



# Who bears the burden of environmental policies *within* countries?

Antonio Estache and Luc Savard

*Climate change policies will have distributional consequences across and within countries. Most of the current environmental policy instruments tend to be regressive and impose a higher burden on the poor. Despite their limitations, more systematic incidence assessments for CC policies are needed so that adaptation and mitigation policies address their distributional effects within countries.*

The threat of catastrophic climate change (CC), if left unchecked, is leading governments across the world to consider a wide range of policy actions at the *international* level. These actions often commit governments to deliver policy changes at the *national* level. While there is a lot of discussion on the share of the global burden that the developed and developing countries will have to take on, there is little debate on the distribution of this burden within countries.

Although adaptation is currently in the limelight in the international community, the design of mitigation policies so as to manage demand for many basic services is a cornerstone of any CC related policy. Moreover, this design will affect the distribution of the sources of the greenhouse gas emissions that contribute to CC and the specific targets these policies will have to focus on in the future. If OECD experience is an indicator of things to come within countries, the share of the residential sector as a contributor to emissions will rise significantly (35-40% of emissions, and one third of this from appliances). The impact of mitigation policies aimed at switching to low carbon options on the affordability of basic services is thus likely to be an issue of growing concern.

## Taxes, fees and tariffs to fund CC policies

According to the UN, lower and lower middle income countries will need to commit about 0.5% of GDP annually for the foreseeable future to adapt to Climate Change. The IPCC also estimates the cost of mitigation to achieve a 450ppm CO<sub>2</sub> stabilization target (i.e. the costs of financing technological change and substitutions to reduce inputs and emission per every unit of output) to be about 1.6% of GDP. This means that the equivalent of an additional 2.1% of GDP will have to be funded from new or existing sources.

Most of these costs will have to be financed through a combination of increases in old taxes (such as motor vehicle taxes), new taxes, and equivalent revenue raising instruments (such as betterment taxes) or levies to capture some of the property value changes resulting from the policies. In many countries, these costs will also be financed through improvements in cost recovery of public services.

Considering that the average indirect tax revenue is about 8-10% of GDP, depending on the level of development, financing these costs through indirect taxes or equivalent

instruments would increase that burden by about 20%. Unless there are explicit concerns for the fairness of policy instruments, for most of the poor it will result in an increase in the cost of their current consumption bundle of at least 20% (disregarding any cascading effect likely to result from poorly designed environmental taxes functioning as the equivalent of sales taxes).

The large adjustment in prices is likely to change at least some consumption and production decisions, in addition to generating the revenue to finance the investments needed to address transitional adaptation and mitigation costs. This is consistent with the objectives of environmental policies. Taxes, fees, and public service tariff increases and rebalancing are needed to increase awareness of the risks of CC and hence change consumer and investor behavior. They also need to ensure that the awareness of the risks is transformed into concrete actions and not just commitments.

### **Who will pay for the added costs?**

Policy debates often assume that the direct buyers and sellers of products targeted by new taxes or tariff adjustments driven by CC concerns are the main “victims” of these policies. In practice, this is not necessarily the case. The debate should be driven by a much deeper assessment of the direct and indirect impacts of the policies.

Changes in prices driven by taxes, subsidies or brutal changes in demand or supply have complex direct and indirect effects with unforeseen distributional effects. For instance, a new tax on a product which results in a decline in the consumption of that product will impact various income classes through reductions in the derived demand for labor or capital in the taxed industry. If the poor represent a large share of the workers in that sector, they will be hurt by the tax disproportionately. Consumers and investors may change their behavior as intended by the CC policies, but this could have socially harsh consequences. For any government concerned with the well being of the poor, or the fair distribution of the burden of policies, the final incidence of any CC policy must be assessed.

### **How to find out who ends up paying?**

Although the literature on tax and expenditure incidence spans over 40 years, there is little empirical research on the incidence of environmental policies across income classes at the national level. Most of the analysis has been done for large countries (United States, Germany, the Nordic countries and for a few developing countries). Most focus on partial assessments of the usual instruments considered by environmental economists: price based instruments such as gasoline taxes, other energy taxes, carbon taxes, and motor vehicles taxes; cost based instruments such as subsidies or grants for changes in behavior or production technology; and pure technology or rationing instruments, such as emission standards or permits.

Most of this research tracks the effects of these policies through the price or cost chain in input-output tables and on consumption patterns of various income groups. Computable general equilibrium (CGE) modeling is sometimes used to add micro-simulation of changes in supply and demand for goods and factors, reflecting differences in elasticities across producers and across consumers.

Policy interventions are typically modeled as an explicit or implicit product or emission tax on an output. Prices will change for producers and consumers. The models recognize that income also changes through wage changes and other factor payments. This allows a tracking of the effects of CC policies across industries and across household types. For countries in which lagging regions are a concern, these models can be used to track differences across regions and track the scope for trade-offs versus win-win situations associated with environmentally conscious, growth stimulating policies for the poorer regions.

