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The innovation paradox of political capital in transition economy firms

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Abstract

Does TMT political capital enhance or hinder firm innovation? While both the innovation benefits and costs of TMT political capital are acknowledged in the literature, we lack a systematic understanding of the theoretical context in which each perspective regarding the innovation outcomes of TMT political capital applies, specifically when the institutional environments are subject to fundamental and ongoing changes. Drawing on insights from upper echelons theory (UET), we propose a non-linear relationship between TMT political capital and firm innovation performance. Based on an analysis of 620 publicly listed firms in China, we find that TMT political capital has a U-shaped relationship with innovation performance. This curvilinear U-shaped relationship is negatively moderated by the marketization of commercial activities and resource allocation. Our study evokes new theoretical mechanisms for the innovation paradox of TMT political capital and sheds light on its boundary conditions in the context of transition economies.

1. Introduction

Political capital is an important and invisible currency for corporate leaders helping them to successfully influence political actors in ways favorable to their companies (Schugurensky, 2000). The presence of politicians as directors in corporate boardrooms is prevalent in most large corporations which engage with the political process to some extent with the aim of satisfying the various interests of corporate stakeholders, such as with regard to innovation (Goldman et al., 2009). Appointing current or ex-politicians is sequential to firm market value (Faccio, 2006). However, such a performance improvement is very unlikely to be sustainable in the long run due to increased competition resulting from globalization (Petricevic & Teece, 2019). To achieve enduring success, innovation serves as a crucial vehicle for firms in order to constantly adapt to the rapidly changing environment and maintain their long-term competitive advantage (Aghion et al., 2005; Danneels, 2010). For a new idea to be approved and implemented within a firm, corporate leaders typically have to acquire and invest in three sets of resources – information, material resources and support (Kanter, 1988). Most of these resources, in particular information and natural resources, are acquired through informal ties (Uzzi & Spiro, 2005). Corporate leaders' connections with politicians enable their firms to occupy a boundary spanning position that links their internal network to external sources of information, resources and support from governments (Aiken et al., 1980). However, the innovation activities of firms with connections to political actors who possess varying amounts of critical resources stemming from informal sources have not yet been thoroughly and systematically investigated.

A few prior studies have shown that the connections between top executives and politicians serve as either an enabler or a barrier to firms' innovation activities (Kotabe et al., 2017; Warren et al., 2004; Robeson & O'Connor, 2013). Political capital can buffer firms from tough competition and unfavorable regulations, and can help facilitate access to new markets

and opportunities, as well as critical resources for innovation (Hillman, 2010; Li & Zhang, 2007). However, despite its benefits, corporate political engagement exposes firms to substantial costs, as well as legal and reputational risks, which may discourage their innovation activity and bind firms into extensive social commitments, distracting their attention away from innovation (Zhang et al., 2016).

The mixed findings and differing theoretical perspectives regarding the innovation outcomes of political capital highlight a lack of systematic understanding of the complexity of the input side of the innovation story, and the boundary conditions of the institutional environments. Existing research considers that firm innovation performance is subject to the influences of both political and market forces in transition economies, such as China (Li et al., 2013). However, firms cannot maximize the benefits of an ambidextrous engagement with political and market activities without a thorough understanding of the extent to which each of these two forces contributes to innovation and how the impact of one force is constrained by the other. While the benefits of market forces to innovation have been widely acknowledged in prior studies (Aghion et al., 2005; Zhou et al., 2017), the extent to which political forces contribute to innovation performance remains understudied.

Moreover, prior studies on transition economies typically assume symmetrical political interference or government intervention in both the market and resource allocation process (Bai et al., 2006; Li et al., 2013), but ignore the circumstances where government coordination is mostly absent or is limited in one of these marketization processes. Hence, it is likely that the advantages of political capital may become less pronounced, given the uneven progress of market liberalization in countries such as China. Thus, examining the contingency of dynamic market transition may pinpoint some potential new mechanisms for the existing relationship between political capital and innovation.

Our study aims to close these gaps by examining the relationship between political capital and innovation performance under different institutional circumstances of the market transition process. Drawing on insights from upper echelons theory (UET), we propose that the political capital of a firm's top management team (TMT) has a curvilinear U-shaped relationship with its innovation performance, as opposed to a linear positive or negative relationship. We argue that the innovation-related benefits of TMT political capital grounded in UET prevail only for political capital flush firms with sufficient political clout and reputation to bargain with politicians over access to critical resources and/or policy support in exchange for their innovation commitment. By contrast, vigorous competition puts firms with a deficit of political capital under greater pressure to survive by introducing new products or technologies rather than by leveraging their limited political capital. Firms with a moderate level of TMT political capital are subject to neither the competitive pressure nor the political obligation to innovate. The amount of political capital they possess is sufficient to maintain their survival but insufficient to secure political backing to the extent necessary to accommodate the increasing costs and risks of their political engagement.

We consider China as the most appropriate setting for our analysis where both politically hooked and unhooked firms can grow and prosper because of the multidimensional characteristics of its institutional transition. On the one hand, highly marketized commercial exchanges open up opportunities for political capital deficit firms to survive and thrive based on their superior market performance. On the other hand, the politicization of resource allocation stymies market actions and motivates firms to surmount institutional barriers to innovation by building bridges to the political actors who control the critical resources on which they depend. This makes senior managers' mobilization of political capital an important strategy for firms seeking to navigate their fast-changing institutional terrain for innovation.

