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How large are the impacts of carbon-motivated border tax adjustments on China and how to mitigate them?

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HIGHLIGHTS

- We compare impacts of carbon-motivated border tax adjustments (CBTAs) across large emerging countries.
- We test effectiveness of different policy options to mitigate the negative impacts.
- We investigate how to design policy mix to mitigate negative impacts of CBTAs.

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ABSTRACT

There have been growing clamours for carbon-motivated border tax adjustments (CBTAs) targeted at countries that do not accept the carbon emission reduction targets. Currently, China is the largest carbon emitter with large annual incremental carbon emissions and might have to face the challenge of CBTA. Therefore, it is a pressing policy challenge for the government to get prepared for mitigating the negative impacts of CBTAs on China. In this article, we compare the impacts of CBTAs across large developing economies and compare the performances of different policy options to mitigate the negative impacts. The main findings are as follows. First, CBTA would affect different economies and different sectors differently. CBTA would result in a shift of production across sectors and relocation of output from the target countries to CBTA users. Second, CBTA would contribute to world's emissions reduction, but less than expected due to carbon leakage. Finally, policy options, which could reduce the present distorting effects, would be preferred to other policy options that would add additional distorting effects to the economy. Looking ahead, the Chinese government should get prepared for mitigating the negative impacts of CBTAs because its economy could be adversely affected.

1. Introduction

There have been growing clamours for carbon-motivated border tax adjustments (CBTAs for short, hereafter in this article) based on competitiveness issue and carbon leakage. Competitiveness issue results from the worries that unilateral climate policies might result in competitiveness losses for domestic sectors (particularly for energy-intensive sectors) compared to the international competitors. Carbon leakage refers to an additional carbon emission increase in countries that do not adopt unilateral climate policies. Carbon leakage could be thought to be a kind of international externality (Markusen, 1975). Carbon leakage would make it difficult for the world to achieve anticipated carbon emission reduction targets. Based on competitiveness issue and carbon leakage, some developed countries argue that developing countries should accept carbon emission reduction targets. Otherwise, the developed countries would levy CBTA as a punishment on the countries that do not accept carbon emission reduction targets.

It is a pressing policy challenge for the Chinese government to get ready for mitigating the potential negative impacts of CBTAs. Currently, China is the largest carbon emitter with large annual incremental carbon emissions. So China might have to face the challenge of CBTA, which might harm its economy. Therefore, the Chinese government should get prepared for mitigating the negative impacts ahead of time. This article might be a good aid to the policy makers, as it compares the impacts of CBTAs across large developing economies and tests the effectiveness of different policy options to mitigate the negative impacts.

CBTA is a kind of import tax which requires imported goods to be taxed according to its carbon content (or carbon intensity) incurred in the production process. It could be levied according to the carbon

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content of exports or the carbon content of imports. Mattoo et al. (2009) argued that it would be a key factor to determine the size of the impacts of CBTAs, whether CBTA would be levied according to the carbon content of domestic goods in CBTA users or imported goods from the target countries.

There were some papers discussing the impacts of CBTAs from different perspectives. Peterson and Joachim (2007) and Dong and Whalley (2009) discussed the impacts of CBTAs on trade, output, etc. from a perspective of macro-economy. Winchester et al. (2011) argued that CBTAs would be a costly policy instrument to deal with the carbon leakage issue, but might be used as an effective coercion strategy. Lin and Li (2011) compared the impacts of CBTAs across different regions of China and argued that CBTAs would affect different regions differently and the adverse effects of CBTAs would mainly go to the regions with high openness to the international trade. Li and Zhang (2012) compared the impacts of CBTAs and other CBTA-emission-equivalent policies (energy tax and carbon tax) and argued that CBTA would be a costly and inefficient policy option to reduce carbon emissions, but could be an effective coercion strategy to force the target countries to accept the targets of carbon emission reduction. Some papers, such as Mathiesen and Maestad (2004), Quirion and Demailly (2006) and Demailly and Quirion (2008), discussed the impacts of CBTAs from a sector perspective. Some papers, such as Cendra de (2006), Monjon and Quirion (2010) and Kuik and Hofkes (2010), addressed the issue of how to add CBTA to the European Union Emissions Trading System (EU ETS) effectively.

