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Do Blockholder Incentives Matter? Evidence from Firm Innovation*

Ching-Hung Chang♦
Department of Finance and Center for Research in Econometric Theory and Applications, National Taiwan University
Yung-Ling Chi♣
Department of Finance, National Chung-Hsing University
Wesley Kuo♥
Department of Finance, National Chung-Hsing University
Stephanie Tsui♠
Department of Accounting, National Chengchi University

We examine whether short-term institutional investors affect firms' innovation. We find that firms with greater concentration of transient and quasi-indexer institutional investors are associated with lower innovation performance. The result is robust to a difference-in-differences test that exploits the positive liquidity shocks brought by the decimalization in 1997 and 2001. The negative effect is

「政策與管理意涵」
本研究發現，企業股權結構對於其創新績效有實質影響，故可作為制定促進企業創新政策時之依據，由調整企業股權結構面加強企業創新的動機。

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♦ National Taiwan University; Department of Finance and Center for Research in Econometric Theory and Applications, No.1, Sec. 4, Roosevelt Rd., Taipei City 106, Taiwan (R.O.C); chinghungc@ntu.edu.tw
♣ Corresponding author. National Chung-Hsing University; Department of Finance, No. 250 Guoguang Rd., Taichung City 402, Taiwan (R.O.C); ylchi@nchu.edu.tw
♥ National Chung-Hsing University; Department of Finance, No. 250 Guoguang Rd., Taichung City 402, Taiwan (R.O.C); kwes4082@gmail.com
♠ National Chengchi University; Department of Accounting, 7F., NO.64, Sec.2, ZhiNan Rd., Wenshan District, Taipei City 116, Taiwan (R.O.C); stsui@nccu.edu.tw

strengthened when managers' own wealth is more sensitive to the stock price but mitigated when the firm has sound corporate governance. In addition, firms with concentrated short-term investors are less likely to engage in explorative innovation. Overall, our findings support the view on institution-induced investment distortion.

Key Words: Institutional investors, Myopic behavior, Innovation, Investment horizon.

JEL: G20, G34, O31

Introduction

Corporate innovation performance heavily relies on manager incentives. Manso (2011) shows that the explicit contract to motivate innovation should exhibit tolerance for early failure and reward long-term success. Tian & Wang (2014) provide evidence that the innovation performance of venture capital-backed IPO firms varies with the incentives of their VC investors. However, innovation performance can be largely shaped by managerial incentives when managers' rewards or careers are tightly tied to stock performance. In particular, when a cluster of institutional investors holds a large part of a firm's equity, the investment strategy pursued by such investors can easily influence stock prices. Institutional investors can affect management decisions by either actively voicing their concerns or passively threatening to vote with their feet (McCahery, Sautner, & Starks, 2016). This situation has not caused problems in the past when institutional investors did not constitute an important stake on the buy-side.[1] However, with the increasingly greater presence and impact of institutional investors on the market, managers have become more likely to cater to institutional investors' interests, and conflicts arise when these blockholders adopt investment strategies that are not in line with maximizing the firm's long-term value (Bushee, 2001).

Early findings on institutional ownership-induced myopic behavior, for example, Bushee (1998), show that managers are more likely to cut R&D as a costly means of earnings manipulation to avoid earnings disappointments. Given the increase in institutional ownership in the 1990s, myopic behavior should be

1 In 1950, institutional investors owned 8% of the equity in the United States. By 1988, twenty intuitional investors held more than 34% of the outstanding shares in the Standard & Poor's 500 Index. That percentage grew to 53% among the top one hundred U.S. corporations by 1991 (Coffee, 1991). The rising trend of institutional ownership is astonishing.

more pronounced. However, this argument does not stand without challenges. Wahal & McConnell (2000) find a positive relation between both R&D and PP&E expenditure and the fraction of shares owned by institutional investors. They argue that the good-performing U.S. economy and technological breakthroughs in the 1990s provide support for the positive impact of the prevalence of institutional investors. More recently, Aghion, Van Reenen, & Zingales (2013) show that a positive relation can exist between institutional ownership and innovation. Later, Helling, Maury, & Liljeblom (2020) find the positive relation increases in the firm's liquidity and support the view that actively trading on private information by the blockholders mitigates managerial myopia. We attempt to further the understanding of the real impact of blockholders from the perspective of the investors' incentives induced by their investment strategy. Specifically, we ask whether myopic behavior is associated with the predominating ownership of institutional investors with earnings-based trading behavior. However, as Edmans & Holderness (2017) emphasize in a recent survey, blockholding position may arise when institutional investors find it easier to achieve their desired outcome. In this paper, we focus on addressing the endogenous nature of blockholding. We establish the causal inference by exploiting the positive liquidity shock induced by the decimalization policy using the difference-in-differences framework. The positive liquidity creates variation in the formation of blockholders with different investment horizons (Edmans, 2009; Edmans, Fang, & Zur, 2013) and thus enables us to isolate the effect of institutional investors' incentives. The topic is of particular interest to the policy-makers who target economic growth, as they can improve innovation performance in the economy through altering regulatory policies in the capital market.

Large institutional investors tend to convey their incentives by actively voicing or passively threatening (Edmans & Holderness, 2017; McCahery et al.,

2016). A long-term-oriented institutional investor is willing to support the manager's job security when innovation activities create additional uncertainty (Aghion et al., 2013).[2] However, an institutional investor who focuses on the short term and is more concerned about stock liquidity is less likely to support the manager's career (McCahery et al., 2016). Thus, if short-term investors own a large stake of a firm's stock, managers may become more averse to uncertainty and invest less in innovation.

However, a fundamental premise is that institutional investors should have a sufficient share of ownership to generate incentives as well as a sizeable impact on moving the stock prices. Intuitively, institutional investors with controlling stakes are more likely to trigger credible threats. Small transient investors typically lack the control right to influence corporate management and have to "vote with their feet", but their threat of exit is not credible if the sale of stocks is not likely to suppress the stock price. Considering general institutional holders without distinguishing the size of their stakes may add noise to our inference when a large number of heterogeneous small institutional owners are present. Therefore, our analysis focuses on the blockholders who own more than 5% of the firm's shares, as defined by the Securities Exchange Act of 1934 (SEA). To begin with, following Bushee (1998), we identify the type of institutional blockholders as transient, quasi-indexer, and dedicated based on their investment horizon derived from the holding size, portfolio turnover, and trading sensitivity. Porter (1991) notes that transient and quasi-indexer investors prefer near-sighted investment strategies. In addition, Bushee (1998) finds that this type of institutional investor is persistent, while transient and quasi-indexer investors are likely to switch between both types. Therefore, we further classify blockholders

2 Chen, Cheng, Lo, and Wang (2015) find that managers who are protected by employment contracts are less likely to cut R&D expenditures in order to avoid earnings decreases and are less likely to engage in real earnings management. This finding supports the view that managers' career concern is an important motive for risk-taking.

into two groups: “near-sighted,” which includes both transient and quasi-indexer investors, and “dedicated,” which includes all others. We find a significant negative relation between the level of ownership stake of near-sighted blockholders and subsequent innovation performance. A one-standard-deviation increase in near-sighted blockholder ownership is associated with an approximately 4% decrease in the number of patents and a decrease of 3.55% to 4.02% in the citations received by these patents.

To address the endogeneity issues, we employ a difference-in-differences test that exploits the positive liquidity shock brought by changes in tick size in 1997 and 2001 (Bessembinder, 2003; Furfine, 2003). The liquidity shock generates exogenous variation in institutional ownership. Increased liquidity allows the investors with high portfolio turnover to profit from aggressive trades and thus increases the strength of the formation of the near-sighted blockholders. However, it does not affect the dedicated investors who do not intend to frequently trade the stocks. We find that a one-standard-deviation increase in near-sighted institutional blockholdings corresponds to a 2.51% (2.5%) decrease in the number of patents after the liquidity event in 1997 (2001). Hence, this identification strategy provides evidence that the relation between near-sighted blockholding and innovation is causal, which strengthens our baseline findings. Overall, our evidence is consistent with the view that the concentration of near-sighted institution ownership may generate investment distortion.

Next, we strengthen our evidence by examining the possible mechanisms. The main implication of the hypothesis is that the baseline relation should be strengthened when the governance environment is too weak to contain managerial misbehavior. Therefore, we measure the strength of the governance environment from the managers’ perspective in that governance is ineffective when the manager is under greater pressure to meet earnings targets or is less effectively monitored. First, by classifying firms into sub-samples in terms of the

sensitivity of managers' compensation to stock prices (Delta), we find evidence consistent with our hypothesis that managers may deviate from value-maximizing strategies in the presence of near-sighted block shareholders. Secondly, we show that strong internal or external corporate governance weakens the investment distortion. Specifically, we find that the baseline relation diminishes when firms have more independent directors. Further, since institutional investors may also interact with each other (Edmans & Holderness, 2017) and long-horizon institutional investors are more likely to influence management (Chen, Harford, & Li, 2007), we also split the sample by the presence of dedicated blockholder. Consistent with the prediction, we find that the deterioration of innovation performance in the presence of near-sighted institutional blockholders diminishes when the firm has an independent and dedicated institutional investor. On the other hand, product market competition has been recognized as a source of external governance (Aghion, Bloom, Blundell, Griffith, & Howitt, 2005; Giroud & Mueller, 2011), as managers may face the threat of losing their job if they do not take the optimal action when competition is strong. As expected, we find that the negative effect on innovation performance is weakened when the firm faces more intense market competition. Overall, the cross-sectional variation of the influence of the short-term blockholders in managerial incentive and corporate governance further lends support to our primary hypothesis.

Next, we explore whether firms' innovation strategies change in the presence of near-sighted blockholders. Near-sighted investors may prefer a quicker resolution of uncertainty, that is, innovation that modifies or improves existing technologies (Hellmann & Puri, 2000; Manso, 2011), while explorative activities involve new and untested actions that generate more variability in patentable outputs. Consistent with our conjecture, we find that a greater level of near-sighted institutional blockholders is strongly associated with lower

patenting volatility and a smaller portion of product patents. Overall, these results support the presence of short-term institutionally induced myopia. Lastly, we present several robustness tests to support our main results. First, since there are firms that do not conduct innovation activities, we show that the main result still holds conditioning on the sample of firms that engage in innovation activities. Second, we address the missing R&D problem as proposed by Koh & Reeb (2015). In our main analysis, missing R&D is replaced by zero. In the robustness tests, we follow the methods used in Koh & Reeb (2015) replacing the missing R&D with the industry average and include either a missing R&D indicator or a pseudo-blank R&D indicator, or both. The robustness tests confirm that the baseline relation is robust to different treatments of missing R&D. Last, as the literature suggests other factors that could affect innovation performance, such as analyst coverage (He & Tian, 2013) and product market competition (Aghion et al., 2005), we show that our result is robust to controlling these variables.

