

# The Incremental Impact of China's Carbon

## Trading Pilots

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**Mei Lu, Michael G. Pollitt, Ke Wang, Yi-Ming Wei**

China has adopted the carbon emissions trading system (ETS) due to its advantages on efficiency and cost grounds. Prior to the national carbon market, China operated seven ETS pilots as experiments for eight years in addition to the existing Energy Conservation and Carbon Abatement Target Responsibility System (ECCA-TRS) in order to accumulate experience with carbon markets. However, the incremental effects of these pilots are unclear so far.

In this study, we estimate the incremental impact of the seven ETS pilots on carbon abatement in the presence of the existing ECCA-TRS. Specifically, we examine whether China's ETS pilots contributed to carbon abatement when the effect of the ECCA-TRS is considered. We use data on 33 two-digit industrial sectors in 30 provinces in China from 2006 to 2019 and employ a triple difference method, taking advantage of the geography, time, and industry variations that China's ETS pilots have in practice.

Our study contributes in two ways to the literature on carbon trading and the carbon governance system.

First, to the best of our knowledge, this is the first paper to adjust for the effect of the ECCA-TRS when exploring the incremental effect of China's ETS pilots on CO<sub>2</sub> abatement. Almost all existing studies did not consider the influence of ECCA-TRS, which is a unique but important mechanism for China. Our results can expand the empirical literature on the implementation of overlapping policy instruments to address the climate change issue.

Second, our results prove the ineffectiveness of the ETS pilots in China, which is quite the opposite conclusion from most other existing research. Specifically, the results show that ETS pilots did not affect the CO<sub>2</sub> emissions or CO<sub>2</sub> intensity of covered industries, and also that the ETS pilots did not substitute command-and-

control measures under ECCA-TRS and did not accelerate carbon abatement or reduce the abatement cost. The ETS pilots offer China's national carbon market valuable lessons to deal with the overlay of the ECCA-TRS and the ETS. Carbon markets with loose targets for aggregate emissions reductions are non-binding on top of the ECCA-TRS with strong political incentives.

Based on our analysis we present evidence that, on the whole, China's ETS pilots do not act as an effective incremental carbon abatement policy to achieve extra carbon reduction beyond ECCA-TRS, nor work as a complementary instrument to reduce the abatement cost of covered industries. Although perhaps several specific sectors in some pilots have some reduction effect caused by ETS, the overall impact is insignificant. However, apart from being expected to achieve some emissions reduction, these pilots were also introduced to increase learning and awareness of carbon markets in China, their failure to have incremental impacts should not be viewed as a policy failure. Indeed, on the contrary, the pilot markets are working as might be predicted by economic theory given their implementation at low levels of stringency in the presence of a tighter pre-existing policy.

ECCA-TRS contributed to the larger carbon abatement of covered industries in ETS pilots. In order to peak the country's CO<sub>2</sub> emissions at around 2030 and achieve net zero by 2060, China must increase the stringency of its carbon trading mechanism. Getting to net zero requires the discipline that carbon markets bring to the enforcement of overall carbon emissions quantities. As the carbon constraint binds, differences in relative costs of abatement between sectors and firms will become more critical.

Thus, a binding target should be set to let the ETS act as the backstop emissions constraint in the process to net zero. This means the interaction between the ECCA-TRS carbon reduction targets and the carbon market cap needs to be explicitly considered. This will involve allowing certain ECCA-TRS carbon reduction targets to be met by the use of the carbon market, in line with economic incentives and shifting the carbon focus of the ECCA-TRS to non-covered sectors or entities below the size thresholds for inclusion. This will allow the ETS to cost-effectively guarantee the overall abatement constraint, and the ECCA-TRS and ETS to play a complementary (rather than substitute) role in encouraging carbon abatement in China.

Contact  
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m.lu@jbs.cam.ac.uk  
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