

- Thus, the environmental benefits increased. There were reduced impacts in terms of consumption of water, and emissions of greenhouse gases because paper bags have a higher environmental impact in these categories relative to plastic bags.

Conclusion

Consumption of plastic bags decreased substantially. The study concluded that the environmental benefits were modest when only plastic bags were levied (Scenario 1) compared to environmental impacts when both plastic bags and paper bags were taxed (Scenario 2).

THE INDIAN SCENARIO

The Indian plastic industry is growing at a rate of about 17%, with the total consumption of plastics being about four million tons per annum. Hence, an outright ban would be politically costly because there is already a thriving industry that employs a considerable number of people.

Although policy instruments like consumer awareness and anti-littering campaign have been initiated, the desired fall in wasteful consumption has not been achieved. In general, the policy instruments had an inherent limitation as they primarily sought to achieve this by promoting reuse and recycling.

It is essential to impose a tax on plastic bags to combat indiscriminate use which is the root cause of littering. Including paper bags in the ambit of the tax would accentuate the environmental benefit.

Without regulation, the cost of plastic bags is often hidden in food prices. Hence, even if consumers do not get a bag, they are still made to pay for it. With more transparent taxation, food prices would be lower. It would also ensure that the economic costs of environmental damage are internalized

by those responsible for causing the damage through the market mechanism (polluter-pays principle).

Introduction of a price signal through the use of a plastic bag tax can influence consumer behavior significantly but stakeholder and consumer acceptance needs to be ensured. Informational campaigns highlighting the environmental impacts and hypothecation of revenues into an environment fund are central in ensuring such acceptance.

Carbon Taxes

Bhavyaa Sharma & Vatsala Shreeti

There is no question about a significant human influence on the globally rising temperatures, especially through emission of greenhouse gases, particularly CO₂. The consequences are innumerable and ominous, including rising sea levels, severe droughts and floods, increase in precipitation intensity and shifts in the natural balance of species in the ecosystem. In this context, Kyoto Protocol (1997) mandated that industrial countries, by 2008-12, should reduce their overall emissions by 5% from their 1990 levels, with different countries accepting different targets of emission. An important instrument through which many countries aimed to do this was the taxation of energy according to its carbon content, well known as the Carbon Tax. Needless to say, since it addresses the issue of a negative externality, it is a Pigouvian tax which aims to limit or reduce Green House Gases (GHG) emissions and in theory meets the criteria of a good taxation policy by bringing the private costs of emitting CO₂ in line with the social costs of global warming and thus, is

expected to stimulate energy saving and substantial investment in 'Green Technology'. Since energy demand increases with incomes, one can expect the tax revenues to have a positive relationship with income.

At present, having realized the precarious condition of the environment, many countries have implemented carbon taxes in response to commitments under the United Nations Framework Convention on Climate Change. On July 1, 2010 India introduced a nationwide carbon tax of Rs. 50 per metric ton of coal both produced and imported into India. In 2012, a Carbon price of \$23AUD per ton of emitted CO₂ on selected fossil fuels was introduced in Australia and the revenue generated was used to reduce income tax and increase the transfer payments slightly. In Europe, most of the Nordic countries have introduced carbon taxes including Norway, Sweden and Finland. However, none of these countries have a uniform carbon tax regime with various exemptions for different industries. In 1993, the UK government introduced the Fuel Duty Escalator, an environmental tax on retail petroleum products designed specifically to reduce CO₂ emissions in the transport sector.

As compared to an energy tax, which is a tax imposed on both fossil fuels and carbon-free energy sources according to their heat contents, carbon taxes do not burden nuclear energy, which could generate large scale electricity without emitting CO₂ in that proportion. Since a carbon tax equalizes the marginal cost of CO₂ diminution across fuels, a carbon tax proves to be more efficient than an energy tax in order to reduce CO₂ emissions since the former effects CO₂ emissions through price effect as well as a switch in fuel choice, while the latter hardly provides any incentives for fuel switching, making it more costly to

reduce CO₂ emissions. Jorgenson & Wilcoxon (1993) suggest that in 2020, the US GNP loss from an energy tax would be 20% greater than that resulting from a carbon tax aimed at reducing CO₂ emissions. In order to reflect the rising costs of damages from the CO₂ concentration in the atmosphere and signal the markets that CO₂ emissions will eventually be heavily taxed, so as to incentivize innovations that make even the most ambitious emission targets seem realistic, the carbon tax rates should rise with time. The tax would impose a deadweight loss on a country with no existing distortions in the energy markets. However, when existing distortions from energy subsidies are considered or the revenues generated from the taxes are used to reduce a distortionary tax, as we saw in the case of some countries, the imposition of a carbon tax may also lead to a net gain.

Economists believe that there is a 'double dividend' from carbon taxes:

1. Environmental dividend – through a reduction in emission of pollutants, not only CO₂ but other pollutants associated with fossil fuels combustion.
2. Economic dividend – through a reduction in the overall economic cost of raising government revenues.

