Johnson
Cornell
SC Johnson College of Business

Administrative Science Quarterly
2017, Vol. 62(2)375–404

DOI: 10.1177/0001839216674457
journals.sagepub.com/home/asq
SAGE

# State Ownership and Firm Innovation in China: An Integrated View of Institutional and Efficiency Logics

**Kevin Zheng Zhou,[1] Gerald Yong Gao,[2] and Hongxin Zhao[3]**

**Abstract**

Using two longitudinal panel datasets of Chinese manufacturing firms, we assess whether state ownership benefits or impedes firms' innovation. We show that state ownership in an emerging economy enables a firm to obtain crucial R&D resources but makes the firm less efficient in using those resources to generate innovation, and we find that a minority state ownership is an optimal structure for innovation development in this context. Moreover, the inefficiency of state ownership in transforming R&D input into innovation output decreases when industrial competition is high, as well as for start-up firms. Our findings integrate the efficiency logic (agency theory), which views state ownership as detrimental to innovation, and institutional logic, which notes that governments in emerging economies have critical influences on regulatory policies and control over scarce resources. We discuss the implications of these findings for research on state ownership and firm innovation in emerging economies.

**Keywords:** state ownership, innovation, agency theory, institutional theory, industrial competition, state start-up, emerging economies, Chinese manufacturing

Innovation is a key driver of sustainable competitive advantage and economic growth, and the rise of emerging economies has fueled a growing interest in how factors unique to those markets affect innovation development (Chen et al., 2014; Lee, Özsomer, and Zhou, 2015). Because governments in emerging economies such as Brazil, China, and Russia play critical roles in affecting firms' behavior, researchers have recently revisited state capitalism, focusing on whether government control may stimulate innovation and competitive

[1] Faculty of Business and Economics, University of Hong Kong
[2] College of Business Administration, University of Missouri–St. Louis
[3] John Cook School of Business, Saint Louis University

advantage (Lazzarini, 2015; Mazzucato, 2015) and how various forms of state ownership foster firms' performance (Inoue, Lazzarini, and Musacchio, 2013; Musacchio, Lazzarini, and Aguilera, 2015). But how different levels of state ownership affect firms' innovation has received less attention (Musacchio, Lazzarini, and Aguilera, 2015).

According to the conventional, efficiency-based economic view, mostly rooted in agency theory, state ownership plays a minor role in spurring firms' innovation and performance. Because state-owned enterprises (SOEs) are governed by administrative rather than economic imperatives, government intervention is unavoidable, and political tasks hinder firms' development (Shleifer and Vishny, 1994; Shleifer, 1998; Ramaswamy, 2001). Managers in SOEs often lack incentives to pursue market-driven, efficiency-based innovative activities and instead just fulfill their administrative mandates (Ramamurti, 2000; Freund, 2001). According to this view, SOEs should gradually lose their innovativeness and competitiveness over time.

In reality, however, many SOEs in emerging economies have evolved into dynamic dynamos, rather than the predicted dying dinosaurs (Ralston et al., 2006; Musacchio and Lazzarini, 2014; Stan, Peng, and Bruton, 2014). China now has 106 companies in the 2015 Fortune Global 500—four times more than in 2006—about two-thirds of which are SOEs. An institutional perspective helps to explain this growth. According to the institutional view (North, 2005; Peng, Wang, and Jiang, 2008), governments are among the most salient institutions in emerging economies, with critical influences on regulatory policies and control over scarce resources, so they profoundly shape firms' competitive environment (Gao et al., 2010; Nee and Opper, 2012). Because SOEs have access to policy information, government support, and valuable resources (Chen et al., 2014; Musacchio and Lazzarini, 2014), these advantages presumably could foster innovation.

Whereas prior studies generally show that SOEs perform worse than their private counterparts (see Megginson and Netter, 2001, for a review), empirical evidence is mixed on the effects of state ownership on innovation. Some studies report that state ownership has negative effects on new product sales, patent applications, firms' adoption of product innovation, and revenue from innovation projects in China (Jefferson et al., 2003; Xu and Zhang, 2008; Guan et al., 2009), and Ayyagari, Demirgüc-Kunt, and Maksimovic (2011) showed that SOEs are less innovative than private firms across 47 emerging markets. In contrast, other studies have shown that SOEs produce more patent registrations or new products than non-SOEs in China (Li and Xia, 2008; Choi, Lee, and Williams, 2011). Meanwhile, Choi, Park and Hong (2012) found that state ownership has no significant bearing on Korean firms' technological innovation performance.

To resolve the theoretical and empirical inconsistencies about the effects of state ownership, we theorize in this paper that the institutional and efficiency logics pertain to different facets of state ownership: the institutional logic focuses on resource allocation, and the efficiency logic refers to resource utilization, so they are intertwined in explaining the impact of state ownership on innovation. Whereas state ownership could enable a firm to obtain more resources for innovation (i.e., more R&D input), it may also decrease the firm's ability to convert its R&D input into innovation output (i.e., to have lower

efficiency). Thus state ownership may have an inverted U-shaped relationship with a firm's innovation output such that a minority state ownership would enable the firm to achieve the highest innovation output. Moreover, we examine important contingencies related to the role of state ownership, which may have differential effects on innovation across various institutional and industrial environments. We propose that a better institutional environment will reduce the positive impact of state ownership on R&D resources, whereas a more competitive market or start-up status could push firms with state ownership to use their resources more efficiently.

## STATE OWNERSHIP AND PRODUCT INNOVATION

State ownership refers to the percentage of ownership stake that the government holds in a firm; SOEs are firms with majority government ownership (Boisot and Child, 1996; Jefferson et al., 2003). Owned by ''the whole people'' but ''operated and managed by the state,'' SOEs act as agencies of the government that carry out the state's policies and regulations (Shleifer, 1998). State ownership exists in both developed and emerging markets, and various forms of state control (e.g., majority ownership and minority investment) have emerged in many countries (Musacchio, Lazzarini, and Aguilera, 2015). Firms with different types of state control represent up to 20 percent of the total stock market value worldwide (Musacchio and Lazzarini, 2014). Here we consider two seemingly competing perspectives on how state ownership of a company should affect its ability to innovate and compete in the market: the institutional and the efficiency views.

### Resource Allocation: An Institutional Logic

Institutional theory focuses on the interaction between institutions and organizations and emphasizes how a firm's behavior is shaped by the surrounding institutions (Scott, 1995), which include both formal organizations, such as social, economic, and political bodies, and informal social norms and rules (North, 1990; Peng, 2003). Because institutions reflect a nation's history, culture, and ideology, they create the rules of the game and regulate business activities through formal and informal constraints (North, 1990; Oliver, 1997). Firms come under strong pressure to react and adapt to various institutional constraints; those that conform to the rules are more likely to survive and prosper (Dacin, Oliver, and Roy, 2007).

According to the institutional view, institutional factors must be considered in determining the role of ownership in firm governance (North, 2005; Dacin, Oliver, and Roy, 2007; Peng, Wang, and Jiang, 2008). In emerging economies, institutional voids, such as shallow capital markets, shortages of skilled labor, weak legal enforcement, and a lack of independent financial intermediaries, seriously hinder firms' operation and development (Khanna and Palepu, 1997; Hoskisson et al., 2000; Ramamurti, 2000), including constraining a firm's motivation and ability to invest in innovative yet risky projects (Chen et al., 2014; Yang, Sun, and Yang, 2015).

One way to address such institutional voids is to get connected with the government, which strongly influences business operations through policy making and resource allocation (Musacchio and Lazzarini, 2014; Xu, Lu, and Gu,

2014).[1] Governments often intervene in firms' activities through their actions to regulate the economy and grant protection to certain business actors through national strategic planning, antitrust policies, financing, and banking regulations (Hoskisson et al., 2000; Sun and Liu, 2014). For instance, many emerging market governments allow only SOEs to operate in strategically important sectors such as petroleum processing (Musacchio and Lazzarini, 2014). Emerging market governments also play a major role in allocating key factor resources such as funding, land, and technical infrastructure (Sheng, Zhou, and Li, 2011; Chen et al., 2014). As government-owned entities, SOEs enjoy privileges granted by the government and related agencies to overcome institutional voids. As Musacchio and Lazzarini (2014) documented, SOEs—especially those in emerging markets—often receive subsidized credit from the government.

We propose that state ownership should enable firms to gain more resources to invest in R&D activities. Innovation often requires substantial resources, but access to financial capital in many emerging economies is heavily controlled by the government (Musacchio and Lazzarini, 2014). In China, state-owned banks, which prioritize SOEs as their top clients, control most of the lending capital (Chen et al., 2014). State ownership helps a firm to access such capital (Xu and Zhang, 2008), borrow more at a lower cost (Khwaja and Mian, 2005), and obtain government subsidies (Ramaswamy, 2001), which then enable the firm to spend more in pursuing its innovation activities. State ownership also offers access to government policy support. As governments devise policies to encourage or discourage certain types of development, SOEs can access important infrastructure resources and enjoy the privileged incentives that facilitate government-initiated innovation (Chang, Chung, and Mahmood, 2006; Siegel, 2007). Government R&D funding also is primarily funneled to SOEs in the name of constructing indigenous national, technological, and defense innovation systems (Sun and Liu, 2014).

Moreover, SOEs are under strong regulatory pressures to fulfill government requirements. The Chinese government views innovation as one of the top national priorities and encourages firms to invest in innovation development (Chen et al., 2014). After recognizing the power of technological innovation to stimulate productivity growth, the Chinese government began to emphasize building an innovation-oriented economy. In 2006, China officially stated its ambition to become the world's leading innovative powerhouse by 2020 and the leader in science and technology by 2050 (Sun and Liu, 2014). The government set a goal of increasing R&D investment to 2.5 percent of its gross domestic product by 2020, which is close to what the United States invested in 1998 (Du, Zeng, and Du, 2012). As the main vehicles for implementing China's ambitious innovation plan, SOEs must respond to the government's call and invest resources in R&D activities. Thus we predict:

[1] Another important way is to form business groups, which use formal and informal ties to take coordinated actions (Guillén, 2000; Khanna and Palepu, 2000). Business groups serve as internal capital markets to provide financial support and act as intermediaries to offer quality market information to member firms; they also use their market power to facilitate transactions and reduce risks (Khanna and Palepu, 2000; He et al., 2013a).

**Hypothesis 1a (H1a):** State ownership of a firm has a positive effect on its R&D input.

### Resource Utilization: An Efficiency Logic

The conventional economic view is that state ownership is incompatible with efficiency, defined as the degree of transformation of resource input into product output (Shleifer, 1998; Megginson and Netter, 2001). According to agency theory, as long as ownership and management are separated, agency problems arise because professional managers may take advantage of their positions as agents and exploit inside information for personal gain at the expense of investors' (principals') interests (Jensen and Meckling, 1976). Because principals and agents have different goals, and agents often have more inside information, principals cannot ensure that agents will always act in their best interests (Eisenhardt, 1989).

