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Carbon Taxes for Managing Climate Change

Financing climate change adaptation and mitigation will need to be addressed by the international community in the UN climate change conference scheduled for the end of 2009 in Copenhagen. Several economists and most recently, the International Monetary Fund (IMF)¹, have been advocating carbon taxation to mitigate climate externalities, and the potential such a tax might have in generating additional revenues for public finances.

Among the most important questions in evaluating the merits of carbon taxation are: What is the evidence regarding the effectiveness of carbon taxes in reducing emissions? What is the distributional impact of carbon taxes, particularly in developing countries? What are the likely overall development implications of environmental policies, since mechanisms for financing climate change adaptation and mitigation cannot be separated from development policy?

While climate change is a global challenge, developing countries are only responsible for a relatively small part of the accumulated stock and per capita contributions to current emissions of greenhouse gases (GHGs). Equity is an integral part of global climate change policy, as reflected by the principle of ‘common but differentiated responsibilities and respective capabilities’ in the UN Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. High-income economies have generated about 80% of past fossil fuel-based emissions, and hence, account for most of the damage.

However, from a long-term perspective, limiting that damage also requires developing countries to shift their energy and consumption needs towards low carbon options, because if they

continue to imitate the pattern of industrialized countries they will contribute substantially and increasingly to the future growth of emissions. The impact of global warming in several areas of relevance to human development has already become manifest, and the poorest developing countries will be affected most by its worst impacts, because of their geography, weak coping capacities, high concentrations of poverty and more vulnerable social, institutional and physical infrastructures.

IMF Carbon Tax Proposal

The IMF has recently argued in preference over direct regulation or performance standards that a tax on the most important energy-related greenhouse gas, carbon dioxide (CO₂), would be the most economically efficient way for managing climate change.² The Fund’s technical argument for the instrument is “Pigovian”³, i.e. a carbon tax has the potential to create an incentive for the "market" to produce and consume fewer fossil fuels, by making it more expensive for companies as well as consumers to pollute.

In support of the proposal, the IMF has conducted macroeconomic policy calculations for a uniform global carbon tax in advanced, emerging and developing countries based on a common carbon price. All countries are assumed to introduce the tax in 2013 and to make a credible commitment over the long run, adjusting the tax rate to achieve a global emission path peaking around 2018, and then gradually declining to 40% of the 2002 levels by 2100. In this scenario, the carbon price would have to rise gradually over time, reaching \$86 per ton by 2040 (an average

¹ International Monetary Fund (IMF); World Economic Outlook, April 2008.

² IMF; Finance and Development, 45 (1), March 2008.

³ A Pigovian tax (named after the economist Arthur Pigou) is a tax levied to correct negative externalities (in this case, carbon dioxide) of market activity, ostensibly to accurately reflect the cost to society.

annual rate of about \$3 per ton of carbon), corresponding to a \$0.21 increase in the price of a gallon of gasoline over current levels, and a \$58 increase in the price of a short ton of bituminous coal by 2040.

The transition of economies towards a low-carbon path would mainly be achieved by the application of new technologies. The IMF has also argued that a carbon tax provides a potential double dividend through its contribution to government revenues. This could ease pressures on public finances and offset adverse distributional effects of the tax.

Economic and Developmental Implications

A major shortcoming in the core argument of the IMF for preferring carbon taxes to other instruments is the fact that a “Pigovian tax” is efficient only if set to be equal to the monetary value of damages caused by emissions. The knowledge required to do so is generally not available, and estimates of damages caused by carbon emissions vary hugely, because of the different assumptions made to value inter-temporal trade-offs or non-monetary damages, or to account for incomplete information and uncertainty.

The range of estimates of the appropriate carbon tax rate is equally large in the economic literature, from a low \$2 per ton of carbon dioxide in one estimate to a high of \$240 per ton (scheduled to be applied by 2020) in another. Even the higher tax of \$240 translates into an increase of only \$2.40 per gallon of petrol, which is close to the rise in gasoline prices in the United States over the last two years. The IMF policy scenario, suggesting a tax at \$71 per ton of carbon dioxide by 2040 is clearly in the lower range of suggested tax rates and there is no confidence that this will suffice to reduce the expected damages from climate change.

