Governance Through Trading: Does institutional trading discipline empire building and earnings management?

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Abstract

This paper empirically identifies an important external corporate governance mechanism through which the institutional trading improves firm values and disciplines managers from conducting value-destroying activities. We propose a reward-punishment intensity (RPI) measure, and show that it is positively related to firm's subsequent Tobin's Q. Importantly, we find that firms with higher RPI exhibit less subsequent empire building and earnings management. Furthermore, we show that the exogenous liquidity shock of Decimalization augments the governance effect of institutional trading. We also find that the discipline effect is more pronounced for firms with moderate institutional ownership concentration, higher managers' wealth-performance sensitivity, and higher trading liquidity, which further supports the governance role of the RPI. The results are robust to using a subsample containing firms with reduced institutional ownership and to using two instrumental variables.

JEL classification: G20, G30, G32.

Keywords: governance through trading, institutional trading, empire building, earnings management

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1 Introduction

Previous studies suggest that institutional investors directly intervene and voice in the board or shareholder meetings when they have strong concern in managerial behavior. Recently, several theoretical works propose the idea of "Governance Through Trading", in which institutional trading also disciplines managerial behavior and enhances firm values. For example, Edmans and Manso (2011) argue that aggressive institutional trading could serve as a commitment device to reward and punish managerial actions and thus elicit managerial efforts ex ante. Accordingly, we propose a reward-punishment intensity (RPI) measure and investigate whether managers in higher RPI firms conduct less value-destroying activities. We contribute to this burgeoning literature by identifying two important managerial misbehavior, namely empire building and earnings management, via which the governance through trading improves the firm values. The intuition of governance through trading is as follows. If managers engage in value-destroying activities, which are detected subsequently, institutional investors could express their discontent by selling the shares. Stock prices would be pulled down accordingly.[1] On the contrary, if managers work hard and undertake actions enhancing firm values, institutional investors would buy more shares, which boosts stock prices. In this regard, institutional trading serves as a discipline force to punish and reward managers whose compensation is linked to the stock prices. As long as this mechanism is dynamically consistent, it would discipline managerial behavior ex ante, as argued in Edmans and Manso (2011). Essentially, the intensity of this reward-punishment force manifests the ability and the willingness of the institutional investors adopting governance through trading. We therefore propose our first hypothesis that *higher reward-punishment intensity (RPI) would result in higher subsequent firm values.*

[1] It has been shown that institutional investors proactively gather information concerning firms' fundamental values. Literature also suggests that institutional investors might take activism directly as well. However, empirical studies provide mixed evidence regarding whether institutions enhance firm value through direct intervention (Woidtke (2002), Gillan and Starks (2000), Klein and Zur (2011), and Klein and Zur (2009)).

Next, we investigate whether firm values increase because the two well-known value-destroying activities, empire building and earnings management, are mitigated by the discipline force of RPI.[2] By linking the RPI and the managerial misbehavior, we could provide direct supporting evidence to the governance-through-trading hypothesis. Literature shows that managers have incentives to build up empires to enjoy private benefits at the expense of shareholders' interests.[3] Managers also have incentives to distort reported financial information to boost their compensations, gain benefits from insider trading, or secure their jobs, and such distortions can harm firm values as well.[4] We therefore propose our second hypothesis that *the discipline force of RPI could mitigate managers' tendency to build up empires and manage earnings.*

The logic behind the construction of RPI measure stems from Edmans and Manso (2011), who state that "...multiple blockholders trade aggressively, augmenting price informativeness, and thus constitute a commitment device to reward the manager ex post for his actions...In effect, blockholder trading rewards managerial effort ex post by impounding its effects into the stock price, therefore inducing it ex ante."[5] Following the implication of their model, we use the absolute value of the institutional investors' position changes for a firm within a year to proxy for the dynamic consistency of this reward and punishment mechanism. The RPI is essentially a noisy measure for the amount of institutional buys and sells in one year as we use four snapshots of quarterly institutional holding data for the construction. However, it still largely reflects the extent to which multiple blockholders are trading aggressively in a certain year, representing the reward-punishment intensity that managers face in the subsequent year. In a nutshell, the higher the RPI is, the higher the discipline force

[2]In this paper, we will use the term over-investment and empire building interchangeably.

[3]See Jensen (1986), Titman, Wei, and Xie (2004), and Billett, Garfinkel, and Jiang (2011).

[4]See Ahmed, Zhou, and Lobo (2006), Bergstresser and Philippon (2006), Cornett, Marcus, and Tehranian (2008), Karpoff, Scott Lee, and Martin (2008), and Karpoff and Lou (2010).

[5]In Edmans and Manso (2011), a "blockholder" is not defined in a conventional way. They argue that "Our model does not assume that blockholders have control rights; a blockholder is simply any party with a sufficient stake to induce intervention, who also has private information and the ability to trade on this information. It thus can apply to shareholders with less than 5% and suggests that empirical studies of blockholders may wish to use data sources other than 13d filings to identify sizable shareholders below the 5% threshold". Hence, we are using position changes of 13F institutional investors (filers) to construct RPI measure, rather than the conventional block holders database.

managers perceive.

We use US-listed stocks from 1980 to 2012 to test our hypotheses. We find that a one-standard-deviation increase in RPI relates to a 4.87% standard deviation increase in firm's Tobin's Q in the next year, after controlling for firm size, firm age, institutional ownership ratio, leverage ratio, cash and sales level, fixed asset ratio, insider ownership ratio, insider ownership squared, and corporate governance provisions (E-index in Bebchuk, Cohen, and Ferrell (2009)). The results are consistent with our first hypothesis that firm value increases with the RPI in the previous year.

