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Australia's Emissions Reduction Fund in an international context

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ABSTRACT

The paper uses the GTAP-E model to examine whether the A$2.55 billion budget of the Emissions Reduction Fund (ERF) is adequate to buy the required abatement with respect to Australia's 2020 target. The ERF is examined according to the Marginal Abatement Cost (MAC) curve theory, with a carbon tax simulated in advance, and the equivalent subsidy outlay is calculated. We also examine whether the operations of some domestic Emissions Trading Schemes (ETSs) in other economies would affect Australia's emissions levels and MAC curves. The results indicate that the ERF budget can only help Australia to buy 85% of the required abatements, subject to its 2020 target, and that the implementations of ETSs in the other economies would not greatly affect either the emissions levels or the MAC curves in Australia.

1. Introduction

In July 2014, Australia's main climate change policy changed from carbon tax to the Direct Action Plan (DAP). The DAP was introduced with a wide range of programmes to help Australia to achieve its emissions target of 5% below the 2000 emissions level by 2020 (UNFCCC, 2014a). Although there is no difference in the emissions target between the carbon tax and the DAP, these two policies act in different ways. The carbon tax is a fixed price on each tonne of emissions [i.e. Carbon Dioxide equivalent (CO_2-e)] that requires polluters to pay for their levels of emissions. The DAP is mainly a subsidy policy operated through the Emissions Reduction Fund (ERF), whereby the Federal Government uses a budget of up to A$2.55 billion to buy emissions abatement from polluters. A firm will receive money from the government if its project wins in one of four reverse auctions. In each reverse auction, an individual or organisation can register projects online to bid for an abatement amount (e.g. 10,000 t of CO_2-e) with a proposed price per tonne. The government sets a benchmark price per tonne of emissions at each reverse auction; this price is not disclosed to participants. The government awards projects with auctioned prices below such a benchmark price in each reverse auction and pays a contractor an amount of money equal to its auctioned price times its emissions abatement units (tonnes of CO_2-e).

By December 2015, the government has already performed two reverse auctions: one in April 2015 and another in November 2015 (Clean Energy Regulator, 2015). In these two auctions, 543 projects were registered in the auctions, and the government awarded 120 contractors, covering 275 projects. The registered projects and awarded projects were from all sectors in the economy. The Government has spent A$1.217 billion to buy an abatement of 92 Mt of CO_2-e in these auctions. This is a promising outcome, as the government has spent only half of its budget to buy an abatement of 92 Mt of CO_2-e, while

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the total cumulative abatement task in 2013–2020 is 236 Mt of CO_2-e (Department of the Environment, 2013). However, over 95% of the contracts have durations of 6–10 years, and only 10 projects have durations of 1–6 years. In addition, most awards have been made to low cost projects, hence the remaining or new projects might present much higher costs for abatements. Therefore, the government might face much higher auction prices in the next round of auctions, compared with average awarded auction prices of A$13.95 in the first auction and A$12.25 in the second auction. These projects raise concern over whether the current budget (A$2.55 billion) of the ERF is adequate to buy the required abatement by 2020.

By applying a computable general equilibrium (CGE) modelling approach, namely the static GTAP-E model, we expect to find whether the current ERF budget is adequate to buy the emissions abatement required for Australia to meet its 2020 emissions target. Scenario 1 examines the ERF in Australia in the context of an international setting, where existing national emissions trading schemes (ETSs) around the world are in operation. There are ETSs in the European Union (EU), Norway, Switzerland, New Zealand, Kazakhstan, and South Korea. These economies ratified the Kyoto Protocol with their own 2020 emissions abatement obligations (Parliament of Australia, 2013). In scenario 2, we solely consider the ERF in Australia, while other economies take no action. The purpose behind these settings is to examine whether implementing ETSs in these economies would significantly affect the emissions levels in Australia and, thereby, the Marginal Abatement Cost (MAC) curves and the efficiency of the ERF policy. This is because a domestic ETS in South Korea, for example, might lower its production level, thereby reducing its energy demands, including demands for energy exports from Australia. Australian energy export sectors will be affected, spreading impacts over the Australian economy. The fugitive emissions from the Australian coal mining and oil-gas extraction sectors will automatically decline, increasing the environmental efficiency of the ERF policy, because the emissions level of the energy sectors, or indeed the whole country, is already reduced. The amount of emissions abatement for the energy sectors will be auctioned at lower costs. That is, the price for each tonne of emissions' abatement for energy sectors, as well as for other sectors, would be reduced. The required abatement cost for the whole economy might be below A$2.55 billion of the ERF. However, the magnitudes of such effects will depend on the trade flows between Australia and each of these six economies concerned.