The most serious questioning of carbon taxes is because of their adverse distributional impacts. Carbon pricing will affect the level and distribution of households’ real incomes, directly through their own use of fossil fuels, and indirectly through the prices of other commodities. A carbon tax is

generally estimated to be regressive in developed countries, with lower income households paying disproportionately more environmental compliance costs. In developing countries, although some studies have found otherwise (because of different treatment regarding prices of biomass), there is broad consensus in the literature that the regressivity of a carbon tax will be even greater. The actual distributional impact will depend on the burden borne by the consumer, rather than the supplier of the commodity, but in the short run, consumers will carry the full costs.

Furthermore, regardless of the share of spending, a high tax on an essential good (e.g. energy, but also food or water) could render it unaffordable by lower income groups. This would not only be regressive, it would also be socially unacceptable and environmentally unpredictable. For example, if fossil fuels are priced too high, poor rural and peri-urban household may switch to using traditional fuels such as firewood and biomass. This distributional burden could be compounded by the indirect impact of carbon pricing on other commodities such as food or water.

A salient feature of a uniform global carbon tax, as proposed by the IMF, even if introduced gradually, would mean that developing countries are taxed at several times the rate of industrial countries, as a proportion of their GNPs. This would impose a disproportionate burden of adjustment on developing countries, although per capita emissions in developing countries are low compared with those in industrial countries.

While the Fund acknowledges that cross-border financial transfers may be needed to assist developing countries in dealing with adjustment pressures, these have not been included in its macroeconomic policy considerations. The only defensible principle from an equity perspective would be a carbon tax levied on the basis of per capita carbon emissions, which would reverse the distributional burden of the tax.

The IMF modeling exercise assumes that developing countries have lower marginal abatement costs, and this justifies placing higher

burdens of emission charges on their economies. In the case of providing a global public good (the environment in this case) this causes a serious “free rider” problem, as developed countries (with higher marginal abatement costs) could argue that others should provide the good, because it costs them less to do so. However, given the need to build huge volumes of new energy infrastructure in developing countries, abatement technologies have large fixed costs, leading to decreasing marginal costs, or economies of scale. In such cases, marginal cost pricing will not lead to efficient outcomes.

While the IMF predicts that under a global carbon tax regime, international capital movements and technology transfers will facilitate mitigation efforts, the Fund does not acknowledge the current regime of intellectual property rights (IPR) which limits the broader utilization of technology, especially in developing countries. As a result, the patent system would involve large transfers of IPR rents from developing to developed countries.

The revenue generating aspect of carbon taxation and its impact on public finances should be appealing to many governments. But this raises the issue of how a government can satisfy two competing goals -discourage pollution and raise revenue with one instrument- namely excise taxation? While a balancing of goals is possible - decreased pollution at a certain revenue level- this will not optimize either goal from a policy point of view.

The taxation option is highly unpopular for many policymakers and even the IMF acknowledges that with carbon taxes the quantity of emission reductions is uncertain. Hence, it seems more feasible to agree on principles and targets, for overall reduction of carbon emissions, while allowing individual countries to choose the instruments they consider most appropriate and for which they can build public consensus, as

proposed by the Intergovernmental Panel on Climate Change (IPCC).

Lastly, the question arises as to why policy discussions on climate change have tended to be limited to the use of market mechanisms, de-linking environmental policies from the development process. Price incentives may be quite effective for introducing changes at the margin, but there is little evidence that price mechanisms can fundamentally transform the economy. Moreover, market-based instruments - such as carbon taxes or cap-and-trade mechanisms- may allow already powerful stakeholders (such as energy producers) to continue current practices.

Conclusion

Currently, there is limited evidence to support the promise of new and additional finance to assist developing countries with climate change adaptation and mitigation. Existing resources under the Global Environment Facility (GEF), which currently operates the financial mechanism of the UNFCCC, are nowhere near the levels required to cover the needs for addressing climate change externalities.

Therefore, marked achievements are required by the international community in tackling economic development challenges and in acting more cooperatively to provide additional resources for tackling climate change, so that the required levels of mitigation and adaptation will be met.

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He wrote this in his personal capacity and the views do not necessarily represent the views of UN-DESA.

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