We employ two methods to gauge the extent to which managers build up their empires. First, following Whited (2006) and Billett et al. (2011), we use a hazard model which captures the frequency of large investments (spikes) and the time between two adjacent investment spikes (spells). The advantage of the hazard model is that it addresses both the issue of measurement errors in instruments for investment opportunities (Tobin's Q) and the lumpy feature of corporate investments. Our results indicate that managers at firms with higher lagged RPI have lower propensity to overinvest, exhibited by a lower hazard rate and long spells between two investment spikes. In detail, we find a one-standard-deviation increase in RPI leads to 7.68% decrease in the hazard rate. Importantly, our result remains after controlling for the E-Index. Second, we use the abnormal capital investment (CI) in Titman et al. (2004), as an alternative way to gauge the tendency of empire building. We find that a one-standard-deviation increase RPI results in 4.58% standard deviation decrease in the subsequent abnormal capital investment, after controlling for firm size, book to market ratio, firm age, leverage ratio, institutional ownership ratio, sales growth rate, cash flow, fixed asset ratio, and E-Index.

Meanwhile, we use the performance-matched discretionary accrual to examine whether the RPI could discipline managers from earnings management (EM). Specifically, following Hazarika, Karpoff, and Nahata (2012), we use the absolute value of discretionary accrual, as the discretionary accruals could be used to both increase and decrease the reported earnings.[6] On the one hand, managers, who

[6]Our main results are robust with respect to signed performance-matched discretionary accrual measures.

attempt to bolster their compensation or to issue new equity, have incentives to inflate the reported earnings.[7] On the other hand, managers might deflate reported earnings before the re-issue of options or before the repurchase of shares.[8] Our results show that a one-standard-deviation increase RPI leads to 4.52% standard deviation decrease in EM in the following year, after controlling for firm size, book to market ratio, return on assets, institutional ownership ratio, cash flow, sales growth ratio, leverage ratio, fixed asset ratio, and E-Index. Both results are supportive of the second hypothesis that the disciplinary effect of institutional trading would mitigate the two important value-destroying managerial misbehavior, empire building and earnings management.

To further support that our results can be attributed to the notion of governance through trading, we explore interaction effects of the RPI and factors that are known to have corporate governance implications. We investigate whether these extant governance factors would complement or substitute the disciplinary effect of the RPI on managers' misbehavior such that the documented effect of lagged RPI on the two agency problems can be connected to the governance mechanism.

First, we use the institutional ownership concentration (IOC) to address the interaction between the ownership structure and the effect of governance through trading. According to Edmans and Manso (2011), when institutional ownership concentration is high, institutional investors have strong incentive to undertake value-enhancing interventions. The high price impact of trading due to the high IOC would deter institutional investors from adopting governance through trading. On the contrary, when institutional ownership concentration is too low, the competition for trading profit among institutional investors is too severe such that they would lose incentive to gather information and trade. Hence, we expect a concave relationship between IOC and the governance effect of RPI. For Tobin's Q (CI and EM) test, we find that the coefficient on the interaction term of RPI and IOC is positively (negatively) significant, and the coefficient on the interaction of RPI and squared

[7] See also Teoh, Welch, and Wong (1998), Burns and Kedia (2006), and Efendi, Srivastava, and Swanson (2007).
[8] See also Coles, Hertzel, and Kalpathy (2006) and Gong, Louis, and Sun (2008).

IOC is negatively (positively) significant. The results are consistent with our two hypotheses and also lend support to Edmans and Manso (2011) that governance through trading is mostly effective when institutional ownership is not too diffused nor too concentrated.

Second, institutional trading does not reward or punish managers directly unless managers' personal wealth are closely linked to the stock prices. We hence expect that the effectiveness of the disciplinary effect of RPI is positively related to the sensitivity of managers' wealth to stock price (Admati and Pfleiderer (2009), Edmans (2009), and Edmans and Manso (2011)). Based on Edmans, Gabaix, and Landier (2009), we use scaled wealth-performance sensitivity (WPS) to gauge the extent to which firm managers' wealth is linked to their stock prices. Indeed, for Tobin's Q (CI and EM) test, we find that the coefficients on the interaction terms of RPI and WPS are positively (negatively) significant. These results lend further evidence to our hypotheses that the correlations between firm values, overinvestment, and earnings management and lagged RPI can be attributed to the notion of governance through trading.

Third, we investigate the role of stock liquidity on the disciplinary effect of the RPI. Both Bharath, Jayaraman, and Nagar (2013) and Edmans, Fang, and Zur (2013) document that exogenous positive liquidity shock of Decimalization and high stock liquidity (low Amihud (2002) ILLIQ) reinforce exit threats, and then improve firm values. Following their argument, we also utilize Decimalization and ILLIQ to test weather the disciplinary effect of the RPI is strengthened by a higher level of overall trading liquidity. We find that the coefficients on RPI are more pronounced after Decimalization and for firms with higher liquidity.

Fourth, we examine how financial constraints, measured by KZ index in Kaplan and Zingales (1997), affect the disciplinary effect of RPI in the context of empire building. Billett et al. (2011) find that the effect of corporate governance provision on the managerial empire building behavior only exists in firms with less financial constraints. Consistently, our tests yield a negatively (positively) significant coefficient on the interaction of RPI and KZ index in the Tobin's Q (CI) test, suggesting

that RPI exhibits a stronger corporate governance effect for firms with less financial constraints to build up empire.

Fifth, during the wave of hostile takeover and merger activities, managers are less likely to pursue value-destroying empire building in order to avoid hostile takeovers (Titman et al. (2004)). Our results show that the disciplinary effect of RPI is less pronounced during takeover wave period from 1984 to 1989, which indicates that the potential hostile takeovers have mitigated the managerial over-investment tendency. Finally, we find that the correlation between Tobin's Q and lagged RPI is more evident for firms with low CI and EM. This finding further substantiates our second hypothesis that the positive RPI effect on subsequent firm values is via lower managerial tendency of conducting empire building and earnings management. Collectively, this set of results provide compelling evidence to the governance mechanism of RPI.

