 2017; OECD/IEA 2021). Second, uses an institutional economics lens to analyzes the features that are thought to have made the Mexican strategy successful; among them are its graduality, its ability to generate a long-term price signal, and its capacity to weave the momentum of the final stage of its subsidy phase-out into the strategy for structural change that made explicit and implicit carbon taxing a resilient element of Mexico's fiscal and environmental policy. Finally, this paper searches for the evidence of the outcomes of this transition. The substantial and sustained price increase experienced over the period analyzed was, theoretically, enough to alter significatively the carbon intensity of the Mexican economy through changes in its consumption of gasoline and diesel, and that needed to be documented.

2. A short account of the research performed

This paper follows a double path: first, it reviews changes to the institutional framework in Mexico, and its specific energy pricing and tax policies that allowed the subsidy phase-out and the introduction of a carbon tax and other fuel excise taxes to be established. Secondly, it estimates the effect this carbon pricing had on carbon emissions in Mexico, specifically the carbon intensity of its transportation sector, by developing policy counterfactual scenarios based on previously observed policy behavior and applying to the resulting price counterfactuals the estimates of price elasticities of demand for fuels previously obtained by the authors. Fossil fuel prices increases, brought on by carbon pricing policies, would have influenced firms and households' decisions to reduce the quantity of fuel demanded, caeteris paribus, via a diverse combination of actions taken both with a short and long term perspective, and these decentralized actions would be captured in the estimated price elasticities of demand for each fuel. By comparing the results to the country's NDC baseline, and reviewing other significant convergent policies, the paper estimates of the most likely effect of carbon pricing on the Mexican economy.

3. Main conclusions and policy implications of the work

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Mexico's government was giving, on average, *subsidies* of US$ 13 per ton of CO_2 to consumers these fuels in 2010; by 2019 *positive carbon prices* through a carbon tax and other excise taxes had changed the situation to imposing net taxation between US$ 91 and US$ 98 per ton of CO_2. The authors find evidence that this transitioning from negative to positive carbon pricing helped Mexico reduce the gasoline and diesel *carbon intensity* of its economy by 29% between 2010 and 2019. These changes were both gradual and structural, and the analysis points to these features as responsible for making positive carbon pricing politically feasible in its inception and resilient to political and economic change later on, including to the effect of the diverse price shocks experienced from 2020 onwards.

The paper approximates the magnitude of the avoided emissions using counterfactual scenarios and concludes that, in 2014, after the subsidy phase-out had been completed, the country was already emitting nearly 28.6 $MtCO_2$ less per year from the use of gasoline and diesel. By 2019, the avoided emissions were larger, approximately 39.8 $MtCO_2$ per year less than if the subsidy policy had remained in place. This reduction represents between 17% and 20% of Mexico's NDC baseline projection for transportation fuels for the period. The estimations show that 33% of the emissions reductions for gasoline and diesel can be attributed to the subsidy phase-out, 2% would be attributable to the explicit carbon tax, and the remaining 65% come from the carbon price implicit in the excise tax. Despite having different names, all carbon pricing instruments converge in Mexico to reduce fuel consumption and emissions, both in absolute and per unit of GDP.

One of the conclusions is that, if all elements of the current carbon pricing policy are maintained and supported with new regulations and investment in transportation and linked economic sectors, such that it allows consumers to be equally or even more fuel-price responsive, Mexico will be able to fully deliver on its updated transportation sector NDC commitments by 2030. Any higher ambition will require higher carbon prices.

Moving forward, Mexico can increase its carbon pricing via a revision of the rates of its federal taxes (carbon and excises): increasing the rate, phasing-out exemptions, and setting a uniform rate per tCO_2 for all fossil fuels. Similarly, the development of Mexico's Emission Trading System, plus the nascent state-level environmental taxation, are key policy instruments to further increase net carbon prices and their efficiency.

Mexico's phase-out of fuel subsidies, followed by the introduction of positive carbon pricing, is helping the country transition to a low-carbon growth path. Its experience, with graduality, fiscal and market structural changes, and a carbon pricing structure responsive to international markets, can provide important lessons for other countries, especially those that still have mounting fuel subsidy challenges and require a politically feasible strategy to overcome them.