To reduce the agency problem, principals in private firms often devise detailed employment contracts with managers to specify incentive structures based on performance evaluations (Jensen and Meckling, 1976). Principals can also impose a monitoring system that collects timely information about what agents are doing (Fama, 1980; Beatty and Zajac, 1994). The key is to align the agent's interests with the principal's, such that the agent acts on behalf of the principal and operates the company efficiently (Eisenhardt, 1989).

Shareholders of private firms may not always succeed at controlling their management teams, but SOEs likely suffer more from the dual agency problem. First, the principal is not clearly defined in SOEs, and there is no visible owner (Shleifer, 1998). Because SOEs in principle are owned by the society as a whole, they end up belonging to nobody and become agents without a principal (Shleifer and Vishny, 1994; Shleifer, 1998). The citizens who are the nominal owners of SOEs have neither contractual nor monitoring mechanisms to align the objectives of the politicians—who are nominally agents but are in effect the firms' principals—with their own objectives (Cuervo-Cazurra et al., 2014). Without effective monitoring mechanisms, government officials look for opportunities to maximize their own interests, secure political support, or increase their chances of being elected (Khwaja and Mian, 2005). When politicians use SOEs for their personal benefit, they unavoidably interfere with firms' regular operations (Khwaja and Mian, 2005), which reduces SOEs' efficiency in using R&D input to generate innovation output.

Second, in many emerging economies, politicians as principals may appoint managers of SOEs more for political reasons than for their capabilities as managers (Qian, 1996; Ramaswamy, 2001). As a result, SOE managers are often bureaucrats but not businessmen, lacking appropriate capabilities or skills to run companies efficiently (Xu and Zhang, 2008). Even SOE managers who are highly qualified may lack strong motivations to pursue innovation diligently, as they cannot benefit much from successful innovation because of the lack of aggressive profit-sharing incentives such as those that private firms offer (Shleifer, 1998). Also, SOE managers do not face the close scrutiny usually provided by the shareholders of private firms (Megginson and Netter, 2001), so they may misuse the R&D investment to achieve their personal objectives, reducing the efficiency of generating innovation output. For these reasons, we propose:

**Hypothesis 1b (H1b):** State ownership negatively moderates the effect of R&D input on innovation output.

## Taking Both Views into Account

Whereas the institutional view emphasizes the resource advantage brought by state ownership, the efficiency view highlights the dual agency problem caused by state ownership. Because both views offer valid arguments, we need to consider both when examining the overall effect of state ownership on innovation. A firm may be majority state-owned (an SOE), minority state-owned (a mixed firm), or privately owned without state capital, and the varying degree of state ownership can make the institutional or efficiency logic more or less salient.

When state ownership increases from zero to minority levels, the institutional effect becomes more salient yet the efficiency problem is relatively minor. As noted earlier, one major challenge for private firms in emerging economies is the difficulty of obtaining financial resources (Khanna and Palepu, 1997; Zhou et al., 2014). Having partial state ownership gives these firms access to scarce resources. As Musacchio and Lazzarini (2014) observed, with partial state ownership, firms in emerging economies can obtain resources more easily from state-owned or development banks, sovereign wealth funds, and other state-controlled funds (e.g., pension funds and life insurance). But governments as minority owners generally relinquish major decision-making power to the private owners, who employ pay-for-performance incentive practices and close monitoring systems to reduce agency problems (Inoue, Lazzarini, and Musacchio, 2013). As a result, the impact of minority state ownership on innovation should be positive.

As state ownership moves from minority to majority levels, however, the additional resource allocation advantages increase rather incrementally, but the decision-making power shifts to the managers designated by government officials. Accordingly, the dual agency problem of SOEs becomes evident, such that politicians likely interfere with business operations for their own benefit and managers may lack the capabilities or motivations to run companies efficiently (Shleifer, 1998; Megginson and Netter, 2001). In such situations, an increase in state ownership triggers more inefficiency problems. Thus we predict that a minority level of state ownership is most beneficial to innovation:

**Hypothesis 1c (H1c):** State ownership of a firm has an inverted U-shaped impact (first increasing and then decreasing) on its innovation, such that a minority state ownership generates the most innovation output.

## Contingencies

**Degree of institutional development.** According to the institutional view, a country's economic, political, and social institutions jointly determine the costs of production and transaction, which in turn shape firms' strategies and operations (Peng, 2003; North, 2005). Because various regions in emerging markets do not develop uniformly, institutional development has a profound influence on the role of state ownership. Institutional development is the degree to which market fundamentals support economic activities, including the

proportion of resources allocated through the market, the percentage of products with market-based prices, and the development of market intermediaries and legal systems (Meyer and Nguyen, 2005). As McDermott (2007) showed, institutional reform in East Central Europe created alternative routes that facilitate or hinder the ability of relevant public and private banks to experiment with new initiatives. Schipani and Liu (2002) argued that China's enactment of better laws, rules, and regulations for its growing market economy compels firms to bring their business practices more in line with Western norms of management. Musacchio and Lazzarini (2014) also suggested that institutional development in Brazil significantly affects the role of state ownership in various types of enterprises, and Khanna and Palepu (2000) found that institutional development in Chile reduces the benefits of business group membership. In China, institutional development varies in pace across provinces: in less-developed regions, local governments remain as ''visible hands'' that intervene in economic activities and business practices; in more-developed regions, local governments tend to coordinate economic activities in their territory but let the market govern business transactions (Zhou et al., 2014).

We posit that institutional development will weaken the effect of state ownership on R&D input. First, the resource advantage of state ownership decreases with institutional development. When the market becomes more cultivated and the ''invisible hand'' of the market permeates economic life, market forces have more influence on determining the supply and demand of resources (Peng, 2003), and firms turn to the market for critical resources. For example, as China's capital market develops, firms are able to find alternative sources of credit funds rather than relying only on state-owned banks (Nee and Opper, 2012). The growth of the private sector and intermediate institutions such as foreign financial institutions and venture capital also expands the sources of external funding (Cuervo-Cazurra and Dau, 2009). Sarkar, Sarkar, and Bhaumik (1998) showed that as India's institutional environments improve, new private investors emerge and provide alternative sources of capital. Musacchio and Lazzarini (2014) indicated that government loans are less important for Brazilian firms after the local capital market develops. These financial and institutional developments break state monopolies and create competitive capital environments so that firms' reliance on the government as a source of funding for innovation declines.

Second, regulatory pressure is alleviated with institutional development, which is accompanied by a reduction of government intervention in economic activities (Li, Peng, and Macaulay, 2013). The government relaxes its control of SOEs and grants them higher degrees of managerial autonomy (Cuervo-Cazurra and Dau, 2009), so SOE managers have more discretionary power to allocate resources and they face less regulatory pressure from the government to invest resources in R&D. As Sun and Liu (2014) noted, major governmental agencies create fewer innovation policies as the Chinese market develops. In the long term, China aims to move from a state-run innovation system toward an enterprise-centered system so that the government would provide policy support, such as subsidies, tax reductions, and funds, to all types of enterprises, both SOEs and non-SOEs, that conduct its preferred innovation activities. Therefore,

**Hypothesis 2 (H2):** The effect of state ownership on R&D input is less positive when institutional development is higher.

**Facing increased competition.** Agency theory posits that aligning the interests of a firm's agents and principals is the best way to reduce the agency problem (Eisenhardt, 1989). Various internal and external controls can be adopted to achieve this objective. Internal corporate governance controls can take the form of setting up the board of directors to monitor managers, drafting outcome-based contracts, and imposing internal control procedures and auditing systems (Jensen and Meckling, 1976; Fama, 1980; Beatty and Zajac, 1994). External corporate governance controls include inducing competition, disclosing performance information, and imposing accounting regulations, which enable external stakeholders to monitor corporations' actions, strategies, and performance (Eisenhardt, 1989).

Among the various external governance controls, competition is perhaps the most salient because it forces inefficient firms to exit the market (Porter, 1985; Geroski, Mata, and Portugal, 2010). Industrial competition refers to the extent of competition a firm confronts in its industry (Porter, 1985). In highly competitive markets, competitive rivalry is intensive and product choices are abundant. In response to increased competition, innovative product development becomes an essential process for organizations' survival, success, and renewal (Brown and Eisenhardt, 1995). Companies must act quickly in response to competitive actions and strategies; otherwise, they will be driven out of the market.

A higher level of industrial competition should reduce the dual agency problem of SOEs and push them to be more efficient in generating innovation output. In emerging markets, where governments have gradually liberalized the economies and opened markets to boost economic growth (Hoskisson et al., 2000), competition has intensified with the explosive growth of private-sector and foreign firms (Peng, 2003). SOEs in these markets must become more sensitive to market needs and more open to new product ideas to survive (Ramaswamy, 2001). In addition, politicians must stop using SOEs for their personal benefit, or else the SOEs will face a higher chance of bankruptcy given the strong market competition. Accordingly, government officials should reduce their interference with firms' operations, opting instead to appoint managers based on their merits and capabilities, draft performance-based incentive contracts with them, and delegate more control and decision-making power to them (Stan, Peng, and Bruton, 2014).

As SOE managers receive more discretion and decision power, they also are held accountable for the SOEs' performance. In competitive markets, information is abundant about the environments in which firms operate, providing clear benchmarks for comparing and evaluating performance (Porter, 1985), which means that managers are more likely to be terminated if SOEs seriously underperform (Stan, Peng, and Bruton, 2014). Meanwhile, even if SOE managers depend on the state for certain resources, industry competition forces them to respond quickly to market demand and develop innovative products to meet customers' preferences; otherwise firms may not survive the competition (Cuervo-Cazurra and Dau, 2009). As Ralston et al. (2006) observed, increasingly competitive markets force SOEs to adopt alternative strategies and pursue new initiatives to survive and succeed. Thus in a highly competitive

environment, the reduced political interference and increased managerial motivation lead SOEs to employ their resources more efficiently in innovation development:

Hypothesis 3 (H3): The moderating effect of state ownership on the relationship between R&D input and innovation output is less negative when industrial competition is higher.