Next, we address several potential concerns one might have with our RPI measure and findings. First, there are two potential explanations that could be also consistent with our main findings. One is that our main results are purely driven by the positive private information held by some institutional investors. If these institutional investors happen to know that the manager will not engage in value-destroying activities in the coming year, they might increase their equity positions of the firm, which results in the positive (negative) relationship between the lagged RPI and firm value (managerial misbehavior). The other one is that institutional investors tend to continuously increase their positions before they start to intervene firms' operations (shareholder activism), which might also result in improved firm values and less managerial misbehavior. The concern on these two alternative explanations is mitigated as we find that our main results still hold in a subsample with annual change in institutional ownership below the median, suggesting that our main findings are not entirely driven by the institutional investors' positive private information or via the institutional investors' activism.

Second, besides the supportive result of exogenous liquidity shock of Decimalization, we use two

instrumental variables (IVs) to address the endogeneity issue. One is the mean RPI of all peer firms in the same state, same year, and same industry (excluding firm i's own RPI), which is in the same spirit of Kim and Lu (2011). The logic is that firms in the same state and the same industry might be traded by the same group of institutional investors who share similar investment styles or strategies. If that is the case, the mean of peer firms' RPI may be associated with firm i's RPI, while it is unlikely to be associated with firm i's managerial behavior. The other IV is the mean RPI of all peer firms held by the same institutional investor in the same year (excluding firm i's own RPI). The intuition is that if one institutional investor adopts the same standard of governance through trading on her portfolio firms, the mean of the portfolio firms' RPI will be related to firm i's RPI, while it is unlike to be related to firm i's managerial activities. The results show that both instruments are not weak instruments, and our conclusion remains.

In addition, our results might be driven by institutional investors' preference and selection on certain unobserved firm characteristics in the cross section.[9] To address this concern, we provide within-firm evidence in two ways. First, we have included a firm dummy in our regressions regarding estimations of the RPI effect on Tobin's Q, CI, and EM. Second, we find qualitatively similar results using the changes of Tobin's Q, CI, and EM as the dependent variables. Finally, we employ an alternative measure of RPI without scaling by the total trading volume, and find that our main results still remain.

Our paper is closely related to the literature that institutional investors vote with feet. Parrino, Sias, and Starks (2003) document that institutional investors sell shares in poorly managed firms prior to forced CEO turnover. Gillan and Starks (2007) argue that shareholders could express their opinions on management's performance, by simply trading a firm's shares. McCahery, Starks, and Sautner (2010) provide survey evidence that institutional investors prepare to employ "Selling Shares"

[9]Institutional investors trade for various reasons, such as, window dressing, portfolio rebalancing, tax motivation, fund-flow driven, reputation concern, and information-driven.

as a primary governance mechanism.[10]

The recent theoretical literature drills further down and argues that institutional trading could serve as a disciplinary force to induce managerial effort ex ante. Edmans (2009) provides a model based on a large informed blockholder, who trades on information and then encourages managers to undertake value-enhancing activities.[11] Likewise, Admati and Pfleiderer (2009) analyze a model of a single large shareholder with exogenous information, and show that large shareholder does not undertake costly intervention, yet engages in trading on her information, which then affects managers' decisions. Edmans and Manso (2011) focus on multiple blockholders setup and argue that the free-rider problem, which may dampen the blockholders' incentive to intervene, strengthens another form of discipline force, i.e., governance through trading. Meanwhile, two recent empirical studies of governance through trading focus on how liquidity affects the credibility of the exit threat and then improves subsequent firm values. Bharath et al. (2013) employ three natural liquidity shocks, namely Decimalization, Russian, and Asian financial crises, and show that the ability of blockholders to "selling their shares" is an effective governance force. Edmans et al. (2013) show that the 13Gs (passive investments) filings of liquid firms result in positive announcement returns, indicating that liquidity encourages blockholders to govern through trading.[12]

Our paper complements this new strand of the literature. We probe deeper into the relationship between governance through trading and firm values by investigating what are the specific channels, through which firm values are improved. In particular, we find that governance through trading mitigates two managerial value-destroying behavior, namely empire building and earnings management, and thus improves firm values. In addition, our results provide supportive evidence on the model of Edmans and Manso (2011) by proposing the reward-punishment intensity (RPI) measure to gauge the

[10] Around 80% (the most popular) of responding institutional investors will sell their shares of firms with misbehavior.

[11] See also Gaspar, Massa, and Matos (2005) and Bushee (1998).

[12] Using Australian data, Gallagher, Gardner, and Swan (2012) find that short-horizon swing trades of multiple institutional investors will improve price informativeness and thus increase the subsequent firm performance. Chen and Swan (2012) argue that managers' equity-based compensation and informed institutional trading are substitutes, indicating the monitoring role of institutional investors based on "Wall Street Rules".

extent to which managers are disciplined by governance through trading.

The remainder of this paper proceeds as follows. Section 2 describes the data and the measure of RPI. Section 3 discusses the basic empirical results, Section 4 presents additional supporting evidence, Section 5 includes robustness checks, and Section 6 concludes.

2 Data and Key Variables

2.1 Data

Our data consists of all companies listed on the NYSE, AMEX, and NASDAQ from 1980-2011. We obtain stock price, stock return, trading volume data, and the number of shares outstanding from Center for Research in Security Prices. Relevant accounting data is derived from COMPUSTAT. Our primary data on institutional trading is derived from the Thomson-Reuters Institutional Holdings (13F) Database. The scaled wealth-performance sensitivity (ScaledWPS) is from Alex Edmans' website.

