

Chapter 36

A Comparative Study on World–Wide Carbon Emission Convergence: An Empirical Analysis

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ABSTRACT

Environmental issue is one of the primary concerns in present global scenario for developed as well as developing countries and reducing the emission level of greenhouse gases is the common objective for all. Study of per capita carbon emission convergence is quite significant in the ongoing debate of climate change policy formulation and implementation as future emission level can only decide the incentive to shift to the clean technology. With a balanced panel of 79 countries and 50 years, over 1960-2009, we have tested for both sigma and beta convergence. The data exhibits a possible convergence in carbon emission. The countries are disaggregated twice, first into OECD and Non-OECD countries and then into five categories on the basis of income. OECD countries show absolute and conditional beta convergence, also with sigma convergence. Countries from lower income group have a lower degree of variability in dispersion in the time period being considered. The set of explanatory variables in this analysis are real GDP per capita, population growth rate and trade openness.

INTRODUCTION

Climate change is a serious and urgent issue. The Earth's climate is changing, and the scientific consensus is not only that human activities have contributed to it significantly, but that the change is far more rapid and dangerous than thought earlier (IPCC 2007). The main factor in anthropogenic climate change is the increase in the concentration of carbon in the atmosphere over time. This increased concentration

DOI: 10.4018/978-1-5225-0803-8.ch036

has been caused by the emission of GHGs as a result of economic activities, including energy, industry, transport, and land use, many of which rely upon fossil fuels. The most important GHG, carbon dioxide (CO₂), currently constitutes 77 per cent of the global warming potential. Other contributors are methane (from agricultural sources), and land use change such as deforestation. Concentration level has increased because emissions during the last two centuries were in excess of what could be absorbed, and the excess GHGs began to accumulate in the atmosphere. The concentration of CO₂ alone has increased by some 100 ppm over this period. Current global emissions contribute another 2-3 ppm of carbon dioxide equivalent (CO₂) GHGs per year. Hence, climate change has become a significant and complex challenge to policy makers. Economic analysis is crucial to the climate policy debate. Continued research into climate change and appropriate policy action is necessary if governments are going to adopt an efficient and effective response. Contraction and Convergence (C&C) is a proposed global framework for reducing greenhouse gas emissions to combat climate change. Conceived by the Global Commons Institute [GCI] in the early 1990s, the Contraction and Convergence strategy consists of reducing overall emissions of greenhouse gases to a safe level (contraction), resulting from every country bringing its emissions per capita to a level which is equal for all countries (convergence). It is intended to form the basis of an international agreement which will reduce carbon dioxide emissions to avoid dangerous climate change, carbon dioxide being the gas that is primarily responsible for changes in the greenhouse effect on Earth. It is expressed as a simple mathematical formula. This formula can be used as a way for the world to stabilize carbon levels at any level. Advocates of Contraction and Convergence stress that negotiations at the United Nations Framework Convention on Climate Change [UNFCCC] are governed sequentially by the 'objective' of the UNFCCC [safe and stable GHG concentration in the global atmosphere] followed by its organising principles ['precaution' and 'equity']. C&C is widely cited and supported.

One of the main environmental concerns nowadays is the climate change and its consequences on the quality of life of the population. The need for using energy as an input for various economic activities together with increasing economic activities, especially in the developed countries, causes an increase in energy consumption. This increase in energy consumption in turn results in an increasing amount of gases that cause a greenhouse effect in the atmosphere, which ends up increasing global warming. There is virtually no doubt today that climate change is already happening, that it is caused by the emission and accumulation of greenhouse gases (GHGs) in the atmosphere, that it poses the gravest of dangers to life on this planet, and that much of its impact is already "locked in" because of past actions, but the most extreme costs could be avoided if policy responses are put in place immediately. A slowdown of the global growth rate by 1 per cent, presumably through aggregate demand contraction slows down the growth of emissions proportionately. Most analysts have not discussed this option explicitly (except insofar as a slowdown might result indirectly from other measures). An argument could be made for a deliberate slowdown of the growth rate in OECD countries in order to bring their ecological and especially climate footprint closer to the resource limitations. Given the current level of growth rates in most OECD countries more may in fact be expected of changes in the quality or content of economic growth there, as captured in the international discussion on production and consumption patterns. However, as far as developing countries are concerned, the rate of economic growth is viewed as the pre-eminent policy goal. This is especially so today, as growth rates in developing countries (especially in Asia) have started to accelerate and offer the genuine hope of narrowing the gap between rich and poor countries. As such, a serious threat to this momentum could also constitute a threat to global stability and mutual trust. In fact, as the text of the UNFCCC bears explicit witness, the economic growth of developing countries has increasingly come to be viewed as a global responsibility—because it is the only mechanism the world has

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