



Business Strategy Under Institutional Constraints: Evidence From China's Energy Efficiency Regulations



Junming Zhu^{a,b}, Marian R. Chertow^{b,*}

^a School of Public Policy and Management, Tsinghua University, Beijing 100084, China

^b Center for Industrial Ecology, School of Forestry and Environmental Studies, Yale University, 195 Prospect St, New Haven, CT 06511, USA

ARTICLE INFO

Article history:

Received 23 July 2016

Received in revised form 21 November 2016

Accepted 6 January 2017

Available online xxxx

Keywords:

Energy efficiency investment

Corporate strategy

Energy saving

China

Institution

ABSTRACT

This paper links theoretical perspectives from energy efficiency economics with those observed from corporate environmental strategy to develop a framework for explaining energy efficiency strategies by firms in response to national policies and local regulations in China. The framework is refined through analytic generalization of 20 cases from four industries and four cities in Jiangsu Province, and reveals two strategies: 1) firms with moderate institutional pressure seek incremental competitiveness by adopting energy-saving technologies, which is reinforced by their informational, organizational, and financing capabilities, and facilitated by voluntary policies and industrial competition; 2) firms with survival risk or development constraints under regulation seek a position favored by local governments by replacing old plant and equipment with larger, more efficient ones and contributing to the local community. The Chinese case studies reveal a strong institutional impact on firms' choice of business strategies and particularly the positioning strategy. The identified business strategies shed additional light on the effectiveness and implications of different policy instruments for energy efficiency.

© 2017 Elsevier B.V. All rights reserved.

1. Introduction

Decision making by firms regarding energy efficiency investment is often viewed as an economic problem. Being a factor of production, energy can be substituted by other factors of production, such as fixed capital. Energy savings, which are often recurrent, can reduce production costs and preserve financial assets over the long term. Although empirical evidence confirms that the adoption of energy-saving technologies is responsive to energy pricing, a gap has long been recognized between the current energy efficiency level and economic or social optimal levels (Jaffe and Stavins, 1994). Such an “energy efficiency gap” has been explained systematically in terms of market failures and non-market behavioral barriers (Gillingham et al., 2009; Jaffe et al., 2004). These broad-scale explanations, however, do not fully address how related policy mechanisms and behaviors are perceived within a specific institutional context and how firms vary in response to regulation and other inputs. In contrast, the management literature discusses institutional constraints more explicitly as well as strategic decision-making and organizational behavior of firms. Causal mechanisms can be identified to help build theories and propose propositions of firm behaviors for further examination and policy recommendations.

Building on the insight provided by the observation of the energy efficiency gap, then, this paper adds perspectives from the corporate environmental management literature, to define a model that helps to explain firms' motivations and decisions for energy saving in the context of substantive regulations on energy efficiency in China. The model considers how multiple policy instruments are interpreted and implemented, and explains how institutional and industrial contexts shape firms' behaviors, conditional on their capabilities. The model is developed based on interviews with industrial firms about their strategies during 2006–2015 and both within-case and between-case analyses.

The geographical setting is China, not only because of its magnitude of energy consumption and significance to global climate mitigation, but also, more importantly, because it offers researchers an ideal setting to confirm or extend previous discussions about energy efficiency decisions. Four case studies are included in the Appendix A to illustrate the decision-making process of example firms doing business in China. The policies that went into force in 2006 in China featured mixed use of policy instruments beyond simple command-and-control or market approaches and immediate tightening of industrial energy consumption. The findings herein are contingent on contextual factors identified explicitly, which help to advance the knowledge of firms' responsiveness in energy saving and inform policy makers on the effect of different policy instruments and their specific dynamics in China.

The remainder of the paper is organized as follows. Section 2 reviews the literature in economics and management about energy efficiency

* Corresponding author.

E-mail addresses: junming@tsinghua.edu.cn (J. Zhu), marian.chertow@yale.edu (M.R. Chertow).

and environmental behaviors of the firm. Section 3 gives an overview of the regulatory background in China and a preliminary framework for explaining firm strategies. Section 4 describes the case study method applied in this research and data collection process. Section 5 presents findings. The implications of these findings for research and policy-making are further discussed in Section 6. Section 7 concludes this paper.

2. Literature

2.1. Energy Efficiency Economics

From an economic perspective, a firm's decision regarding energy efficiency is based on a balance of costs of initial investment and expected benefits of future cost savings, as well as expected profits from technology transfer (Jaffe et al., 2004). As a rational actor, a firm should invest in all of the energy efficiency technologies with a positive net present value. An energy efficiency gap is often observed empirically, however, revealing that firms do not adopt all of the profitable technologies. Rather, it appears that firms make decisions based on an implicit discount rate higher than other market interest rates and, as a result, the investment falls short of the optimal (Gillingham et al., 2009; Jaffe et al., 2004; Tietenberg, 2009).