**Competing as start-ups.** Competition is also increased by the proliferation of start-ups, including newly founded SOEs (Ralston et al., 2006; Li, Poppo, and Zhou, 2008). The rise of China's emerging economy has been coupled with the explosive growth of new firms, changing the competitive landscape and the behavior of existing firms (Peng, 2003). Start-ups in general are more innovative, because after routines are formed in established firms, the likelihood of adopting new alternatives decreases (Hannan and Freeman, 1984). Innovation requires taking risks and deviating from current practices, so start-ups are in a better position to identify new opportunities, respond promptly to environmental changes, and manage the innovation processes. Managers in start-ups are also more inclined to engage in R&D because it increases the chances of the firms' early survival by leading to new product development, interfirm alliances, and employment growth during the early stages of firms' lives (Stam and Wennberg, 2009).

When governments set up state start-ups, they aim to develop breakthrough technologies with great potential that are yet to be understood by the business community, and they use public venture capital to fund many innovative yet highly risky start-ups (Mazzucato, 2015). Thus state start-ups have relatively straightforward economic objectives rather than social goals, and the governments scrutinize them closely to ensure their behaviors are consistent with their objectives. Individual politicians are less likely to take advantage of state start-ups than other SOEs for their own benefit because of this higher scrutiny (Musacchio, Lazzarini, and Aguilera, 2015). They would instead grant greater discretion to managers to make strategic decisions.

Compared with established SOEs, state start-ups are also less influenced by the legacy of a socialist imprint and bear fewer historical burdens, such as redundant workers (Lin, Fang, and Zhou, 1998). Without such burdens, state start-ups can build a more flexible organizational structure and employ incentive mechanisms that reward managers based on performance and profitability, so they attract and retain better qualified managers (Khanna, 2009). With clear objectives and performance-based incentives, managers can focus their attention on making and implementing strategic decisions that lead to innovation and being more competitive. Also, unlike established SOEs, state start-ups face liabilities of newness, including limited resources and no established relationships with key actors, such as suppliers, buyers, and distributors (Peng, 2003; Chen et al., 2014). Managers must work diligently to overcome these liabilities and enhance their firms' competitiveness to survive in the market. As a result, state start-ups suffer less from the dual agency problem and can use their resource input more efficiently to generate innovation:

Hypothesis 4 (H4): The moderating effect of state ownership on the relationship between R&D intensity and innovation output is less negative for start-up firms than for established SOEs.

**Figure 1. An integrated model of institutional and efficiency logics.**

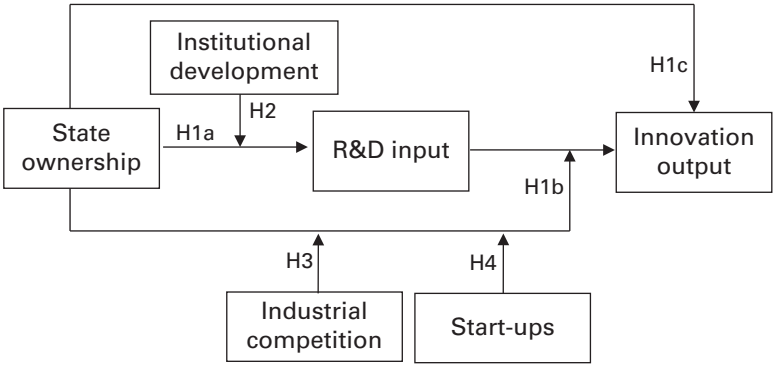



Figure 1 depicts our conceptual model. Our empirical setting is the Chinese market, a leading emerging market that has been undergoing a fundamental institutional transformation. Starting in the mid 1990s, the Chinese government used two major criteria to restructure and privatize its SOEs: (1) whether the SOE was in a strategically important industry that the government wished to maintain control of, such as natural resources, national defense, transportation, and communication networks (Lin, Fang, and Zhou, 1998), and (2) whether the SOE was a large company, based on its annual production capacity or fixed assets. The government kept larger SOEs, and smaller ones were gradually transformed into or acquired by private companies (Xu, Lu, and Gu, 2014). The remaining SOEs continue to be critical in the country's economy, generating 23.72 percent of national revenues from principle businesses in 2014 (National Bureau of Statistics of China, 2015). After three decades of reform, the Chinese economy has become increasingly competitive and market oriented, yet government influence remains prevalent, and institutional development and market competition vary dramatically across different regions (Sheng, Zhou, and Li, 2011; Xu, Lu, and Gu, 2014). Thus China serves as a rich context for examining the role of state ownership in emerging markets.

## STUDY 1

### Data

We used data from the *Annual Census of Chinese Industrial Enterprises* (2001–2007), conducted by the National Bureau of Statistics of China. This database contains detailed information about manufacturing firms operating in China, such as their ownership type, industry, assets, liabilities, capital structure, and financial performance. The annual census covers all SOEs and non-SOEs whose annual sales are at least 5 million RMB (about US$685,000 in 2007), thus providing a comprehensive coverage of SOEs in China. Research in strategy and international business often uses it as a reliable source of information about firms operating in China (e.g., Gao et al., 2010; Xu, Lu, and Gu, 2014).

Because we examine SOEs' innovation activities relative to other types of domestic firms, we excluded firms with majority ($\geq$ 50 percent) foreign ownership and firms that were registered as SOEs initially (i.e., with majority state

capital) but then were transformed into mixed or private firms, and we employed a one-year lag for the independent variables in the models. The final sample consisted of a balanced panel of 12,288 manufacturing firms, and the number of observations in our analyses was 73,728 (12,288 × 6 years, 2002–2007). The 12,288 firms consist of 2,235 SOEs, 647 mixed firms, and 9,406 firms without state capital. Notable examples include Weichai Heavy Machinery as an SOE, Gree as a mixed firm, and Sichuan New Hope Agribusiness as a private firm without state capital. The sample covers manufacturing firms in 31 provinces and 182 industries, classified by three-digit Chinese Industry Code, which exhibit significant variance in cross-region institutional environments and cross-industry competition levels.

## Measures

*Innovation output*. The new product value that a firm can generate in the market is an important measure of its innovation capability, because it indicates the commercial significance of the firm's product innovation (Laursen and Salter, 2006). Innovations cannot enhance a firm's performance until they have gone through testing, production, and commercialization processes (Katila, 2002). Therefore we measured innovation output as the ratio of new product output to its total industrial output. In the census, new products are defined by the National Bureau of Statistics as those new to the market that (1) are based on substantially new technologies and designs or (2) make substantial improvements to functionality and performance. For *R&D input*, we measured R&D expenses divided by a firm's total sales.

*State ownership.* We measured state ownership in two ways. First, we treated it as a continuous variable and measured the percentage of stakes owned by the government. Because ownership structure does not change often, this measure is an enduring, objective indicator. Second, we created a dummy variable to indicate whether a firm was an SOE (i.e., a firm with majority state ownership). The two measures produced consistent results.

*Institutional development*. In China, the National Economic Research Institute (NERI) compiles a composite ''marketization'' index yearly to indicate institutional development at the provincial level (Fan, Wang, and Zhu, 2011). This index consists of five sub-indices: (1) the relationship between the government and the market, (2) the development of the non-state sectors, (3) the development of the product market, (4) the development of the factor market, and (5) the development of market intermediaries and the legal environment. Previous studies in economics, finance, and international business have used it extensively to measure institutional development in different regions in China (e.g., Li, Meng, and Zhang, 2006; Gao et al., 2010).

*Industrial competition*. We used the Herfindahl index to measure industrial competition (one minus industry concentration). On the basis of information from the census data, we calculated the Herfindahl index at the three-digit industry level for each year, using the sales revenue and market share of each firm (Gao et al., 2010).

*Start-ups*. We used a dummy variable to indicate whether an enterprise was established as a new venture within the previous five years (1 = yes; 0 = no). Start-ups that have failed to build strong market positions in five years likely go out of business (Bantel, 1998), and the average gap between a firm's founding

and its first foreign entry is 5.4 years (Autio, Sapienza, and Almeida, 2000), so the five-year cutoff offers a reasonable indicator of start-up status.[2]

**Controls.** We controlled for several variables that may influence firms' product innovation. First, we controlled for *firm size* with a logarithm transformation of the number of employees. Second, we controlled for a firm's *export market orientation* (i.e., whether the firm's export sales represent more than 50 percent of its total sales) to capture possible differences between firms that focus on the domestic market and those that generate the majority of their sales overseas. Third, we used *industry growth rate* (based on industry-aggregated annual sales) and *industrial performance* (average return on assets) variables, at three-digit industry levels, to control for industry heterogeneity.

## Analysis and Results

We employed a Tobit analysis to deal with the non-negative nature of our dependent variables, namely, R&D intensity and new product output (Feinberg and Gupta, 2004; Salomon and Shaver, 2005). We used firm random effects and industry/year fixed effects in the model estimation. In table 1, we report the descriptive statistics and correlations for the variables. A review of correlations among independent variables suggests that multicollinearity is not a major concern, as confirmed by the variance of inflation factor (VIF) ranging from 1.01 to 1.50 (Hair et al., 1998).

Table 2 contains the estimation results for the impact of state ownership on firms' R&D intensity, with state ownership as both a continuous variable (models 2 and 3) and the SOE dummy (models 4 and 5). Hypothesis 1a predicted that state ownership would exert a positive effect on R&D intensity. Consistent with this assertion, the coefficient of state ownership is positive and significant (model 2), as is that of the SOE dummy (model 4), so hypothesis 1a receives support.

We report the results of the moderating effect of state ownership in table 3, again including the results of state ownership as a continuous variable (models 2, 3, and 4) and as an SOE dummy (models 5, 6, and 7). Hypothesis 1b suggests a weaker positive effect of R&D input on innovation output when state ownership is high; our findings confirm that the interaction between R&D intensity and state ownership exerts a negative effect on new product output (model 2).[3] The SOE dummy also negatively moderates the relationship between R&D intensity and innovation output (model 5), in support of hypothesis 1b.

Hypothesis 1c dealt with the direct effect of state ownership on a firm's innovation output. The results in table 4 show that state ownership positively affects innovation output (model 3), yet the squared term has a negative effect on new product output (model 3). Therefore state ownership has an inverted U-shaped relationship with innovation, with a turning point at 29.18 percent.

[2] We also used six- and eight-year cutoffs to classify start-up status and obtained consistent results.

[3] The moderating effect consists of one with an interaction variable and one with the inherent nonlinearity of limited dependent variable models, such as Tobit models. We decomposed this interaction effect into secondary moderating effect and structural moderating effect (Bowen, 2014). The results show that the secondary effect is significant and consistent with the total interaction effects, providing support for the validity of our hypothesis testing.