Our study seeks to make several contributions to the literature. First, we extend UET by moving beyond its traditional consideration of TMT characteristics, such as simple demographic or background factors. Our specific focus on the role of TMTs' power, associated with their prestige as government officials in firm innovation activities, advances our understanding of the innovation advantage of corporate political capital and responds to a recent call to expand research on UET topics (Neely et al., 2020). Second, by theorizing a U-shaped relationship between TMT political capital and innovation with the support of empirical evidence, we provide important insights into the theoretical context that underpins variations in firm innovation performance at varying levels of political capital. Finally, this research sheds new light on the trajectories of institutional transition by drawing attention to the scope and uneven pace of different dimensions of market liberalization in a large transition economy and their moderating effect on firm innovation. Specifically, examining the contingencies of the politicization of market mechanisms enables us to elucidate the institutional boundary conditions under which TMT political capital affects firm innovation performance.

2. Theoretical background

2.1. UET and the innovation advantage of political capital

The central argument of UET suggests that TMT attributes and experience are key determinants of firm outcomes (Hambrick & Mason, 1984). While UET offers important insights into how TMT characteristics and traits affect their receptiveness to change, creativity or innovation, the power which emanates from TMT members' personal prestige or status in the institutional environment determines the extent to which they can influence firm strategy and subsequent performance outcomes (Finkelstein, 1992; Hambrick, 1981). The power of a TMT denotes its members' capacity to influence others (Finklestein, 1992; Barnett et al., 1995; Pfeffer, 1981). Their higher personal status in the society provides TMT members with wider

networks of connections which are considered as arenas of power and which can be manipulated for the purpose of meeting particular corporate goals, such as obtaining critical and scarce resources for innovation (Scott, 1991; Pettigrew, 1992; Wang et al., 2011). Specifically, management elites who occupy formally defined positions of authority within the government have a great capacity to exercise their influence and their political status to gain support from external contacts such as regulators and policy makers who can provide not only timely information valuable to a firm to reduce uncertainty, but also resource access that is critical for innovation (Finkelstein, 1992; Geletkanycz & Hambrick, 1997). According to this theory, firms whose top executives were government officials in an upper echelon of the government hierarchy are able to perform better with regard to innovation than those whose TMT members were not government officials, or who were in a lower echelon of the government hierarchy.

A firm's political power is typically manifested by its TMT political capital representing the arenas of their political influence and enabling senior executives who are cadres or ex-cadres to effectively communicate and coordinate with the government and/or politicians to secure government resources and support that are crucial for the firm's innovation success in the context of transition economies (Schugurensky, 2000; Kjaer, 2013). The wide network of political connections accumulated through their party membership status allows corporate directors to gain access to precious business information on the demand for, and price fluctuation of, any particular product or service in the market. Such information is, however, not easily available to outsiders, as information flow is usually channelled through the centre and horizontal flows are typically weak in transition eco nomies (Liu & White, 2001; Schuler et al., 2002). The possession of valuable market knowledge helps these companies overcome information asymmetry and enables them to more precisely identify gaps in the market and better capitalize on the potential opportunities for innovation. Thus, firms with politically

connected TMTs have information advantages in identifying innovation opportunities (Haveman et al., 2016; Casanueva et al., 2013).

TMT political capital also helps reduce the regulatory uncertainty associated with innovation. Both firms and external investors may be reluctant to engage in innovation where they are concerned about the lack of clear future regulations and the risk of liability claims, particularly in the case of emerging technologies (Williams, 2003). Having privileged access to individuals in the state apparatus or local administration can provide early knowledge of new regulations and laws on emerging industries, as well as any unwritten rules concerning their interpretation and implementation (Danis et al., 2010; Schuler et al., 2002). Furthermore, connections with the direct resource allocators in the government allow firms to gain access to various forms of government support for innovation, such as financial backing, bank loans at deflated prices, R&D tax exemption and, in some cases, government guarantee schemes for the commercialization of particular new products or services (Li & Zhang, 2007; Faccio, 2010).

3. Hypotheses

At low levels of political capital, there are two rationales that underpin political capital deficit firms having more incentives to innovate which support the notion of a negative impact of TMT political capital on firms' innovation. The first rationale emphasizes that firms which believe that they have a political capital deficit are less likely to interact with political actors within their network unless the market conditions are dire for them (Fan et al., 2007). TMTs in such firms are under greater pressure to ensure the survival of their firms through innovation than those in political capital flush firms. In particular, constant exposure to environmental uncertainties in transition economies such as China further heightens their pressure to innovate (Keister, 2002; Chang & Xu, 2008). Moreover, introducing radical and sweeping changes is often time-consuming, resource-extensive and littered with uncertainty and risks (Hess &

Rothaermel, 2011). These senior managers are less likely to rely on innovation, especially developing new technologies from scratch to enhance the long-term survival of their firms, if a less risky and more effective strategy can be found to ensure their short-term viability (Xia & Liu, 2017).

The second rationale contends that the cost or liability of capitalizing on TMT political capital may override the innovation-related benefits it generates for several reasons. First, political capital deficit firms are more likely to make major mistakes in attempting to assess the political capital leverage of their political ties. The less TMT political capital a firm possesses, or the less experience the TMTs have in political capital exchange activities, the more likely they are to miscalculate or underestimate, or overestimate, the political leverage of the politicians (Mizruchi, 1992). This may lead to little or no access to the critical resources needed for the firm's innovation activity as a return for its political capital investment. However, the more limited the resources firms have, the more creative top executives have to be in terms of how they use these resources. For instance, top executives with little or no political background are able to enhance the efficiency of their resource usage by making more effective use of their human talents, such as their expertise, knowledge, skills and experience to generate organizational capabilities that enable innovation to take place (Finkelstein & Hambrick, 1996; Hambrick & Mason, 1984). Executives are more likely to prosper and obtain higher innovation returns from for their know-how as a result of increased competition and constant exposure to environmental uncertainties that heighten firm innovation pressure (Keister, 2002).

