



The effects of firm ownership and affiliation on government's target setting on energy conservation in China

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ABSTRACT

Targets of energy conservation in China are allocated by the central government across subnational jurisdictions and firms. However, we know little about why some regulated entities receive higher mandates than others. In this paper, we use the Top-1000 Enterprises Energy-Saving Program, which was adopted in 2006, to examine the underlying mechanisms through which energy-saving targets are assigned. After considering a variety of control variables, we find that state-owned enterprises (SOEs) receive significantly higher targets than non-SOE firms. In addition, centrally affiliated firms are assigned with higher targets than their locally affiliated counterparts. Furthermore, firm ownership and affiliation interactively affect target assignment, with central non-SOE firms bearing the heaviest tasks. We then derive theoretical and policy implications from the findings for energy policy and results-based management strategy.

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1. Introduction

Global climate change calls for nations' actions to reduce carbon dioxide (CO₂) emissions. The Chinese government was committed to reducing its energy intensity (measured by energy consumption per unit of gross domestic product, or GDP) by 20 percent by 2010 (Andrews-Speed, 2009). Mandated in the 11th Five-Year Plan (2006–2010), the emissions reduction targets were disaggregated and assigned to local governments and large enterprises (Li et al., 2016). To achieve its policy goal of reducing CO₂ emissions and improving energy efficiency, the central government has implemented various energy conservation policies and programs. In this study, we focus on the Top-1000 Enterprises Energy-Saving Program (Top-1000 Program), which was initiated in 2006 and targeted over 1000 large-scale energy-consuming enterprises in China (Price et al., 2010).

In the Top-1000 Program, target firms were assigned with varying levels of energy-saving targets by the central government. Although the central government suggested that regulated entities' total energy consumption and research and development (R&D) capacity were used as the key criteria to identify target firms and assign related performance targets, it is of theoretical and empirical interest to explore whether other political and contextual factors of regulated entities account for the variations in target assignment.

Specifically, we examine whether and how target firms' ownership and affiliation, which are two important institutional linkages between government and businesses, influence target assignment by the central government. By exploring the understudied mechanisms through which government assigns energy-saving targets among firms, this study helps deepen our understanding of the target-setting dynamics. Furthermore, our study is among the first research to use firm-level data of the Top-1000 Program to empirically examine the rationales of target assignment, generating critical implications for comparative studies.

China's party-state regime is adept at top-down policy implementation, and the central government mobilizes local agents to meet its policy priorities through various incentive strategies (Heilmann and Melton, 2013). Policy targets are often disaggregated and allocated to local governments and firms, in which economic rewards and political prospect of their leadership are generally gauged in terms of organizational achievement of these targets (Gao, 2009). Although the allocation and accomplishment of policy mandates across governmental hierarchy have been extensively examined (Liang and Langbein, 2015; Ma, 2016), we still know little about how the results-based accountability system is implemented in quasi-public and private enterprises. In this paper, we use the case of energy conservation to explore the institutional linkages between government and regulated firms and their implications for policy target allocation.

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In China, large-scale industrial enterprises contribute to approximately 47% of the industrial and 33% of the nation's total energy consumption. Without regulating these firms, it is almost impossible for the central government to accomplish its national energy-saving targets. In 2006, the National Development and Reform Commission (NDRC) promulgated the Top-1000 Program (Price et al., 2010). The NDRC selected 1008 enterprises in nine most energy-intensive industries (i.e., chemicals, construction materials, non-ferrous metals, coal mining, electric power generation, petroleum and petrochemicals, textiles, pulp and paper, and iron and steel) and assigned targets to those firms. Target firms were mandated to reduce energy consumption and report their performance to the NDRC annually. The public accessibility of regulated firms' performance worked as an external accountability mechanism (e.g., naming and shaming). The Program provides strong behavioral incentives for target achievement, as those firms that met targets were rewarded with various benefits (e.g., preferential policies and subsidies).

The NDRC suggested that the primary criteria of firm selection and target allocation are the firms' total amount of energy consumption and technological capacities. However, it remains uncertain whether other political and contextual factors may also play a role in the central government's decision making on target allocation. The Program is mandatory, but firms may withdraw due to various reasons. For instance, a couple of private firms refused to be assessed by the Program at the early stage, but no SOEs did so (Li et al., 2013). In addition, almost all regulated firms, particularly centrally affiliated enterprises, not only met but also substantially exceeded the mandatory targets (Li et al., 2016). These observations imply that firms' political and contextual attributes other than the official criteria may also affect the outcome of target assignment.

