Taiwan's Economic Responses to Different Carbon Trajectories of China and Taiwan

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Overview

The National Congress of China passed its 13th Five-Year Plan in 2016, in which social and economic roadmap including climate change issues are identified. The Five-Year Plan paves ways for green development and sets specific agendas to promote clean energy and reduce carbon emissions. Basically, the Five-Year Plan requires that China keep its total energy consumption under 5 billion metric tons of energy each year by 2020. However, China's INDC has promised to reduce the rate of growth of carbon dioxide emissions in order that the peak of carbon dioxide emissions would be reached around 2030. Around the same time, The Legislative Yuan of Taiwan passed the Greenhouse Gas Emission Reduction and Management Act in 2015, which offers a legal basis for a series of response measures to climate change in Taiwan. According to the Act, a long-term CO_2 emission reduction target in 2050, as well as periodic five-year reduction targets shall be met with the introduction of various policy measures and economic incentives. While Taiwan has long and close economic ties with China over the past decades, the climate policies of both economies which set differential future carbon emission trajectories should have different effects to the economy of Taiwan. The aim of this paper is to examine the potential economic responses of Taiwan facing different carbon emission trajectories in both China and Taiwan. Our results could be important information for Taiwan in formulating policy measures to allow a better carbon emission path that makes the cost of mitigation to the least possible.

Methods

The method used is a three-region (Taiwan, China, and the rest of the world) dynamic computable general equilibrium (CGE) model focusing on energy and environmental issues and the trading between regions. The key features of the model are the inclusion of different renewable energy technologies and the detailed specification of power generation with different generation technologies, including several advanced technologies that will join the market when they become cost-effective as the economy evolves. The specification of the model is conceptually very close to that of the EPPA model developed by the Massatuasttss Institute of Technology. However, except for carbon dioxide, specification of the sources of other greenhouse gas emissions have been significantly simplified to keep the model tractable.

Results

We run the reference scenario first, whose results can be used as a reference of comparion to figure out the effects of policy targest and measures. We specify policy scenarios following the major policy targets and potential measures or incentives that appear in and Plan for China and the Act for Taiwan. Different carbon trajectories might result with different assumptions on the timing of the introduction of policy measures, which might also result in different economic responses of the Taiwanese economy.

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