**Table 1. Descriptive Statistics and Correlations for Study 1**

| Variable | Mean | S.D. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. State ownership (SO) | .18 | .35 | | | | | | | | |
| 2. SOE dummy | .18 | .39 | .96••• | | | | | | | |
| 3. Institutional development (ID) | 8.13 | 1.91 | −.24••• | −.22••• | | | | | | |
| 4. Industrial competition (IC) | .97 | .05 | −.07••• | −.07••• | .08••• | | | | | |
| 5. Start-ups | .11 | .31 | −.08••• | −.07••• | −.13••• | −.03••• | | | | |
| 6. Firm size | 5.06 | 1.24 | .32••• | .31••• | −.15••• | −.05••• | −.10••• | | | |
| 7. Export market orientation | .12 | .33 | −.12••• | −.11••• | .18••• | .02••• | .00 | .03••• | | |
| 8. Industry growth | .29 | .22 | −.01• | −.01* | .05••• | .02••• | −.06••• | −.04••• | −.00 | |
| 9. Industrial performance | .08 | .04 | −.00 | −.00 | .07••• | .04••• | −.09••• | −.02••• | −.01••• | .03••• |
| 10. R&D intensity (RDI) | .01 | .02 | .01•• | .01• | .03••• | −.02••• | −.02••• | −.01 | .03••• | .02••• |
| 11. SO × ID | −.16 | .70 | −.37••• | −.35••• | .08••• | .02••• | .06••• | −.16••• | −.01••• | −.02••• |
| 12. RDI × SO | .00 | .01 | .01•• | .01•• | .02••• | .01 | .00 | −.02••• | .01 | .00 |
| 13. RDI × IC | −.00 | .00 | .01•• | .01• | −.01••• | −.11••• | .00 | .02••• | .00 | −.00 |
| 14. SO × IC | −.00 | .01 | −.09••• | −.08••• | .01••• | .36••• | .01••• | −.06••• | −.00 | .02••• |
| 15. RDI × SO × IC | .00 | .02 | −.01 | −.01 | −.01 | −.08••• | −.00 | .01•• | .00 | −.00 |
| 16. RDI × Start-ups | −.00 | .01 | .00 | .00 | −.01 | .00 | −.05••• | .00 | −.00 | .02••• |
| 17. SO × Start-ups | −.01 | .09 | −.15••• | −.14••• | .08••• | .02••• | −.23••• | −.02••• | .02••• | .02••• |
| 18. RDI × SO × Start-ups | .00 | .00 | −.02••• | −.02••• | .00 | −.00 | .02••• | .00 | .00 | −.00 |
| 19. New product output | .10 | .23 | .03••• | .03••• | .08••• | −.04••• | −.03••• | .12••• | .00 | .02••• |

| Variable | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10. R&D intensity (RDI) | −.03••• | | | | | | | | | |
| 11. SO × ID | .01•• | .02••• | | | | | | | | |
| 12. RDI × SO | −.00 | .16••• | .05••• | | | | | | | |
| 13. RDI × IC | .02••• | −.23••• | −.02••• | −.34••• | | | | | | |
| 14. SO × IC | −.01• | .01 | .07••• | −.01 | −.10••• | | | | | |
| 15. RDI × SO × IC | .01 | −.25••• | −.02••• | −.53••• | .48••• | −.16••• | | | | |
| 16. RDI × Start-ups | .02••• | −.10••• | .00 | −.14••• | .06••• | −.00 | .07••• | | | |
| 17. SO × Start-ups | .03••• | .00 | −.05••• | −.01••• | −.01 | −.00 | −.00 | .02••• | | |
| 18. RDI × SO × Start-ups | −.00 | −.21••• | −.01 | −.41••• | .14••• | −.00 | .22••• | −.30••• | −.03••• | |
| 19. New product output | −.06••• | .16••• | −.01 | −.00 | −.03••• | −.01••• | .00 | −.03••• | .01• | .01•• |

• $p < .05$; •• $p < .01$; ••• $p < .001$.

That is, a minority state ownership of 29.18 percent is most beneficial for product innovation, in support of hypothesis 1c.

Hypothesis 2 predicted that institutional development would weaken the effect of state ownership on R&D intensity. Because the index of institutional development is endogenous to regional economic development, we need to find an instrument that affects the R&D intensity indirectly through institutional development. Because regions' geographic location is exogenous and predetermined by nature (Frankel and Romer, 1999), we used the distance of each province to major seaports as the instrument for the index of institutional development (Wei and Wu, 2001). We calculated the shortest physical distance from the capital city of each province to one of the two major seaports—Hong Kong and Shanghai—using the Great Circle formula with the latitudes and longitudes of cities.[4] The instrumental variable estimate of institutional development was

[4] We also used the shortest physical distance from the capital city of each province to one of the four major seaports in China—Hong Kong, Shanghai, Dalian, and Qinhuangdao—as an alternative instrumental variable and obtained consistent results.

**Table 2. Impact of State Ownership on R&D Intensity, Study 1 (H1a and H2; N = 73,728)***

| | | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|
| Variable | Model 1 | State share | | SOE dummy | |
| Intercept | –.038••• | –.039••• | –.039••• | –.039••• | –.039••• |
| | (.007) | (.007) | (.007) | (.007) | (.007) |
| **H1a**: State ownership (SO) | – | .002••• | .002••• | .002••• | .002••• |
| | | (.000) | (.000) | (.000) | (.000) |
| Institutional development (ID) | .001••• | .001••• | .001••• | .001••• | .001••• |
| | (.000) | (.000) | (.000) | (.000) | (.000) |
| **H2**: SO × ID | – | – | .001 | – | .001 |
| | | | (.000) | | (.000) |
| Industrial competition | –.002 | –.001 | –.000 | –.001 | –.001 |
| | (.006) | (.006) | (.006) | (.006) | (.007) |
| Start-ups | –.001 | –.001 | –.001 | –.001 | –.001 |
| | (.000) | (.000) | (.004) | (.000) | (.000) |
| Firm size | .003••• | .003••• | .003••• | .003••• | .003••• |
| | (.000) | (.000) | (.000) | (.000) | (.000) |
| Export market orientation | –.003••• | –.003••• | –.003••• | –.003••• | –.003••• |
| | (.000) | (.000) | (.000) | (.000) | (.000) |
| Industry growth | .003••• | .003••• | .002••• | .003••• | .003••• |
| | (.001) | (.001) | (.001) | (.001) | (.001) |
| Industrial performance | –.001 | –.001 | –.001 | –.001 | –.001 |
| | (.004) | (.003) | (.004) | (.004) | (.004) |
| Log likelihood | 68180.4 | 68191.7 | 68193.5 | 68190.1 | 68191.5 |
| AIC | –136267 | –136287 | –136387 | –136284 | –136285 |

• $p < .05$; •• $p < .01$; ••• $p < .001$.

* Standard errors are in parentheses. Industry and year fixed effects are included and not shown. The instrumental variable for institutional development is distance to major seaports, with first-stage F value of 144.12 ($p < .001$).

substituted into the models. In contrast with our prediction, the interaction of state ownership or the SOE dummy with institutional development is not significant (table 2, models 3 and 5), so hypothesis 2 is not supported.

To deal with the inefficiency of SOEs in transforming R&D input into innovation output, we proposed two potential remedies, industrial competition and start-up status. As table 3 shows, the three-way interaction of R&D with state ownership and industrial competition in model 3 has a significantly positive effect, as does the parallel three-way interaction of R&D, state ownership, and start-up status in model 4. The results using the SOE dummy offer consistent findings (models 6 and 7). Thus both hypotheses 3 and 4 are supported.

We further plotted the moderating effects of industrial competition and start-ups. We displayed the effect of R&D intensity on new product output at different levels of industrial competition for non-SOEs and SOEs in figure 2A. It shows that the effect of R&D intensity is stronger for non-SOEs than SOEs at lower levels of industrial competition, but the two lines converge at higher levels of industrial competition. Figure 2B exhibits the effect of R&D intensity on new product output for non-SOEs and SOEs depending on whether they are established firms or start-ups. Consistent with our prediction, the marginal impact of R&D intensity is stronger for non-SOEs when they are established

**Table 3. State Ownership, R&D Intensity, and New Product Output, Study 1 (H1b, H3, and H4; N = 73,728)***

| Variable | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 |
|---|---|---|---|---|---|---|---|
| | | State share | | | SOE dummy | | |
| Intercept | –2.191••• | –2.235••• | –2.382••• | –2.233••• | –2.228••• | –2.377••• | –2.225••• |
| | (.234) | (.235) | (.245) | (.234) | (.234) | (.244) | (.234) |
| R&D intensity (RDI) | 3.220••• | 3.354••• | 3.472••• | 3.406••• | 3.334••• | 3.464••• | 3.378••• |
| | (.106) | (.108) | (.111) | (.110) | (.107) | (.111) | (.110) |
| State ownership (SO) | – | .048••• | .046••• | .051••• | .042••• | .041••• | .045••• |
| | | (.008) | (.008) | (.008) | (.007) | (.007) | (.007) |
| **H1b**: RDI × SO | – | –1.764••• | –.955•• | –1.407••• | –1.634••• | –.853•• | –1.289••• |
| | | (.247) | (.295) | (.283) | (.239) | (.281) | (.274) |
| Industrial competition (IC) | –.130 | –.097 | –.058 | –.096 | –.102 | –.055 | –.101 |
| | (.133) | (.133) | (.152) | (.133) | (.133) | (.150) | (.133) |
| RDI × IC | – | – | –2.903 | – | – | –2.018 | – |
| | | | (7.978) | | | (7.936) | |
| SO × IC | – | – | –.325 | – | – | –.343 | – |
| | | | (.271) | | | (.260) | |
| **H3**: RDI × SO × IC | – | – | .757••• | – | – | .765••• | – |
| | | | (.155) | | | (.151) | |
| Start-ups | –.019 | –.016 | –.016 | –.013 | –.015 | –.015 | –.012 |
| | (.009) | (.009) | (.009) | (.009) | (.009) | (.009) | (.009) |
| RDI × Start-ups | – | – | – | –.212 | – | – | –.230 |
| | | | | (.440) | | | (.439) |
| SO × Start-ups | – | – | – | .060 | – | – | .058 |
| | | | | (.031) | | | (.027) |
| **H4**: RDI × SO × Start-ups | – | – | – | 5.349•• | – | – | 4.597•• |
| | | | | (1.642) | | | (1.571) |
| Firm size | .142••• | .138••• | .138••• | .138••• | .138••• | .139••• | .138••• |
| | (.002) | (.003) | (.003) | (.003) | (.003) | (.003) | (.003) |
| Export market orientation | .002• | .003•• | .003•• | .003•• | .003•• | .003•• | .003•• |
| | (.009) | (.009) | (.009) | (.009) | (.009) | (.009) | (.009) |
| Institutional development | .021••• | .024••• | .024••• | .024••• | .024••• | .024••• | .023••• |
| | (.003) | (.003) | (.003) | (.003) | (.003) | (.003) | (.003) |
| Industry growth | .051••• | .052••• | .052•• | .051•• | .052••• | .052•• | .051•• |
| | (.012) | (.012) | (.012) | (.012) | (.012) | (.012) | (.012) |
| Industrial performance | .849••• | .867••• | .863••• | .866••• | .867••• | .862••• | .866••• |
| | (.083) | (.084) | (.084) | (.084) | (.084) | (.084) | (.084) |
| Log likelihood | –38247.5 | –38207.2 | –38192.3 | –38197.8 | –38209.8 | –38193.4 | –38201.1 |
| AIC | 76591.0 | 76514.5 | 76490.7 | 76501.6 | 76519.5 | 76492.9 | 76508.1 |

• $p < .05$; •• $p < .01$; ••• $p < .001$.

