

Global Warming: The Economic Perspective

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Abstract : Global warming is the increase in the average temperature of the Earth's near surface air and oceans in recent decades, and its projected continuation. Most of the observed increase in globally averaged temperature since the mid-twentieth century is due to increase in anthropogenic greenhouse gas concentrations through Greenhouse effect. Climate model projection summarized by IPCC indicate global surface temperature will likely rise further 1.1 to 6.4⁰C during 21st Century.

Increasing global temperature will cause sea levels to rise and expected to increase the intensity of extreme weather events. Other effects include changes in agricultural yields, trade routes, glaciers retreat, species extinctions, and increases in the ranges of disease vectors. Failing to curb the impact on climate due to global warming could damage the global economy on the scale of great depression. The environmental devastation could shrink the world's annual Gross Domestic Product (GDP) by 20% as per the report of Sir Nicholas Stern, the world renowned British economist. But taking action now would cost just 1% of world GDP. The economic impacts will be also experienced in insurance, infrastructure and investment sectors. Increased costs of migration slow down of economic development and thus retardation in poverty eradication process will also face the serious implications. The whole scenario will make it even harder to achieve the millennium development goals globally. It is not an option to wait and see, and we must act now. This paper highlights the different sectors of economy affected and cost estimates involved in mitigation efforts of global warming.

Keywords : Global warming, greenhouse gases, Sir Stern report, Economic impact on mitigation efforts, economic impact on various sectors, Global GDP Contraction.

Introduction

"Global warming" is a universally debated topic, since the beginning of this century. The Intergovernmental Panel on climate change (IPCC) in the fourth assessment report published has come out with some of the stark realities about its overall impact on life. It is generally difficult to attribute specific natural phenomena to long term causes, but some effects of recent climate change may already be occurring. Rising sea levels, glacier retreat, Arctic shrinkage and altered patterns of Agriculture are cited as direct consequences. Predictions for secondary and regional effects include extreme weather events, an expansion of tropical diseases, changes in timing of seasonal patterns in ecosystems and drastic economic impact. Concerns have led to political activism advocating proposals to mitigate, eliminate, or to adapt to it.

The IPCC findings claim that the effects of global warming will be mixed across regions. For smaller values of warming (1 to 3⁰C), changes are expected to produce net benefits in some regions and for some activities, and net costs for others. Greater warming is very likely to produce net costs to reduce the benefits from smaller warming in all regions. Most of the consequences of global warming would result from one of three physical changes: sea level rise, higher local temperatures, and changes in rainfall patterns.

Economics Effects:

Many estimates of aggregate net economic costs of damages from climate change across the globe are available. The social cost of carbon (SCC) expressed in terms of future benefits and costs are discounted to the present value. Estimates of the SCC have an average value of \$ 43 per ton of carbon (\$ 12 per ton of carbon dioxide).

Stern has warned that 1% of the global GDP is required to be invested in order to mitigate the effects of climate change and failure to do so could risk a recession worth up to 20 % of global GDP.

Agriculture :

Rising atmospheric temperatures, longer droughts and side effects of both such as higher levels of ground level ozone gas, are likely to bring about a substantial reduction in crop yields in the coming decades. Region likely to be worst affected is Africa, both because its geography makes it particularly vulnerable, and because 70% of the population rely on rain fed agriculture for their livelihoods. Countries in the tropical & Subtropical region are likely to be severely affected in terms of agricultural yields.

Transport:

Roads, airport runways, railway lines and pipelines (Including oil pipelines, sewers, water mains etc) may require increased maintenance and renewal as they become subject to greater temperature variation.

Flood Defense:

For facilitation of trade, many of the world's largest and most prosperous cities are on the coast. The cost of building better coastal defenses (Due to rising sea level) is likely to be considerable (estimated to be \$ 250 billion). Some countries will be more affected than others low lying countries such as Bangladesh, Netherlands would be worst hit by any sea level rise, in terms of floods or the cost of preventing them.

Migration :

In 1990's variety of estimates placed the number, of environmental refugees at around 25 million. IPCC estimated that 150 million environmental refugees will exist in the year 2050, due mainly to the effects of coastal flooding, shoreline erosion and agricultural disruption. This amount to 1.5% of 2050s predicted 10 billion world population.

Health :

The most direct effect of climate change on human being might be the impact of hotter temperatures themselves. Global warming is expected to extend the favorable zones for vectors conveying infectious disease such as dengue fever and malaria. In poorer countries, this may lead to higher incidence of such diseases. In richer countries, where such diseases have been eliminated or kept in check by vaccination, draining swamps and using pesticides, the consequences may be felt more in economic than health terms.

Mitigation & Adaptation:

Advocates of mitigation hold the view that reducing the greenhouse gas emissions is important in order to control the effects of global warming. Reducing green house gas emissions depends on lowering consumption of fossil fuels. The key challenge is that nearly all forms of economic activity; both domestic as well as industrial rely on fossil fuel energy sources. Reducing emissions can be achieved through gains in efficiency producing the same benefits with smaller amounts of fossil energy, or by displacing fossil sources such as wind, solar and biomass still represent only a small fraction of total energy consumption.

Cost Estimates:

IPCC report suggested values of \$ 78 billion to \$1.14 trillion annual mitigation costs, amounting to 0.2 % to 3.5% of current world GDP(Which is around \$35 trillion),or 0.3% to4.5 % of GDP if borne by the developed countries. As economic growth is expected to continue, the percentage would fall. In terms of cost per tone of carbon emission avoided, the range is \$18 to \$80.

Benefits:

McKibben & Wilcoxon also report that Nordhaus and Boyer calculated that the present value of benefits from mitigation under the Kyoto Protocol would be \$120 billion, far below the likely costs. However, The Stern review produced much larger benefit estimates, of between 5% to 20% of world GDP. The difference reflected a number of factors, the most important of which were the choice of discount rate, the use of welfare weighing for effects on people in poor countries, a greater weight on damage to the natural environment and use of more up-to-date scientific estimates of likely damage. Mitigation actions can bring other benefits, depending on factors such as the technology used. These include, the reduced economic impact from oil supply disruptions and/or price rises, if mitigation reduces oil dependence. This may particularly benefit developing countries dependent on oil imports. Benefits from ending deforestation include protection of biodiversity, benefits for tribal communities, research & development possibilities, tourism and some protection from extreme weather events.

Optimal Strategies for Mitigation:

Financial and technological strategies can have a major impact on reaching a particular target atmospheric greenhouse gas concentration.

- Carbon Tax
- Carbon emissions trading
- Hybrid systems of fuel consumption
- Reducing the carbon intensity of energy through the use of Nuclear power and renewable energy sources.
- Energy efficiency

Cost Distribution:

- Low lying countries risk of floods.

- Many countries subject to drought are poor African countries.
- Ability of poor countries to mitigate/adapt

The costs of mitigation may also be distributed unequally, both within and between countries. Wier et al showed that carbon taxes, particularly direct taxes on households, are regressive, suggesting that in order to maintain social acceptance the regressive effect needs to be compensated for either within the environmental tax structure, or in other parts of the tax system.

Conclusion :

Critics like Rich Deem have criticized that, the effects of global warming have been exaggerated. However, uneven climate events taking place in the recent past find their roots in global warming. The increased frequency at which cyclones, hurricanes, drought, floods occur are the traceable consequences of global warming.

Gradual, Continuous uncertainty in the global warming process is likely to delay the adoption of abatement policies, however the possibility of climate catastrophes accelerates the implementation of these policies as their net discounted benefits increase significantly.

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