Resource scarcity encourages firms to search for new opportunities and explore a variety of novel ideas and paths, such as socialization, recombination and internalization, because no resources are available to increase either the search scope or depth of the existing paths (Nonaka & Takeuchi, 1995; Schulze & Hoegl, 2006). Doing so enables corporate executives

to become more experienced in transforming existing innovation inputs into innovation outputs (Leiponen, 2005; Fonseca et al., 2019), which is essential for firm innovation success. Specifically, the increased creativity resulting from resource scarcity enhances executives' likelihood of identifying analogies and serendipitous findings that are crucial to the development of novel technological solutions and breakthrough innovations (Ahuja & Lampert, 2001; Baker & Nelson, 2005). Moreover, time and resource constraints eliminate their doubts and second thoughts about new projects (Li & Atuahene-Gima, 2002).

Second, building forceful political capital either takes resources that a firm may need in the marketplace, or is not viewed as an undertaking that would be highly valued (Hillman, 2010). An increase in political capital investment leads to an increase in the level of political risk a company has to bear on top of the potential risks associated with innovation. Thus, firms with a minimal level of TMT political capital are less afraid to undertake innovation activities than others. Moreover, being an ancillary player in the corporate political game also enables these firms to free ride the innovation-related benefits accrued by the pack leaders (political capital flush firms) at no risk.

At high levels of political capital, the innovation-related advantage of political capital underpinned by UET prevails for several reasons. First, it is easier for capital flush firms to enforce intellectual property protection laws and regulations to protect their innovation because strong TMT political capital helps build trust between government authorities and firms. Regulators and legislators are more likely to favor firms with a good political track record, and about whom they have more insightful information (Li & Zhang, 2007; Peng & Luo, 2000). Enhanced legal oversight and formal legal procedures increase the cost of patent infringement and reduce the risk of knowledge leakage and misappropriation resulting from imitation and pirating, thereby advancing firm innovation performance (Haveman et al., 2016; Zhang et al., 2016). Empirical studies show that politically powerful Chinese firms developed similar, if not

more innovative products, than analogous unconnected firms (Kotabe et al., 2017; Zhang et al., 2016).

Second, firms extensively investing in political capital may have to initially bear more political risks and costs than those with low and moderate levels of involvement. However, this is unlikely to discourage their innovation because such initial risks and costs can be mitigated by the length and quality of relationships between TMT members and political actors, which increase with the intensity of political capital. If their prior relationship is well established, the politician and top executives will give each other a good behavioural evaluation based on past experiences (Solow, 1995). The longer the relationship, the better they know each other; the more a politician trusts a firm and its executives, the more they trust each other unconditionally, and so the more likely it is that the politician will fulfil his or her promised commitments. The long duration of the relationship shapes confidence, grows empathy, reduces ambiguity, and inserts elements of predictability into the equation, which maximizes the likelihood of successful political capital transactions (Frye, 2002).

Finally, political capital flush firms are obliged to innovate to maintain their strong connections with governments and politicians, and this allows them to access government resources and regulatory benefits. Politically powerful firms that obtain such benefits have to deliver innovative products or services in return (Frye 2002). Specifically, some of the government subsidies and contracts are strictly tied to innovation-related outcomes. Once received, politically powerful firms become targets for more stringent monitoring by government authorities so that they are unable to receive any benefit from such projects without committing to developing and delivering innovative solutions (Brogaard et al., 2015). This innovation obligation is reinforced by strong affiliations with higher levels of government, which subjects highly politically embedded firms to direct monitoring by the central government, and rigorous annual innovation performance reviews (Naughton, 2007).

At moderate levels of political capital, firms are less likely to reap innovation-related benefits from such investments than those at either end of the spectrum. They are neither able to take advantage of their TMT political capital to enhance innovation, nor under pressure to survive or thrive through innovation. The level of political capital invested is insufficient to ensure their access to critical resources for innovation. Politicians who might want to cause such firms harm, or place them at a competitive disadvantage, may not hesitate to do so as these firms do not have the political influence, or bargaining power, to push back (Frye, 2002). These firms are semi-astute participants, working in much the same political territory as a politically forceful firm but not as intensely, and without such a broad impact (Healy, 2014). Thus, they do not have the political astuteness and solid political reputation possessed by political capital flush firms to create a political environment in their favor, with few political obligations to innovate. In many cases, the TMT members do not have the skills to understand and take advantage of policy and political opportunities (Bai et al., 2006). In comparison to political capital deficit firms with greater resource constraints, they have fewer incentives or less pressure to innovate to survive the tough competition. The amount of TMT political capital they have may not be sufficient to make these firms as skilled in dealing with politicians as capital flush firms, or take a high profile role in a national political party convention, but it is sufficient to defend themselves and facilitate their survival with the minimal level of innovation activity required (Cull et al., 2015). However, the costs and risks incurred by a moderate commitment to TMT political capital are much higher than those incurred by companies with little or no TMT political capital commitment and cannot be mitigated without an enhanced relationship with politicians or a well-established political reputation like that possessed by political capital flush firms (Li et al., 2009). Thus, we hypothesize:

H1. A firm's TMT political capital has a U-shaped relationship with its innovation performance.

China has achieved tremendous economic success as a result of market liberalization since 1979. This success, however, has not convinced the government to withdraw from its role in the economy but to redefine it on a regional basis (Johansson & Feng, 2016). Market liberalization has a more narrowed scope in China compared to other transition economies, such as Russia and Eastern European countries. It is mainly confined to the marketization of commercial exchange, but deliberately skips the process of marketization of resource allocation. A nonmarket allocation of resources coexists with highly marketized commercial activities (Johansson & Feng, 2016). This has been done to ensure stability and the gradual opening of markets, as opposed to the 'big bang' strategy of a sudden transformation to capitalism that was followed in Eastern European countries such as Russia. Understanding how these two market forces affect the innovation advantage of political capital not only helps reconcile the prior mixed findings regarding the impact of government intervention on firm innovation in transition economy contexts, but also enables us to unveil the implications of marketization or reduced government intervention for the innovation activity of transition economy firms. Therefore, we examine two boundary conditions – the marketization of commercial activities, and the marketization of resource allocation for our hypothesized U-shaped relationship between political capital and innovation performance.

