



# Does China's low-carbon pilot programme really take off? Evidence from land transfer of energy-intensive industry

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## ABSTRACT

To realise the targets for controlling greenhouse gas emissions by 2020, China has issued three batches of low-carbon pilot programme since 2010. In this paper, we estimate the causal effect of the programme from the perspective of land transfer of energy-intensive industry, by using a difference-in-differences method. We also analyze the role of the local secretary, the de facto "first-in-command" official of local government. The results suggest that the pilot programme has come into play to a certain extent (a reduction of 26.271–29.158 ha' land transfer of energy-intensive industry), but the effect attenuates quickly over time. After considering the moderating role of the secretary, the greater promotion potential (younger than 54 years old, more than the third year of time in office, and working experience in the upper level) is found to have worsened the pilot programme's effect. Therefore, the key to performing the pilot programme's function lies in enhancing the weight of the environment-related indicators in the promotion assessment system.

## 1. Introduction

During the rapid development of industrialisation and urbanisation, China has become the world's largest energy consumer and greenhouse-gas emitter (Wang et al., 2015a), which causes serious environmental damage and poses a higher health risk (Wang and Yang, 2016). Evidence from Chen et al. (2013) suggests that air pollution from fossil fuel usage can reduce human longevity by 5.5 years in China. Meanwhile, the negative externality is also putting increasing international pressure on China (Zheng et al., 2014).

To gain legitimacy both at home and abroad and reflect the responsibility of a great nation, China promised to reduce its carbon emission intensity by 40–45% by 2020, compared with the level in 2005 (Zhang and Da, 2015). The National Development and Reform Commission (NDRC), which represents China's central government in formulating and implementing national economic and social development plans (Khanna et al., 2014), issued three batches of low-carbon pilot programme in 2010, 2012, and 2017, respectively, to achieve this ambitious goal. Since then, low-carbon pilot programme is in rolled-out format, and city has become the main force.

Following the trend of the low-carbon programme's full coverage, a natural question arises as to whether previous programmes have really

taken effect in these cities. Meanwhile, it is also unclear whether the effect will vary across cities, in view of city differences (Liu and Qin, 2016), especially besides the usual factors, such as urban development, resource endowment, and industrial structure (Wang et al., 2015b). The answers to both questions are of great importance for adjusting measures to local conditions.

The key to evaluating the effect of low-carbon programme lies in local government responses, in view of the dominant role of local government in the process (Liu and Qin, 2016). More specifically, as the de facto "first-in-command" official of local government (Joseph, 2014), the effort put in by the Communist Party secretary determines the effect of such a programme to a large extent; the mayor is also under the guidance of the secretary (Zheng et al., 2014). After taking the evaluation system for the local secretary into consideration, land transfer of energy-intensive industry (EII) has been chosen to reflect the local government's trade-off between economic development, energy conservation, and emission reduction.

Since the term "low-carbon economy" appeared in the British government's *Energy White Paper* in 2003 (Mitchell and Connor, 2004), scholars have paid great attention to this concept, especially in relation to the role of cities in energy consumption and greenhouse-gas emissions (Weitzman, 2007). As for studies of China's low-carbon

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development, scholars have examined the overall transition process to a low-carbon economy (Qi and Wu, 2013) and related practice in specific areas, including energy consumption (Liu et al., 2013), electronic development (Kahrl et al., 2011), technological advances (Dong et al., 2014), and urban planning (Chen, 2015). Scholars have also been keeping a watchful eye on the practices of low-carbon cities, such as Beijing (Zhang et al., 2011), Shenzhen (Jong et al., 2013), Zhenjiang (Wang et al., 2015b), and Guangyuan (Jiang, 2015). Some researchers have provided a comprehensive perspective on the low-carbon programmes. Su et al. (2016) point out that the low-carbon objective is time-consuming and should be differentiated among cities. Wang et al. (2015b) suggest that the central government should strengthen related support and establish a policy assessment system. It is noteworthy that Khanna et al. (2014), Liu and Qin (2016), and Fu and Zhang (2017) have made beneficial exploration on the effect of the low-carbon programme from the perspective of the master plans of local government; however, the key lies in the outcomes and performance of the programme, as concrete implementation may violate the plans' targets and goals.