In the meantime, CBTA suffers from several important drawbacks, such as the negative economic impacts on the target countries, being costly and inefficient to reduce world's carbon emissions and legal acceptability. Some papers, such as Esty (1994), Hoerner and Muller (1997), Sampson (1998), Zhang and Assunção (2001), Fischer et al. (2004), Ismer and Neuhoff (2004), Biermann and Brohm (2005), Pauwelyn (2007), Brewer (2008), Mattoo et al. (2009), Fischer and Fox (2009), van Asselt and Brewer (2010) and Li and Zhang (2012), discussed these issues from economic or legal perspectives.

Currently, it is a pressing policy challenge for the Chinese government to mitigate the negative impacts of CBTAs. Against such backgrounds, we seek to provide an empirical contribution to the debate on CBTA by focussing on the following questions. First, are there significant differences in the impacts of CBTAs across countries and across sectors, and what may explain these differences? Second, how big are the impacts of CBTAs on China, and how to mitigate the potential negative impacts? Third, how much can CBTA do to reduce the world's emissions, and which factors would affect the size of world's emission reduction? To answer these questions, we employ a multi-country general equilibrium model to compare the impacts of CBTAs across large developing economies and test the effectiveness of different policy options to mitigate the negative impacts.

The rest of the sections of this article are organised as follows. In section 2, we introduce some features of China's economy. In section 3, we introduce the model and data. In section 4, we present the model-based simulation results. In section 5, we make the concluding remarks.

2. Some striking features of China's economy

In this section, we introduce some relevant striking features of China's economy, which are presented as follows.

First, China is the largest primary energy consumer in the world with coal-dominated energy consumption mix, and consequently China's economy is of high carbon intensity. Following a rapid economic growth, China's energy consumption grows rapidly. According to BP (2012), China was the largest energy consumer with 2613 Mtoe of primary energy consumption in 2011. Further, there has been a significant increase in the share of China's primary energy consumption over world's total, from 10.8% in 2000 to 21.3% in 2011 (see Fig. 1). Under such circumstances, significant fluctuations in China's energy demands or prices might affect world's energy markets, and large changes in international energy prices would affect China's economy significantly. Therefore, climate reforms might generate interactions between China and other economies through the energy channel. In the meantime, China's energy consumption mix remained coal-dominated and coal accounted for around 70% of the total primary energy consumption in recent years. As a consequence, China's economy is of high carbon intensity.

Second, China is the largest carbon emitter in the world with large annual incremental carbon emissions, and hence the Chinese government might have to face the challenge of CBTA. Following rapid growth in energy consumption and coal-dominated energy consumption mix, China's carbon emissions have grown rapidly during the past few years. In 2010, China's carbon emissions were about 7.26 billion tons. Additionally, there has been a marked increase in the percentage of China's emissions over the world's total, from 13% in 2000 to 24% in 2010 (see Fig. 2). Meanwhile, China's carbon emissions are expected to continue to increase rapidly, because China is still in the process of industrialisation and urbanisation. China's large annual incremental carbon emissions would make it difficult for the world to achieve the anticipated carbon emission reduction targets. Against such backgrounds, China might have to accept the targets of carbon emission reduction or face the challenge of CBTA. In particular, we focus on the issue of CBTA in this article.

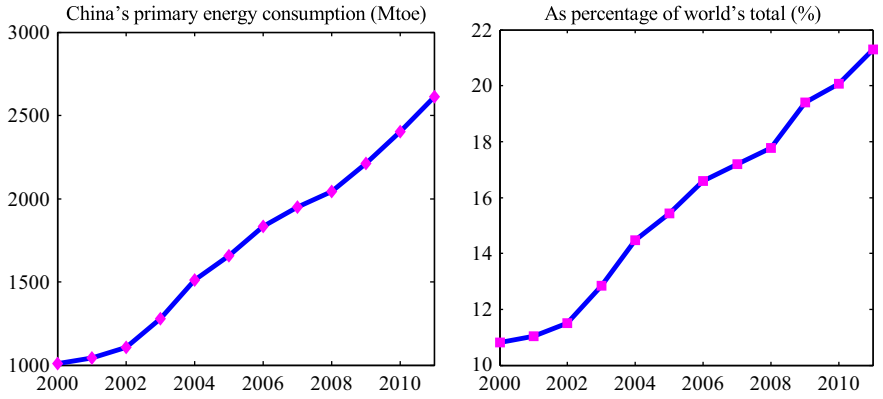

Fig. 1. China's primary energy consumption and its percentage of world's total.
Source: BP (2012).