This double dividend is further categorized into 'weak' and 'strong' double dividends, which are distinguished from each other in the literature. While the former holds that costs may be saved by using carbon taxes revenues to reduce other distortionary taxes as compared to the case where revenues are returned in a lump-sum way, the latter states that the economic dividend is 'larger than the gross costs' i.e. a 'green tax swap' would be costless since that would lead to a net welfare gain. The 'strong

double dividend' proposition, however, has not garnered universal acceptance from scholars, because of various reasons. The existence of an economic double dividend depends on two effects of carbon tax:

1. Tax- interaction effect: Since carbon taxes add to existing set of distortionary taxes, they may further affect overall employment and investment, thus raising the costs of reducing carbon emissions.
2. Revenue-recycling effect: As shown earlier, carbon taxes may be used to reduce the level of other distortionary taxes, thus producing an economic gain. If the welfare gain from revenue-recycling effect is greater than costs arising from the tax-interaction effect, then there is an economic net benefit i.e., a strong double dividend.

The impact of carbon taxes on the environment has generally been considered to be positive, despite the various problems that hinder an effective estimation of their efficiency. For instance, The Dutch Green Tax commission in the Netherlands calculated that each Euros 450 m raised from its fuel taxes leads to a CO₂ reduction of 1-1.5 million tonnes. However, estimating the effectiveness of carbon taxes simultaneously requires the impact of the different components of the carbon control policy package to be separated out, which is extremely difficult. However, since lower-income households spend a larger proportion of their income on energy than higher-income household do, a carbon tax is expected to have a regressive impact on the distribution of income, if the tax is passed on to the consumers in the form of higher prices for final goods and services. Smith (1992) calculated the distributional effects of a mixed carbon and energy tax at \$10/barrel in the UK and concluded that the

poorest 20% of the population would have to pay 2.4% of their total spending as increases of tax, as compared to the 0.8% & 1.4% for the average household and the top 20% of the population respectively, thus creating the need for adequate analysis and appropriate political attention in this field. A way of mitigating these impacts is to set a tax free allowance for essential use of energy, to incorporate the fact that some amount of energy is necessary to satisfy basic needs, above which the usage would be progressively taxed to incentivize reduction of energy consumption. Another possibility could be to use the revenues generated to reduce the labor taxes, income taxes or improvise the social-security benefits system so as to target those social groups that do not directly benefit from such tax cuts. At the same time, using revenue from a carbon tax to subsidize household investments that reduce CO₂ emissions would help diminish households' cost of adapting to higher energy prices, though this effect would be more visible in the case of higher-income households. A lump-sum redistribution of carbon taxes to the groups in question could be an option, however many scholars believe that this could reduce the scope of efficiency gains that could be achieved by using the tax revenues to reduce the distortionary taxes.

An alternative to carbon taxes, given the fact that some analysts consider them to have a negative impact on the international competitiveness in the economy; one could also see Carbon Emissions Trading as a possible option. Like a carbon tax, emission trading system is also a market-based instrument. Under this arrangement, emitters have access to emission permits which they can trade amongst themselves. In contrast to the tax, where the emissions adjust with the fixed increase in the price of carbon, here the quantity of carbon emitted is fixed, and the price of carbon adjusts

accordingly. The latter is believed to be preferable when there is uncertainty about the damage function and there is a possibility that it may be very sensitive to greater than optimal emissions. The allocation can be done through auctions and 'Grandfathering' of the permits, which refers to the free allocation of the permits on the basis of some formula related to current emissions. Although, it is sometimes considered to be more efficient than a tax in terms of achieving a target, any relevant policy should combine taxes, permits and other forms of regulation and One affects the basic social consciousness about climate change and global warming.

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THINKING SEEDS: GREEN

ECONOMICS

Green Trade & Commerce

Manisha Jain

Growing environmental consciousness has generated a parallel interest in liberalization of trade in Environmental Goods and Services (EGS). According to WTO, this has win-win-win objectives: for trade, environment and development. But the realization of these objectives is fraught with many obstacles, especially regarding market access of Developing Countries. Developing Countries are net importers of EGS. Lack of a universally accepted definition of EGS coupled with many other issues has rendered the trade-environment negotiations to proceed at a slow pace.

This article attempts to identify the Environmentally Preferable Products of Export interest to India using trade balance and Balassa's Revealed Comparative Advantage Index.

First of all, owing largely to the dispersed and diffuse nature of environmental goods and to diverging perceptions of how one defines 'environment', environmental goods and services lack a universal definition; which proved to be one of the main barriers to progress in negotiations on liberalization of trade in EGS. However, according to UNCTAD (2003), an Environmental Good (EG) is considered any equipment, material or technology used to address a particular environmental problem or as a product that is itself "environmentally preferable" to other similar products because of its