

Economic and Market based Measure of Global Warming: Light and Shadows

KEYWORDS

Carbon tax, Cap and Trade, carbon credit etc.

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ABSTRACT All we are facing the unfavourable effects of Global warming. And Global warming is happening for over existence of Green House Gases (GHGs) in the atmosphere. For reducing these GHGs there are two types of mechanism one is Carbon tax which comes under Tax or price based mechanism and Cap and Trade comes under Market based mechanism. Carbon tax may be defined as imposition of the tax on the carbon content or emission potential of the fuel consumed. And in Cap and Trade Govt. will fix up a quota or cap on the total emission that can be made by all the GHGs emitter and this will be distributed among all the emitters. Considering the quota and actual emission of the emitter surplus or deficit quota will be traded among the emitters in exchange of currency. Both the mechanisms have some advantages and disadvantages but the objective of both the mechanism is to reduce the global warming by reducing the emission by imposing some cost on emission of GHGs. The objectives of the paper are to identify the relative impact of Carbon Taxation and Cap and Trade on GHGs emission reduction and associated advantages and disadvantages of both the mechanisms cap and trade may be consider as better mechanism but the effectiveness of the mechanisms depends how the mechanism is designed.

Introduction:

Climate changes are happening mainly for global warming. Climate change and global warming has become a matter of serious concern for all the people of both developed and developing countries. Global warming is a situation of increasing earth surface temperature year by year due to over existence of Green house Gases (GHGs) in the atmosphere. Basically there are six GHGs in the atmosphere namely Carbon dioxide (CO₂), Nitrous oxide (N₂O), Methane (CH₄), Perflurocarbons (PFCs), Hydroflurocarbons (HFCs) and Sulphur Hexafluoride (SF,).All these six GHGs have several Global warming potential (GWP) and availabilities of these gases in the atmosphere are also different. Considering the GWP and availabilities CO₂ is the major element of Global warming in the atmosphere. So for freezing and then reducing the global warming it is important to tackle the quantity of emission of CO, in the atmosphere by taking or developing appropriate tools and strategies. These strategies are to be taken not only at the national level but also at the international level. Basically there are two types of mechanisms for freezing and reducing GHGs in the atmosphere namely Market based mechanism (Cap and trade) and Tax or Price based mechanism (Carbon tax).

Global warming scenarios and its effect:

Global warming is a situation of increasing earth surface temperature due to over existence of GHGs in the atmosphere. The Intergovernmental Panel on Climate Change (IPCC) projects that the global mean temperature may increase between 1.4 and 5.8 degrees Celsius (C) by 2100. This unprecedented increase is expected to have severe impacts on the global ecosystems, sea level, crop production and related processes. The impact would be particularly severe in the tropical areas, which mainly consist of developing countries, including India.

Following are some evil effects of Global warming as summarized by different authors-

- 1) Faster melting of Hindu Kush Himalayan glaciers will increase flood risk and deplete water reservoirs.
- 2) Rising sea levels could leave 200 million people permanently displaced especially in heavily populated costal lands as diverse as Bangladesh on the one hand and counties such as the Netherlands on the other.
- Both the number and the intensity of extreme weather phenomenon, such as floods, droughts, hurricanes and

storms

 Up to 40% of species could face extinction resulting in unprecedented biodiversity reduction and potentially upsetting the delicate balance in many ecosystems.

Carbon Tax and Cap and Trade: Concepts and Application Carbon taxation:

Carbon tax may be defined as imposition of the tax on the carbon content or emission potential of the fuel consumed. A carbon tax puts a monetary price on the real costs imposed on our economy, our communities and our planet by greenhouse gas emissions and the global warming they cause. The objective of carbon tax was to include the environmental cost in cost of production. Pricing carbon and including it with the cost of production encourage the firms to advance their technology of production process to reduce emission per unit of output. These policies of charging price to carbon also affect consumers' decisions by reducing the use of carbon intensive products to other less carbon intensive products. They thereby encourage shifts in consumption patterns toward less carbon-intensive goods, which imply lower output by carbon-intensive industries and further emissions reductions. So carbon tax is a powerful tool which encourages the industry for shifting into greener, efficient and environmental friendly technology in one hand and encourages the ultimate consumer for shifting from carbon intensive product to carbon free products in other hand. The tax is set by assessing the cost or damage associated with each unit of pollution and the costs associated with controlling that pollution.

Application of Carbon tax:

Sweden has used a carbon tax to reduce greenhouse gas emissions since 1991. The Swedish Ministry of Environment estimated the carbon tax has cut emissions by an additional 20 per cent enabling the country to achieve its 2012 target under the Kyoto Protocol. Canada also uses carbon taxes as part of their strategies to reduce emissions and encourage investments in energy-efficiency and renewable energy.