In Hypothesis 1, the initial decreasing relationship between political capital and innovation performance is driven by firms' increasing exploitation of TMT political capital, which incurs more costs than innovation-related benefits. Specifically, the negative relationship between low levels of TMT political capital and innovation is reinforced as the dominance of market-based mechanisms further deteriorates with little marketization of commercial activities. This is because, in the absence of sufficient competition, firms with little or no TMT political capital are bound by neither the pressure to survive the competition through

innovation nor the political obligation to innovate (Hillman, 2010; Slinko et al., 2005). In contrast, firms' pressure to innovate is strengthened in markets with free access and intense competition for buyers and sellers at high levels of marketization of commercial exchange (Aghion et al., 2005). Greater competition and increased consumer demand stimulate companies with insufficient TMT political capital to develop better new products at lower cost and offer consumers more choices on a continuous basis (Nonaka & Takeuchi, 1995). This innovation incentive is more pronounced for firms that have accumulated a moderate amount of TMT political capital. Increased commercial returns from their innovation in a free market not only helps these firms to mitigate their competitive disadvantages resulting from a lack of sufficient TMT political capital to boost their innovation performance, but also to compensate for the escalating costs of firms' increased exploitation of TMT political capital. In the meantime, the laws and forces of supply and demand in an unrestricted market system are mostly free from government intervention, price-setting monopoly or other authority (Róna-Tas, 1994). This means that firms with moderate levels of TMT political capital can no longer survive by leveraging their insufficient political capital to obtain government support, such as government contracts and price subsidies to compensate for their decreasing sales as result of competition, and have to instead rely on their own innovation. Thus, the increasing marketization of commercial activities weakens the negative effects of political capital on the innovation performance of firms with low and moderate levels of TMT political capital.

The subsequent positive slope of the curvilinear relationship between TMT political capital and innovation performance is also weakened by market freedom. As discussed in Hypothesis 1, political capital flush firms have enough capital sources and political clout, shrewdness and reputation to effectively bargain with the political actors and policy makers to secure access to resources and environments that are critical, and conducive to their innovation activities. The positive effect of high levels of TMT political capital on innovation is more

pronounced when the marketization of commercial exchange is low. On the one hand, political capital flush firms have the power to deliberately drive a limited number of non-connected competitors out of business by diverting public demand (Goldman et al., 2013; Shleifer & Vishny, 2002), or charging lower prices and cross-subsidizing their losses using the subsidies or grants awarded by the governments (Chang & Xu, 2008; Cull et al., 2015). On the other hand, reduced competition will not discourage their motivation to innovate because firms deeply embedded in political relationships are bound by their political obligations to innovate in return for the advantages gained via their political capital (Hillman, 2010; Slinko et al., 2005).

At high levels of marketization of commercial exchange, increased free market competition diminishes the overall profit margin of their innovative products (Aghion et al., 2005), which may counterbalance the innovation advantage generated by their intensive TMT political capital. Although politically powerful firms can use political capital to alleviate the competitive threats from rivals, this only works on the premise that their innovative products either offer good value or are sold at prices similar to, or even better than, their competitors (Goldman et al., 2013; Cull et al., 2015). Thus, highly marketized commercial activities reduce the post-innovation rents of political capital flush firms and may discourage their innovation. In comparison to low levels of marketization of commercial activities, where they can grab a higher profit margin for their innovation with less competition, these firms are less motivated to innovate apart from fulfilling their innovation obligations. Consequently, both the initial negative and subsequent positive relationship between TMT political capital and firm innovation performance will become less pronounced with the increasing marketization of commercial activities. Accordingly, we hypothesize:

H2. The U-shaped relationship between a firm's TMT political capital and its innovation performance is less pronounced when the level of marketization of commercial activities is high.

The dominant role of the government in resource allocation is undermined by market forces when transition economies shift from central planning to market economies (Liu & White, 2003). High levels of marketization of resource allocation, to a large extent, diminish the resource allocation power exercised by individual political actors on behalf of the governments at both central and provincial levels. This effectively constrains the level of innovation-related benefits, such as privileged access to critical scarce resources and favorable policies that firms can extract from the government by leveraging their TMT political capital, in particular for political capital flush firms. Conversely, the positive impact of TMT political capital on innovation is reinforced at low levels of marketization of resource allocation when political forces outweigh markets as the dominant mechanism in resource allocation. This makes it possible for political capital flush firms to gain access to critical resources by exercising their political power. The more they use their TMT political capital to gain resources or advantages, the more innovation obligations they are subject to in exchange for favors by politicians (Hillman, 2010; Slinko, et al., 2005).

Increased marketization of resource allocation may also alleviate the pressure to innovate for political capital deficit firms. The market power under an open system of market-based resource allocation will gradually gravitate towards the more competitive firms, since the production of goods and services and allocation of resources are guided through market incentives rather than direct command and control, or network forms of organizations (Holmes et al., 2016). This implies that highly competitive firms with little or no TMT political capital can survive with less pressure to innovate in the short term because of their pre-emption of the

critical resources for innovation, such as key raw materials, skilled labor and components that followers will have to pay dearly for, and the industry standards they established to temporarily block rivals' threats. By contrast, these resources are not easily available, and standards may be difficult to enforce, for firms without sufficient TMT political capital when political forces determine how resources are distributed at low levels of marketization of resource allocation. Unlike those operating in a highly marketized system with ample resources, resource constraints put political capital deficit firms under constant pressures to innovate because they have to use their limited resources creatively and explore a variety of novel options (Nonaka & Takeuchi, 1995; Schulze & Hoegl, 2006).