### **Lessons from OECD countries**

Assessments of individual CC policies reveal that they tend to be regressive. The result holds for a wide range of instruments, particularly for energy taxes. The evidence suggests that firms tend to respond to environmental taxes by adopting less labor-intensive

technologies that, in particular, reduce the demand for unskilled labor, disproportionately penalizing the poor.

Research also shows that CC policies' regressivity can be partially, offset. Recycling revenue from CC based taxes and permits seems to be a very effective solution, but in order to make it progressive it would require a reform of the income tax system as well. Creating jobs is another way to reduce the regressivity of CC policies (a double dividend). Investing the revenue from CC tax instruments in infrastructure biased towards the needs of the poorest is a third option to offset the regressivity of these taxes. Finally regressivity can also be reduced by ensuring that the benefits of CC policies are biased in favor of the poorest.

## What we know from developing countries

There are significantly fewer incidence analyses of CC policies for developing countries than there are for developed countries. Our review of the literature identified published case studies for Brazil, Cameroon, Chile, Senegal, and Thailand. All generally confirm the regressive nature of most instruments as observed in OECD countries.

When assessing the distributional outcomes of CC policies, there are two main types of differences between developed and developing countries, and they imply a significant additional burden on the poor.

The first is driven by the adjustment and transition costs for *the poor as workers*. As industries adopt new technologies, labor market transitions can be quite painful. This was the case with the initial job loss or displacement associated with the introduction of Brazil's large-scale proalcohol program that intended to reduce the dependence on traditional fuels. Changes in the relative prices of agricultural products associated with CC policies may also change comparative advantages and hence production structure towards more capital intensive products. Finally, changes in production location within countries or across countries can be much more hurtful in poor countries than in OECD countries' labor markets.

The second difference is the increased risks for *the poor as consumers*. Some of the specific sources of added tension include the higher cost of basic nutrition sources (the debate on the use of corn for biofuels rather than food in Mexico for instance) and the tendency of CC policies to favor urban over rural consumers.

## Limitations of current incidence analyses

The models used to assess the incidence of CC policies in developed countries have some limitations when applied to developing countries. First, standard models often assume competitive pricing and constant returns to scale. These are not typical in many key industries (i.e. energy) which are regulated. These models, therefore, *underestimate the progressivity* of CC price-based policies intended in regulatory design but may also *underestimate the regressivity* associated with rationing when service coverage is an issue.

Second, these models often assume downward supply curves. This is not always the case for key industries associated with CC, particularly in developing countries where industry specific capital or dependency on a scarce natural resource is common. This also results in *underestimates of the progressivity* of CC policies since the assumption implies lower rents rather than higher prices.

Other limitations include: a) failure to reflect that agriculture is a major employer, as well as, a major supplier of local food, which can also become a major tradable under global CC policies (i.e. biofuels); b) not taking into account that the composition of supply may change significantly as a result of global changes (such as trade) driven by carbon footprinting; c) overlooking the regressivity of subsidies to water, energy, and transport in their current design; and d) failing to offer joint assessments of the distributional effects of benefits, income, and expenditures associated with CC policies.

Furthermore, in developing countries large shares of the population are served by informal markets which can distort many evaluations of the distributional effects of

CC policies. Incidence analyses are also yet to account for dimensions such as: enforcement costs or problems, differences in demand elasticities across income groups, and the differences in expenditure and income structures across income groups, which can all result in misleading diagnostics.

Despite these limitations there remains a strong analytical case for conducting more systematic incidence analysis of CC policies. These models can help in the design of policies that are both efficient and fair.

### Why policymakers need to care about the fairness of CC policies

Ultimately, it is important to recognize that the benchmark to compare the incidence of CC policies should be the long-run incidence of the failure to act. Ignoring the consequences of CC is widely expected to be more regressive in developing countries than in developed countries. For instance, up to 80% of the poorest rely on more damaging (health wise) energy sources for their immediate needs compared to longer-term strategic concerns. Thus, policy interventions seem to be the only ethical option from the viewpoint of the poorest.

Caring about the incidence of climate change policies is not only needed for ethical reasons. It is also important to ensure the social acceptability and political viability of reforms. Both tend to be higher with progressive reforms than with regressive ones.

This survey has shown that most CC policy reforms tend to be regressive and unless this is addressed, the talk about climate change will continue to be just talk. No serious action will take place. The demand for energy consumption will continue to explode, the number of private vehicles will do

the same, the adaptation of land use will be confronted with inertia and ultimately, this generation's problem will simply be passed on to the next generation with even less scope for corrections and adjustments.

*This brief draws from A. Estache and L. Savard (2008), "Incidence of Environmental Policies in Developing Countries: A Survey," PREM Economics of Climate Change Discussion Papers. The specific references and sources for the ideas summarized in this paper are available in this Discussion Paper.*

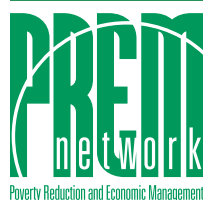
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