* Standard errors are in parentheses. Industry and year fixed effects are included and not shown. The instrumental variable for institutional development is distance to major seaports, with first-stage F value of 144.12 ($p < .001$).

firms, whereas R&D intensity contributes more to innovation outputs for state start-ups.

With respect to the effects of the control variables, firm size and industry growth have positive, significant effects on R&D intensity and new product output; export-market-oriented firms devote less to R&D; institutional development exhibits a positive effect on innovation output; and industries with higher performance produce more product innovation.

**Table 4. Direct Effect of State Ownership on New Product Output, Study 1 (H1c; N = 73,728)***

| Variable | Model 1 | Model 2 | Model 3 |
|---|---|---|---|
| Intercept | –1.993••• | –2.031••• | –1.881••• |
| | (.240) | (.241) | (.240) |
| **H1c**: State ownership (SO) | – | .048••• | .344••• |
| | | (.008) | (.026) |
| **H1c**: SO squared | – | – | –.503••• |
| | | | (.042) |
| Institutional development | .021••• | .024••• | .023••• |
| | (.003) | (.003) | (.002) |
| Industrial competition | –.297• | –.265 | –.299• |
| | (.135) | (.136) | (.135) |
| Start-ups | –.022 | –.019 | –.019 |
| | (.010) | (.010) | (.010) |
| Firm size | .142••• | .139••• | .135••• |
| | (.002) | (.003) | (.003) |
| Export market orientation | .015 | .018• | .021• |
| | (.009) | (.009) | (.009) |
| Industry growth | .040•• | .040•• | .042•• |
| | (.013) | (.013) | (.013) |
| Industrial performance | .383••• | .395••• | .403••• |
| | (.092) | (.092) | (.092) |
| Log likelihood | –38557.4 | –38539.6 | –38468.9 |
| AIC | 77218.8 | 77185.2 | 77045.9 |

• $p < .05$; •• $p < .01$; ••• $p < .001$.

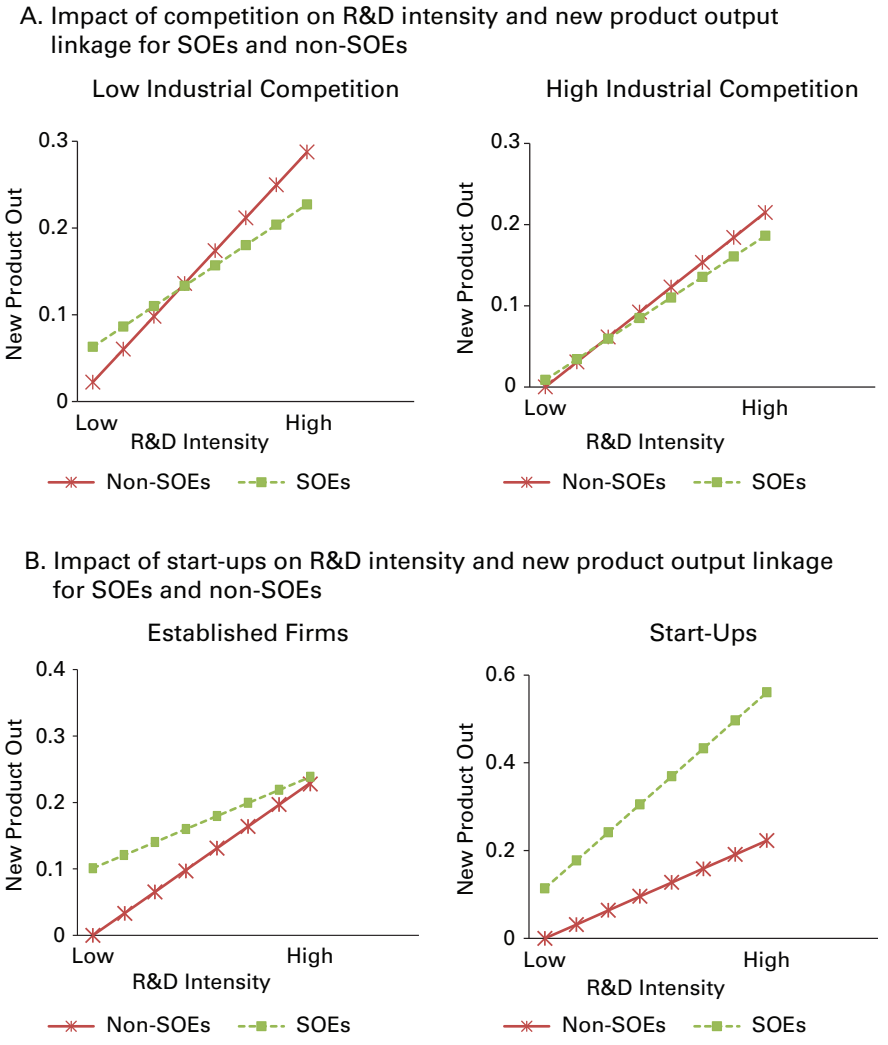
* Standard errors are in parentheses. Industry and year fixed effects are included and not shown. The instrumental variable for institutional development is distance to major seaports, with first-stage F value of 144.12 ($p < .001$).

## Robustness Test

We tested the sensitivity of the results in several ways. First, we used propensity score matching techniques to generate a sample of comparable SOEs and privately owned enterprises. We first estimated a probit model, using 2,235 SOEs and 3,153 private firms in our sample, with variables of firm size, age, capital intensity, debt ratio, export market orientation, industry growth, industrial performance, and institutional development. We then used the propensity score to perform a one-to-one matching, resulting in 788 pairs of matched SOEs and private firms. Such a matched sample removes differences between SOEs and private firms other than firm ownership type and ensures comparability between these two types of firms. We then re-ran the analysis, and the results were highly consistent with findings of the whole sample.

Second, we had excluded SOEs that were restructured into mixed or private firms during 2001–2007. We examined whether our results remained the same if we included those firms that experienced dramatic changes in their state ownership, and the findings were consistent. Third, we used the logarithm of new product output as an alternative dependent variable. We obtained consistent results, with all significant effects still unchanged. Fourth, we estimated the models with various subsamples of local firms, excluding locally controlled firms with limited foreign ownership at various levels (e.g., $>$ 25 percent, $>$ 5

**Figure 2. Three-way interaction effects (H3 and H4).**




percent, > 0 percent). We again obtained highly consistent results across these different subsamples.

## Post-hoc Analysis

We tested whether industrial competition moderates the effect of state ownership on R&D intensity in hypothesis 1a and whether institutional development affects the moderating role of state ownership in hypothesis 1b, but we found no significant effect. These findings were consistent with our reasoning that competition affects the efficiency of generating new product output.

We also performed additional analyses to rule out the endogeneity concern of state ownership that R&D activities and previous innovation performance may have affected whether an SOE was privatized or not. In the original sample, 755 SOEs were privatized in various years. We compared R&D intensity and the new product output ratio of all pairs of privatized vs. non-privatized

SOEs one year before the ownership change, and none of the results were significant. We further ran an event history analysis with R&D intensity and new product output ratio as predictors of the privatization of SOEs. These two variables again were not significant (R&D intensity: $\beta = -2.925$, $p = .174$; new product output: $\beta = -0.036$, $p = .769$), suggesting that the ownership change of SOEs is not related to their R&D efforts and innovation outcomes. This is consistent with Xu, Tihanyi, and Hitt's (2014) finding that in China whether an SOE will be privatized is not related to its innovation capability.

## STUDY 2

In Study 1, we measured innovation outcome as a firm's new product output ratio, which captures the commercial value of product innovation in the market. To examine the impact of state ownership on more fundamental and revolutionary innovation, we conducted Study 2 using *patent* as the innovation output indicator to analyze data on a sample of Chinese publicly listed manufacturing firms.

We retrieved archival data of Chinese publicly listed manufacturing firms on the Shanghai or Shenzhen stock markets (2006–2010) from the CSMAR (China Stock Market Accounting Research) database and Wind database. We restricted our samples to manufacturing firms and merged them with firm-level patent information from the Chinese Patent Data Project (He et al., 2013b). After deleting firms with incomplete information, we obtained a balanced panel of 827 firms. We employed a one-year lag for the independent variables in the models, and the final sample consisted of 3,308 firm-year observations (827 × 4 years, 2007–2010).

We obtained patent information from the State Intellectual Property Office of China (SIPO).[5] Chinese patent law defines an invention patent as a new

**Table 5. Descriptive Statistics and Correlations for Study 2**

| Variable | Mean | S.D. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. State ownership (SO) | .21 | .23 | | | | | | | | | | | |
| 2. R&D | 7.07 | 9.85 | –.01 | | | | | | | | | | |
| 3. Industrial competition (IC) | .90 | .09 | .06••• | .10••• | | | | | | | | | |
| 4. Institutional development (ID) | 8.18 | 1.99 | –.20••• | .15••• | .02 | | | | | | | | |
| 5. Firm age | 2.79 | .16 | .14••• | .14••• | .04• | .07••• | | | | | | | |
| 6. Firm size | 7.47 | .94 | .22••• | –.01 | –.01 | –.05••• | .02 | | | | | | |
| 7. SO × ID | –.09 | .42 | –.05•• | –.03 | –.01 | –.14••• | –.03 | .01 | | | | | |
| 8. RD × SO | –.02 | 2.21 | .01 | –.04• | .03 | –.03 | –.04• | .05•• | .20••• | | | | |
| 9. RD × IC | .10 | .84 | .03• | .09••• | –.26••• | –.02 | –.01 | –.01 | .03 | .09••• | | | |
| 10. SO × IC | .00 | .02 | .03 | .03 | –.09••• | –.01 | .03• | .05•• | .03 | .13••• | –.12••• | | |
| 11. RD × SO × IC | .01 | .18 | .14••• | .09••• | –.11••• | .01 | –.03 | .03 | .01 | .13••• | –.22••• | –.29••• | |
| 12. Patent | 3.30 | 14.37 | .04• | .04• | –.04• | .07•• | .00 | .08••• | .00 | –.04• | –.04• | .02 | .02 |

• $p < .05$; •• $p < .01$; ••• $p < .001$.