An environment where the government has less control over resource allocation than market incentives do, benefits most the innovation performance of firms with moderate levels of TMT political capital. Increasing marketization of resource allocation puts these firms under greater pressure to innovate to ensure their survival for several reasons. First, allocating resources according to market incentives removes the reasonable moderate amount of government protection and support these firms can access by exploiting their TMT political capital, which previously shielded them from competition and discouraged their innovation in a highly planned system of resource allocation. Second, decreased government intervention in resource allocation makes it possible for these firms to compete for critical scarce resources for innovation based on competitive market performance instead of the political capital which they lack. To succeed in such competition, firms have to work very hard to attract customers through innovation, such as developing better products and/or services and offering more varieties and choices. We propose:

H3. The U-shaped relationship between a firm's TMT political capital and its innovation performance is less pronounced when the level of marketization of resource allocation is high.

4. Data and methods

4.1. Sample and data

Our study sample includes all China's listed companies traded on the Shanghai and Shenzhen Stock Exchanges. We focus on the 2006-2015 period when the first official 'Medium and Long Term Plan for National Science and Technology Development' stressing indigenous innovation was implemented, and leading government and party officials were not banned from working for outside companies. To analyse the impact of TMT political capital on firm innovation performance, we constructed a unique longitudinal database by merging data from the China Stock Market & Accounting Research (CSMAR) database with a variety of time-varying provincial institutional indicators and industry-level variables. The CSMAR database offers detailed information on firms' TMT political ties, patents and their characteristics, such as size, age and location. We collected information on their patent citations for the same period from the patent database of the China National Intellectual Property Administration (CNIPA), which is the most reliable and comprehensive nationwide database containing detailed information on all patents granted by CNIPA. All independent variables were lagged by two years (*t-2*) to avoid endogeneity problems. We were able to build an eight-year panel of 665 listed Chinese firms with 5,320 (665 x 8) observations. Table 1 reports the descriptive statistics and Pearson correlations of our study variables.

4.2. Measures

4.2.1. Dependent variable.

We measure a firm's *innovation performance* by its number of forward patent citations, operationalized as prior art citations made to the focal patent by subsequent patents (Trajtenberg, 1990). Prior studies extensively used patent counts as a measurement for firm innovation performance (Aghion et al., 2005). However, measuring only variations in patenting quantity may provide an incomplete account of firm innovativeness because there is substantial variance in invention quality and value (Trajtenberg, 1990). In any given year, for instance, two firms might be granted the exact same number of patents but in one case patents are of little or no value with regard to future patents, while in the other case patents are building blocks upon which future patents are created. Thus, computing a weighted patent count using forward citations allows us to effectively discriminate between high and low-quality patents and to better gauge variation in firm innovation performance. We collected patent citations for each sample firm until 2020 and used 2015 as the last observation year to avoid right-censoring problems.

4.2.2. Independent variables.

Political capital. We adopt the definition of a firm's political capital as the influence its TMT has with government decision-makers (Schugurensky, 2000). This form of political capital is accumulated through their experience, seniority and leadership positions (Mizruchi, 1992). Prior studies capture a Chinese firm's political capital by merely counting the presence, number and source of the political ties of its top management (Chizema et al., 2015; Zhang et al., 2016), with little attention paid to the strength of the influence, in particular the hierarchy and length of political capital. For example, the political influence of cadres working in the Chinese Communist Party and government organizations varies at different levels. Usually, the members of the Standing Committee of the Political Bureau of the Communist Party of China (CPC) and the Central Committee supersede all party members at other levels as the most

powerful political leaders. Companies whose top management used to be members in the Central Committee of the CPC may have accumulated greater political capital and become more powerful in political lobbying because of the higher political status of their staff, and certainly more powerful than those with only ties to local governors in the province-level governments. In a similar vein, companies whose CEOs used to be government officials for a longer period may have greater political acumen because of their greater political experience than those whose executives briefly worked in the government in the past. To effectively gauge a senior manager's political capital, we constructed a measurement that captures its hierarchical source and influence, in addition to quantity. To capture its hierarchy, we first identify a firm's top management, including the board of directors, who used to or currently serve as a cadre in the central government, provincial governments, legislative and/or military organizations. For each individual in this category, we collected information on his or her highest position held in these political organizations and the length of serving in this position in years. We further ranked their positions from 1 (no rank) to 17 (the top rank) according to the official ranking system adopted in the civil service and the military of China, which classifies cadres into subdivisions of 16 levels based on the positions they hold in the party or government. A detailed description of how we compiled the ranked data and their positions is provided in Appendix A. To capture their influence, we multiplied the weighted ranking of the position with the length of time each cadre or ex-cadre was in that position. Finally, to measured the total amount of political capital of a firm, we aggregated all the multiplicative interaction terms of the weighted ranking of the positions, and length, of its TMT members who are cadres or ex-cadres.

4.3.3. Moderating variables.

We collected information on marketization from the Chinese National Economic Research Institute (NERI) database (Fan et al., 2007; Wang et al., 2017). To capture the level of

marketization of commercial activities, we used the item from the NERI's marketization indices indicating the degree to which price is determined by the market. This item is a standardized index that is constructed based on the province-level average of the percentage of prices of resources and goods including factors of production, retail goods and agricultural products that are determined by market competition rather than governments (Fan et al., 2007; Wang et al., 2017). Thus, the index allows us to capture the extent to which commercial activities are self-disciplined by the market instead of the government. Likewise, we measured the level of *marketization of resource allocation* using the item from the NERI's marketization indices capturing the degree of reduced government intervention in resource allocation. This item is a standardized index that is reverse constructed based on the province-level average of the local government expenditure as a percentage of the provincial level GDP together with the difficulty of getting government approval for resource access and/or other support in terms of the complexity and inconvenience of the procedure, and the time senior managers spent dealing with government officials and/or regulators as a percentage of their overall working hours (Fan et al., 2007; Wang et al., 2017). Specifically, the smaller the proportion of provincial government expenditure in the local GDP, the greater the extent to which resource allocation is highly marketized. This is evidenced by the analysis of macroeconomic data of developed countries characterized by a highly marketized economy (Fan et al., 2007). The information used to calculate these indices during our sample period is gathered from separate surveys in Fan et al. (2007) and Wang et al. (2017). Both measures have been widely used in previous studies (Peng & Luo, 2000; Shi et al., 2012).