2.2 Measure of the Reward Punishment Intensity from Institutional Investors

As suggested by Edmans and Manso (2011), once the managerial action has taken place, blockholders are only concerned with their own portfolio performance. They thus trade aggressively to compete for the trading profits, which in turn serves as a commitment device to reward and punish managers for their managerial behavior. We therefore construct the measure of the reward-punishment intensity from institutional investors for firm i in year t is as follows:

$$RPI_{i,y} = log(\frac{\sum_{q=1}^{4}\sum_{j\in Q}|N_{j,i,q} - N_{j,i,q-1}|}{\sum_{q=1}^{4} VOL_{i,q}}), \tag{1}$$

where $N_{j,i,q}$ denotes the number of shares held by institutional invest j at the end of quarter q. Q denotes all institutional investors who hold the stock of firm i in quarter q. $VOL_{i,q}$ denotes the

trading volume of firm i during quarter q. The RPI is a noisy scaled measure for the total amount of institutional trading in year y, and represents the reward-punishment intensity from institutional trading that managers might perceive in the following year.

The way to construct the RPI is also in the same spirit to the investor churn rates measure in Gaspar et al. (2005).[13] The main difference is that we focus on the changes in institutional holding at the firm level, whereas Gaspar et al. (2005) focus on the portfolio rotation rate of the institutional investors.Further, Edmans and Manso (2011) state that "Total quantities (here, trading volumes) are higher than under monopoly, so more information is impounded in prices and they more closely reflect fundamental value and thus the manager's effort.", suggesting that trading volume itself is positively related to the number of blockholders, price efficiency, and manager's effort. We therefore focus on the total absolute position changes of institutional investors in one year.In untabulated tests, we find a mild autocorrelation of 15% for the RPI measure. The time-varying feature of RPI provides a better identification of the governance effect on firm values and managerial misbehavior, compared with the highly persistent G- or E-Index.

Table 1 reports summary statistics for variables used in the analysis. The number of firm-year observations varies from 12,907 to 324,411 mainly due to the availability of governance factors like E-Index. Our main variables of interest are RPI, Tobin's Q, abnormal capital investment (CI), and performance-matched discretionary accrual (EM).

3 Basic Empirical Results

3.1 RPI and Subsequent Tobin's Q

In this section, we investigate the association between RPI and subsequent Tobin's Q. Following Kaplan and Zingales (1997), Gompers, Ishii, and Metrick (2003), and Bebchuk and Cohen (2005), we define the Tobin's Q as the ratio of market value of assets and the book value of assets, subtracting the

[13]Shu (2013) employs a similar way to calculate institutional trading volume, and find strong impact of institutional trading volume on stock market anomalies.

value-weighted average industry Tobin's Q.[14] In the regressions, we include the logarithm of the assets of the firm, firm age based on the first date appears in Compustat (Shin and Stulz (2000)), return on assets, institutional ownership ratio, leverage, fixed asset, cash, sales, the ratio of capital expenditure and total asset, insider ownership (fraction of shares held by insiders), and insider ownership squared (Bebchuk and Cohen (2005)), E-Index (Bebchuk et al. (2009)), and price informativeness measures (AdjPIN and 1 - RSQ in Duarte and Young (2009) and Chen, Goldstein, and Jiang (2007))[15] as the control variables[16]. We also include the firm and year dummies to control for the firm and year fixed effects. Standard errors are also clustered at firm level.

Model 1 of Table 2 indicates that RPI is positively associated with Tobin's Q in the subsequent year. After controlling for other firm value relevant variables, a one-standard-deviation increase in RPI leads to a 4.87% standard deviation increase in firm's Tobin's Q in the following year. Model 3 of Table 2 shows that after the inclusion of E-index, the coefficient on RPI remains significant. It indicates that the corporate governance provisions do not drive the documented effect of RPI on firm value. In addition, models 4 and 5 show that the positive correlation between RPI and subsequent Tobin's Q is not driven by the price informativeness measured by PIN or 1-RSQ (Fang, Noe, and Tice (2009)).[17] Overall, the association between the RPI and the subsequent firm values is consistent with our first hypothesis.

[14]Market value of assets is calculated as the summation of the market value of common stocks, the book value of preferred stocks, the book value of short term debt, and the book value of long term debt.

[15]1-RSQ is the the logistic transformation of 1-R^2.

[16]One might be concerned that more institutional trading results in higher firm value as the level of institutional ownership is positively related both to trading and to firm value, as Gompers and Metrick (2001) find a positive association between the institutional ownership and future stock returns. In order to rule out this possible explanation, we include institutional ownership ratio in our regression, and examine whether the effect of institutional trading on firm value will be subsumed.

[17]Fang et al. (2009) documents that liquidity improves firm value, which is attributed to the increase in the information content in stock price as well as performance-sensitive managerial compensation.

3.2 RPI and Managerial Value-destroying Behaviors

Having identified a positive association between intensive institutional trading and subsequent firm value, we now turn to the test of our second hypothesis that whether RPI (governance through trading) would mitigate the tendency of managers to undertake value-destroying activities, such as empire building and earnings management.

3.2.1 RPI and Empire Building: Hazard Estimation

Jensen (1986) states that "Managers have incentives to cause their firms to grow beyond the optimal size. Growth increases managers' power by increasing the resources under their control." This type of managerial behavior is based on power play and manager's ego, which harms the shareholder value. Whited (2006) develops an empirical methodology based on hazard estimation to examine the managerial over-investment behavior. The hazard estimation investigates the "hazard rate" rather than the level of investment, and thus avoids the computation of the proxy for investment opportunities.[18] This method also allows for the lumpy feature of corporate investment by focusing on the time that passes since a firm's last large investment.

The hazard function is composed of two parts. The first part is the baseline hazard, which is common to all firms. The second part is the time-varying explanatory variables, which impact the shape of the hazard function. In particular, the technique allows the hazard rates to move up or down according to the value of the covariates, incorporates the cross-sectional heterogeneity, and accounts for the right-censoring of our data due to the fact that firms have not yet experienced large investments at 2012. More details of the hazard estimation are discussed in Appendix A.

Our second hypothesis suggests that firms with higher RPI are less likely to experience over-

[18]The discussion of the measurement errors in Tobin's Q can be found in Erickson and Whited (2000), Cooper and Haltiwanger (2006), and Cummins, Hassett, and Oliner (2006).

investment frequently. Thus, we carry out the hazard estimation as follows:

$$\lambda_i(s) = \omega_i \lambda_0(s) exp(RPI_{i,s} \cdot \gamma_1 + x_i(s)' \cdot \beta) \tag{2}$$

where $RPI_{i,s}$ denotes the reward-punishment intensity of institutional investors during the spell s between two investment spikes. $x_i(s)'$ represents a column vector of covariates value during the spell s, including total assets, sales growth, cash flow, and leverage. Following Whited (2006) and Billett et al. (2011), we measure the investment rate as the difference between capital expended and sale of property, scaled by total asset. Investment spike is an indicator, which equals to one if the firm's investment rate in spell s exceeds pre-defined benchmark, otherwise zero. We define the benchmark as 2 and 2.5 times of the median of the firm's investment rate in our sample as in Whited (2006).

Because the variables of interest in Whited (2006) and Billett et al. (2011), number of business segments and corporate governance provision, are time-invariant, they need to sort sample firms into two groups based on those variables and then compare the shape of the baseline hazard function to examine the hazard rate.However, our RPI measure is time-varying by its construction. We thus could include RPI as a covariate and test our hypothesis by estimating the coefficients on RPI, γ_1, rather than comparing the baseline hazard functions for two groups of firms sorted by the variable of interest.[19] As we argue that managers in higher RPI firms are less likely to engage in over-investment (empire building), we would expect γ_1 is less than one, suggesting a negative marginal effect of RPI on the hazard rate.

Table 3 includes the results of the hazard estimations. Across all models, we find that the γ_1 is smaller than one and significant, suggesting that the intensity of institutional trading is negatively associated with the hazard rate of over-investment. In model 1, a one-standard-deviation increase in

[19]Our method is in the similar spirit as Hazarika et al. (2012), who employ proportional hazard model and find that the likelihood of CEO's forced turnover in year t is increasing with the extent to which he manipulates reported earnings in year *t-1* .

RPI leads to 7.68% decrease in the hazard of over-investment. In addition, a one-standard-deviation increase in RPI leads to 12.67% decrease in the hazard of over-investment in model 3. It is also noticeable that the coefficients on cash flow are larger than one and significant, indicating that managers are more likely to build up empire with more positive cash flow.

In order to control for the effect of governance provision on over-investment documented in Billett et al. (2011), we add E-Index in models (2) and (4), and γ_1 remains significant. Overall, these results indicate that the managers are less likely to over-invest when institutional trading is more active, which is consistent with our second hypothesis.

3.2.2 RPI and Empire Building: Abnormal Capital Investments

Titman et al. (2004) utilize the measure of abnormal capital investment to estimate the extent of over-investment, and document a significantly negative association between abnormal capital investment and future stock returns. Further, Titman et al. (2004) find that the association between abnormal capital investment and stock return disappears during the period when the hostile takeover is quite prevalent, suggesting that if managers are disciplined by an active takeover market, they are less likely to engage in over-investment.

Following Titman et al. (2004), we compute the abnormal capital investment (CI_t) in year t as follows:

$$CI_t = \frac{CE_t}{(CE_{t-1} + CE_{t-2} + CE_{t-3})/3} - 1 \tag{3}$$

where t represents the year when the abnormal capital investment is computed, and CE_t is a firm's capital expenditure (CAPEX) scaled by its total asset (TA) in year t.

We then investigate whether institutional trading affects firm's abnormal capital investments in

the following year. In particular, we perform the following panel regression:

$$\begin{aligned} CI_{i,t+1} &= a_0 + a_1 \times RPI_{i,t} + a_2 \times SIZE_{i,t} + a_3 \times AGE_{i,t} + a_4 \times IOR_{i,t} \\ &+ a_5 \times Leverage_{i,t} + a_6 \times FixedAsset_{i,t} + a_7 \times BM_{i,t} + a_8 \times SaleGrowth_{i,t} \\ &+ a_9 \times CashFlow_{i,t} + a_{10} \times ROA_{i,t} + a_{11} \times E - Index_{i,t} + a_{12} \times PrcInfo_{i,t} + \epsilon_{i,t} \end{aligned} \tag{4}$$

where the dependent variable, $CI_{i,t+1}$ is computed following the specification in Eq.(3). RPI is our main variable of interest, constructed according to Eq.(1). The control variables are the log of market capitalization, firm age, institutional ownership ratio, leverage ratio, the ratio of fixed assets and total assets, book-to-market ration, the changes in sales scaled by lagged sales, the cash flows of the firm, the ratio of net income to total assets, E-Index, and price informativeness (PrcInfo). We also control for firm and year fixed effects and cluster standard errors at firm level.

Table 4 presents the results of the panel regressions. Consistent with our second hypothesis, the coefficient on RPI is negatively significant across all specifications, suggesting that managers of firms with intensive institutional trading are less likely to engage in over-investment. A one-standard-deviation increase RPI results in 4.58% standard deviation decrease in abnormal investment rate in the overall sample, with all investment relevant variables controlled in model 3.

It is noteworthy that models 4, 5, and 6 show that the effect of RPI is fairly robust even after controlling for the governance provisions or price informativeness. However, owing to the much smaller sample size of firms with E-Index data, the coefficient of RPI becomes slightly weaker but remain significant. In models 5 and 6, we use AdjPIN (Duarte and Young (2009)) and 1-RSQ (Chen, Goldstein, and Jiang (2007)) to proxy for price informativeness.[20] Our results still hold after controlling for AdjPIN or 1-RSQ. Consistent with Billett et al. (2011), we see that the coefficient on E-Index is positively significant, suggesting that firms with more governance provisions whose managers are

[20]Following Chen, Goldstein, and Jiang (2007), 1-RSQ is the logistic transformation of 1-R^2, based on Fama-French Three-Factor model.

more likely to build up empire.