Our paper is closely related to Helling et al. (2020). They find that a positive relation exists between blockholders and R&D investments when stocks are liquid and conclude that blockholders can constrain managerial myopia by trading on private information. However, our study differs in both the focus and scope. In their study, blockholders' incentives are assessed by their size, i.e. small blockholders have a shorter investment horizon, while we measure blockholders' incentives by their portfolio turnover. This gives us a better standpoint in addressing the incentives of the investors. Second, our study extends the scope by covering all U.S. public firms, while their empirical test is based on a sample of S&P 500 firms. Additionally, instead of R&D investments, we measure innovation performance based on its outcome. Last, their conclusion relies on the sensitivity of the impact of blockholders' ownership in stock liquidity. This does not address the possibility of reverse causality such that

blockholders who favor greater innovation outcome choose to invest in more liquid stocks. In contrast, we isolate the effect of ownership change on the near-sighted blockholders by exploiting a positive liquidity shock. Due to these differences, our result is different from theirs but similar to that of Fang, Tian, & Tice (2014). However, we also distinguish our study from that of Fang et al. (2014). They argue that increased liquidity attracts short-term institutional investors, and thus lowers the firm's innovation. While our finding is consistent with theirs, we add to the literature by providing evidence on possible mechanisms in an alternative perspective. In contrast to their focus on increased takeover threat, our mechanism relies on whether a greater proportion of near-sighted blockholding weakens the corporate governance environment. By showing that the negative impact of near-sighted blockholders is enhanced when governance structure is weak, our finding also suggests that a sound governance mechanism may alleviate the effect. Thus, our result adds to the literature by its policy implication that strict regulation on governance structure can enhance innovation in a liquid market. Overall, our study contributes to the current literature by generalizing the results using a large sample that incorporates all public firms in the U.S. and establishing causal evidence of the influence of blockholders' investment horizons.

In the next section, we discuss the existing literature and develop our hypotheses. Section 2, describes the data and the construction of variables and provides descriptive statistics. We present our main results based on the baseline model and identification strategy in Section 3, Sections 4 and 5. present extended analyses and additional robustness checks. Section 6 concludes the paper.

1. Related Literature and Hypothesis Development

1.1 Related Literature

Our paper is related to the broad literature on the effect of institutional investors on firm policies. Specifically, we contribute to studies on institution-induced myopia (Bebchuk & Stole, 1993; Bushee, 1998; Narayanan, 1985). However, Wahal & McConnell (2000) argue that the evidence on managerial myopia is inconsistent with the economic growth trend in the 1990s, and later studies also find that institutional ownership improves innovation by protecting managers from career failure (Aghion et al., 2013), promoting knowledge spillovers (Luong, Moshirian, Nguyen, Tian, & Zhang, 2017) or protecting firms from hostile takeovers (Atanassov, 2013). Especially, our findings complement Aghion et al. (2013)'s theory as short-term institutional investors may not be able to provide the career protection that is required to motivate managers to innovate. In this study, we emphasize the importance to distinguish the type of influential blockholders when assessing their impact on innovation performance and contribute to the literature by reconciling the mixed empirical evidence in prior studies. In general, our evidence suggests that investment horizon has to be considered when evaluating whether institutional investors distort or support value-maximizing decisions.

We also contribute to research on corporate innovation that distinguishes innovation strategies between exploration and exploitation (Ferreira, Manso, & Silva, 2014; Manso, 2011). Gao, Hsu, & Li (2014) study the innovation strategies of public and private firms and find that firms whose CEOs have a short-term focus are associated with more exploitative and less exploratory innovation. However, they classify public firms as having a short-term focus based on the

degree to which these firms are exposed to takeovers. In contrast, we are interested in how shareholders' incentives affect corporate innovative strategies. Our findings, therefore, complement previous findings by suggesting that capital market pressure may slow down technology breakthroughs.

1.2 Hypothesis Development

Prior studies hold the view that institutional investors may positively influence innovation activities. On one hand, the presence of institutional investors can prevent managers from diverging from suboptimal decisions, such as cutting innovation activities, by effective monitoring through either actively voicing or passively threatening (Edmans & Holderness, 2017; McCahery et al., 2016). Alternatively, Aghion et al. (2013) show that institutional investors induce managers to innovate by providing a buffer against negative shocks that may result from the uncertainty generated by innovative activities. Competing with the view of the bright side of institutional investors, researchers also argue that institutional investors emphasize on short-term trading gains may have high portfolio turnover and engage in momentum trading behavior; therefore, they are under great pressure to show positive short-run return (Jacobs, 1991; Porter, 1991). Hence, should long-term value-enhancing activities, such as innovation, and its related expected outcomes not align with these investors' interests, the stock price may fall owing to the institutional selling of shares.

More importantly, studies show that managers are often sensitive to stock price performance and may sacrifice long-term projects for meeting earnings targets. For example, Graham, Harvey, & Rajgopal (2005) find that 78% of executives sacrifice long-term value to meet short-term earnings benchmarks in order to maintain stock prices. He & Tian (2013) show that analysts exert pressure on managers to meet short-term goals and therefore impede firm investment in long-term innovative projects. Cheng, Subramanyam, & Zhang

(2005) find that firms issuing earnings guidance frequently invest significantly less in research and development (R&D) than those issuing guidance occasionally. By influencing stock price through block selling, large institutional investors can instill their preference to managerial decisions by threatening to exit (Edmans & Holderness, 2017; McCahery et al., 2016). However, their incentives to engage in long-term investments depend on their investment horizon. A long-term-oriented institutional investor is willing to support the manager's job security when innovation activities create additional uncertainty (Aghion et al., 2013). Alternatively, the investor can also monitor managerial decisions when the manager's incentives do not sufficiently align with those of the shareholders and deviate from the optimal choice. However, an institutional investor who focuses on the short term and is more concerned about stock price may intervene in corporate decisions less intensively (McCahery et al., 2016). As a result, the short-term oriented investor either provides less support for the manager to take on risky investments or fails to monitor the manager who tends to misbehave. Thus, if short-term investors own a large stake of firms' ownership, managers may become more averse to uncertainty and invest less in innovation. Based on these arguments, we form the following hypothesis:

Hypothesis 1: A firm's innovation performance decreases with the level of institutional ownership by near-sighted blockholders.

In addition, investment distortion occurs when managers' self-interest is in line with that of large, near-sighted shareholders. This happens when the manager's compensation is closely tied to the short-term stock performance. While compensation is structured to align managerial incentives with that of the shareholders, vesting periods are often not sufficiently long to curb myopia in practice (Kole, 1997). It is also shown that managers require a higher risk premium if they are exposed to long-term risk (Edmans, Fang, & Lewellen, 2013). Therefore, it is expected that the negative impact of near-sighted

institutional blockholding on innovation performance deteriorates when the manager's compensation or wealth is more sensitive to the stock price.

On the other hand, even though near-sighted institutional ownership leads to myopic decisions, corporate governance should correct, if not rectify, such actions. Prior studies show that the board of directors plays a fiduciary role in monitoring managerial decision-making (Adams & Ferreira, 2007). For example, evidence suggests that the presence of independent directors can effectively mitigate management entrenchment and reduce expropriation (e.g. Nguyen & Nielsen (2010), Kim, Mauldin, & Patro (2014), Armstrong, Core, & Guay (2014), Harford, Mansi, & Maxwell (2008)). In addition to the internal governance, when the manager is more likely to be penalized, either in the form of lower monetary compensation or job replacement, he is less likely to deviate from a value-enhancing investment strategy. For example, Giroud & Mueller (2011) suggest that product market competition serves as a form of external governance because the firm may easily lose its competitive advantage if it does not conform to the optimal strategy. The fact that there are more competitors suggests that there is a greater supply of managerial talents of similar expertise, which implies that it is easier for the manager to be replaced when the firm performance is not as expected. Based on the above discussions, we expect that the negative impact of near-sighted blockholding on innovation is alleviated in the strength of both internal and external corporate governance. Therefore, we build our second hypothesis on the cross-sectional variation of the impact imposed by near-sighted blockholding as follows:

Hypothesis 2: The negative effect of near-sighted institutional blockholder ownership on innovation performance is stronger when managers' wealth is sensitive to the stock price and is weaker when corporate governance is strong.

However, innovation activities can be either explorative or exploitative, and the former involves more untested procedures and highly uncertain outcomes

(Manso, 2011). It is shown that investors who can tolerate early failure and reward for long-term success are more likely to encourage explorative innovation (Tian & Wang, 2014). In addition, Gao et al. (2014) find that public firms' patents are less exploratory and more exploitative than those of private firms, and they attribute their findings to pressure from the capital market. Xu, Wang, & Cheng (2015) document that the presence of blockholders is associated with less explorative innovation. Since the near-sighted blockholders have a quick portfolio turnover and short investment horizon, their presence is more likely to impede explorative innovation, which forms our third hypothesis:

Hypothesis 3: The presence of near-sighted institutional blockholders is associated with fewer explorative innovation activities.

2. Data and Empirical Design

2.1 Data

We use Thomson Reuters Institutional (13f) Holdings data to calculate institutional holdings and organize institutions into various types based on Bushee's classification.[3] Patent and citation data are obtained from the National Bureau of Economic Research (NBER) patent database. We then merge our data with Compustat to acquire the accounting information for each firm. Hence, our sample represents the intersection of institutional holdings data, patent data, and Compustat firm data. We include firms with zero patents to mitigate potential sample selection bias. Additionally, we exclude firms in the financial and utilities industries owing to their special financial requirements and regulations. Our final sample comprises 76,858 firm-year observations for the period from 1982 to 2003.

3 We thank Brian Bushee for making these data available for public use. Website: http://acct.wharton.upenn.edu/faculty/bushee/IIclass.html.

2.2 Variable Definitions

2.2.1 Measure of Innovation

Following the existing literature, for example, Hall, Jaffe, & Trajtenberg (2005) and Hall, Jaffe, & Trajtenberg (2001), we use three measures to capture a firm's patenting activities. First, we use the natural logarithm of one plus a firm's total number of patents applied and finally granted in a given year (Patent) to capture its total innovation output in a given year. Second, we use the natural logarithm of one plus the weighted citations received by a patent (Qcitation) to mitigate the truncation bias. Finally, we use the natural logarithm of one plus the adjusted citation counts scaled by technology class-year fixed effects (TTcitation) as another alternative to measure a firm's research output.[4] In untabulated results, we also use R&D expenditure as innovation input and obtain consistent conclusion.

2.2.2 Measure of Institutional Investors

The presence of institutional investors is classified based on institutional ownership information taken from the Thomson Reuters Institutional (13f) Holdings data. We compute the average of the quarter-end holdings over a given fiscal year. We consider only institutions with concentrated holdings in our study, that is, institutions holding more than 5% of the firm's shares. In addition, following Bushee (1998), we classify all of the institutional blockholders into three types: "transient", "quasi-indexer" and "dedicated". Finally, we construct two groups named Near-sighted and Dedicated by summing up the blockholdings from transient and quasi-indexer investors and from dedicated investors, respectively. In untabulated results, we also consider the five largest institutional investors' ownership for each group and find that our results are qualitatively similar.

4 See, for example, Hall et al. (2001) and Hall et al. (2005).

In addition, following Almazan, Hartzell, & Starks (2005), Brickley, Lease, & Smith (1988) and Chen et al. (2007), we utilize the CDA/Spectrum database to separate institutions into two types (Independent or Grey), given their business relationship with the invested firms. Banks and insurance companies are defined as Type 1 and Type 2, respectively, and they are combined to form the Grey investor group. Investment companies and independent investment advisors are defined as Type 3 and Type 4, respectively, and they are grouped into the Independent investor group. The remaining institutions are defined as Type 5. Employee stock ownership plans (ESOPs), university endowments, foundations, and private and public pension funds are all included in Type 5.[5] Following Del Guercio & Hawkins (1999), we extract public pension funds from Type 5 and map them to become part of the Independent investor group as well.[6]

2.2.3 Other Control Variables

Following the innovation literature, we obtained financial information from Compustat and constructed a number of firm attributes influencing innovation output. These control variables include firm size (TA), calculated as the natural logarithm of total assets plus one; research expenditure (RD), calculated as R&D expenditure divided by total assets; cash holdings (CHE), calculated as cash over total assets; Tobin's Q (Q), calculated as operating cash flow over total assets; profitability (ROA), measured as net income over total assets; capital intensity, (PPE), calculated as the natural logarithm of one plus net property, plant and equipment divided by the total number of employees; and leverage ratio (LEV), calculated as the sum of short-term and long-term debts divided by total assets. We also include industry fixed effects to control for industry heterogeneities in innovation activities and year fixed effects to control for potential fluctuations in

5 After 1998, most institutions are misclassified as type 5. Similar to Chen et al. (2007), we rectify the misclassification by correcting the mapping error and check against the pre-1998 CDA/Spectrum institution information for accuracy.

6 Including university endowments and foundations in the independent investor group does not alter the results.

patenting activities over time. All of the independent variables are lagged by one year, and all continuous variables are winsorized at the 1st and 99th percentiles to mitigate concerns regarding extreme outliers.

2.2.4 Descriptive Statistics

Table 1 presents the descriptive statistics for our dependent and main control variables. We define the variables in Appendix Table 1. An average firm has 5.678 patents. The median number of patents is zero, as a typical firm in our sample does not engage in any innovation that is patentable. Firms on average have 154.503 and 9.955 weighting index-adjusted citations (Qcitation) and technology class-year fixed effects-adjusted citations (TTcitation), respectively. In addition, firms on average have 5.7% near-sighted institutional block ownership and 3.4% dedicated institutional block ownership. In untabulated descriptive statistics, we also find that about 42.8% (23.8%) of the firms are covered by at least one near-sighted (dedicated) institutional investor. In terms of the distribution of our control variables, the sample is representative of a large sample of publicly traded firms. Our sample firms have on average a total asset value of $2.02 billion and RD of 4.5% of assets. An average firm in the sample has Tobin's Q of 1.931 and earns 7.2% ROA annually.

Table 1 Descriptive statistics

Summary statistics for the variables used in the study from 1982 to 2002. The sample excludes the financial and utility companies. All of the variables are winsorized at 1%. The variables are defined in Appendix.

	25th percentile	Mean	Median	75th percentile	STD
Dependent Variables					
Patent	0.000	5.678	0.000	1.000	25.269
Qcitation	0.000	154.503	0.000	3.572	1433.030
TTcitation	0.000	9.955	0.000	0.234	84.450
Patent volatility	0.000	1.484	0.000	1.000	4.909
Product patents	0.000	5.763	0.000	1.000	24.373

Independent Variables					
Near-sighted	0.000	0.057	0.000	0.082	0.095
Transient	0.000	0.016	0.000	0.000	0.046
Quasi-indexer	0.000	0.041	0.000	0.063	0.078
Dedicated	0.000	0.034	0.000	0.000	0.077
Control Variables					
TA	40.295	2019.647	150.690	664.846	11105.634
RD	0.000	0.045	0.000	0.051	0.093
CHE	0.009	0.088	0.034	0.112	0.127
Q	1.047	1.931	1.370	2.063	1.716
ROA	0.042	0.072	0.115	0.175	0.208
PPE	0.000	0.494	0.000	0.000	0.974
LEV	0.057	0.240	0.210	0.365	0.208

Panel A of Table 2 presents the year-wise distribution of blockholdings for all sample firms over the sample period. A firm can have either no blockholder or multiple blockholders of different types. Columns 1 to 3 display the fraction of firms with at least one institutional investor of a given type in a given year. In 1982, 6.48% (170 out of 2624) of the firms have at least one transient blockholder, approximately 23.1% (605 out of 2,624) of the firms have at least one quasi-indexer blockholder, and 10.4% (273 out of 2,624) of the firms have at least one dedicated blockholder.[7] In 2002, the percentage of firms with at least one transient, quasi-indexer or dedicated blockholder jumps to about 20%, 48.1%, and 35.3%, respectively. Columns 4 to 6 present the percentage owned by each type of blockholders, averaged across the sample firm. Specifically, an average sample firm in 1982 has 0.6%, 2.6%, and 1.4% of its shares held by the transient, quasi-indexer, and dedicated blockholders, respectively. In 2002, these corresponding figures increase by at least three times to 2.2%, 6.5%, and 5.8%, respectively. Overall, we observe a clear upward trend in the holdings of all three

7 The sum of the percentages does not add up to 100% because there are firms that do not have any blockholders. In addition, a firm can be counted in more than one type because it can have multiple blockholders of different types. That means, if a firm has one transient blockholder and one quasi-indexer, then it is counted as both a transient blockholder firm and a quasi-indexer firm.

types of institutional blockholders, which is consistent with previous studies.

To better understand the trend of blockholding, Panel B presents the year-wise distribution for firms having at least one type of blockholder. A similar rising trend for all types of institutional blockholders is observed between 1982 and 2002. For example, in 1982, 896 out of the 2,624 firms have at least one type of blockholders. Of the firms that have at least one type of blockholders, about 19% of the firms have at least one transient blockholder, and this number almost doubled to 30.5% in 2002. Similarly, a steadily increasing trend can be observed for the percentage owned by institutional blockholders. For instance, transient and quasi-indexer blockholders held on average 1.66% and 7.73% of total shares in 1982, which grew by 100% to 3.33% and by roughly 30% to 9.93%, respectively, in 2002. This assures that the increasing blockholding observed in Panel A is not driven by the annual variation of the number of listed firms in the sample.

Table 2 Descriptive statistics: institutional ownership

Trend of the activities of different types of institutional investors in a given year. % Block represents the fraction of firms with at least one institutional investor of a given type in a given year. % Own represents the average total blockholdings of a given institutional type in a given year. Panel A is based on the whole sample while Panel B is restricted to firms that have at least one type of institutional investor. The variables are defined in Appendix.

Panel A

		% Block			% Own		
		Transient	Quasi-Indexer	Dedicated	Transient	Quasi-indexer	Dedicated
Year	N	(1)	(2)	(3)	(4)	(5)	(6)
1982	2624	6.48	23.06	10.37	0.60	2.60	1.40
1983	2753	8.57	21.54	10.83	0.70	2.50	1.30
1984	2935	11.24	24.06	13.66	0.90	2.80	1.60
1985	3106	11.24	26.22	15.14	0.90	3.10	1.70
1986	3118	11.13	29.15	16.42	0.90	3.20	1.70
1987	3209	11.25	29.14	16.27	0.90	3.10	1.80
1988	3352	10.74	28.31	16.62	0.90	3.00	1.90
1989	3370	11.19	29.73	16.94	1.00	3.10	1.80

1990	3384	13.30	32.15	17.29	1.20	3.50	1.90
1991	3407	10.92	33.05	21.90	1.10	3.60	2.80
1992	3554	14.43	33.06	22.82	1.40	3.70	3.20
1993	3766	16.65	35.05	25.07	1.60	4.00	3.70
1994	4061	17.63	34.94	27.43	1.70	4.00	4.20
1995	4291	18.57	34.91	28.36	1.80	4.10	4.50
1996	4417	21.06	36.52	29.48	2.10	4.30	4.60
1997	4581	22.16	37.83	30.28	2.30	4.50	4.60
1998	4450	22.83	37.51	30.14	2.30	4.60	4.60
1999	4252	19.76	43.86	30.32	2.10	5.80	4.80
2000	4119	19.37	43.72	30.95	2.00	5.90	4.80
2001	4177	19.46	45.80	31.24	2.10	6.20	5.00
2002	3933	20.01	48.08	35.32	2.20	6.50	5.80

Panel B

		% Block			% Own		
		Transient	Quasi-indexer	Dedicated	Transient	Quasi-indexer	Dedicated
Year	N	(1)	(2)	(3)	(4)	(5)	(6)
1982	896	18.97	67.52	30.36	1.66	7.73	4.12
1983	953	24.76	62.23	31.27	2.11	7.11	3.86
1984	1155	28.57	61.13	34.72	2.33	7.01	3.99
1985	1308	26.68	62.23	35.93	2.09	7.30	4.08
1986	1376	25.22	66.06	37.21	2.08	7.19	3.94
1987	1439	25.09	64.98	36.28	2.09	6.91	4.05
1988	1464	24.59	64.82	38.05	2.13	6.86	4.24
1989	1521	24.79	65.88	37.54	2.21	6.85	4.09
1990	1590	28.30	68.43	36.79	2.53	7.43	4.08
1991	1669	22.29	67.47	44.70	2.27	7.35	5.77
1992	1794	28.60	65.50	45.21	2.68	7.26	6.25
1993	2024	30.98	65.22	46.64	2.92	7.36	6.85
1994	2241	31.95	63.32	49.71	3.14	7.29	7.63
1995	2417	32.98	61.98	50.35	3.22	7.33	8.07
1996	2601	35.76	62.02	50.06	3.62	7.26	7.79
1997	2750	36.91	63.02	50.44	3.77	7.54	7.62
1998	2670	38.05	62.51	50.23	3.86	7.64	7.70
1999	2651	31.69	70.35	48.62	3.36	9.24	7.70
2000	2561	31.16	70.32	49.79	3.19	9.45	7.72
2001	2640	30.80	72.46	49.43	3.34	9.80	7.84
2002	2580	30.50	73.30	53.84	3.33	9.93	8.89

3. Empirical Results

3.1 Do Near-sighted Institutional Blockholders Impede Innovation?

We investigate the influence of institutional investors with a short-term horizon on firms' innovation. To do so, we estimate the following model to relate the types of institutional blockholders to a firm's patenting activities while controlling for various firm characteristics, as described in Section 2. All regressions include industry and year fixed effects. The subscript it indicates individual firm i in year t.

$$\begin{aligned} Innovations_{i,t+1} = {} & \beta_1 (Near\text{-}Sighted)_{it} + \beta_2 (Dedicated)_{it} + \beta_3 TA_{it} \\ & + \beta_4 RD_{it} + \beta_5 CHE_{it} + \beta_6 Q_{it} + \beta_7 ROA_{it} + \beta_8 PPE_{it} \\ & + \beta_9 LEV_{it} + \mu_1 Industry_j + \mu_2 Year_t + \varepsilon_{it.} \end{aligned} \quad (1)$$

We begin by examining the effect of institutional ownership on innovation by using the number of patents as our dependent variable. The regression results show that near-sighted institutional blockholders are negatively associated with innovation. Specifically, in Panel A of Table 3, Column 1 shows that the regression estimate of Near-sighted, the percentage owned by near-sighted institutional blockholders, is negative and significant at the 1% level. The coefficient of -0.416 implies that a one-standard-deviation increase in near-sighted blockholdings is associated with an approximately 4% decrease in the number of patents.[8] In Column 2, where we separate transient institutional blockholdings and quasi-indexer blockholdings, the estimated coefficients of Transient and Quasi-indexer are also negative and significant at the 1% level.

8 When we consider firms with at least one patent in the sample, we find an approximately 8% drop in patent counts.

Additionally, we find that the coefficient of Transient is slightly larger than that of Quasi-indexer. A test of coefficient inequality rejects the null hypothesis that these two coefficients are equal. An increase of one standard deviation in Transient and Quasi-indexer institutional blockholdings corresponds to an approximately 2.74% and 2.64% decrease in patent counts, respectively. Column 3 presents the result from using the number of blockholders as an independent variable, and Column 4 provides the result from using an indicator variable to capture the presence of near-sighted institutional blockholders. The results based on these alternative measures of institutional ownership are consistent and economically significant. For example, based on the coefficient estimate in Column 4, a firm with near-sighted institutional investors is associated with a 10.60% decrease in the number of patents.

Panel B and Panel C of Table 3 present the regression results using Qciation and TTcitation to measure innovation. Based on the coefficients of Near-sighted from Column 1 of Panels B and C, a one-standard-deviation increase in Near-sighted institutional blockholdings is associated with a decrease of 3.55% and 4.02% in the adjusted citations, respectively. Similarly, in Column 4 of Panels B and C, we use an indicator variable to denote the presence of near-sighted institutional investors. The coefficients of -0.106 and -0.112 indicate a 10.06% and 10.68% decrease, respectively, in the number of adjusted citations when near-sighted blockholders are present. These findings are consistent with H1, which proposes that capital market participants affect managers' decision-making, and provide evidence that near-sighted institutional investors have a detrimental effect on firms' patenting activities.

Additionally, we perform a battery of robustness checks in which we include new controls, such as industry concentration measured by the Herfindahl–Hirschman Index, G-index, insider holdings, and annual stock returns. The results are robust to the inclusion of these additional variables. Further, we

estimate the effect of institutional blockholdings on innovation by using a zero-inflated Poisson and Negative Binomial model given the count-data nature of our dependent variable and find that our results are qualitatively similar with these alternative model specifications.[9] We also exclude self-citations for a given patent and rerun the analyses. The results are robust to this alternative definition of innovation. Finally, we exclude firms with no patents or exclude firms that have no information on institutional holdings and find that the results are consistent with H1.[10]

Table 3 Type of institutional investors and innovation

This table presents the multivariate regression results. Columns 1 and 2 use % own to measure the level of blockholdings. % own represents the total blockholdings of a given institutional investor type. Column 3 and 4 use # of block and block dummy variable to measure the level of blockholdings. # of block represents the count of blocks of a given institutional investor type while block dummy takes a value of 1 for firms with at least one institutional investor of a given type. The sample excludes financial and utilities firms. In Panel A the dependent variable is a firm's total number of patents, while Panel B and C use adjusted subsequent citations that a firm's patents received. All regressions include industry and year fixed effects. All variables are winsorized at the 1%. The t-statistics is presented in parentheses. Standard errors are robust to heteroscedasticity and firm level clustering. *, **, and *** measure significance at the 10%, 5%, and 1% level. The variables are defined in Appendix.

Panel A

	(1) Patent $_{t+1}$ % own	(2) Patent $_{t+1}$ % own	(3) Patent $_{t+1}$ # of block	(4) Patent $_{t+1}$ block dummy
Near-sighted	-0.416***		-0.054***	-0.112***
	(-5.97)		(-8.10)	(-7.33)
Transient		-0.605***		
		(-5.80)		
Quasi-indexer		-0.343***		
		(-3.96)		
Dedicated	-0.109	-0.107	-0.003	-0.010
	(-1.12)	(-1.10)	(-0.26)	(-0.62)
TA	0.304***	0.304***	0.304***	0.305***
	(29.67)	(29.68)	(29.58)	(29.58)
RD	1.491***	1.493***	1.498***	1.507***
	(13.92)	(13.95)	(14.00)	(14.08)
CHE	0.035	0.038	0.033	0.033
	(0.68)	(0.75)	(0.64)	(0.65)

9 The number of patents and citations ranges from zero to a discrete integer.

10 In untabulated results, we examine whether blockholders affect innovation efficiency as measured by the number of patent counts divided by inflation-adjusted R&D expenditure. We find that while dedicated investors help improve innovation efficiency, near-sighted investors have no effect on innovation efficiency.

Q	0.049***	0.049***	0.048***	0.048***
	(11.15)	(11.22)	(11.01)	(11.01)
ROA	0.053	0.054	0.059	0.061
	(1.37)	(1.39)	(1.53)	(1.58)
PPE	0.056***	0.056***	0.057***	0.057***
	(5.85)	(5.83)	(5.88)	(5.94)
LEV	-0.355***	-0.353***	-0.360***	-0.364***
	(-10.16)	(-10.13)	(-10.28)	(-10.38)
Observations	76,858	76,858	76,858	76,858
Adjusted R-squared	0.404	0.405	0.405	0.406
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Panel B

	(1) Qcitation $_{t+1}$ % own	(2) Qcitation $_{t+1}$ % own	(3) Qcitation $_{t+1}$ # of block	(4) Qcitation $_{t+1}$ block dummy
Near-sighted	-0.380***		-0.050***	-0.106***
	(-3.27)		(-4.41)	(-4.23)
Transient		-0.639***		
		(-3.43)		
Quasi-indexer		-0.280*		
		(-1.91)		
Dedicated	-0.065	-0.062	0.005	0.003
	(-0.40)	(-0.38)	(0.34)	(0.12)
TA	0.500***	0.501***	0.501***	0.502***
	(33.28)	(33.28)	(33.12)	(33.08)
RD	3.090***	3.094***	3.096***	3.104***
	(15.13)	(15.15)	(15.16)	(15.20)
CHE	0.079	0.084	0.078	0.078
	(0.85)	(0.90)	(0.83)	(0.84)
Q	0.095***	0.096***	0.095***	0.095***
	(12.32)	(12.37)	(12.25)	(12.24)
ROA	0.246***	0.247***	0.250***	0.253***
	(3.41)	(3.43)	(3.48)	(3.52)
PPE	0.118***	0.117***	0.118***	0.118***
	(6.65)	(6.64)	(6.67)	(6.70)
LEV	-0.704***	-0.702***	-0.708***	-0.712***
	(-11.38)	(-11.35)	(-11.42)	(-11.47)
Observations	76,858	76,858	76,858	76,858
Adjusted R-squared	0.377	0.377	0.377	0.377
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Panel C

	(1) TTcitation $_{t+1}$ % own	(2) TTcitation $_{t+1}$ % own	(3) TTcitation $_{t+1}$ # of block	(4) TTcitation $_{t+1}$ block dummy
Near-sighted	-0.432***		-0.054***	-0.113***
	(-6.17)		(-8.09)	(-7.32)
Transient		-0.560***		
		(-5.38)		

Quasi-indexer		-0.383***		
		(-4.38)		
Dedicated	-0.133	-0.132	-0.005	-0.018
	(-1.37)	(-1.36)	(-0.52)	(-1.05)
TA	0.291***	0.291***	0.292***	0.293***
	(28.11)	(28.11)	(28.02)	(28.03)
RD	1.422***	1.424***	1.430***	1.440***
	(12.40)	(12.42)	(12.47)	(12.55)
CHE	0.034	0.037	0.032	0.033
	(0.65)	(0.70)	(0.61)	(0.62)
Q	0.053***	0.053***	0.053***	0.052***
	(11.42)	(11.46)	(11.30)	(11.28)
ROA	0.074*	0.075*	0.080**	0.082**
	(1.84)	(1.86)	(1.99)	(2.06)
PPE	0.056***	0.055***	0.056***	0.056***
	(5.53)	(5.52)	(5.55)	(5.62)
LEV	-0.350***	-0.349***	-0.355***	-0.359***
	(-9.87)	(-9.85)	(-9.98)	(-10.09)
Observations	76,858	76,858	76,858	76,858
Adjusted R-squared	0.364	0.364	0.365	0.365
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

3.2 Identification Strategy

The formation of near-sighted institutional blockholding can arise endogenously. First, managers who tend to meet the earnings target and focus on short-term profits may attract institutional investors with a short-term strategy. Second, cofounding variables may jointly affect both firms' innovation performance and the type of institutional ownership. For example, impatient managers may prefer faster resolution of investments and may dislike prolonged innovation. Both reverse causality and unobserved confounding factors may cast doubt on the causal impact of blockholders' incentives.