At firm level, we controlled for *innovation input* (R&D expenditure as a percentage of sales), *firm age* (in years), *firm size* (total sales logged), *market to book ratio* (the ratio of market price to net assets per share), *firm performance* (return on assets), *organizational slack* (the ratio of current assets to current liabilities), *diversification* (1= the firm operates in different

industries; 0 = otherwise) and *ownership* variations (1 = SOE; 0 = otherwise). We also controlled for a firm's *innovation capacity* by its cumulative number of patents since it was established, *industry effect* by industry dummies, *TMT size* by the number of top executives and *TMT skills* by the percentage of members in a firm's TMT with a postgraduate degree or higher in any given subject. We did not use their first degree as a threshold, because it is a basic qualification for positions at the top executive level in Chinese listed firms. At regional level, we introduced three province-level institutional and economic indices based on NERI's marketization indices: the level of *local government protection for intellectual property*, *the development of non-SOEs* and *GDP per capita of the province* where the firm is located.

4.3. Estimation methods

Our dependent variable, the number of forward patent citations, is a count variable taking on non-negative integer values with marked signs of over-dispersion relative to the Poisson distribution. To effectively account for the over dispersion in our dependent variable, we used the generalized estimating equation (GEE) with the negative binomial specification model to estimate firm innovation performance. Although the within-firm fixed effects allow us to effectively deal with the potential problem of the omitted variables, cross-province variations in our two marketization variables are one of the main focusses in our hypothesis-testing. The hierarchical structure of our dataset in which individual firms represent level one, and provinces represent level two, suggests the need to use multilevel models in our analysis. However, this approach cannot account for the correlation between firm-level variables and the province-level effect. To capture province-level variance caused by firm-level covariates, we used a one-stage random effect model with the inclusion of Mundlak instruments in Models 1-8 of Table 2, which are provincial specific average values of firm-level covariates.

Insert Table 1 about here

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5. Results

Table 2 reports the results from Mundlak one-stage random effect model in our Negative Binomial GEE regression analysis of firm innovation performance. Model 1 represents a baseline specification, including all control variables. Models 2, 3, 4 and 5 present the direct effect of the key independent variable, TMT political capital. Models 6 and 7 add each set of interaction terms, respectively. Model 8 is the full model comprising all the independent variables, moderators and their interaction terms.

Insert Table 2 about here

We find support for Hypothesis 1. In Model 5, the coefficient of the linear term of TMT political capital is negative and significant ($p<0.01$ in Model 5), suggesting that low and moderate levels of TMT political capital hinder firm innovation performance. The squared term of TMT political capital is positive and significant ($p<0.01$ in Model 5), indicating that the negative impact of TMT political capital on innovation performance diminishes up to a certain point. Once this point is passed, and firms have accumulated high levels of TMT political capital, their innovation performance starts to increase. Specifically, one standard deviation increase in the linear term of TMT political capital leads to 0.59 decrease in a firm's number of forward patent citations, whereas one standard deviation increase in the squared term of TMT political capital results in 2.91 increase in a firm's number of forward patent citations. We plotted the U-shaped effect of TMT political capital on innovation performance with 95 percent confidence intervals in Fig. 1 based on estimations presented in Model 5. As Fig. 1 shows, the innovation-enhancing effect appears at the inflection point of 4.66 level of TMT

political capital. This suggests that a firm has to accumulate more than 4.66 level of TMT political capital before being able to reap any of its innovation-related benefits. We further tested whether the U-shaped relationship between TMT political capital and innovation performance is mediated by resource access and competition in Appendix B, and obtained consistent empirical support for our prediction.

Insert Fig. 1 about here

Hypothesis 2 tests how the curvilinear relationship between TMT political capital and innovation performance varies given the degree of marketization of commercial activities. Model 8 in Table 2 shows that the coefficient of the interaction term with the linear effect of TMT political capital is positive and significant ($p<0.01$), but the interaction with its squared term is negative and significant ($p<0.001$). The results suggest that increasing marketization of commercial activities weakens the U-shaped effect of a firm's TMT political capital on its innovation performance. In line with Hypothesis 2, the marketization of commercial activities helps mitigate the disadvantages of lacking sufficient TMT political capital to obtain innovation-related benefits, in particular for firms with a moderate amount of TMT political capital. The graphs in Fig. 2 are plotted using the coefficients generated by Model 8.

Insert Fig. 2 about here

Hypothesis 3 proposes that increasing marketization of resource allocation influences the curvilinear relationship between TMT political capital and firm innovation performance. According to Model 8 of Table 2, the coefficient of the interaction term with the linear effect of TMT political capital is positive and significant ($p<0.001$), and the coefficient of the

interaction term with the quadratic effect of TMT political capital is negative and significant ($p<0.01$). These results indicate that the U-shaped effect of TMT political capital on innovation performance is weakened by increasing marketization of resource allocation, providing support for Hypothesis 3. More graphic support is provided in Fig. 3.

