Aiming for carbon neutrality: which environmental taxes does Spain need by 2030?

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1. Motivations underlying the research

On December 2019 the European Commission presented the Green Deal, a strategic plan with the ambition to achieve climate-neutrality by 2050. As part of this strategy, the Commission aims to reduce greenhouse gas emissions by at least 55% below 1990 levels by 2030, as an intermediate target. Consequently, in the next years European policymakers should design a set of policy instruments to significantly curb emissions. However, the direct impact of energy policies, international prices of fossil fuel, and economic activity on carbon emissions is no easy to address.

In this new ambitious policy context, Spain is seeking to pass a new climate law to cut its emissions to net zero by 2050. The current Spanish strategy for a long-term decarbonization sets a reduction of 23% in greenhouse emissions in 2030. The aim of this paper is to find the level of taxes on fossil fuels and on carbon consistent with targets for 2030 set by the current strategy (23%) and by EU commission (55%). The level of these taxes might provide a useful benchmark for policymakers, given the ambitious carbon target pointed out by the European Commission.

Our study uses a general equilibrium model where the government, to achieve its environmental target, taxes the consumption of oil, coal and natural gas, focusing on the long-run impacts. We identify the optimal mix of taxes on fossil fuels to curb emissions and to achieve a specific carbon target in a competitive equilibrium framework. We compare the optimal tax-mix to a standard carbon tax. Previous studies focused on the optimal tax on a specific fossil fuel, but, to best of our knowledge, there is a gap regarding optimal taxes on oil, natural gas and coal simultaneously.

2. A short account of the research performed

We use a general equilibrium model for a decentralized small open economy with a representative household, competitive firms, a government, and an external sector. These interact actively by trading final goods, foreign bonds, and three primary energy inputs: oil, natural gas, and coal. This model focuses on carbon emissions from energy use. In this theoretical framework we define the optimal tax-mix as the combination of tax rates on fossil fuels that minimizes the negative impact on household welfare in the steady state while achieving, at the same time, a specific target of CO2 emissions.

The aim of this paper is to provide a benchmark for policymakers, focusing on two carbon targets: the one set by current Spanish strategy for a long-term decarbonization and one the one set by the European Commission plan in 2030, which imply a decline in the level of emissions of 23% and 55%, respectively.

This model simulates energy consumption of Spain using historical data and market dynamics. The main conclusion is that there is the need for a substantial increase in fossil fuel taxes to achieve both carbon targets in the long run (23% or 55%). When we compare the actual tax mix with the optimal one, the misalignment for coal and natural gas is evident: for coal the tax rate should increase from the current 100% to around 460% or 760% depending on the target, and for natural gas should increase from the current 60% to around 130% or 260%. Contrarily, the current taxation of oil, 130%, is not

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so different from the model optimal, around 81% or 180% for each target. Alternatively, the two emissions cut targets could be achieved with a carbon tax in 2030 around 40 or 150 euros per ton of carbon dioxide (€/tCO2), respectively.

3. Main conclusions and policy implications of the work

In the new European climate strategy for 2030, Spain should reduce its carbon emissions significantly, around 55% in the next decade. This study, based on Spanish economic data, suggest that the domestic prices of fossil fuels need a substantial increase to achieve the carbon targets for 2030. This increase can be achieved through higher taxes on fossil fuels or by means of a substantially higher carbon price. We estimate that taxes on oil should increase around 50 percentage points to achieve a 55%-cut in emissions, taxes on natural gas should between twofold and fourfold, and taxes on coal, between fivefold or sevenfold, depending on the target. We also find that, alternatively, the carbon tax needed to achieve a 55% reduction is around 150 €/tCO2, similar to previous findings for other countries.

This study suggests that, for Spain, carbon taxes are an appropriate policy instrument to achieve the carbon target for year 2030 for three reasons: its simplicity, it penalizes the negative externality, and it is -almost- identical in terms of welfare losses to the optimal taxes on oil, natural gas, and coal.