Simulating the Socio-Economy-Environment Impacts of Ecotaxes in India: An Environmentally-extended Social Accounting Matrix Analysis

Topic:
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Climate mitigation strategies are on the rise across the globe to achieve commitments of net-zero carbon emissions. Pricing carbon, either directly or indirectly, provides a price incentive to the producers to gradually move away from the polluting sources of inputs or outputs. India has already amended its Energy Conservation Act in 2022 to implement carbon prices. Therefore, it is important to examine the impact of such governmental policies on the economy, and particularly households, who will bear the incidence of such taxes. For developing countries like India, the effect of such policies on marginalised and low-income households is a pertinent question that needs examination.

We aim to answer three questions in this paper: first, what is the incidence of proposed environmental taxes (ecotaxes) on the households in India; second, what are its impacts on the Indian economy, wages of the labourers, and environmental pollution; and third, how can revenue recycling dampen the impacts on the affected marginalised households. In this paper, we seek to analyse these issues using an Environmentally-extended Social Accounting Matrix (ESAM).

We have constructed an ESAM for India 2019-20 (CSEP-ESAM), which is used for this analysis. The CSEP-ESAM consists of households disaggregated by region (rural and urban), quintiles of annual consumption expenditures, and social categories identified in India (Scheduled Tribe (ST), Scheduled Caste (SC), Other Backward Caste (OBC), and Other Social Group (OSG)). The first three categories are marginalised groups in India. The level of disaggregation of industries, factors of production, households and environmental accounts provided in CSEP-ESAM is novel for India, both in terms of the level of detail and its recency. To the best of our knowledge, this work on the impacts of ecotax has not been not been attempted before in the India context using an ESAM.

To address our research questions, we have used the methodology of Verma (2021), which had altered the methodology of Datta (2010). This method has been used to analyse the incidence of a proposed carbon tax on 5 polluting sectors (fertilisers, aluminium, iron and steel, coal-powered electricity generation, and cement) by using a price-vector model for computing the change in the relative prices of the 45 sectors of production, 32 categories of labour, 1 category of capital, and 40 categories of households of the CSEP-ESAM. Thereafter, the relative price changes are used to measure the per-household tax burden on the 40 categories of households (2 regions, 4 social categories, and 5 quintiles) by computing the change in the budget shares for these households, to give the tax incidence for each household group. We analyse four ecotax scenarios which were determined by using the prevailing Goods and Services Tax rates in India â€“ 5%, 12%, 18% and 28% â€“ across the 5 polluting sectors.

The pollution coefficients for air emissions (GHGs), and land degradation have been used to compute their pollution share from the ESAM. The impact on the economy has been simulated by modifying the methodology proposed by Grottera et al. (2015), as also has been done by Verma and Sivamani (2022). The impact on the air emissions (GHGs) and land degradation have been computed by using the pollution coefficients from the ESAM.

We have applied the ecotax on the gross value of output (Output-Net Indirect Taxes) of the 5 polluting sectors. For each of these cases, we have looked at revenue recycling scenarios. The

revenue recycling values come in the form of government transfers to households, and are in proportion to the impact of the taxes on household incomes. For each scenario, taxes are recycled only for Quintiles 1 and 2. These are applied to either all social groups, or only the marginalised social groups (ST/SC/OBC). Further, these are either applied only to the rural sector, rural and urban equally, or slightly higher for the rural sector.

We find that ecotax policy scenarios appear to be progressive for both rural and urban India, depicting that the costs of these policies are not disproportionate across region or social categories. These preliminary findings suggest that revenue recycling can help reduce the impact of the ecotax on GDP and household expenditure, and further reduces the air emissions intensity compared to a no-recycling scenario.