[5] According to the *Derwent Innovations Index*, Chinese firms have overwhelmingly focused on patent applications in China, mainly due to the high costs of international patent filing and lack of foreign market orientation.

**Table 6. State Ownership, R&D, and Patent Output, Study 2 (N = 3,308)***

| Variable | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| Intercept | .841 | .748 | .725 | 1.046 |
| | (.536) | (.538) | (.542) | (.492) |
| R&D (RD) | .009••• | .010••• | .008••• | – |
| | (.001) | (.001) | (.001) | |
| **H1c**: State ownership (SO) | .295••• | .393••• | .396••• | .461••• |
| | (.048) | (.048) | (.049) | (.057) |
| **H1c**: SO squared | – | – | – | –.666•• |
| | | | | (.205) |
| **H1b**: RD × SO | – | –.056••• | –.050••• | – |
| | | (.004) | (.004) | |
| Industrial competition (IC) | –4.842••• | –5.213•• | –5.386••• | –4.914••• |
| | (.617) | (.620) | (.626) | (.600) |
| RD × IC | – | – | –.104••• | – |
| | | | (.011) | |
| SO × IC | – | – | 1.014• | – |
| | | | (.498) | |
| **H3**: RD × SO × IC | – | – | .132• | – |
| | | | (.052) | |
| Firm age | .257••• | .315••• | .355••• | .233••• |
| | (.068) | (.068) | (.068) | (.062) |
| Firm size | .087••• | .098••• | .099••• | .086••• |
| | (.010) | (.010) | (.011) | (.010) |
| Institutional development | .180••• | .184••• | .183••• | .185••• |
| | (.006) | (.006) | (.006) | (.008) |
| Log likelihood | 8804.9 | 8911.1 | 8971.1 | 8766.0 |
| AIC | 38361.4 | 38151.3 | 38035.0 | 38433.4 |

• $p < .05$; •• $p < .01$; ••• $p < .001$.

* Standard errors are in parentheses. Industry and year fixed effects are included and not shown. The instrumental variable for institutional development is distance to major seaports, with first-stage F value of 137.52 ($p < .001$).

technical solution relating to a product, a process, or an improvement, and it can be approved only after substantive examination by patent examiners. To measure innovation output, we used the total number of invention patents that had been applied for by a listed firm in a given year of 2007–2010 and granted by the end of 2012. We used firms' cumulative R&D investment as the innovation input to capture the effect of past R&D expenditure on the long-term process of fundamental innovation. We adopted a declining weight of .4 for R&D investment from previous years (Dutta, Narasimhan, and Rajiv, 2005), and our findings were robust with different declining weights. We measured state ownership, institutional development, and industrial competition in the same way as in Study 1. Firm age and firm size (number of employees) were included as controls with logarithm transformation.

In table 5, we report the descriptive statistics and correlations for the variables. We first tested the effect of state ownership on firms' R&D investment, but it has no significant effect on R&D investment for publicly listed manufacturing firms. The interaction term between state ownership and institutional development is also not significant, so hypothesis 1a and hypothesis 2 are not supported.

To test the relationship between R&D investment and patents and the moderating effects of state ownership and industrial competition, we employed Poisson models to deal with the count nature of the dependent variable (Ahuja and Katila, 2001) and report the results in table 6. The findings are similar to those in Study 1: the interaction term between R&D investment and state ownership in model 2 has a negative effect on patent output, supporting hypothesis 1b. As for the direct effect of state ownership on patent output in model 4, state ownership positively affects patent output, and the squared term has a negative effect. Therefore state ownership exhibits an inverted U-shaped relationship with patent, with a turning point at 28.89 percent, in support of hypothesis 1c.

Hypothesis 3 proposed industrial competition as a remedy for the inefficiency of state ownership. As model 3 in table 6 shows, the three-way interaction of R&D investment with state ownership and industrial competition has a significant, positive effect, supporting hypothesis 3. Because the latest founding year of listed firms in this sample was 1995, we could not test the three-way interactions with the variable of start-ups proposed in hypothesis 4. Overall, the findings of Study 2 with the number of patents as the innovation output are largely consistent with the results of Study 1, which uses new product output ratio as the innovation measure.

### Additional Analysis

First, because SIPO does not provide information on patent citations, we could not use a measure of weighted patent count. SIPO specifies three types of patents: invention, utility, and design. Utility patents are new technical solutions of a product's shape, structure, or both, and design patents are new designs relating to a product's shape, pattern, or both, or the combination of color, shape, and/or pattern for aesthetic purposes (He et al., 2013b). In previous analysis, we focused on invention patents because they represent higher levels of technological advancement. We also tested our model with utility and design patents as innovation output, respectively, and the findings consistently show that state ownership reduces the impact of R&D input on innovation output. Interestingly, state ownership has a negative main effect on design patents, suggesting that state capital favors more fundamental innovations (i.e., invention patents).

Second, because the state may use pyramidal structures to ensure control, we considered *state ultimate control*, measured as a dummy variable indicating whether the largest shareholder is the state or governmental authorities, based on the information from the CSMAR and Wind databases (Liang, Ren, and Sun, 2015). Because state ultimate control captures the effect of state capital and is highly correlated with state ownership ($r = .623$), we used it to replace the SOE dummy and reestimated our model, which generated highly consistent results. Third, we also tested our model including a firm's *stock of patents* up to 2006 as an additional control and again got highly consistent results.

## DISCUSSION

We examined how state ownership affects a firm's innovation, as well as the contingent roles of institutional development, industrial competition, and start-up status. Based on two longitudinal panel datasets of Chinese firms, we find

that state ownership positively affects the R&D input of non-listed firms but weakens the effect of R&D input on innovation output, and the negative effect decreases when competition is high and for state start-ups. Overall, state ownership has an inverted U-shaped effect on a firm's innovation such that firms with minority state ownership are the most innovative. These findings provide novel insights into the role of state ownership and contribute to extant literature in four ways.

First, we offer a new framework of state ownership to explain its implications for innovation. According to agency theory, state ownership is incompatible with innovation (Shleifer, 1998; Ramaswamy, 2001), but it overlooks the resource advantage that state ownership brings to overcome the institutional voids in emerging economies (Inoue, Lazzarini, and Musacchio, 2013; Musacchio, Lazzarini, and Aguilera, 2015). As our findings show, state ownership enables firms to obtain more resources to invest in R&D. Due to the dual agency problem, however, state ownership also leads to the inefficiency curse: SOEs are less capable of transforming their R&D input into innovation output. Our framework sheds new light on previous inconsistent findings: prior studies consider the direct linear effect of state ownership on innovation outcomes (or comparing SOEs with other types of firms) and thus only partially capture the impact of state ownership (e.g., Guan et al., 2009; Ayyagari, Demirgüc-Kunt, and Maksimovic, 2011; Choi, Lee, and Williams, 2011; Choi, Park, and Hong, 2012). By considering both the resource allocation advantage and resource utilization disadvantage associated with state ownership, our framework provides a more complete understanding of the role of state ownership in innovation and helps reconcile existing contradictory perspectives (Shleifer and Vishny, 1994; Ramaswamy, 2001; Ralston et al., 2006).

Second, we contribute to the study of the recent development of state capitalism and expand it to the innovation context. The rapid growth of emerging economies brings with it the prevalence of government capital (e.g., development banks and sovereign wealth funds) and the globalization of SOEs (Cuervo-Cazurra et al., 2014). Many researchers regard the rise of state capitalism as antithetical to market capitalism and reflecting the state's ambition to use the market for political goals (e.g., Bremmer, 2010). But they overlook the new varieties of state ownership that governments use to influence business activities, such as the state as a majority or minority shareholder (Musacchio and Lazzarini, 2014; Musacchio, Lazzarini, and Aguilera, 2015). For example, Inoue, Lazzarini, and Musacchio (2013) found that minority state ownership positively affects firms' performance in Brazil, and Lazzarini (2015) proposed a conceptual framework to discuss how governments can actively devise industrial policies to enhance firms' competitive advantage. Extending this line of enquiry, we show that state ownership has an inverted U-shaped effect on innovation, such that minority state-owned firms could generate more innovation output than either SOEs or private firms. Our findings also reveal the intermediating mechanisms of R&D input and efficient resource utilization that explain why a minority state ownership is optimal for innovation. As such, this study enriches research on state capitalism by showing how governments can strategize to boost innovation output (Lazzarini, 2015; Mazzucato, 2015). We do not suggest, however, that state capitalism is better than market capitalism, because state ownership still reduces the efficiency of resource utilization;

rather, we offer important evidence on the power of state capital and explain the rise of mixed firms in emerging markets with institutional voids.

Third, we add to the agency theory of state ownership by showing how to address the inefficiency problem of SOEs from the competition side. Firms with state ownership can convert their R&D input into innovation output more efficiently in a more competitive market. State start-ups also suffer less from inefficiency, because they must work hard to survive. These aligned objectives reduce the dual agency problem for state start-ups, but listing SOEs on the stock market does not solve their inefficiency problem (see Study 2). Because listed SOEs are under the heavy control of the government, they still suffer from the dual agency problem. By examining the moderating roles of industrial competition and start-up status, our research complements traditional agency studies, which tend to focus on internal mechanisms such as incentives and boards of directors to solve agency problems (Cuervo-Cazurra and Dau, 2009).

Fourth, this study adds to the literature on institutional voids. Previous studies have emphasized the important role of business group membership in overcoming institutional voids in emerging markets (Guillén, 2000; Khanna and Palepu, 2000; He et al., 2013a). Our study suggests that state ownership represents yet another critical means to obtain scarce resources and address institutional voids. Our findings in both Studies 1 and 2, however, indicate that institutional development does not reduce the resource advantage of a firm's state ownership. Possibly, institutional development creates market-based norms, such that firms must rely on their own market- and technology-based capabilities (Briscoe and Safford, 2008; Zhou et al., 2014). Because of these normative pressures, SOEs may invest more in R&D. Overall, when institutions develop, SOEs may receive fewer resources from the government, but they invest more due to rising normative pressures from the market, resulting in a non-significant moderating effect of institutional development. Interestingly, we also find that state ownership has no significant bearing on R&D investment for listed firms (see Study 2). When SOEs are listed publicly, they rely primarily on the market to obtain capital resources, making state ownership less important for resource allocation. Taken together, the findings of Studies 1 and 2 suggest that either state ownership or getting listed provides resource advantages, state ownership leads to inefficient resource utilization, a minority state ownership is optimal for innovation output, and competition plays an important role in reducing the inefficiency problems associated with SOEs. These findings show the complicated interplay of institutions, competition, and state ownership in China and provide new insights into the ongoing development of the institutional view (Xu, Lu, and Gu, 2014).