Cap and Trade:

According to this mechanism there would be a cap on the total amount of greenhouse gases that could be emitted nationwide by all the GHG emitters. This limit of emission will be reduced year by year to reach a particular emission target. Each emitter will be given a specific quota for emission considering national quota. It may be mentioned that the quota

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in relation to a country refers to the limit of total emissions from all the sources, be it from industry, business, domestic households or individuals. This quota of emission may be given free of cost or at auction. Then considering the allocated quota and actual emission surplus or deficit unit of emission will be traded among the different emitting units. With this mechanism total emission of the country as well as of the world will remain under control. Application of Cap-and-trade: Cap-and-trade has been used successfully in the U.S. to reduce emissions of sulphur dioxide and nitrous oxide, two key ingredients responsible for acid rain. Since the early 1980s, this cap-and trade system has reduced acid rain-forming emissions by nearly half.

The European Union has applied cap and trade system in 2005 to reduce greenhouse gas emissions from about 10,000 large industrial emitters.

Comparison between Carbon Taxation and Cap and Trade:

Basis	Carbon Taxation	Cap and Trade
Complexity	It is very simple in nature and can be implement- ed just by modifying existing tax system.	It is highly complicated and technical in nature. Complexity involves in fixation of emission quota, distribution of quota and implementation of the system electronically.
Certainty	It does not provide any certainty about reduction of GHGs from environment but provide certainty about how much Govt. will get revenue in the form of carbon tax and emitters also knows with certainty how much he has to pay for using energy in the form of carbon tax.	It provides certainty about quantity of reduction of GHGs emission from the country but does not en- sures the cost it requires for successful implementation of this system.
Transaction cost	It requires lower imple- mentation costs as they can introduce it just by modifying existing tax structure and rules.	It involves huge transaction costs for fixing baseline emission, developing mar- ket for trading the carbon credit, Technological costs for implementing the sys- tem electronically etc.
Redistribution effects	It is regressive in nature because it charges same rate of tax for poor peo- ple and rich people also. With this principle poor people will loses more than the rich people because poor people spend more of their income on fuels than the rich. So a very small increase of carbon tax will do more harm to the poor than the rich.	It is progressive in nature. Because all the people get the equal emission quota. And the total emission of the poor is lower than the rich. So generally in this system poor people will be able to save the credit and the rich people will emit more than the quota and will be forced to purchase the excess emission credit from the poor people in exchange of money
Political support	It claims less political support as it does not maintain the principle of equity and its regressive- ness nature.	It can claim support from different types of political ideologist as it maintain the principle of equity and progressiveness nature.

Dividend earning potential	It helps the govt. to earn revenue by imposing tax and it also helps to reduce the pollution. So it provides double dividend.	It does not ensures rev- enue generation for Govt. as emission quota is given free of cost.
Equity	It does not follow the principle of equity. Though the rate of tax for all the emitters is same but it promotes inequity in 'cost burden to income' between rich people and poor people.	It follows the principle of equity as in this case quota is given to all the emitters equally.

Conclusion:

From the above discussion it is clear that climate changes are happening for global warming and global warming is the effect of over existence of GHGs(Mostly Co₂)in the atmosphere and Carbon Tax and Cap and Trade scheme both of them are effective for reducing GHGs but their principle of working is different to each other. Each of them has some advantages and disadvantages. From the viewpoint of certainty, redistribution effect and political support cap and trade scheme is more effective than carbon tax for reducing emission. Again from the view point of complexity, transaction cost and dividend earning potential Carbon tax is more suitable than the Cap and trade scheme. But from my point of view Cap and trade is more effective than the Carbon tax as Cap and trade will helps in reducing the emission from the environment with certainty. Because our main objectives is to reduce the GHGs emission by any means and Cap and trade fulfill this most important purpose but Carbon tax does not do so with certainty. Again carbon tax is not in favour of the common principle of tax i.e. reducing the income inequality. It actually increases the income inequality between rich and poor people. It actually increases the burden of the people by imposing such tax without considering their level of income that means it effects equally all the people in the society. With carbon tax poor people will be more looser than rich people. With a very small increase in carbon tax rate, cost of tax burden to income for poor people will be more than the rich people. But, in case of Cap and trade system poor people will more benefitted as they have low carbon footprint than the rich people. That means poor people will be able to sale their surplus carbon credit (1credit=1 ton of CO₂ e) to the rich people who has high carbon footprint. So this system actually motivates the people for lowering their carbon footprint by giving some financial benefit. Lastly I may conclude that both the mechanisms will lead to emission reduction but for getting its effectiveness it is important to design the tools in a proper way. The design will determine the environmental and economic effectiveness.

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