In the subsequent sections, we examine whether and how organizational ownership and administrative affiliation, which are two organizational attributes shedding light on government-business relationships (Nie, 2017), interactively affect target allocation in energy conservation. Ownership and affiliation are two distinct but related characteristics of firms. It is broadly observed that firms that are publicly held by governmental entities usually are in a better position to obtain political protection, but in the meantime subject to tighter political oversight (Ang, 2017). Furthermore, although China has transformed steadily from a centrally planning-to a market-oriented economy, firms are legally required to register with corresponding governmental entities at different levels, which exercise monitoring authority. In this regard, compared to organizational ownership, administrative affiliation may play an equally important role in shaping government-business relationships.

The remainder of the paper is organized as follows. In the second and third section, we review the literature on target setting in energy policy, and describe the empirical context and develop testable hypotheses, respectively. We then present the data, measures, and analytic methods. After presenting the findings in the fifth section, we conclude by discussing the theoretical and policy implications derived from the findings for energy policy and results-based management strategy.

2. Literature review and hypotheses

2.1. The logics of target allocation

Setting appropriate performance targets for regulated entities and evaluating their accomplishment are critical in energy policy (Rietbergen and Blok, 2010). Speaking generally, the central or national government allocates energy-saving targets across subnational jurisdictions and firms (Li et al., 2016). In practice, the specific strategy of assigning energy performance targets is contingent on political and institutional context. In the case of the European Union

(EU), energy-saving targets are distributed among member countries through iterative processes of bargaining and negotiation. In contrast, in China, local governments generally have weak bargaining power in negotiating their performance mandates (Zhu and Chertow, 2017). The distribution of energy-saving targets by the central government is more based on the concerns with the potential impact on local economic development and social stability than on regulated entities' organizational capacities (Ni et al., 2015). Due to their varying political and economic incentives (e.g., administrative autonomy and economic benefits), it is not uncommon that many local governments are reluctant to comply with central mandates (Van Aken and Lewis, 2015). Provinces with a higher level of bureaucratic integration with the central government may be more likely to meet, and in some instances, excessively accomplish the assigned targets (Liang, 2015). As policy priorities of central and local governments are not always compatible, to mobilize regulated entities' compliance, local governments often bundle central mandates with other pressing policy tasks in the policy implementation process (Kostka and Hobbs, 2012).

In addition to macro-level perspectives (Yuan et al., 2010), studies also focus on firm-level factors. Zhao and Wu (2016) shows that the central government in China sets energy performance targets based on the evaluation of previous policies and programs, local energy-saving practices, and experts' knowledge. Provincial governments follow suit to further allocate their energy-saving targets to local enterprises (Zhang et al., 2011). Given their shared incentives in meeting central mandates, local governments play a key role in facilitating regulated entities to enhance energy use (Zhao et al., 2014), through mandatory or voluntary programs (Liu, 2010). Some case studies point out that to meet government's energy-saving targets, firms generally are faced with various challenges, including the uncertainty of local governments' supports, procedural red tape, and financial constraints (Zhao and Ortolano, 2010). In particular, small- and medium-sized enterprises usually lack information and organizational resources that are essential to increase energy efficiency (Kostka et al., 2013). Due to the pressure for performance, firms, to a varying degree, may falsify the amount of saved energy (Zhao et al., 2016), or over-report the achieved targets (Ma and Zheng, 2016).

Despite identifying a variety of factors related to target setting in energy conservation in China, extant research is limited in three respects. First, most of the studies focus on the level of local government, while firm-level investigation is scarce. Second, current research on energy performance targets at the firm level primarily relies on qualitative case studies. Lastly, compared to target achievement, rarely examined is the allocation of targets, which may be attributed to regulated entities' political and contextual factors. This paper aims to fill these gaps and contributes to the literature by reporting new evidence on target assignment at the firm level.

2.2. Firm ownership and target assignment

We expect that firms' ownership and affiliation will independently and jointly affect target assignment, and our conceptualization is illustrated in Fig. 1. We then develop three hypotheses in accordance with the theoretical framework.

In China, ownership refers to whether firms are owned or controlled by government in terms of capital composition (Xu et al., 2014). According to the definition by the National Bureau of Statistics (NBS), SOEs are state solely owned or holding firms. Non-SOE firms are non-state-owned collective enterprises, non-state-owned associated enterprises, joint venture, privately-owned enterprises, or foreign-owned enterprises.

Two competing theories are relevant in explaining the variations in target allocation among enterprises with different

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