Insert Fig. 3 about here

To further distinguish between these two marketization dimensions and their impacts on the TMT political capital – innovation performance relationship empirically, we constructed a variable that captures the difference in the level or progress of marketization between commercial activities and resource allocation (DM) as follows:

$$\mathrm{DM}_i = \left| \frac{mc_i \times mr_i}{mc_i^2 - mr_i^2} \right|$$

Where mc_i and mr_i represent the levels of marketization of commercial activities and resource allocation in province i, respectively. The smaller the absolute value of DM_i, the greater the difference in the level of marketization between these two dimensions. We included this variable in our estimation and tested its moderating effect on the relationship between political capital and innovation. Our results in Table 3 suggest that the more synchronous (the less different) the progress of these two marketization processes are, the less pronounced the U-shaped relationship between TMT political capital and innovation performance is. The results also provide additional empirical support for our arguments on the patchy progress of market liberalization in China and its contingencies in the TMT political capital – innovation performance relationship.

We performed several robustness checks. First, we re-estimated the models using alternative measures for innovation performance, including overall patent counts and utility patent counts, and obtained results consistent with our main results (Appendix C1). Second,

we performed two separate estimations of our models using subsamples of SOEs and non-SOEs, with no significant differences identified (Appendix C2). Third, we re-estimated the models using the number of politically connected members as an alternative measure for TMT political capital. The results from our analysis show very similar patterns to our main results. Moreover, we further tested the impact of TMT political capital on types of innovation. Our results verify the assumption that the high-level reach of a firm's TMT political capital matters more than the low-level political connections to its innovation. Finally, to assess the direction of causality between TMT political capital and innovation performance, we set firm innovation performance as the independent variable and TMT political capital as the dependent variable, and tested the impact of this independent variable and its interaction with the moderating variables on TMT political capital with the lagging of all our independent, moderating and control variables for 1- 8 years. We found that none of these variables is significant, and the results are robust to longer lags, suggesting that reverse causality is of minimal concern in our data.

6. Discussion and conclusions

This study examines to what extent, and under what conditions, TMT political capital is beneficial to firm innovation performance. Using UET, we theorize and find empirical support for a U-shaped relationship between a firm's TMT political capital and its innovation performance. The findings suggest that firms have to be politically forceful in order to reap innovation-related benefits from political capital, otherwise capitalizing on political capital results in more harm than benefit with regard to their innovation outcomes, in particular for firms with moderate levels of TMT political capital. As predicted, TMT political capital enhances firms' access to critical resources for innovation, and compels them to fulfil government obligations through delivering superior innovation performance. Moreover, we

find that the U-shaped relationship between TMT political capital and firm innovation performance becomes less pronounced at high levels of marketization of commercial activities and resource allocation. This implies that both marketization of commercial activities and marketization of resource allocation constrain firms' exploitation of the innovation advantage of their TMT political capital.

6.1. Theoretical implications

Our study contributes to UET and the innovation literature in several important ways. First, this study complements existing UET studies and expands the scope of UET research by exploring the impact of the power which emanates from a TMT's prestige as cadres or ex-cadres on firm innovation outcomes. Extant research appears limited with a narrow focus on the innovation-enhancing effect of top executives' power within TMTs (Grams & Engelen, 2019). However, power within TMTs can be generated externally by their social attributes, specifically their personal prestige in the society. Top executives' standing in the political elite sends out powerful signals to other top executives about their personal importance (Useem, 1979). Prestige provides power by indicating that executives have exceptional qualifications and powerful external connections (D'Aveni, 1990), which determines the effectiveness of their boundary spanning activities and their associated interactions with external entities that are of consequence to firm performance (Collins & Clark, 2003; Geletkanycz & Hambrick, 1997). Our findings add important insights to this emerging literature by demonstrating that the power of politically connected TMTs determines the resource access that is critical to firms' innovation.

Moreover, we inform broader research on the social attributes of TMTs and their power derived from their social attributes. While TMT demographic attributes have been extensively researched as a predictor of strategic decision-making and firm outcomes (Hambrick & Mason,

1984; Collins & Clark, 2003; Jansen et al., 2008), executives' social attributes, such as their political engagement, also have a significant impact on firms' responses to changes in their environment (Jansen et al., 2008).

Second, our hypothesis and finding of a U-shaped relationship between TMT political capital and innovation corroborate and extend the theoretical predictions of UET in the context of a transition economy. On the one hand, persistent government intervention in economic activities makes top executives' interpersonal networks, such as their political connections, valuable for access to critical resources for innovation (Finkelstein, 1992; Geletkanycz & Hambrick, 1997). On the other hand, increased shift towards marketization stimulates political capital deficit firms to make more effective use of executives' individual talents, such as their knowledge and expertise, to keep up with their political capital flush counterparts in innovation (Finkelstein & Hambrick, 1996; Hambrick & Mason, 1984). Prior studies argue for the positive impact of political capital on firm innovation performance primarily based on the dominance of political forces in transition economies (Kotabe et al., 2017; Zhang et al., 2016; Xia et al., 2014). Our prediction and finding of the diminishing innovation performance returns of TMT political capital provides theoretical and empirical support for the coexistence of both political and market forces that drive the relationship between TMT political capital and innovation. Linking the dual forces in the overarching context of UET reveals that firms with the least competitive advantage in innovation are those stuck-in-the-middle with moderate levels of political capital, who are not entirely subject to a strong market incentive to innovate but lack sufficient TMT political capital to secure access to critical resources for innovation. The conflicting demands of market transition and government intervention make it challenging for ambidextrous firms to achieve synergies by devoting resources and efforts to leveraging both political capital and market competition (Zhou et al., 2017). It is highly unlikely that firms will be able to maximize the innovation benefits of both mechanisms simultaneously due to the

fundamental incongruity between the principles of market economies and government intervention (Kornai, 1990). Thus, our findings shed light to the broader theoretical context that explains how these mechanisms relate to each other as a dual set of driving forces of firm innovation.