The underinvestment in energy efficiency is often explained by market failures regarding accessibility to information and investment. Information about the existence of a technology and the act of adopting it – often called learning by using – creates positive externalities by letting others be more informed about the technology at little or no cost (Jaffe et al., 2004). Positive externalities indicate undersupply of the information that is essential to firms' ability to make investment decisions. Within an organization, imperfect information exacerbates principal-agent problems – managers who determine an energy saving investment may be evaluated before the benefit of the investment is fully revealed, and would likely choose not to invest suspecting that others do not understand and appreciate the benefit of investing in the technology. Additional principal-agent problems are manifested by capital costs being treated differently from operating costs in an organization, leading to similar underinvestment (Tietenberg, 2009).

Lack of access to financing for energy efficiency features another kind of market failure (Gillingham et al., 2009). Liquidity constraints apply not only to energy efficiency investments, but also to other potential investments a firm faces. Under a financing or credit constraint, a firm-as-rational-actor would choose only the most profitable investments with the shortest payback periods, or choose among those that lenders – without the same knowledge about energy efficiency – would consider to have low credit risks.

Policies can encourage technology adoption by directly addressing market failures. Positive information externalities associated with energy efficiency technologies can be internalized through financial incentives to technology adopters. Imperfect information and principal-agent problems can be mitigated through information programs that provide energy audits or information about certain technologies. Capital market failures can be solved by financing or loan assistance particularly for energy efficiency projects.

Deviating from the assumption of rational choice, behavioral economics sheds additional insights on the behaviors of energy users from their nonstandard preferences and nonstandard decision-making (Gillingham and Palmer, 2014). Nonstandard preferences include temptation and self-control that favor products with lower upfront costs and most often, lower energy efficiency (Tsvetanov and Segerson, 2013). The endowment effect and loss aversion under uncertainty also suggest a preference for the status quo (Gillingham and Palmer, 2014). Nonstandard decision-making includes bounded rationality, which implies a limited ability to process information, and heuristic decision making, which deviates from pure net-present-value or cost-benefit decision making (Gillingham et al., 2009).

Firms, as economic agents, experience and learn directly from an exchange institution and arbitrage, and may behave more rationally compared to individual consumers, but they are not fully immune to behavioral anomalies (Tversky and Kahneman, 1986). In economic terms, as long as these behavioral anomalies exist, their interaction with other market failures makes the policy efforts to “correct the multiple imperfections” far more difficult than addressing a single one (Shogren and Taylor, 2008). Policies can improve energy efficiency through investment incentives that reduce upfront cost, information programs that assist decision-making, and energy efficiency standards that mandate the use of more efficient technologies and products.

2.2. Strategic Behaviors Under Institutional Constraints

Empirical research shows that firms are heterogeneous in levels of investment inefficiency and preferences for energy efficiency within and across different geographic and institutional contexts, based on revealed preference (for example Anderson and Newell, 2004; Arvanitis and Ley, 2013; DeCanio and Watkins, 1998) or self-stated preference (for example De Groot et al., 2001; Hasanbeigi et al., 2010; Liu et al., 2012; Rohdin and Thollander, 2006; Schleich, 2009). This implies that universal policy efforts discussed above may lead to distortions especially for firms already close to efficient investment levels and not enhance overall welfare. To understand the heterogeneity across firms and contexts requires causal explanations of energy saving decisions that are built upon essential characterization of corporate responses on the one hand, and are embedded in detailed institutional contexts with accurate accounts of policy mechanisms on the other hand.

On broader environmental issues, the management literature often incorporates external contexts and internal organizational processes in rationalizing corporate responsiveness and strategy. Seemingly costly environmental practices can arguably bring competitive advantage to firms. From Porter's dynamic perspective of competitiveness, environmental innovation can create advantage for firms that are subject to well-designed regulations that induce innovation, moving the firms to a position of lower cost or greater differentiation compared with the offerings for non-subject firms (Ambec et al., 2013; Esty and Porter, 1998; Porter and Van der Linde, 1995).

Reinhardt (2000) explores alternative conditions for environmental behaviors to be economically viable – environmental externalities coexisting with asymmetric information and oligopoly. Reinhardt (2000) also explains additional competitive advantages of environmental behaviors beyond direct economic returns, including managing competitors through new rules and regulations, managing environmental risk, differentiating the environmental characteristics of products, and redefining markets.

The literature also invokes institutional theory, which helps to explain the coercive, mimetic, and normative influences of institutions on organizations (DiMaggio and Powell, 1983; Scott, 1987). How firms act upon these influences and position themselves on environmental issues depends on their motivation (Bansal and Roth, 2000), interpretation of the issues (Naffziger et al., 2003; Sharma, 2000), perception of stakeholders (Henriques and Sadosky, 1999), social networks (Pulver, 2007), and organizational structures (Delmas and Toffel, 2008). Institutions are not unidirectional influential forces, but are also affected by the strategic behavior of firms that have larger bargaining power and more proactive positions (Child and Tsai, 2005).

The effect of firms' internal capabilities on their environmental decisions is more thoroughly explored in research based on the resource-based view of the firm. In contrast to the view of competitive advantage of firms' positioning in an industry, the resource-based view of the firm argues that competitive advantage is sustained by valuable, rare, imperfectly imitable, and non-substitutable resources and capabilities (Barney, 1991), among which environmentally oriented ones are important (Hart, 1995; Hart and Dowell, 2010). The empirical research indicates that environmental performance and strategies are positively

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات