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## The effect of institutional ownership on firm innovation: Evidence from Chinese listed firms

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### ABSTRACT

Monitoring by institutional investors can act as an important mechanism to promote firm innovation. By investigating the patenting behavior of Chinese listed firms between 2002 and 2011, we find that the presence of institutional investors enhances firm innovation. Consistent with this monitoring view, we further find that (1) the effect of institutional investors on firm patenting mainly comes from mutual funds; (2) the effect is more pronounced when product market competition is more intense; (3) the effect exists among private- and minority state-owned enterprises, but not among majority state-owned enterprises. The above findings remain robust when innovation quality is examined.

### 1. Introduction

Ownership structures play an important but complicated role in the level of innovation in listed firms, which account for a large proportion of private R & D (research and development) expenditures. On the one hand, listed firms have a natural advantage in conducting innovation because the high risk associated with innovation can be spread across a large number of shareholders. On the other hand, with dispersed ownership, innovation in listed firms may be stunted due to agency problems. For example, since innovation activities are associated with high risks, the concern about being fired when innovation fails might discourage managers from investing in R & D (Kaplan and Minton, 2006; Aghion et al., 2013). Meanwhile, another agency problem emerges in transition economies such as China where state ownership remains a key element of corporate governance. Managers in state-owned enterprises (SOEs) have few incentives to enhance firm competitiveness through innovation as these public employees do not benefit much from R & D but have to bear its costs such as innovation risks and the outrage of laid-off workers (Megginson, 2005). With the

presence of the state as a shareholder, the influence of ownership structures on innovation in listed firms is further complicated. This paper focuses on a specific force of external governance on innovation—ownership by institutional investors—and how it interacts with state ownership by examining the patenting behavior of Chinese listed firms between 2002 and 2011.

The relationship between institutional ownership and firm innovation has been examined and found to be positive by several studies on US listed firms (e.g., Francis and Smith, 1995; Bushee, 1998; Eng and Shackell, 2001; Aghion et al., 2013). However, such a relationship has rarely been examined in a transition economy, where ownership structures of listed firms are substantially different from those in developed economies. Unlike US listed firms, which are characterized by dispersed ownership and well-developed institutional investors, Chinese listed firms are characterized by concentrated ownership (e.g., state ownership) and an emergence of institutional investors.<sup>1</sup> This paper contributes to the existing literature by documenting the relationship between institutional ownership and firm innovation in China, the largest emerging economy in the world.

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<sup>1</sup> Similar to other transition economies, China's institutions are under-developed. Despite its startling economic growth, China is one of the worst countries regarding property rights protection (La Porta et al., 2004).

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On average, state shares make up about one-third of total shares for Chinese listed firms. The strong presence of state ownership in China results in the coexistence of two types of listed firms, SOEs and non-SOEs. There is some evidence to support Megginson's (2005) argument that SOE managers have few incentives to innovate (e.g., Hu and Jefferson, 2009; Lin et al., 2010; Boeing et al., 2016). However, it is so far unclear, both theoretically and empirically, how state ownership affects the relationship between institutional ownership and firm innovation, and through which channel. This paper attempts to fill this gap.

As discussed in the literature, active monitoring carried out by institutional investors can act as an important mechanism to promote firm innovation. We expect that this positive effect should be more pronounced in China, where the scattered shares that institutional investors (e.g., mutual funds) pool together used to be held by individual investors, who generally free ride on monitoring. To further motivate our research, we turn to the "career concern" hypothesis, first proposed by Holmstrom (1999) and then tested by Aghion et al. (2013). Specifically, CEOs may be concerned that once involved in innovation they will expose themselves to the risk of being fired for innovation-related stochastic reasons. Active monitoring by institutional investors may help to identify these stochastic reasons, thereby motivating CEOs to innovate (Aghion et al., 2013).

We postulate that compared to non-SOEs, the manager market of SOEs is less competitive due to the bureaucratic arrangement in the SOE system. Ranked as government officers, the appointment of CEOs in SOEs is very selective, and the candidates are generally selected from a pool of current government officers and SOE top management. Given this relatively small pool of qualified candidates, CEOs in SOEs may hold leading positions even though they are not qualified for business administration. According to the career concern view, the incentive for institutional investors to engage in active monitoring should be reduced since firing an unqualified CEO is a major benefit of monitoring, and this benefit vanishes if it is unlikely that such a CEO will be replaced. We thus postulate that the positive effect of institutional ownership on firm innovation should be weakened when the factor market for managers is less competitive as in the case for SOEs.