Third, prior studies adopted an inside-out approach to examine political capital as a means for firms to overcome the external environmental constraints to innovation in transition economy settings. In particular, it is widely acknowledged that the possession of such resources allows firms to effectively compensate for weak institutional and market environments, such as inefficient legal enforcement, lack of government support, and high levels of technological uncertainty and turbulence (Danis et al., 2010; Wang et al., 2015; Li et al., 2013). However, how the institutional environment affects firms' exploitation of the innovation-related benefits of their political resources has been overlooked in the innovation literature, with only a limited number of studies looking at the contingency effect of firm specific moderators, such as absorptive capacity and managerial time investment in nurturing political ties (Kotabe et al., 2017). The institutional environments within which firms operate vary considerably across national boundaries, depending on the role the government plays in organizing economic activities, which may influence the importance of political capital for firm innovation performance. In the USA, the government has been seen as playing an enabling role in shaping the industry environment and encouraging entrepreneurship, with intervention limited to creating conducive institutional conditions (Wolter, 2003). Therefore, the possession of more political capital than others does not give firms any advantage in innovation, as the market rather than political mechanisms provides the preferred signaling and resource allocation mechanism enabling innovation to flourish (Dunning, 1997). In countries such as China, the government acts as an industry organizer or coordinator through policy initiatives such as 'the state advances, the private sector retreats'. Here, the function of the government is as an

initiator and overseer of the economic system which sets the legal and institutional framework within which the resources and capabilities in its jurisdiction are created and deployed (Wu, 2013). Therefore, maintaining a good relationship with the government gives firms a greater competitive edge in accessing resources and capabilities crucial to their innovation. Our study supplements the innovation literature by taking an outside-in approach to highlight contingencies where the institutional environment, such as the politicization of market mechanisms, shapes the relationship between firms' political resources and innovation performance.

Finally, we also advance theoretical understanding of institutional transition by drawing attention to the variations in the trajectory of the process of marketization, in particular the patchy progress of market liberalization in China and its contingencies in the TMT political capital – innovation relationship. Most theories on institutional transition were developed based on the trade-off instead of the ambidexterity between marketization and government intervention, with an exclusive focus on the openness of the market or free market competition (Li et al., 2013; Shi et al., 2014). The underlying assumption is that the openness of the market or free market competition is accompanied by relinquished direct government control over resource allocation in the marketization process. This is evidenced in countries where marketization has been accompanied by political upheaval such as the overthrow of a dictator in Romania or the collapse of the government in the Soviet Union. However, in practice, the marketization approach varies substantially across different transition economies. In countries such as China and Vietnam, for example, free market competition has been adopted by incumbent governments, but with little interest in eschewing their control (Naughton, 2007). Although this unique phenomenon has been acknowledged, prior studies tend to take a crude count of government intervention and marketization in general (Park et al., 2006; Xia et al., 2014). The mechanisms through which the government influences firms' innovation

performance have not yet been thoroughly examined. Understanding of these mechanisms, however, is of crucial importance for firms, not only in order to effectively lobby for government protection, law changes and/or instituting new laws, but also to determine how best to maximize the innovation-related benefits of their TMT political capital. Our study helps address this gap by explicitly examining the moderating effects of different dimensions of marketization (marketization of commercial activities and marketization of resource allocation) on the TMT political capital – innovation relationship.

6.2. Managerial implications

Managers should avoid putting firms in a stuck-in-the-middle scenario, with neither sufficient capacity to exploit the innovation-related benefits of their TMT political capital nor enough capability to innovate based on market competition. Instead of being over concerned with their weakness, firms should focus on their strengths in order to enhance innovation performance. If a firm does not have the political astuteness and capacity to exploit the innovation-related benefits of their TMT political capital, the best bet for managers would be to maximize the benefits of market-based strategies, such as strategic alliances and diversification. Also, managers could enhance their innovation performance and relocate their R&D operations in provinces where there is both a highly competitive market and a low level of government intervention in the resource allocation process, such as those provinces or municipalities along the Southeast coast of China. Equally, political capital flush firms are more likely to stand out in the innovation race if the managers of such firms focus on maximizing their political influence to secure access to critical and scare resources for innovation and locate their R&D centres in provinces or municipalities near the Central and Northeast regions. It is worth noting that the insights gleaned from the main effect of our analysis are not unique to China. Politicians often confer benefits to connected firms across

various institutional settings, with rich empirical evidence derived from countries ranging from liberal market economies such as the United States (Brogaard & Duchin,2017; Goldman et al., 2013), coordinated market economies such as Germany (Ferguson & Voth, 2008; Lehmann-Hasemeyer & Opitz, 2019), to other transition economies such as Russia (Trifonov, 2021; Klarin & Sharmelly, 2021).

6.3. Limitations and future research

Our study is subject to a number of limitations which open potential avenues for future investigation. First, our main focus in this study is radical innovation in terms of invention; although we find consistent results on incremental innovation measured by a firm's number of forward patent citations of utility patents, it is likely that TMT political capital may have a differential impact on incremental innovation. Future studies should validate these predictions by distinguishing between the impact of TMT political capital on different types of innovation, using measures other than forward patent citation counts. Second, we focus on China, whose institutional transition and basic constitutional elements are distinct from other transition economies, such as the Eastern European bloc countries. Future research could compare and contrast the different mechanisms that drive the relationship between TMT political capital and firm innovation performance in China and other transitional economies in dissimilar transition trajectories, such as Russia and Eastern European economies with a less regulated style, and/or economies at different phases of transition, such as Iran and Mongolia. Another fruitful avenue for future research would be to explore other potential boundary conditions which can help effectively unravel the underlying mechanisms for the TMT political capital – innovation performance relationship. Finally, given that our sample only includes listed firms traded on the Shanghai and Shenzhen Stock Exchanges in China, it is difficult to generalize our findings to firms in different categories. Empirical analyses using data from other populations and

geographical settings with a more thorough estimation of the effect of confounding variables are needed to validate and generalize the U-shaped relationship between TMT political capital and innovation performance.

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