There are some other regional climate change schemes, such as the regional greenhouse gas initiative in the United States, the Western climate initiative in the United States and Canada, the Californian cap-and-trade scheme, the Tokyo cap-and-trade scheme in Japan, the tax on coal scheme in India, the regional ETS in China, and some others (Parliament of Australia, 2013). In all economies, trade policies, and many other associated policies, are also in operation. These will impact trade, financial, and capital flows between countries, hence affecting emissions' levels in each sector and each economy as a whole. It is, however, unrealistic for us to capture all of the reactions arising from policies adopted by all global economies. Accordingly, we have taken into account only the six domestic national ETSs, along with the effects of the Australian ERF on the environment.

All sectors in Australia will participate in the auctions or the ERF programmes, whereas the ETSs in these six economies have emissions caps subject to their 2020 targets. All sectors in each economy will participate in the national ETS, where they are located.

The paper is organised in five sections. Section 2 provides the practical implementation of auction theory. Section 3 describes the ERF in Australia. Section 4 provides the modelling structure and the enhancements incorporated. This section explains how the modelling is appropriate to the analysis of the ERF and also describes emissions targets and caps. Section 5 provides the key findings. Section 6 highlights the sensitivity analysis, while Section 7 presents concluding remarks.

2. The auction theory in practice

The auction theory is well applied for efficient allocation of resources, particularly in agricultural sectors (Chan et al., 2003; Milgrom, 2004). When a market faces intangible costs, strategic behaviour, asymmetric information, and informal subsistence, which cause the demand and supply in the microeconomic models to fail, an auction becomes an appropriate and reliable method for both price setting and improving efficiency of resource allocation (Brown et al., 2011; Jack et al., 2009; Pant, 2014).

In a reverse auction, there are multiple bidders and one auctioneer. The bidders are willing to sell their commodities at a corresponding price, whereas the auctioneer will select and buy commodities from low- to high prices up to requirements. Sometimes, there is a benchmark price in the reverse auction, and the auctioneer will select bids with prices below such a benchmark price. The reverse auction could be either a single-unit or a multi-unit auction. In the single-unit auction, bidders will bid to sell their commodities at a fixed price, whereas, in the multi-unit auction, bidders could bid to sell different quantities of commodities at various corresponding prices (Alsemgeest et al., 1998; Hailu and Thoyer, 2006; Kagel and Levin, 2001; List and Lucking-Reiley, 2000). The multi-unit auctions could help to avoid the 'lumpy bid' problem (Hailu and Thoyer, 2006; Tenorio, 1993), which arises in single-unit auctions. The multi-unit auctions are consistent with the MAC curve theory, in terms of trading emissions' abatement. The MAC curve theory indicates that high abatement of emissions levels requires higher associated costs per unit of emissions' abatement. This is because an entity (e.g. firm or farmer) still bears the costs of fixed capital and labour, and emissions' abatement usually requires a reduction in production levels. When the output level of a firm reduces, the associated net profits per unit of output will reduce as costs of capital and labour are fixed. To compensate for its losses, the firm concerned must require higher prices for any abatement unit at higher abatement levels. Therefore, the range of quantities and associated prices in a multi-unit auction improves allocation efficiency considerably, as the auctioneer can purchase required amounts with the least cost when there is a high density of prices to select from.