To generate a convincing proxy for firm innovation, we collect listed firms' patenting records. It is well acknowledged that patents are heterogeneous in quality. We address the quality issue in two ways. First, to generate firms' patent counts, we only count invention patents, which have the highest standards of novelty and technological inventiveness among the three types of patents granted by the SIPO (State Intellectual Property Office) of China. Second, we turn to forward citations to measure the quality of innovation output.

By regressing listed firms' patent counts on institutional ownership with control for other influential factors as well as year and industry fixed effects, we find that the effect of institutional ownership is significantly positive. The relationship persists when we control for R & D investment, suggesting that the positive effect of institutional ownership is mainly realized through improving R & D productivity. By examining different types of institutional investors, we further find that the positive effect of institutional ownership can be attributed to mutual funds but not to the remaining domestic institutional investors. It is consistent with Chen et al.'s (2007) finding that "independent" institutional investors such as mutual funds tend to collect information and carry out active monitoring. Moreover, we find that QFII (Qualified Foreign Institutional Investor) ownership has a positive effect, but this effect relies on the presence of mutual funds.

One may be concerned about reverse causality; that is, institutional investors may tend to invest in firms with more innovation. Our study is less subject to this endogeneity problem compared to the US case. As a developed economy, in the US institutional ownership is already stabilized, and its variations result largely from institutional investors adjusting their portfolios. In contrast, as a transition economy, in China institutional ownership increased from around 1% in 2001 to over 25%

in 2010, and this surge was largely driven by government policy. To further mitigate the endogeneity concern, we show that even the exogenous increase in a firm's institutional ownership following its inclusion into the stock index has a positive effect on patenting. This is particularly the case for mutual fund ownership. Additionally, the positive effect persists when we address endogeneity by using firms' "internal instruments" based on GMM (Generalized Method of Moments) estimations. Overall, we confirm a causal and positive effect of institutional ownership, particularly mutual fund ownership, on firm patenting.

Stronger product market competition tends to increase the risk of imitation by competitors, thus making CEOs more concerned about their career when carrying out innovation projects. The career concern hypothesis thus predicts a stronger effect of mutual funds on firm innovation when product market competition intensifies. Consistently, we find that the effect of mutual funds on firm patenting is more pronounced when market competition is more intense.

Further examinations reveal that the positive effect of mutual funds on firm patenting is more pronounced among POEs (private-owned enterprises with zero state ownership) than among either minority SOEs (enterprises with positive state ownership but not more than 50%) or majority SOEs (enterprises with more than 50% state ownership). Moreover, all our major results persist when we use citation counts instead of patent counts to measure firms' innovation output. Particularly, for majority SOEs, while mutual funds have a weak impact on the quantity of innovation (i.e., patent counts), there is no impact on the actual quality of innovation (i.e., citation counts). Overall, we conclude that mutual funds enhance firm innovation both quantitatively and qualitatively for Chinese POEs and minority SOEs, but not for majority SOEs.

We regard our study as an important complement to studies on institutional ownership and firm innovation. It contributes to this strand of the literature in three ways. First, instead of investigating another developed economy, we provide new evidence on the positive relationship between institutional ownership and firm innovation in a transition economy. Second, by examining POEs, minority SOEs, and majority SOEs separately, we highlight the important role that the competitiveness of the manager market plays on firm patenting through the career concern channel. Third, we are among the first to document the heterogeneous effects of different types of institutional investors (i.e., mutual funds, QFIIs, and other domestic institutional investors) on firm patenting.

This paper is closely related to the burgeoning literature on corporate governance and firm innovation in China. By examining Chinese listed firms between 2001 and 2004, Choi et al. (2011) find that foreign ownership and business affiliation are positively related to firm patenting. In a similar vein, Shapiro et al. (2015) investigate small and medium-sized enterprises (SMEs) in China and find that corporate governance and ownership are significantly associated with firm patenting. However, the actual causality has not been well established so far. Our study attempts to fill this gap by using a more updated and representative sample of listed firms compared to earlier research. Additionally, our study explores the relationship between institutional ownership and firm innovation more rigorously and allows for a more causal interpretation.

This paper also enriches the literature on state ownership and firm innovation in China. Consistent with Megginson (2005); Hu and Jefferson (2009) document that patenting propensities are much lower in SOEs than in private firms; Lin et al. (2010) find that government ownership and its intervention in CEO appointments are negatively related to firms' R & D activities; Boeing et al. (2016) show that POEs experience higher returns on productivity from R & D than SOEs. Our study shows that the positive effect of institutional ownership on firm innovation barely exists among majority SOEs, suggesting that majority SOEs may stunt their innovation by insulating external governance from monitoring.

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