## Managerial Implications

Our findings offer some important implications for managers and policymakers, who must understand both the benefits and the costs of state ownership. Conventional academic literature and the popular press tend to view state ownership as an impediment to innovation and firms' growth, but our findings suggest that state ownership offers important resource advantages, making a minority state ownership most beneficial for innovation development. Therefore, SOEs should attempt to negotiate with the government and persuade it to diversify their ownership structures. By diluting their governmental

ownership, firms can reduce interferences from politicians but retain access to resources and innovation opportunities. For example, the appliance manufacturer Gree negotiated with related governmental authorities and restructured into a mixed company with minority state ownership (around 20 percent) during the 2000s, which greatly weakened the control rights of bureaucrats and reduced government interference. At the same time, its remaining state ownership provided Gree with opportunities to access important resources, such as financial capital from state-owned banks and governmental subsidies, making it a highly innovative and successful enterprise. Managers should also understand the conditions in which state ownership can be beneficial or detrimental to their new product development. As competition and start-up status reduce the inefficiency problems associated with state ownership, start-ups and firms in more-competitive industries should try to exploit the resource advantages of state ownership fully to build their innovation capabilities.

Chinese policymakers have long attempted to convert SOEs into dynamos and global competitors. Our findings suggest that whereas R&D investment is critical to innovation development, more important is how to improve the efficiency of transforming R&D input into innovation output. Getting SOEs listed cannot solve the low efficiency problem; instead, governments could partially privatize SOEs and hold minority state shares in order to boost their efficiency and innovation. Policymakers also need to recognize that established SOEs tend to have inefficiency problems, so policymakers should encourage SOEs to form start-ups with other types of companies to sustain their innovation ability. Also, SOEs become more efficient in competitive markets, so although SOEs may need protection to survive, policymakers should balance between protection and efficiency and gradually decrease entry barriers to encourage competition. Beiqi Foton Motor represents an example of a truly competitive and innovative state start-up: since its founding in 1996, the company has invested substantial resources in R&D and been granted over 4,000 patents, including many international patents. It has grown into the leading automaker for commercial vehicles in China.

## Limitations and Further Research

We posit that state ownership can provide policy and resource benefits, as well as political intervention and motivational concerns, but we do not explicitly test this argument. Further research should delineate this mechanism and assess possible mediating effects. Also, we focus only on the role of state ownership, yet ownership structures are quite complex in China, including SOEs and collective, cooperative, shareholding, and private firms. As Xu, Lu, and Gu (2014) showed, collective firms mix the features of SOEs and private firms. Further research could examine the differences and similarities among different types of firms. In addition, Musacchio, Lazzarini, and Aguilera (2015) suggested that alternative forms of state ownership may function differently across various institutional conditions; it is thus necessary to examine those contingency variables, including voids in production factors and local capital markets, as well as key government capabilities such as legal enforceability and independent regulation.

Another important means to overcome institutional voids in emerging markets is to form business groups (Guillén, 2000; Khanna and Palepu, 2000;

He et al., 2013a). Private firms could also build informal personal connections with government officials to obtain scarce resources (Li, Poppo, and Zhou, 2008; Sheng, Zhou, and Li, 2011). To develop innovative products, firms could use technologies acquired from external research institutes, universities, alliance partners, or foreign companies (Sun and Liu, 2014). Future research could consider how different types of relationships (e.g., state ownership, business group membership, and political ties) and various sources of technologies affect innovation outcomes.

We have used the propensity score matching techniques to generate a sample of comparable SOEs and privately owned enterprises. It will be worthwhile to examine innovation activities of SOEs and private firms before and after major political and policy changes with a difference-in-difference estimation (Moita and Paiva, 2013). Because provincial governments in China can also formulate and implement local policies, the privatization process of SOEs varies across regions (Batjargal et al., 2013). A plausible approach is to limit the scope to particular industries and locations to capture the impact of exogenous policy changes.

Finally, our research context may limit the generalizability of our findings. Whereas China is one of the leading emerging markets, its government is particularly strong in directing economic activities. Also, institutional environments in emerging economies, including the legal environment, R&D infrastructure, and capital market, are constantly changing. Additional research should refine our framework with a longer time period in other emerging and developed economies to understand the evolving role of state ownership. Facing recent financial tsunamis, many governments, including those in developed countries, have been adopting more proactive stances toward corporations, such as providing financial bailouts and taking over business operations (Musacchio and Lazzarini, 2014). The value of state ownership, especially minority state ownership, is thus becoming a more critical issue even in developed markets. We hope that further research continues to explore the intriguing interplay of institutional and competitive conditions with various forms of state ownership in emerging as well as in developed economies.

## Acknowledgments

The authors thank Associate Editor Mauro Guillén and three anonymous reviewers for their insightful comments and guidance. This study was supported by the General Research Fund from the Research Grants Council, Hong Kong SAR Government (Project no. HKU 17503014), and Office of International Studies and Programs at University of Missouri–St. Louis.

## REFERENCES

Ahuja, G., and R. Katila
2001 ''Technological acquisitions and the innovation performance of acquiring firms: A longitudinal study.'' Strategic Management Journal, 22: 197–220.

Autio, E., H. J. Sapienza, and J. G. Almeida
2000 ''Effects of age at entry, knowledge intensity, and imitability on international growth.'' Academy of Management Journal, 43: 909–924.

Ayyagari, M., A. Demirgüc-Kunt, and V. Maksimovic
2011 ''Firm innovation in emerging markets: The role of finance, governance, and competition.'' Journal of Financial and Quantitative Analysis, 46: 1545–1580.

Bantel, K. A.
1998 ''Technology-based 'adolescent' firm configurations: Strategy identification, context, and performance.'' Journal of Business Venturing, 13: 205–230.
Batjargal, B., M. A. Hitt, A. S. Tsui, J. Arregle, J. W. Webb, and T. Miller
2013 ''Institutional polycentricism, entrepreneurs' social networks and new venture growth.'' Academy of Management Journal, 56: 1024–1049.
Beatty, R. P., and E. J. Zajac
1994 ''Managerial incentives, monitoring, and risk bearing: A study of executive compensation, ownership, and board structure in initial public offerings.'' Administrative Science Quarterly, 39: 313–335.
Boisot, M., and J. Child
1996 ''From fiefs to clans and network capitalism: Explaining China's emerging economic order.'' Administrative Science Quarterly, 41: 600–628.
Bowen, M. P.
2014 ''Testing moderating hypotheses in limited dependent variable and other nonlinear models: Secondary versus total interactions.'' Journal of Management, 38: 860–889.
Bremmer, I.
2010 The End of the Free Market: Who Wins the War between States and Corporations? New York: Portfolio/Penguin.
Briscoe, F., and S. Safford
2008 ''The Nixon-in-China effect: Activism, imitation, and the institutionalization of contentious practices.'' Administrative Science Quarterly, 53: 460–491.
Brown, S. L., and K. M. Eisenhardt
1995 ''Product development: Past research, present findings, and future directions.'' Academy of Management Review, 20: 343–378.
Chang, S. J., C. N. Chung, and I. P. Mahmood
2006 ''When and how does business group affiliation promote firm innovation? A tale of two emerging economies.'' Organization Science, 17: 637–656.
Chen, V. Z., J. Li, D. M. Shapiro, and X. Zhang
2014 ''Ownership structure and innovation: An emerging market perspective.'' Asia Pacific Journal of Management, 31: 1–24.
Choi, S. B., S. H. Lee, and C. Williams
2011 ''Ownership and firm innovation in a transition economy: Evidence from China.'' Research Policy, 40: 441–452.
Choi, S. B., B. Park, and P. Hong
2012 ''Does ownership structure matter for firm technological innovation performance? The case of Korean firms.'' Corporate Governance: An International Review, 20: 267–288.
Cuervo-Cazurra, A., and L. A. Dau
2009 ''Promarket reforms and firm profitability in developing countries.'' Academy of Management Journal, 52: 1348–1368.
Cuervo-Cazurra, A., A. Inkpen, A. Musacchio, and K. Ramaswamy
2014 ''Governments as owners: State-owned multinational companies.'' Journal of International Business Studies, 45: 919–942.
Dacin, M. T., C. Oliver, and J. Roy
2007 ''The legitimacy of strategic alliances: An institutional perspective.'' Strategic Management Journal, 28: 169–187.
Du, X., Q. Zeng, and Y. Du
2012 ''Do political connections crowd-out R&D investment of Chinese listed firms?'' Investment Research, 31: 98–113 (in Chinese).
Dutta, S., O. Narasimhan, and S. Rajiv
2005 ''Conceptualizing and measuring capabilities: Methodology and empirical application.'' Strategic Management Journal, 26: 277–285.

Eisenhardt, K. M.
1989 ''Agency theory: An assessment and review.'' Academy of Management Review, 14: 57–74.
Fama, E.
1980 ''Agency problems and the theory of the firm.'' Journal of Political Economy, 88: 288–307.
Fan, G., X. Wang, and H. Zhu
2011 NERI Index of Marketization of China's Provinces, 2011 Report. Beijing: Economics Science Press.
Feinberg, S. E., and A. K. Gupta
2004 ''Knowledge spillovers and the assignment of R&D responsibilities to foreign subsidiaries.'' Strategic Management Journal, 25: 823–845.
Frankel, J. A., and D. Romer
1999 ''Does trade cause growth?'' American Economic Review, 89: 379–399.
Freund, E. M.
2001 ''Fizz, froth, flat: The challenge of converting China's SOEs into shareholding corporations.'' Policy Studies Review, 18: 96–111.
Gao, G. Y., J. Y. Murray, M. Kotabe, and J. Lu
2010 ''A 'strategy tripod' perspective on export behaviors: Evidence from firms based in an emerging economy.'' Journal of International Business Studies, 41: 377–396.
Geroski, P. A., J. Mata, and P. Portugal
2010 ''Founding conditions and the survival of new firms.'' Strategic Management Journal, 31: 510–529.
Guan, J., R. Yam, E. Tang, and A. Lau
2009 ''Innovation strategy and performance during economic transition: Evidences in Beijing, China.'' Research Policy, 38: 802–812.
Guillén, M.
2000 ''Business groups in emerging economies: A resource-based view.'' Academy of Management Journal, 43: 362–381.
Hair, J. F., R. E. Anderson, R. L. Tatham, and W. C. Black
1998 Multivariate Data Analysis, 5th ed. Upper Saddle River, NJ: Prentice Hall.
Hannan, M. T., and J. Freeman
1984 ''Structural inertia and organizational change.'' American Sociological Review, 49: 149–164.
He, J., X. Mao, O. M. Rui, and X. Zha
2013a ''Business groups in China.'' Journal of Corporate Finance, 22: 166–192.
He, Z., T. Tong, W. He, Y. Zhang, and J. Lu
2013b ''Chinese patent database user documentation: Matching SIPO patents to Chinese publicly-listed companies and subsidiaries.'' https://docs.google.com/file/d/0B3aYSKx9DasbWE1LdTBVdDAwTWM/edit?pli=1.
Hoskisson, R. E., L. Eden, C. M. Lau, and M. Wright
2000 ''Strategy in emerging economies.'' Academy of Management Journal, 43: 249–267.
Inoue, C. F., S. G. Lazzarini, and A. Musacchio
2013 ''Leviathan as a minority shareholder: Firm-level implications of state equity purchases.'' Academy of Management Journal, 56: 1775–1801.
Jefferson, G., A. Hu, X. Guan, and X. Yu
2003 ''Ownership, performance, and innovation in China's large- and medium-size industrial enterprise sector.'' China Economic Review, 14: 89–113.
Jensen, M., and W. Meckling
1976 ''Theory of the firm: Managerial behavior, agency costs, and ownership structure.'' Journal of Financial Economics, 3: 305–360.