3.2.3 RPI and Earnings Management

Analogous to the analysis in the previous subsection, we examine the effect of RPI on earnings management. We carry out the following panel regression:

$$\begin{aligned} EM_{i,t+1} &= a_0 + a_1 \times RPI_{i,t} + a_2 \times SIZE_{i,t} + a_3 \times BM_{i,t} + a_4 \times ROA_{i,t} \\ &+ a_5 \times IOR_{i,t} + a_6 \times CashFlow_{i,t} + a_7 \times SaleGrowth_{i,t} + a_8 \times Leverage_{i,t} \\ &+ a_9 \times FixedAsset_{i,t} + a_{10} \times E - Index_{i,t} + a_{11} \times PrcInfo_{i,t} + \epsilon_{i,t} \end{aligned} \tag{5}$$

where the dependent variable, $EM_{i,t+1}$ is the performance-augmented discretionary accruals based on Kothari, Leone, and Wasley (2005). The detail construction can be found in Appendix B. We report the results using both the absolute value and signed value of the discretionary accruals. We construct the measure of RPI according to Eq.(1). To address other factors that might influence earnings management, we control for the log of market capitalization, book-to-market ration, the ratio of net income to total assets, the institutional ownership ratio, the cash flows of the firm, the changes in sales scaled by lagged sales, the ratio of debt and total assets (leverage ratio), the ratio of fixed assets and total assets, E-Index (Bebchuk et al. (2009)), and price informativeness (Duarte and Young (2009) and Chen, Goldstein, and Jiang (2007)). We also control for firm and year fixed effects and cluster standard errors at firm level.

Table 5 presents a significantly negative relation between RPI and earnings management, which remains across different specifications. In model 1 of Table 5, our result shows that a one-standard-deviation increase in RPI is associated with 4.52% standard deviation decline in absolute value of the performance-augmented discretionary accrual in the next year. Similar to the results in Section 3.2.2, we find the effect of RPI on earnings management still holds after controlling for E-Index, though less significant as a result of reduced sample size.

In order to address the extent to which that the intensive institutional trading might directly impact the likelihood that managers manipulate earnings information upward, we also use the signed discretionary accruals as our dependent variable. In model 2, we find that a higher RPI would lead to a lower value of signed discretionary accruals in the following year, suggesting that aggressive institutional trading deters managers from inflating earnings information. In models 4, 6, and 8, we show that the effect of RPI on signed EM remains after we control for E-Index and price informativeness (AdjPIN or 1-RSQ).

Overall, these results are supportive to our second hypothesis that governance through trading can deter managers from engaging in self-interested, yet value-destroying activities, namely, empire building and earnings management.

4 Additional Supporting Evidence

In order to substantiate our understanding on the discipline effect of institutional trading, we investigate the interaction between RPI and other variables that are shown to have governance effect. Our goal is to show in what circumstances the discipline effect of RPI is more effective. Specifically, we examine the following factors: the institutional ownership concentration (Kim and Lu (2011)), the Edmans et al. (2009) wealth-performance sensitivity measure, the Decimalization (Bharath et al. (2013) and Edmans et al. (2013)), the Amihud (2002) illiquidity measure, the Kaplan and Zingales (1997) financial constraints index (KZ index), and the takeover wave years (Titman et al. (2004)).

4.1 Institutional Ownership Concentration

On the one hand, traditional theories argue that a lower institutional ownership concentration (IOC) might impede the direct intervention from institutional investors, as the benefits from the activism (intervention) might not be sufficient to offset the costs incurred.[21] On the other hand, in a recent

[21]Previous studies provide mixed evidence on institutional activism. On the one hand, empirical studies provide evidence that institutional investors lack ability to intervene (Black (1990) and La Porta, Silanes, and Shleifer (1999)). On the other hand, other studies show that institutional investors have impact on firm decisions (Chen, Harford, and

theoretical paper, Edmans and Manso (2011) argue that, although a lower institutional ownership concentration might hinder the direct interventions, it reinforces another discipline force, "Governance Through Trading", by encouraging the competitive trading among institutional investors.[22] Moreover, Edmans and Manso (2011) argue that the trading competition should be sufficient enough to encourage each institutional investor to gather information, therefore the institutional ownership could not be too dispersed. Based on Edmans and Manso (2011), we hence expect a concave relation between the institutional ownership concentration and the discipline effect of RPI on the subsequent managerial value-destroying activities.

Following Hartzell and Starks (2003) and Kim and Lu (2011), we use the sum of the top five institutional investors share ownership as the proxy for institutional ownership concentration (IOC). The empirical results are reported in Table 6.[23] As predicted, we find a concave relation between the IOC and the effect of RPI on the subsequent Tobin's Q, CI, and EM. In the first two model, we use firms' subsequent firm value (Tobin's Q) as the dependent variable. We find that the effect of the interaction term of RPI and IOC is positively significant with a coefficient of 0.71 and a standard error of 0.29, and the interaction term of RPI and IOC^2 is negatively significant with a coefficient of -1.68 and a standard error of 0.64. It suggests that, comparing to a single large institutional investor, multiple small institutional investors strengthens the effect of governance through trading. However, when the ownership is too diffused, the competition in institutional trading becomes too severe to provide profit for investors who therefore are less incentivized to acquire information, and then the effect of governance through trading is mitigated. We find similar concave relation between

Li (2007) and Cronqvist and Fahlenbrach (2009)). The idea of "Governance Through Trading", introduced in Edmans and Manso (2011) might reconcile these two conflicting observations, by providing a different perspective of governance force.