Our research ties in with four strands of literature. First, it contributes to research on the effect of the low-carbon pilot programme by Khanna et al. (2014), Liu and Qin (2016), and Fu and Zhang (2017), from the perspective of land transfer, the fundamental factor input of economic activities, thereby helping us to extrapolate the effect of such a programme based on a specific practicing process. Our research finds that the low-carbon pilot programme can reduce land transfer of EII by 29.158 ha in pilot cities, but the effect attenuates quickly over time, which reflects the inconsistency of policy implementation. The second strand of literature stresses the importance of an industry perspective on energy conservation and emissions' reduction. Compared with a considerable body of research on energy issues from the perspective of region, an industry perspective is insufficient (Wang et al., 2015c). Therefore, our research studies the effect of low-carbon pilot programme on land transfer of EII. The third strand of literature responds to the role of government (Shleifer, 1996) and the motivation and restriction of politicians (Olson, 1993). Political factors are extremely important for the market operational mechanism, which is more typical in transitional countries, and as the major policymaker and executor, the local leader's balance between cost and benefit will have a great effect on the outcome of policy. Our empirical results show that those secretaries with a lower chance of being promoted tend to strictly follow their own low-carbon pilot plans. Last but not least, our research responds to the literature on the land transfer behaviour of local government (Wu and Heerink, 2016). However, scholars hold two typical viewpoints, from fiscal incentives to political incentives (Wu et al., 2015). The empirical results strongly support political incentives by only focusing on industrial land transfer for its low price (Wu et al., 2014).

## 2. Institutional background

### 2.1. Practice of low-carbon pilot programme

Through the way of promotion after establishing experiment site, NDRC issued three batches of low-carbon pilot programme in 2010, 2012, and 2017, respectively, as shown in Fig. 1. Among them, 5 provinces and 8 cities has been selected in the first batch. As the area of provinces is too large to conduct pilot work and replicate practical experience, cities have been selected as the main object of the pilot programme in the second batch including 1 province and 28 cities, and in the third batch which consists of 45 cities. Moreover, four provinces previously absent of pilot city are now included in the third batch of the low-carbon pilot programme, making sure that each province has at least one pilot city.

In this paper, we select the second batch as the treatment group, as the first batch includes more provinces that violate the current trend

towards the main role of cities in the pilot programme, and the third batch is in the initial stage. Additionally, there were some overlapping areas among the batches, e.g., Yanan, Wuhan, Guangzhou, and Kunming belong to the second batch, but their provinces are also in the first batch. Therefore, we exclude the cities to get the pure effect of the low-carbon pilot programme.

### 2.2. Role and preference of local government

China has traditionally had greater centralisation of state power, compared to Western countries, but this higher centralisation became an obstacle for development during the initial implementation of the reform and opening-up policy, leading to the redistribution of decision-making powers between central and local government, which is one of the most striking differences compared with Eastern Europe and Russia where the central government is dominant in the process of privatization, and has become the fundamental component of reform since 1980 (Qian and Roland, 1998). Moreover, the redistribution of powers between central and local government also differs from Western countries' federalism, and it is called market-preserving federalism by Montinola et al. (1995), the Chinese style, which generates far-reaching consequences on political institution and economic development.

More generally, the redistribution of powers between central and local government is called as economic decentralisation and political centralisation (Cai and Treisman, 2006). Such redistribution of power is not discussed in China's constitution, but it exists at a practical level. According to Zheng (2007), political centralisation has led to the central government having control of political rights, such as foreign policy, media, religion, and the appointment of government personnel, and economic decentralisation has given local government more rights on economic decision-making, such as coordinating urban development plans, resolving business disputes, and providing local public goods. There are also some policies that are formulated by central government, but implemented by the local government. During the formation of certain policy, central government also seeks advice from the local government. Taken together, intervention from local government plays an important role in regional development, and the effect of government intervention has been magnified by poor local government quality (Chen et al., 2014). Through economic decentralisation, the local government has been motivated to develop economics quickly, so as to get higher chance of being promoted by the central government.

Corresponding to the area of energy conservation and pollution reduction, China's central government has applied a target responsibility system (TRS); the local government should be responsible for the disaggregated goals (Li et al., 2016), i.e., the concrete implementation depends on the effort of local government. Moreover, during the implementation of the low-carbon programme, civil society and other stakeholders lack of sufficient participation chance, including co-operation and supervision (Liu and Qin, 2016).

In the paper, we mainly focus on the preference of the Communist party secretary, the de facto "first-in-command" official of local government (Joseph, 2014). Following the standard political economy studies, we assume the secretary to be a rational self-interested actor (Olson, 1993). The local secretary's work is evaluated by indicators of economy, environment, and social security, which has a direct effect on career advancement.<sup>1</sup> The economy-related indicators have long been dominant (Cai, 2017), but more weight has been given to environment-related indicators (Zheng et al., 2014). Therefore, the secretary should make a balance between economic development, energy conservation, and environment protection.

<sup>1</sup> The evaluation results are also linked to personal reputation and wealth accumulation, but, as Cai (2017) points out, these are inferior to career advancement; e.g., the politicians can, arguably, generate more income elsewhere.

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