To address the endogeneity issue, we exploit the exogenous variation in the formation of blockholding by investors with different investment strategies due to an exogenous change in stock liquidity. Fang et al. (2014) argue that increased liquidity attracts institutional investors who have less incentive to enhance the long-term value of the firm, and thus lowers innovation performance. Our identification explores the degree to which the formation of different types of

blockholders is affected by liquidity shocks, rather than the firm's direct exposure to liquidity. Increased liquidity allows the investors with high portfolio turnover to profit from aggressive trade, while does not affect the dedicated investors who do not intend to frequently trade the stocks. As a result, the proportion of high turnover investors should increase, and thus innovation further decreases in near-sighted blockholding in the aftermath of the shock. We use the decimalization policies in both 1997 and 2001 as two exogenous liquidity shocks. Before the period from May 7 to June 24, 1997, the minimum tick size of the major U.S. stock exchanges, namely, NYSE, AMEX, and Nasdaq, was $1/8th. Part of the decimalization plan was to increase the liquidity in the market, and thus, after June 24, 1997, the minimum tick size was reduced to $1/16th. After January 29, 2001, the minimum tick size was further reduced to one cent. We define this first event as, Sixteenth, and the second event as, Hundredth. Prior studies find that decimalization increases stock liquidity especially for frequently traded stocks (Bessembinder, 2003; Furfine, 2003). Especially, Chordia, Roll, & Subrahmanyam (2008) find a significant drop in the value-weighted daily average effective spread due to the move from the Sixteenth event and then further drop after the Hundredth event. Liquidity shock induced by decimalization is a good candidate of exogenous shock since it is unlikely to directly affect innovation,[11] and there is no reason that future innovation affects the variation induced by the decimalization shock. Hence, examining the change in innovation performance in the variation of the near-sighted blockholders following the decimalization-induced liquidity identifies the causal link.

We interact our blockholding measure with an indicator variable, which equals 1 for the period after the identified event and vice versa. Panel A in Table 4 presents the regression results using the event Sixteenth. To balance the length

11 Fang et al. (2014) find that stock liquidity affects innovation by attracting institutional investors who have less incentive to enhance the long-term value of the firm. However, as also specified in their paper, the liquidity shock does not directly affect innovation.

of the period before and after the liquidity event, we restrict our sample period for Panel A from 1994 to 2000, three years before and after the event in 1997. From Columns 1 to 3, we observe that the interaction term between Near-sighted * Post is negative and significant, indicating that the effect of near-sighted blockholders increases with the additional liquidity imposed by the event. In terms of economic magnitude, a one-standard-deviation increase in near-sighted institutional blockholdings corresponds to a 2.48% decrease in the number of patents after the liquidity event in 1997. Both Near-Sighted and Post are also included to control for the direct effects on innovation from blockholdings and liquidity resulting from the decimalization. In line with Fang et al. (2014), we find firms' patenting activity decreases after an increase in stock liquidity. In Columns 2 and 3, we observe a similar result when using adjusted citations as an alternative measure of innovation (Qcitation and TTcitation). To the extent that an exogenous increase in liquidity leads to the formation of near-sighted block ownership to a greater extent than to that of long-term shareholders, this further deterioration in innovation performance after decimalization suggests a causal interpretation between the level of near-sighted blockholder ownership and innovation. In unreported results, we regress near-sighted dedicated institutional blockholdings on Post while controlling for firm fixed effects. We indeed find a greater increase in near-sighted block ownership than that in dedicated ownership after decimalization. The inequality test rejects the null hypothesis that these two coefficients are not different from zero at the 1% level.[12]

To alleviate the concern that the more pronounced negative relationship between near-sighted institutional blockholders and innovation is due to some other existing trends rather than due to the event identified, we create a "pseudo-shock" period six months before the actual event (Roberts & Whited, 2012). The "pseudo-shock" period ranges from November 1996 to April 1997. If

12 The results are similar when we include more control variables.

the exogenous liquidity shock merely represents a temporal factor or time trend, then we should observe similar results when we use a "placebo-shock" period. The results from this falsification test are presented in Panel B, Table 4. The coefficients of the interaction term between Near-Sighted and the "pseudo-shock" event (Near-sighed * $Post^{Psuedo}$) across all models are nonsignificant for the three different measures of innovation. These results provide further confidence that the results of our identification tests are not merely representative of any unobserved shocks that occurred before the liquidity event in 1997 or shocks that are driven by other temporal factors.

Table 4, Panel C, presents the results using the event Hundredth as the exogenous shock on liquidity, which generates exogenous variation in blockholdings. The sample period for Panel C is from 1998 to 2003, two years before and after the liquidity event. We adopt a slightly shorter period to fully separate the two events. Similar patterns are observed in Columns 1 to 3 in Panel C. The regression estimates of Near-sighted * Post remain negative and statistically significant, which indicates a greater adverse effect of blockholders on firms' patenting activities with additional liquidity imposed by the event. The economic effect is also significant. A one-standard-deviation increase in institutional blockholdings is associated with a 2.63% drop in the number of patents after the decimalization in 2001.

Similarly, we create a "pseudo-shock" period six months before the actual event to ease our concern that the results reflect certain temporal factors. The decimalization is completed by January 2001; therefore, our pseudo shock period is from July 2000 to December 2000. The result of this falsification test is presented in Panel D. In Column 1, we still find a negative effect of Near-Sighted on innovation. However, the coefficient of Near-sighed * $Post^{Psuedo}$ is insignificant. The result holds for all other distinct measures of innovation. The insignificant coefficients of Near-sighed * $Post^{Psuedo}$ alleviate the concern that our finding in Panel C of

Table 4 is due to some other existing trends before the event period. In untabulated results, we also define a couple of different "pseudo-shock" periods, and the results are consistent with what we present above.

To further address the concern that any adverse effect of institutional blockholdings on corporate innovation is attributable to reverse causality, we consider an alternative specification that uses a 3-year forward measure of innovation as our dependent variables to create a sufficient lag between the dependent and independent variables. The historical values for the independent variables are more likely to be pre-determined and thus less likely to be affected by corporate patenting activities (Faleye, 2007). Panel E of Table 4 reports the regression estimates and shows that our results continue to hold.[13]

Next, we add a lagged value for innovation as an additional control. This implementation helps us examine the effect of institutional blockholdings while allowing the influence of potential observed and unobserved heterogeneities on future patenting activity (Harford et al., 2008). As Panel F shows, not surprisingly, the lagged values of the innovation measures explain a considerable amount of firms' future patenting activities. Nevertheless, the relationship between institutional blockholdings and innovation remains negative and significant.

Finally, we conduct the estimation with firm fixed effects to alleviate concerns that unobservable time-invariant firm characteristics may affect the estimates. This firm-fixed effect approach also helps us examine the time-series effect of institutional block ownership on innovation. The results are provided in Panel G. The effect of shortsighted block ownership is negative and statistically significant for two of three measures of innovation. Therefore, so far, the negative effect of the concentration of near-sighted institutional investors on innovation performance is robust to causal interpretation.

13 We also consider 2-year forward measures of innovation and obtain consistent results.

Table 4 Difference-in-differences test: decimalization

Regression results for the interaction of the exogenous variations in liquidity. Panel A uses the decimalization in 1997 when the minimum tick size was reduced to $1/16th. Post is an indicator variable that takes the value of one for the period after May 1997. The sample is restricted to the three-year window before and after the event in 1997. Panel B is the pseudo experiment of the decimalization in 1997 where $Post^{Pseudo}$ is an indicator variable that takes the value of one for the period between November 1996 and April 1997 (six months prior to the event month). Panel C uses the decimalization in 2001, when the minimum tick size was reduced to one cent. Post is an indicator variable that takes the value of one for the period after January 2001. The sample period is from 1998 to 2003. Panel D reports a pseudo experiment of the decimalization in 2001, where $Post^{Pseudo}$ is an indicator variable takes the value of one for the period between July 2000 and December 2000. Panel E reports the results using 3-year forward measures of innovation as dependent variables. Panel F reports the results with a lagged 1-year dependent variable as additional control. Panel F reports the results that include firm and year fixed effects. Other control variables are included but not reported for brevity. All variables are winsorized at the 1%. The t-statistics is presented in parentheses. Standard errors are robust to heteroscedasticity and firm level clustering. *, **, and *** measure significance at the 10%, 5%, and 1% level. The variables are defined in Appendix.

Panel A: 1997 decimalization (Sixteenth)

	(1) Patent $_{t+1}$	(2) Qcitation $_{t+1}$	(3) TTcitation $_{t+1}$
Near-sighted	-0.275***	-0.145	-0.295***
	(-3.21)	(-0.96)	(-3.46)
Near-sighted*Post	-0.241**	-0.454**	-0.230**
	(-2.16)	(-2.02)	(-2.03)
Dedicated	-0.104	0.020	-0.102
	(-0.74)	(0.08)	(-0.73)
Dedicated* Post	-0.009	-0.190	-0.049
	(-0.06)	(-0.73)	(-0.34)
Post	-0.045***	-0.241***	-0.065***
	(-3.27)	(-8.98)	(-4.61)
Controls	Yes	Yes	Yes
Observations	30,171	30,171	30,171
Adjusted R-squared	0.403	0.371	0.361
Industry FE	Yes	Yes	Yes

Panel B: Decimalization in 1997 (*Sixteenth*)--Pseudo experiment 1

	(1) Patent $_{t+1}$	(2) Qcitation $_{t+1}$	(3) TTcitation $_{t+1}$
Near-sighted	-0.414***	-0.436***	-0.438***
	(-5.30)	(-3.23)	(-5.58)
Near-sighted*$Post^{Pseudo}$	0.031	0.092	0.043
	(0.24)	(0.35)	(0.33)
Dedicated	-0.098	-0.069	-0.114
	(-0.81)	(-0.34)	(-0.94)
Dedicated*$Post^{Pseudo}$	-0.109	-0.178	-0.145
	(-0.66)	(-0.55)	(-0.84)
Post	0.002	0.084**	0.005
	(0.09)	(2.55)	(0.32)
Controls	Yes	Yes	Yes
Observations	30,171	30,171	30,171
Adjusted R-squared	0.402	0.367	0.360
Industry FE	Yes	Yes	Yes

Panel C: Decimalization in 2001 (*Hundredth*)

	(1) Patent $_{t+1}$	(2) Qcitation $_{t+1}$	(3) TTcitation $_{t+1}$
Near-sighted	-0.335***	-0.347**	-0.365***
	(-4.17)	(-2.57)	(-4.45)
Near-sighted*Post	-0.228**	-0.382**	-0.239*
	(-1.99)	(-2.00)	(-1.95)
Dedicated	-0.147	-0.041	-0.158
	(-1.02)	(-0.17)	(-1.09)
Dedicated*Post	-0.109	-0.338	-0.060
	(-0.76)	(-1.39)	(-0.39)
Post	-0.032**	-0.370***	-0.085***
	(-2.08)	(-13.84)	(-5.18)
Controls	Yes	Yes	Yes
Observations	20,931	20,931	20,931
Adjusted R-squared	0.416	0.360	0.354
Industry FE	Yes	Yes	Yes