[22]Though Edmans and Manso (2011) use blockholders in their paper, they did not strictly assume that the blockholders have control rights or have stake above 5%. They state that "...in our model a blockholder is simply a shareholder who has greater information than the market...". We, therefore, employ 13F filers (institutional investors) to examine whether institutional trading would discipline managers.

[23]On the basis of the model 2 of Table 2, model 3 of Table 4 and model 1 in Table 5, we include IOC, the square of IOC, and their interaction terms with RPI. We choose these three model specifications, since they have all important control variables and quite sufficient sample size. We would use these three specifications to examine the interaction between the RPI and other factors, including WPS, Decimal, Amihud, and KZ index as well.

the IOC and the governance effect of RPI on the subsequent abnormal capital investment and earnings management in models 4 and 6.

4.2 Wealth Performance Sensitivity

The mechanism of governance through trading presumes that the institutional trading would have impact on stock prices, which in turn alters managers' activities owing to the managerial equity compensation. Therefore, the effectiveness of governance through trading largely hinges on the extent to which managers compensation is related to stock price (Admati and Pfleiderer (2009); Edmans (2009); Edmans and Manso (2011)). In this section, we investigate whether the sensitivity of managers' compensation to the stock price magnifies the governance effect of RPI.

Following Edmans et al. (2009), we use the measure of wealth-performance sensitivity (WPS), which represents the dollar change in CEO wealth for a one-hundred percentage change in firm value, scaled by annual flow of compensation.Table 7 model 2 shows that the coefficient on the interaction term is 1.22 at 5% significance level, indicating that higher WPS leads to a larger positive effect of RPI on the subsequent firm value.

In model 4, the coefficient on the interaction of WPS and RPI is negative and significant. This suggests that, other things being equal, the discipline force of institutional trading on empire building (CI) is more effective when managers' wealth is more sensitive to stock prices. In model 6, the coefficient on the interaction between WPS and RPI is also significant, with the expected negative sign, indicating that the disciplinary effect of RPI on the managerial earnings management in the following year is more pronounced in firms whose manager's compensation is more closely linked to stock price.

4.3 Decimalization and Amihud Illiquidity Measure

Both Bharath et al. (2013) and Edmans et al. (2013) document that high stock liquidity, either in the form of positive liquidity shock (after Decimalization) or in the form of low price impact (low ILLIQ), imposes governance effect via blockholders' threat. Our identification strategy also employs Decimalization and Amihud ILLIQ measure to examine whether the increases in overall trading liquidity will reinforce the governance effect of RPI because it is less costly for institutional investors to reward and punish managerial behavior by buying and selling firm shares. As argued byBharath et al. (2013) and Edmans et al. (2013), adopting the exogenous liquidity shock of Decimalization also mitigates the endogegeity issue.

In model 2 of Table 8, the coefficient on the interaction term between RPI and decimalization is 0.46 at 1% significance level. This indicates that the positive liquidity shock of Decimalization reinforces the positive association between RPI and the subsequent firm values. In columns 4 and 6, the coefficients on the interaction term of RPI and Decimalization are negatively significant, indicating that the institutional trading would be more effectively to deter managers from empire building and earnings management in the post-decimalization period.

Likewise, model 2 of Table 9 shows that the interaction terms of RPI and ILLIQ are negatively significant. It is consistent with our argument that higher stock liquidity would reinforce the positive association between RPI and firm value. In models 4 and 6, the coefficients on the interaction terms of RPI and ILLIQ are both positively significant, suggesting that the disciplinary effect of RPI on the subsequent empire building and earnings management is more effective for firms with a lower price impact. Overall, our results indicate that the RPI and the overall trading liquidity are complements in deterring managers from empire building and earnings management.

4.4 Financial Constraints and Empire Building

Whited (2006) argues that financial constraints may bring in extra costs when adjusting the capital, and then reduce over-investment. Billett et al. (2011) find that there is no effect of corporate governance provisions on the over-investment when firm is financially constrained, implying that the effect of governance provisions and financial constraints on mitigating managers' incentives to over-invest can be substitutes. We therefore expect the discipline effect of the RPI would be offsetted in firms with a higher degree of financial constraints. Model 2 of Table 10 shows that the coefficient on the interaction term of RPI and KZ-index is negatively significant, indicating that a higher level of KZ index (more financially constrained) will mitigate the positive association between the RPI and the following firm value. In model 4, the coefficient on the interaction term is positive and significant, illustrating that managers in financially constrained firms are less likely to build up empire.

4.5 Hostile Takeover Wave and Empire Building

According to Titman et al. (2004), during the wave of hostile takeover and merger activity from 1984 to 1989, managers with empire building propensity are forced to pursue more value-enhancing projects to deter these takeovers and secure their own jobs. We expect to find a weaker discipline effect of RPI on empire building during hostile takeover years as the managers have been under the radar of the hostile takeovers. Model 2 of Table 11 shows that the coefficient on the interaction term of takeover wave dummy and RPI is 0.03 at 1% significance level, suggesting that the RPI and the takeover wave are substitutes for deterring managers from empire building.

4.6 Improved Firm Values via Less Empire Building and Earning Management

The previous results have shown that the discipline effect of RPI improves firm value and reduces empire building and earning management. In this subsection, we further substantiate our hypotheses

by establishing that the positive effect of RPI on the following firm value would be more pronounced in firms with less empire building as well as less earnings management in the subsequent year. It provides further evidence that aggressive institutional trading would deter managers from misconducts, which in turn improves the following firms value.

The empirical results are presented in Table 12. In model 2, the coefficient on the interaction term of RPI and EM_{t+1} is -0.84 at 5% significance level, suggesting that the positive effect of RPI on the subsequent Tobin's Q will be reinforced by a lower level of absolute performance-augmented discretionary accruals. In model 3, we find similar results that the coefficient on the interaction term of RPI and CI_{t+1} is -0.03 at 10% significance level, which suggests that the improved firms value is partially driven by a lower level of empire building in the next year. In summary, the findings are consistent with the notion of governance through trading.

