

Hiromi Nishimoto

Key Words: Stabilization of GHG concentration, Burden sharing, CGE model,

1. INTRODUCTION

In order to achieve the stabilization of GHG concentrations in the atmosphere, international community will need to strengthen its long-term efforts beyond 2012. In this study, to contribute international negotiations beyond 2012, I calculate 1)national emission allowances, 2)the carbon prices (emission trading price, carbon tax) to achieve the target, 3)and their impacts on GDP.

2. OUTLINE OF THE MODEL AND ANALYSIS

A CGE model used in this study is the world wide multi-regional applied general equilibrium model. Population, economic growth, technological changes, and rates of non-fossil fuel introduction are exogenously given by the SRES scenarios. Firstly, the carbon price to meet the GHG reduction target and the GDP change are estimated. There are two emission reduction methods; (1)ONLY domestic reduction, (2)emission trading without constraints. This study uses the global emission path calculated by the post-SRES project. Each country is allocated the emission right by the contraction & convergence approach (Meyer, 2001).

3. RESULTS

Figure 1 shows the changes of national emission allowances at 450 ppm stabilization level in B2 scenario. Values by year 2000 are actual values and from 2000 to 2010 denote Kyoto targets. Values after 2010 are calculated in this study. By 2050, China, Thailand, Latin America, and Middle East have reduction obligation because per capita emissions of these countries exceed the global average per capita emission. However, in India, Indonesia, Philippines, and sub Sahara, per capita emissions will be less than the global average per capita emission.

The abatement costs of the ONLY domestic reduction scenario are higher than those of other scenarios and GDP losses are large. By introducing the emission trading, impacts on abatement costs and negative macroeconomic effects are mitigated.