

The Impacts of Carbon Tax on Sectoral Competitiveness in China¹

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Abstract

Overview

China is expected to implement carbon tax in the near future to limit emissions of greenhouse gases. Despite the theoretical efficiency advantages of carbon taxes, concerns of reduced international competitiveness are the hot debate topic among decision-makers. The conventional wisdom is that carbon taxes impose significant costs, and thereby hinder the ability of China's firms to compete in international markets. This paper attempts to assess the competitiveness-related impacts of carbon taxes using simulations based on a dynamic computable general equilibrium model of Chinese economy.

Methods

The method adopt here is to investigate the effects of carbon policy on macro economy and industrial competitiveness, which is defined as the relevant variable deviation between the case with carbon policy and the business-as-usual (BAU) case if historical trends prevail, by CGE simulations.

The model is a single-region, Monash-style dynamic CGE model of the Chinese economy, including 138 sectors. In particularly energy-intensive sectors and trade-intensive sectors are described in detail. There are six modules: household, production, trade, government, emissions, and factor markets. Our model incorporates two types of inter-temporal links: physical capital accumulation and lagged adjustment in the labor market.

This model estimates changes in tastes and technology and generates up-to-date input-output tables via historical simulations, generates BAU forecasts for industrial, occupational variables using detailed extrapolations of trends in tastes and technology together with a wide variety of projections from organizations specializing in macro, population and policy forecasting via forecast simulations, and calculates the deviations from explicit forecast paths for macro-economy and competitiveness-related variables which would be caused by the implementation of carbon policy via policy simulations.

This study assesses the sectoral competitiveness from the sectoral output, sectoral value added, sectoral output price, export demand, and competitiveness indicator especially. The competitiveness indicator is defined as the relative change in the ratio of world price to prices at

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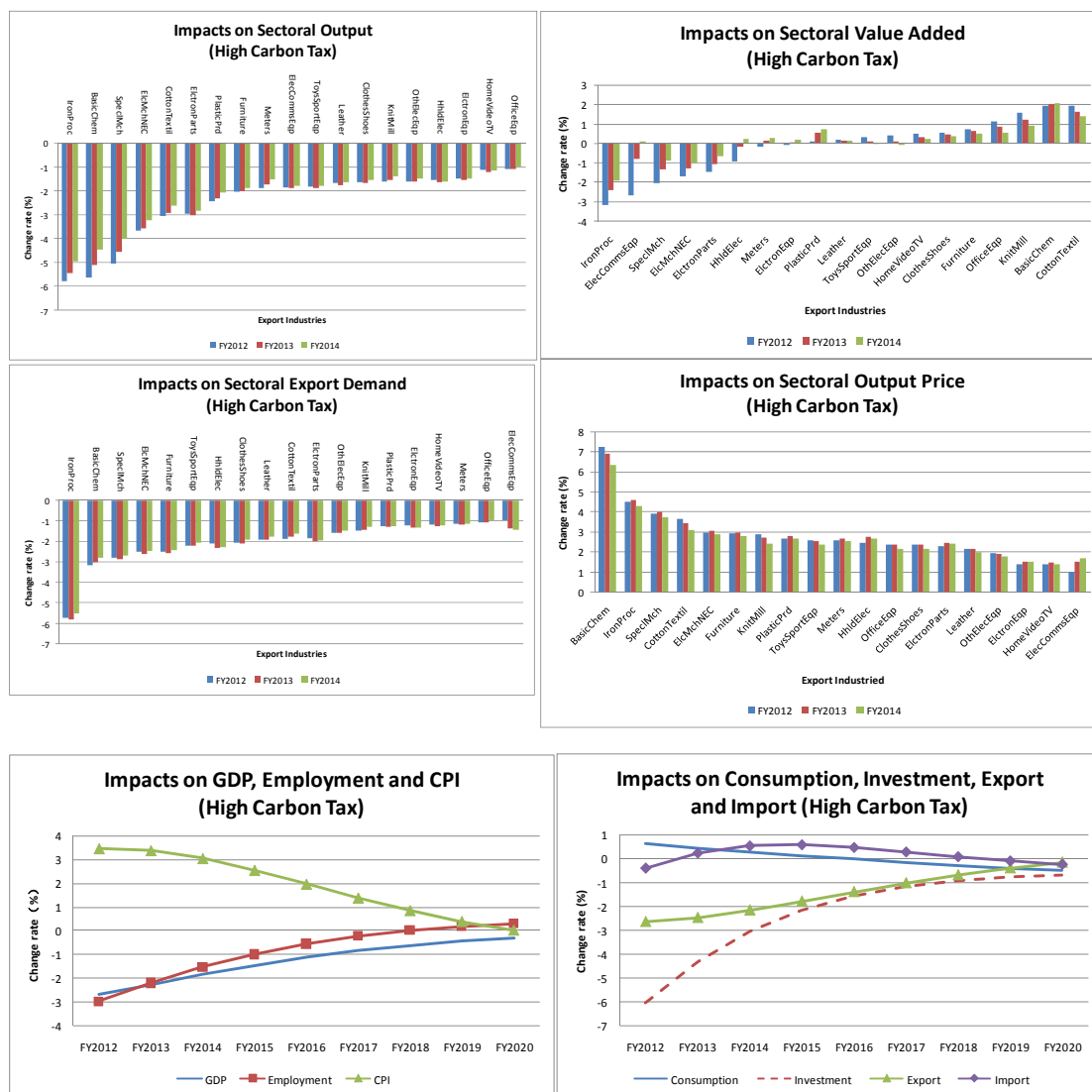
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which domestic firms produce output. A negative value indicates domestic firms have become less competitive compared to foreign firms, while a positive value indicates the opposite. The loss of competitiveness is believed to be reflected in declining exports, increasing imports in the short-term.

Data and calibration are based on the China's economy 2002 input-output table and 2002~2010 macro economy variables, mainly including consumption, investment, government expenditure, exports and imports, GDP price index, agriculture output, industry output and services output.

Preliminary Results

The main result shows that the most energy and trade intensive sectors of the Chinese economy, such as Iron production, Basic Chemistry, Coal mine and production, could become somewhat less competitive under the high carbon tax rate (100 RMB per ton CO₂), as shown in the following figure. In addition, simulation results show likely negative impacts on exports, investments, employment and GDP. The ascending-carbon-tax scenario study indicates modest impacts on sectoral competitiveness, especially if the tax revenues can be returned to the household to induce domestic consumptions.



References (omitted)