Panel D: Decimalization in 2001 (*Hundredth*)--Pseudo experiment 2

	(1) Patent $_{t+1}$	(2) Qcitation $_{t+1}$	(3) TTcitation $_{t+1}$
Near-sighted	-0.395***	-0.497***	-0.438***
	(-5.04)	(-3.93)	(-5.41)
Near-sighted*Post^{Pseudo}	-0.148	-0.217	-0.126
	(-1.34)	(-1.10)	(-1.09)
Dedicated	-0.196	-0.259	-0.200
	(-1.59)	(-1.36)	(-1.61)
Dedicated*Post^{Pseudo}	-0.024	0.210	0.035
	(-0.15)	(0.75)	(0.21)
Post	0.043**	0.054*	0.033*
	(2.52)	(1.80)	(1.78)
Controls	Yes	Yes	Yes
Observations	20,931	20,931	20,931
Adjusted R-squared	0.415	0.349	0.352
Industry FE	Yes	Yes	Yes

Panel E: 3-year forward measures of innovation

	(1) Patent $_{t+3}$	(2) Qcitation $_{t+3}$	(3) TTcitation $_{t+3}$
Near-sighted	-0.454***	-0.410***	-0.484***
	(-5.15)	(-2.83)	(-5.44)
Controls	Yes	Yes	Yes
Obs.	56,708	56,708	56,708
Adjusted R^2	0.424	0.393	0.382
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

Panel F: Lagged measures of innovation

	(1) Patent $_{t+1}$	(2) Qcitation $_{t+1}$	(3) TTcitation $_{t+1}$
Near-sighted	-0.048***	-0.091**	-0.058***
	(-3.31)	(-2.03)	(-3.47)

Lagged innovation measure	0.886*** (229.15)	0.749*** (132.98)	0.847*** (160.52)
Controls	Yes	Yes	Yes
Obs.	76,858	76,858	76,858
Adjusted R^2	0.864	0.731	0.812
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

Panel G: Firm fixed effect

	(1) Patent $_{t+1}$	(2) Qcitation $_{t+1}$	(3) TTcitation $_{t+1}$
Near-sighted	-0.129** (-1.99)	-0.205 (-1.56)	-0.115* (-1.94)
Controls	Yes	Yes	Yes
Obs.	76,858	76,858	76,858
Adjusted R^2	0.849	0.766	0.816
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes

4. Cross-sectional variation: managerial incentives and corporate governance

Our second hypothesis pertains to the mechanisms that drive the variation in the influence of near-sighted blockholders and lends support to the primary hypothesis that blockholders instill their incentives to managerial decisions. The negative relation should be stronger if the manager more easily succumbs to the pressure of near-sighted blockholders.

4.1 Managerial Incentives

Managers are particularly sensitive to capital market pressure when their wealth is tied to the value of the firm. To gain further understanding of the effect of capital market pressure on managers' behavior, we estimate Equation (1) separately for the two groups of firms based on managers' Delta, where Delta measures the sensitivity of the CEO's own firm equity holdings to changes in the firm's stock price (Core & Guay, 2002). We sort the firms into terciles and define the firms in the top (bottom) tercile as the high (low) Delta group. We estimate

Equation (1) for each group and test the coefficient inequality between these two groups. We conjecture that near-sighted investors will have a greater effect when managers are more exposed to stock performance (high Delta), as the pay-performance compensation contract would discourage them from investing in long-term investments. Table 5, Panel A, presents the results. Each set of columns contains the results for both the high Delta and low Delta groups. In Columns 1 and 2, we provide regression estimates using the patent counts as our dependent variable. The coefficient of Near-Sighted is insignificant for the low Delta group, while the coefficient is negative and significant at the 5% level for the high Delta group. This result provides support for H2 and indicates that when managers are short-term oriented owing to their reliance on their firm's stock price, the effect of near-sighted blockholders is even stronger. The z-statistic from the test of coefficient inequality is 5.29 (p-value = 0.021), indicating that there is a significant difference in the coefficients between the low and high groups. Similar and robust differences in results hold across the two other measures of innovation.

We also use scaled wealth-performance sensitivity (WPS) as a proxy for managerial short-termism. As noted by Edmans, Gabaix, & Landier (2009), using WPS can mitigate the concern regarding which existing measures of managerial incentives are related to firm size. As with Delta, we sort firms into terciles and segregate firms into a high WPS group (firms whose managers' WPS is within the top tercile) and a low WPS group (firms whose managers' WPS is within the bottom tercile). We estimate Equation (1) for each group and compare the coefficients between the high and low subsamples. Panel B presents the results and shows that with high wealth performance sensitivity, the negative relationship between Near-sighted institutional blockholders and innovation is more pronounced (for example, the z-statistic from the coefficient inequality test is 4.32, p-value = 0.038 when comparing the regression estimates between Columns 1 and 2).

Table 5 Type of institutional investors, innovation and managerial incentives

Regression results based on various segregating criteria of managerial incentives. In Panel A, High (Low) group contains firms with Delta that is at the top (bottom) tercile of the sample in a given year. In Panel B, High (Low) group contains firms with WPS (scaled wealth-performance sensitivity in Edmans et al. (2009) that is at the top (bottom) tercile of the sample in a given year. All regressions include industry and year fixed effects. Other control variables are included but not reported for brevity. The χ^2 and its associated p-value report the results of the test of the null hypothesis that the coefficients between two sub-groups are equal. All variables are winsorized at the 1%. The *t*-statistics is presented in parentheses. Standard errors are robust to heteroscedasticity and firm level clustering. *, **, and *** measure significance at the 10%, 5%, and 1% level. The variables are defined in Appendix.

Panel A: Delta

	Dependent Variable					
	$Patent_{t+1}$		$Qcitation_{t+1}$		$TTcitation_{t+1}$	
	Low (1)	High (2)	Low (3)	High (4)	Low (5)	High (6)
Near-sighted	0.040	-0.590**	0.052	-0.844**	0.052	-0.707***
	(0.26)	(-2.28)	(0.18)	(-1.99)	(0.32)	(-2.61)
χ^2 of diff. (p-value of diff.)	5.29 (0.021)		3.60 (0.057)		7.16 (0.008)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	3,366	3,778	3,366	3,778	3,366	3,778
Adjusted R^2	0.404	0.626	0.373	0.601	0.344	0.598
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: WPS						
Dependent Variable						
Near-sighted	0.128	-0.287*	0.349	-0.668*	0.172	-0.381**
	(0.78)	(-1.76)	(1.24)	(-1.79)	(0.99)	(-2.22)
χ^2 of diff. (p-value of diff.)	4.32 (0.038)		6.08 (0.014)		6.51 (0.011)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	3,255	3,786	3,255	3,786	3,255	3,786
Adjusted R^2	0.521	0.558	0.483	0.545	0.474	0.527
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

4.2 Corporate governance – Internal Governance

If managerial myopia leads to sub-optimal action, corporate governance should correct, if not rectify, such actions. Prior studies show that the board of directors plays a fiduciary role in monitoring managerial decision-making

(Adams & Ferreira, 2007). Several studies emphasize the role of independent directors as effective monitors who mitigate management entrenchment and expropriation and thus enhance firm valuation (e.g. Nguyen & Nielsen (2010), Kim et al. (2014), Armstrong et al. (2014), Harford et al. (2008)). We expect that with the presence of independent board members, managers are more likely to dedicate effort needed for innovation, as it is one of the main resources supporting the long-term sustainability of a firm's competitive advantage. To understand the role of independent directors on firms' patenting activities, we sort firms into terciles, defining firms in the top tercile as low agency cost groups and firms in the bottom tercile as high agency cost groups, based on the number of independent directors.[14] We then compare the coefficients between the high and low agency cost groups. Table 6 presents the results. As predicted, when using patent counts as our measure of innovation, we observe that the near-sighted block ownership has a stronger impact on firm innovation when firms have fewer independent boards. The test of the difference between the estimated coefficients across these two groups is significant at the 1% level (p-value = 0.009), indicating that there is a significant difference between the coefficients of the High and Low agency groups. This indicates the presence of independent board members helps to ease the negative relationship between the near-sighted institutional blockholders and innovation. In Columns 3 to 6, we report the estimates using adjusted citations as alternative measures and obtain similar conclusion.

Further, institutional investors may also interact with each other (Edmans & Holderness, 2017). Institutional investors with a long-term investment strategy may influence management, whereas other investors share the benefit from its externality. For example, Chen et al. (2007) find that independent investors that maintain large stakes in a firm for at least one year specialize in monitoring. In

14 Due to the availability of IRRC data, our sample period runs from 1996 to 2002.

this case, we expect that the presence of such investors can help lessen investment distortion induced by near-sighted institutional shareholders. We partition our sample based on the existence of independent and dedicated investors. Following Brickley et al. (1988), we redefine institutional classification into two groups according to their potential business relationships with the firm.[15] We estimate Equation (1) separately for the two groups: one with dedicated and independent investors and one without dedicated and independent investors. If independent and dedicated investors can help to improve corporate governance and motivate managers to focus on long-term investment that maximizes shareholder wealth, we would expect the adverse effect of near-sighted block ownership to be alleviated when such independent investors are present.

Table 6 Type of institutional investors, innovation and corporate governance

Regression results based on the number of independent board members: High (Low) group contains firms whose total number of independent board members is at the top (bottom) tercile of the sample in a given year. All regressions include industry and year fixed effects. Other control variables are included but not reported for brevity. The χ^2 and its associated p-value report the results of the test of the null hypothesis that the coefficients between two sub-groups are equal. All variables are winsorized at the 1%. The *t*-statistics is presented in parentheses. Standard errors are robust to heteroscedasticity and firm level clustering. *, **, and *** measure significance at the 10%, 5%, and 1% level. The variables are defined in Appendix.

	Dependent Variable					
	$Patent_{t+1}$		$Qcitation_{t+1}$		$TTcitation_{t+1}$	
	Low	High	Low	High	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)
Near-sighted	-0.748***	-0.396***	-0.792***	-0.407***	-0.849***	-0.363***
	(-5.85)	(-5.36)	(-3.76)	(-2.95)	(-6.35)	(-4.70)
χ^2 of diff.	6.86		2.81		12.07	
(p-value of diff.)	(0.009)		(0.093)		(0.001)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	9,713	9,716	9,713	9,716	9,713	9,716
Adjusted R^2	0.490	0.344	0.460	0.300	0.448	0.282
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

15 See also Almazan, Hartzell, and Starks (2005).

Table 7 presents the results. In Columns 1 and 2, the coefficients of Near-Sighted for both groups are negative and significant at the 1% significance level. However, by comparing the two coefficients between the two groups, we observe the negative relationship between near-sighted institutional blockholders and innovation is mitigated by the efforts of the dedicated and independent institutional blockholders (the p-value from a test of inequality is 0.008). Columns 3 to 6 present the results derived from estimating Equation (1) using Qcitation and TTcitation as the dependent variables. The results again show that the independent and dedicated investors mitigate the negative relationship between innovation and the near-sighted institutional blockholders.