Katila, R.
2002 ''New product search over time: Past ideas in their prime?'' Academy of Management Journal, 45: 995–1010.
Khanna, T.
2009 ''Learning from economic experiments in China and India.'' Academy of Management Perspectives, 23 (2): 36–43.
Khanna, T., and K. G. Palepu
1997 ''Why focused strategies may be wrong for emerging markets.'' Harvard Business Review, 75 (4): 41–51.
Khanna, T., and K. G. Palepu
2000 ''The future of business groups in emerging markets: Long-run evidence from Chile.'' Academy of Management Journal, 43: 268–285.
Khwaja, A. I., and A. Mian
2005 ''Do lenders favor politically connected firms? Rent provision in an emerging financial market.'' Quarterly Journal of Economics, 120: 1371–1411.
Laursen, K., and A. Salter
2006 ''Open for innovation: The role of openness in explaining innovation performance among UK manufacturing firms.'' Strategic Management Journal, 27: 131–150.
Lazzarini, S. G.
2015 ''Strategizing by the government: Can industrial policy create firm-level competitive advantage?'' Strategic Management Journal, 36: 97–112.
Lee, R. P., A. Özsomer, and K. Z. Zhou
2015 ''Introduction to the special issue on innovation in and from emerging economies.'' Industrial Marketing Management, 50: 16–17.
Li, H. B., L. S. Meng, and J. S. Zhang
2006 ''Why do entrepreneurs enter politics? Evidence from China.'' Economic Inquiry, 44: 559–578.
Li, J. J., L. Poppo, and K. Z. Zhou
2008 ''Do managerial ties in China always produce value? Competition, uncertainty, and domestic vs. foreign firms.'' Strategic Management Journal, 29: 383–400.
Li, S., and J. Xia
2008 ''The role and performance of state firms and non-state firms in China's economic transition.'' World Development, 36: 39–54.
Li, Y., M. W. Peng, and C. D. Macaulay
2013 ''Market-political ambidexterity during institutional transitions.'' Strategic Organization, 11: 205–213.
Liang, H., B. Ren, and S. L. Sun
2015 ''An anatomy of state control in the globalization of state-owned enterprises.'' Journal of International Business Studies, 46: 223–240.
Lin, Y. F., C. Fang, and L. Zhou
1998 ''Competition, policy burdens, and state-owned enterprise reform.'' American Economic Review, 88: 422–427.
Mazzucato, M.
2015 The Entrepreneurial State: Debunking Public vs. Private Sector Myths, rev. ed. New York: Public Affairs.
McDermott, G. A.
2007 ''Politics, power, and institution building: Bank crises and supervision in East Central Europe.'' Review of International Political Economy, 14: 220–250.
Megginson, W. L., and J. M. Netter
2001 ''From state to market: A survey of empirical studies of privatization.'' Journal of Economic Literature, 39: 321–389.

Meyer, K. E., and H. V. Nguyen
2005 ''Foreign investment strategies and sub-national institutions in emerging markets: Evidence from Vietnam.'' Journal of Management Studies, 42: 63–93.
Moita, R., and C. Paiva
2013 ''Political price cycles in regulated industries: Theory and evidence.'' American Economic Journal: Economic Policy, 5: 94–121.
Musacchio, A., and S. G. Lazzarini
2014 Reinventing State Capitalism: Leviathan in Business, Brazil and Beyond. Cambridge, MA: Harvard University Press.
Musacchio, A., S. G. Lazzarini, and R. V. Aguilera
2015 ''New varieties of state capitalism: Strategic and governance implications.'' Academy of Management Perspectives, 29 (1): 115–131.
National Bureau of Statistics of China
2015 China Statistical Yearbook 2015. Beijing: China Statistics Press.
Nee, V., and S. Opper
2012 Capitalism from Below: Markets and Institutional Change in China. Cambridge, MA: Harvard University Press.
North, D. C.
1990 Institutions, Institutional Changes, and Economic Performance: Political Economy of Intuitions and Decisions. Cambridge: Cambridge University Press.
North, D. C.
2005 Understanding the Process of Institutional Change. Princeton, NJ: Princeton University Press.
Oliver, C.
1997 ''Sustainable competitive advantage: Combining institutional and resource-based views.'' Strategic Management Journal, 18: 697–713.
Peng, M. W.
2003 ''Institutional transitions and strategic choices.'' Academy of Management Review, 28: 297–317.
Peng, M. W., D. Y. Wang, and Y. Jiang
2008 ''An institution-based view of international business strategy: A focus on emerging economies.'' Journal of International Business Studies, 39: 920–936.
Porter, M. E.
1985 Competitive Advantage: Creating and Sustaining Superior Performance. New York: Free Press.
Qian, Y.
1996 ''Enterprise reform in China: Agency problems and political control.'' Economics of Transition, 4: 422–447.
Ralston, D. A., J. Terpstra-Tong, R. H. Terpstra, X. Wang, and C. Egri
2006 ''Today's state-owned enterprises of China: Are they dying dinosaurs or dynamic dynamos?'' Strategic Management Journal, 27: 825–843.
Ramamurti, R.
2000 ''A multilevel model of privatization in emerging economies.'' Academy of Management Review, 25: 525–550.
Ramaswamy, K.
2001 ''Organizational ownership, competitive intensity, and firm performance: An empirical study of the Indian manufacturing sector.'' Strategic Management Journal, 22: 989–998.
Salomon, R., and J. M. Shaver
2005 ''Export and domestic sales: Their interrelationship and determinants.'' Strategic Management Journal, 26: 855–871.
Sarkar, J., S. Sarkar, and S. K. Bhaumik
1998 ''Does ownership always matter? Evidence from the Indian bank industry.'' Journal of Comparative Economics, 26: 262–281.

Schipani, C. A., and J. H. Liu
2002 ''Corporate governance in China: Then and now.'' Columbia Business Law Review, 1: 1–69.
Scott, W. R.
1995 Institutions and Organizations. Thousand Oaks, CA: Sage.
Sheng, S., K. Z. Zhou, and J. J. Li
2011 ''The effects of business and political ties on firm performance: Evidence from China.'' Journal of Marketing, 75: 1–15.
Shleifer, A.
1998 ''State versus private ownership.'' Journal of Economic Perspectives, 12: 133–150.
Shleifer, A., and R. W. Vishny
1994 ''Politicians and firms.'' Quarterly Journal of Economics, 109: 995–1025.
Siegel, J.
2007 ''Contingent political capital and international alliances: Evidence from South Korea.'' Administrative Science Quarterly, 52: 621–666.
Stam, E., and K. Wennberg
2009 ''The roles of R&D in new firm growth.'' Small Business Economics, 33: 77–89.
Stan, C. V., M. W. Peng, and G. D. Bruton
2014 ''Slack and the performance of state-owned enterprises.'' Asia Pacific Journal of Management, 31: 473–495.
Sun Y., and F. Liu
2014 ''New trends in Chinese innovation policies since 2009—A system framework of policy analysis.'' International Journal of Technology Management, 65: 6–23.
Wei, S., and Y. Wu
2001 ''Globalization and inequality: Evidence from within China.'' NBER working paper 8611.
Xu, D., J. W. Lu, and Q. Gu
2014 ''Organizational forms and multi-population dynamics: Economic transition in China.'' Administrative Science Quarterly, 59: 517–547.
Xu, E., and H. Zhang
2008 ''The impact of state shares on corporate innovation strategy and performance in China.'' Asia Pacific Journal of Management, 25: 473–487.
Xu, K., L. Tihanyi, and M. A. Hitt
2014 ''Firm resources, governmental power, and privatization.'' Journal of Management, published online ahead of print. DOI: 10.1177/0149206314546194.
Yang X., S. L. Sun, and H. Yang
2015 ''Market-based reforms, synchronization and product innovation.'' Industrial Marketing Management, 50: 30–39.
Zhou, K. Z., J. J. Li, S. Sheng, and A. T. Shao
2014 ''The evolving role of managerial ties and firm capabilities in an emerging economy: Evidence from China.'' Journal of the Academy of Marketing Science, 42: 581–595.

**Authors' Biographies**

Kevin Zheng Zhou is a professor of strategy and international business at School of Business, Faculty of Business and Economics, University of Hong Kong, Pokfulam, Hong Kong (e-mail: kevinzhou@business.hku.hk). His research interests include capabilities and innovation, trust and relational ties, and strategic issues in emerging economies and China. He received a Ph.D. specializing in strategy and marketing from Virginia Polytechnic Institute and State University.

Gerald Yong Gao is an associate professor of marketing at College of Business Administration, University of Missouri–St. Louis, One University Blvd., St. Louis, MO 63021 (e-mail: gaogy@umsl.edu). His research focuses on marketing and innovation strategies, FDI performance, and export behavior. He received his Ph.D. in marketing from University of Hong Kong.

Hongxin Zhao is the David Orthwein professor of international business at Boeing Institute of International Business, John Cook School of Business, Saint Louis University, 3674 Lindell Blvd., St. Louis, MO 63108 (e-mail: zhaox@slu.edu). His research interests center on multinational enterprises strategy, market entry mode, internationalization, and emerging economies. He earned a Ph.D. in international science and technology policy and management from George Washington University.