Table 7 Type of institutional investors, innovation and dedicated investors

Impact of the existence of independent and dedicated investors on firm innovation. The sample is segregated into two sub-groups by the presence of at least one independent and dedicated institutional investor. The institutions are classified as independent types based on the CDA/Spectrum institutional classification, where CDA type 1 and 2 are classified into grey investor groups. Type 3, 4, and the public pension funds in type 5 are classified into independent investor groups. Other institutions in type 5 are classified into grey investor groups. All regressions include industry and year fixed effects. Other control variables are included but not reported for brevity. All variables are winsorized at the 1%. The *t*-statistics is presented in parentheses. Standard errors are robust to heteroscedasticity and firm level clustering. *, **, and *** measure significance at the 10%, 5%, and 1% level. All variables are defined in Appendix.

	Dependent Variable					
	Patent $_{t+1}$		Qcitation $_{t+1}$		TTcitation $_{t+1}$	
	With dedicated & independent investors	Without dedicated & independent investors	With dedicated & independent investors	Without dedicated & independent investors	With dedicated & independent investors	Without dedicated & independent investors
	(1)	(2)	(3)	(4)	(5)	(6)
Near-sighted	-0.330***	-0.546***	-0.200	-0.404***	-0.347***	-0.567***
	(-2.71)	(-5.67)	(-1.25)	(-2.92)	(-2.81)	(-5.85)
χ^2 of diff.	6.97		3.94		6.63	
(p-value of diff.)	(0.008)		(0.047)		(0.010)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	16,451	60,407	16,448	60,414	16,451	60,407
Adjusted R^2	0.424	0.403	0.397	0.375	0.375	0.365
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

4.3 Corporate Governance - External Governance

We then consider how external market conditions affect the influence of the near-sighted blockholders on innovation. Following Hoberg, Phillips, & Prabhala (2014), we use product market threats, the fluidity using the business descriptions of firms from 10-K's, as the proxy for potential agency conflicts. Prior works suggest that managers are more likely to exert effort and to innovate to retain competitive advantages for long-term survival in a competitive environment (Aghion et al., 2005; Giroud & Mueller, 2011). Thus, we expect the impact of short-term-oriented investors on innovation is stronger under the less competitive market.

Table 8 presents the results based on the product market competition condition of firms. We again sort our sample into terciles and compare the coefficients from the high and low agency groups. The coefficient of the Low agency group is statistically greater than that of the High agency group (z-statistic from the $\chi 2$ difference test is 5.04 with p-value = 0.025). This finding provides evidence that market competition helps to mitigate the conflict between managers and shareholders, and that managers exert more effort on innovation when there is high market competition. Similar results hold for all of the measures of innovation, and this is reported in Columns 3 to 6.

Overall, our results provide evidence that the negative effect of near-sighted investors on patenting activities is more pronounced when managers are more incentivized by short-term gains and when greater agency conflict is present. These findings provide plausible support for the idea that institutional investors can magnify their influence on a firm's decision-making process.

Table 8 Type of institutional investors, innovation and product market competition

Regression results based on various segregating criteria of market competition. High (Low) group contains firms with a product market fluidity that is at the top (bottom) tercile of the sample in a given year. All regressions include industry and year fixed effects. Other control variables are included but not reported for brevity. The χ^2 and its associated p-value report the results of the test of the null hypothesis that the coefficients between two sub-groups are equal. All variables are winsorized at the 1%. The *t*-statistics is presented in parentheses. Standard errors are robust to heteroscedasticity and firm level clustering. *, **, and *** measure significance at the 10%, 5%, and 1% level. The variables are defined in Appendix.

	Dependent Variable					
	$Patent_{t+1}$		$Qcitation_{t+1}$		$TTcitation_{t+1}$	
	Low (1)	High (2)	Low (3)	High (4)	Low (5)	High (6)
Near-sighted	-0.454*** (-5.04)	-0.398*** (-3.52)	-0.508*** (-3.42)	-0.385* (-1.94)	-0.446*** (-4.82)	-0.422*** (-3.46)
χ^2 of diff. (p-value of diff.)	5.04 (0.025)		4.19 (0.041)		3.41 (0.065)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	5,610	5,611	5,610	5,611	5,610	5,611
Adjusted R^2	0.440	0.412	0.396	0.347	0.380	0.348
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

5. Additional discussions

In this section, we present additional discussions with respect to the influence of blockholders' incentives on innovation strategy, as well as robustness tests.

5.1 Innovation strategy

Manso (2011) shows that tolerating early failures and rewarding long-term success create the optimal condition for corporate innovation. Given our hypotheses, if institutional investors impose greater market pressure on managers, thus reducing their flexibility to experiment with more explorative technologies, we would expect a negative relationship between near-sighted institutional investors and explorative patenting activities. We employ two

measures of explorative innovation. First, following Atanassov (2015), we measure a firm's degree of exploration regarding new technologies using the volatility of patent output. Second, as Chava, Oettl, Subramanian, & Subramanian (2013) argue that product innovation is related more to the development of new products and is hence associated with greater risk, we classify patents as product patents if they do not fall into the International Patent Classification (IPC) category B01.

Table 9 presents the results based on patent volatility and the number of product patents. Consistent with our conjecture, the regression estimates from Columns 1 and 2 show that an increase in near-sighted block ownership leads to a decrease in patent volatility and product innovation. The results suggest that when near-sighted institutional investors are present, managers are less risk-tolerant and therefore less likely to engage in exploratory innovation activities.

Table 9 Type of institutional investors and innovation strategies

Multivariate regression results of the effect of institutional investors on firm's innovation strategies. The dependent variables are patent volatility and # of product patent in Column 1 and 2, respectively. All variables are winsorized at the 1%. The *t*-statistics is presented in parentheses. Standard errors are robust to heteroscedasticity and firm level clustering. *, **, and *** measure significance at the 10%, 5%, and 1% level. The variables are defined in Appendix.

	(1) Patent volatility	(1) # of product patents
Near-sighted	-2.968***	-0.421***
	(-7.28)	(-5.77)
Dedicated	-0.848	-0.119
	(-1.49)	(-1.18)
Controls	Yes	Yes
Observations	55,826	66,044
Adjusted R^2	0.215	0.410
Year FE	Yes	Yes
Industry FE	Yes	Yes

5.2 Robustness tests

Last, we present several robustness tests to assure our main results. First, it is known that firms do not always file patents. In Table 10, we show that our result is robust to the exclusion of these firms by keeping the firms that have at least filed one patent in the sample. Results for each measure of innovation performance are reported in Panel A, B, and C, respectively. The estimates are all consistent with the main results, suggesting that the negative relation still holds conditioning on the sample firms that engage in patenting activities.

Table 10 Robustness test: Excluding no-patent firms

This table presents the multivariate regression results of the sub-sample that includes firms that have at least one patent. Columns 1 and 2 use % own to measure the level of blockholdings. % own represents the total blockholdings of a given institutional investor type. Column 3 and 4 use # of block and block dummy variable to measure the level of blockholdings. # of block represents the count of blocks of a given institutional investor type while block dummy takes a value of 1 for firms with at least one institutional investor of a given type. In Panel A the dependent variable is a firm's total number of patents, while Panel B and C use adjusted subsequent citations that a firm's patents received. All regressions contain firm control variables as in Table 3. All regressions include industry and year fixed effects. All variables are winsorized at the 1%. The *t*-statistics is presented in parentheses. Standard errors are robust to heteroscedasticity and firm level clustering. *, **, and *** measure significance at the 10%, 5%, and 1% level. The variables are defined in Appendix.

Panel A

	(1) Patent $_{t+1}$ % own	(2) Patent $_{t+1}$ % own	(3) Patent $_{t+1}$ # of block	(4) Patent $_{t+1}$ block dummy
Near-sighted	-0.664***		-0.063***	-0.112***
	(-4.62)		(-6.61)	(-5.09)
Transient		-0.635***		
		(-3.33)		
Quasi-indexer		-0.444***		
		(-2.79)		
Dedicated	-0.064	-0.069	-0.003	-0.009
	(-0.43)	(-0.46)	(-0.22)	(-0.34)
Controls	Yes	Yes	Yes	Yes
Observations	19,908	19,908	19,908	19,908
Adjusted R-squared	0.553	0.553	0.554	0.553
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Panel B

	(1) Qcitation $_{t+1}$ % own	(2) Qcitation $_{t+1}$ % own	(3) Qcitation $_{t+1}$ # of block	(4) Qcitation $_{t+1}$ block dummy
Near-sighted	-0.680***		-0.075***	-0.124***
	(-3.58)		(-4.80)	(-3.73)
Transient		-0.919**		
		(-2.20)		
Quasi-indexer		-0.771***		
		(-3.16)		
Dedicated	-0.020	-0.011	0.003	-0.011
	(-0.09)	(-0.05)	(0.16)	(-0.30)
Controls	Yes	Yes	Yes	Yes
Observations	19,908	19,908	19,908	19,908
Adjusted R-squared	0.452	0.452	0.452	0.452
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Panel C

	(1) TTcitation $_{t+1}$ % own	(2) TTcitation $_{t+1}$ % own	(3) TTcitation $_{t+1}$ # of block	(4) TTcitation $_{t+1}$ block dummy
Near-sighted	-0.572***		-0.066***	-0.118***
	(-3.99)		(-5.73)	(-4.54)
Transient		-0.564**		
		(-2.56)		
Quasi-indexer		-0.575***		
		(-3.05)		
Dedicated	-0.108	-0.108	-0.005	-0.021
	(-0.61)	(-0.61)	(-0.29)	(-0.69)
Controls	Yes	Yes	Yes	Yes
Observations	19,908	19,908	19,908	19,908
Adjusted R-squared	0.449	0.449	0.450	0.450
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

In addition, despite whether firms engage in patenting activities, firms do not always report R&D. In the main analysis, we assume that firms with missing R&D reported in the financial statements do not engage in innovation activities. However, Koh & Reeb (2015) point out that about 10.5% of the missing R&D firms do receive patents. As robustness tests, we employ the approach introduced by Koh & Reeb (2015) to control for the missing R&D firms. In Table 11, we conduct the baseline regressions in column 1 of Table 3 for each of the three

dependent variables with different treatment for missing R&D. First, missing R&D is replaced with the industry average. Then, (1) in Panel A, we control for a missing R&D indicator; (2) in Panel B, we control for a pseudo-blank R&D indicator, which is set to 1 if a firm has patenting activity but reports R&D as missing; (3) in Panel C, we include both indicators. With any of these treatments, our main results remain robust.

Last, there are various other factors that lead to managerial myopia and in turn, affect a firm's innovation performance. For example, He & Tian (2013) suggest that equity analysts can induce managerial myopia as they exert too much pressure on managers to meet short-term goals. However, Guo, Pérez-Castrillo, & Toldrà-Simats (2019) find that equity analysts encourage managers to make more efficient investments, which increases their future patents and citations. On the other hand, Aghion et al. (2005) show that product market competition affects the manager's incentive to engage in innovation depending on the allocation of the innovation rent given the market structure. In order to isolate either effect, we control for the number of analysts (coverage) and product market competition (Herfindahl) in a robustness test. The result is reported in Table 12 and indicates that the baseline result remains robust.

Table 11 Robustness tests: Missing R&D

This table presents the multivariate regression results that control for missing R&D in the financial statements. All independent variables use % own to measure the level of blockholdings. % own represents the total blockholdings of a given institutional investor type. All regressions contain firm control variables as in Table 3 and include industry and year fixed effects. All variables are winsorized at 1%. The *t*-statistics is presented in parentheses. Standard errors are robust to heteroscedasticity and firm level clustering. *, **, and *** measure significance at the 10%, 5%, and 1% level. The variables are defined in Appendix.

	Panel A			Panel B			Panel C		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
	Patent $_{t+1}$ % own	Qcitation $_{t+1}$ % own	TTcitation $_{t+1}$ # own	Patent $_{t+1}$ % own	Qcitation $_{t+1}$ % own	TTcitation $_{t+1}$ # own	Patent $_{t+1}$ % own	Qcitation $_{t+1}$ % own	TTcitation $_{t+1}$ # own
Near-sighted	-0.393***	-0.335***	-0.410***	-0.394***	-0.338***	-0.411***	Near-sighted	-0.394***	-0.338***
	(-5.78)	(-2.96)	(-5.98)	(-5.64)	(-2.89)	(-5.85)		(-5.81)	(-3.02)
Dedicated	-0.103	-0.052	-0.127	-0.089	-0.029	-0.113	Dedicated	-0.109	-0.070
	(-1.09)	(-0.33)	(-1.34)	(-0.91)	(-0.18)	(-1.16)		(-1.16)	(-0.45)
RD (blank as ind. avg)	0.565***	1.291***	0.538***	0.261***	0.674***	0.254***	0.556***	1.266***	0.531***
	(5.98)	(7.28)	(5.45)	(2.83)	(3.97)	(2.65)	(5.90)	(7.16)	(5.38)
Missing R&D	-0.413***	-0.786***	-0.395***				-0.463***	-0.926***	-0.432***
	(-19.92)	(-21.43)	(-19.01)				(-23.62)	(-27.04)	(-22.08)
Pseudo-blank R&D				0.114***	0.531***	0.044	0.362***	1.029***	0.276***
				(2.71)	(7.46)	(1.03)	(9.07)	(15.13)	(6.80)
Observations	76,858	76,858	76,858	76,858	76,858	76,858	76,858	76,858	76,858
Adjusted R-squared	0.418	0.391	0.377	0.398	0.371	0.357	0.422	0.400	0.379
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 12 Robustness test: additional control variables

This table presents the multivariate regression results that control for missing R&D in the financial statements. All independent variables use % own to measure the level of blockholdings. % own represents the total blockholdings of a given institutional investor type. All regressions include industry and year fixed effects. All variables are winsorized at the 1%. The *t*-statistics is presented in parentheses. Standard errors are robust to heteroscedasticity and firm level clustering. *, **, and *** measure significance at the 10%, 5%, and 1% level. The variables are defined in Appendix.

	(1) Patent $_{t+1}$ % own	(2) Qcitation $_{t+1}$ % own	(3) TTcitation $_{t+1}$ # own
Near-sighted	-0.411***	-0.357***	-0.429***
	(-5.96)	(-3.12)	(-6.18)
Dedicated	-0.271	-0.192	-1.043
	(-1.36)	(-1.09)	(-1.39)
TA	0.253***	0.410***	0.236***
	(22.07)	(24.00)	(20.56)
RD	1.389***	2.895***	1.302***
	(13.46)	(14.71)	(11.86)
CHE	0.079	0.155*	0.081
	(1.57)	(1.69)	(1.57)
Q	0.030***	0.062***	0.033***
	(7.07)	(8.11)	(7.34)
ROA	-0.018	0.119*	-0.005
	(-0.51)	(1.74)	(-0.14)
PPE	0.045***	0.097***	0.043***
	(4.89)	(5.75)	(4.53)
LEV	-0.269***	-0.548***	-0.254***
	(-7.57)	(-8.78)	(-7.08)
Coverage	0.032***	0.058***	0.035***
	(8.95)	(10.70)	(9.51)
Herfindahl	0.223***	0.311***	0.199***
	(3.49)	(2.97)	(3.11)
Observations	76,858	76,858	76,858
Adjusted R-squared	0.364	0.364	0.365
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

6. Conclusion

Theories predict the conditions under which investment distortion can occur with the presence of short-term-oriented shareholders. However, previous studies provide mixed evidence for this prediction. We re-examine the relation between the blockholders' incentives and the firm's innovation investment by focusing on the investors' investment horizons. Our evidence is consistent with the view of institutional-induced myopia. Specifically, our evidence suggests that near-sighted institutional investors exert pressure on managers to focus on short-term performance, and hence impede corporate innovation. Moreover, by exploiting the liquidity shock that generates an exogenous variation in the holdings of the short-term institutional investors, our evidence is robust to a causal interpretation. Lastly, subsequent tests show that such investment distortion is aggravated when the manager's personal wealth is tied to the firm's stock price or when the firm lacks sound corporate governance.

Our study, therefore, contributes to the ongoing contention on the presence of managerial myopia. Investment myopia should arise from investment where its outcome is difficult to recognize and measure (Froot, Perold, & Stein, 1991; Wahal & McConnell, 2000) or from an investment that involves greater uncertainty. Compared to other capital investments, innovative investments are more difficult to quantify and their quality is harder to access. Therefore, the results of the paper not only cast doubt on the bright side of institutional shareholdings but emphasize the importance of distinguishing the types of investments that can be distorted under short-term pressure.

Appendix: Definition of variables

Variable	Definition
Measures of innovation	
Patent	Natural logarithm of a firm's total number of patents granted plus one in a given year.
Qcitation	Natural logarithm of one plus a firm's total number of adjusted citations received on its patents granted in a given year. Each patent is adjusted by the weighting index from Hall, Jaffe and Trajtenberg (2001).
TTcitation	Natural logarithm of one plus a firm's total number of adjusted citations received on its patents granted in a given year. Each patent is scaled by technology and year fixed effects method as stated in Hall, Jaffe and Trajtenberg (2001).
Measures of types of institutional investors	
Near-sighted	Sum of all transient and quasi-indexer blockholdings of a firm in a given year. The definition of types of institutional investors is classified in Bushee (1998).
Transient	Sum of all transient blockholdings of a firm in a given year.
Quasi-indexer	Sum of all quasi-indexer blockholdings of a firm in a given year.
Dedicated	Sum of all dedicated blockholdings of a firm in a given year.
Measures of control variables	
TA	Natural logarithm of one plus total assets in 2004 dollars.
RD	R&D expenditure divided by total assets, set to zero if missing values.
CHE	Cash divided by total assets.

Q	Book value of assets minus the book value of equity plus the market value of equity divided by the book value of assets.
ROA	EBITDA divided by total assets.
PPE	Natural logarithm of one plus net property, plant, and equipment over the number of employees.
LEV	Sum of short-term debt and long-term debt to total assets.
Independent and dedicated investor	An indicator variable that equals 1 if a firm has at least one independent and dedicated institutional investor. These institutions are categorized into independent and grey based on their potential business relationship with target firms (Almazan et al., 2005; Brickley et al., 1998; Chen et al., 2007).
Post	An indicator variable denoting the 1997 and 2001 decimalization periods, separately. For 1997 decimalization, Post equals 1 for fiscal year ends after May 1997. For 2001 decimalization, Post equals 1 for fiscal year ends after January 2001.
Delta	The sensitivity of the dollar value change in CEO's wealth to a dollar change in the firm's stock price (Core and Guay, 2002).
WPS	The dollar change in wealth for a one percent change in firm value scaled by annual pay (Edmans, Gabaix and Landier, 2009).
Independent board	Firm's total number of independent boards in a given year.
Product market competition	Product market threats measure from Hoberg, et al. (2014).
Patent volatility	Standard deviation of the number of patents from t+1 to t+3.
Product patents	Patents that do not fall into the category B01 based on the International Patent Classification (IPC).
Coverage	Number of equity analysts that cover the firm.
Herfindahl	Sales based Herfindahl index based on three-digit SIC code.

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大股東持股動機重要嗎？由企業創新的角度探討*

張景宏♦ 戚永岑♣ 郭貴肇♥ 徐愛恩♠

本文探討短期機構投資人對於企業創新的影響。實證發現當公司股權集中在短暫型和準指數型的機構投資者時，公司的創新績效較低。本研究分別利用 1997 及 2001 兩次股市升降單位改革所造成的流動性衝擊執行差異中之差異法測試，以獲得上述結果的穩健性。短期機構投資者持股對公司創新的負面效果在經理人財富對公司股價較敏感時尤為增強，但在公司治理較完善時則會減弱。此外，當股權集中在短期投資者時，企業亦較少進行探索性的創新。整體而言，本研究結果支持機構投資者持股動機會扭曲企業投資決策之觀點。

關鍵詞：機構投資者, 短視行為, 創新, 投資期限。

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♦ 國立台灣大學；財務金融系與計量理論與應用研究中心，106 台北市羅斯福路四段一號；電子郵件：chinghungc@ntu.edu.tw

♣ 通訊作者。國立中興大學；財務金融學系，402 台中市南區國光路 250 號；電子郵件：ylchi@nchu.edu.tw

♥ 國立中興大學；財務金融學系，402 台中市南區國光路 250 號；電子郵件：kwes4082@gmail.com

♠ 國立政治大學；會計學系，116 台北市文山區指南路二段 64 號；電子郵件：stsui@nccu.edu.tw