5 Robustness Tests

In this subsection, we conduct robustness tests for our main result thats higher lagged RPI leads to higher firm value by reducing the managerial propensity of empire building and earnings management. We first exclude firms with changes in institutional ownership ratio above the median value to address the concern that our results are purely driven by the private information held by institutional investors regarding subsequent managerial behavior and firm values. Second, we employ two instrumental variables for RPI to address the endegeneity concern. Third, use the changes in Tobin's Q, CI, and EM as the dependent variables to address the issue on the cross-sectional stock selection of institutional investors. Finally, we use an alternative measure for RPI, which is based on the numbers of shares traded only. Our conclusions hold for all robustness checks.

5.1 Subsample Analysis of Firms With The Changes in Institutional Ownership Ratio Below the Median Value

Nofsinger and Sias (1999) and Yan and Zhang (2009) find that institutional investors' holdings forecast future stock returns, indicating that some institutional investors possess private information.[24] Therefore, one may be concerned that the lead-lag relation between RPI and firm value as well as managerial behavior might simply reflect the private information held by institutional investors rather than the discipline effect of institutional trading on managerial behaviors. When institutional investors have positive information about higher firm value and better managerial behaviors in the subsequent year, they would buy more shares. If this is the case, higher Tobin's Q and lower empire building following high RPI that we observe could be purely stemmed from the information-driven institutional trading rather than from the disciplinary effect of RPI, i.e., governance through trading.

In addition, another potential explanation of our main results is that institutional investors might continuously increase their holdings before they start to intervene in firms' operation (activism). This also leads to a positive correlation between lagged RPI and firm values.

To address these two potential concerns, we first re-run our estimation by excluding firm-year observations that have four consecutively positive quarterly position changes of institutional investors. We obtain largely similar results and do not report these results for brevity. Next, we categorize firms according to the changes in institutional ownership ratio (ΔIOR), and only include firms whose ΔIOR are below the median value in that year.[25] The intuition is that if the intensive intensive institutional trading is purely information driven and and has no discipline effect on managerial misbehavior, we should observe that for firms with reduced institutional ownership ratio, the high RPI should lead to low subsequent firm values and more managerial value-destroying activities. The results in Table 13

[24] Gompers and Metrick (2001) also document a positive association between institutional holding and future stock returns, while they attribute this association to the demand of institutional investors.

[25] These firms experience 4% reduction in institutional ownership ratio on average, which is statistically significant.

reveal the opposite. In the first model, we find that the coefficient on the RPI is positive and significant. In model 2, we find that the negative associations between the RPI and the subsequent managerial empire building remains. Similarly, model 3 shows that the negative associations between the RPI and the subsequent managerial earnings management also holds. Overall, our findings indicate the positive association between the RPI and subsequent firm value and the negative associations between the RPI and subsequent value-destroying activities are not purely driven by the private positive information held by institutional investors or by the effect of institutional investors' activism. This further substantiates our hypothesis that high RPI exerts discipline effect on managerial behaviors.

5.2 Instrumental Variables for RPI

We have shown that the positive exogenous liquidity shock of Decimalization improves the governance effect of RPI. The result, together with the fact that the lagged RPI is time-varying (unlike the E-index), helps to alleviate the concern of the endogeneity. In this subsection, we further address the endogeneity issue by employing two instrumental variables (IVs). The first one is the mean RPI of all firms (excluding firm i's own RPI) in the same state, same year, and same industry, RPI_SYI(-i). Kim and Lu (2011) propose that institutional investors might have same preference or investment style for specific firm locations and industries. Following their intuition, RPI_SYI(-i) may be associated with firm i's own RPI, but may not be related to firm i's firm value and manager's activities.[26] The other IV is the mean RPI of all peer firms held by the same institutional investor in the same year (excluding firm i's own RPI value), RPI_IY(-i). The intuition is that if one institutional investor adopts the same standard of governance through trading (investment style) on her all portfolio firms, the mean of the rest portfolio firms' RPI will be related to firm$i$'s RPI, while it is unrelated to firm i's value and managerial activities.

According to Roberts and Whited (2012), the IVs should satisfy two conditions. The first condition

[26]Kim and Lu (2011) employ the average institutional ownership concentration (IOC) of peer firms in the same state, same year, and same industry as IV for firm i's IOC, and find it alleviates the effect of CEO ownership on firm value.

is the relevance condition, meaning that the partial correlations between RPI and these two IVs are not equal to zero. We regress RPI on RPI_SYI(-i) and RPI_SYI(-i) with control variables, respectively. The results of these regressions are presented in Table A-1 and Table A-2, and the coefficients on both RPI_SYI(-i) and RPI_IY(-i) are positively significant.[27] It suggests that our two instrumental variables satisfy the relevance condition.

The second condition is the exclusion condition, which requires the covariance between the instrumental variable and the residual equals zero. It means that the effect of IVs on firm i's managerial behavior and firm value is only through its impact on firm i's RPI. Intuitively, it is unlikely that institutional investors' trading behavior in peer firms would have impact on firm i's managerial behavior. Our results of overidentification tests (untabulated) suggest that the instrumental variables are exogenous.

Table 14 and Table 15 present the results of the second stage regressions of instrumental variables. The predicted values in the first stage regression (Table A-1 and Table A-2) are employed as main explanatory variables. In models 1 of Table 14 and Table 15, the coefficients on Instrumented RPI are positively significant, and in models 2 and 3 of Table 14 and Table 15, the coefficients on Instrumented RPI are negative and significant, consistent with the results presented in the previous section. These findings provide supportive evidence that our conclusion is unlikely to be driven by the possible omitted variables or endogeneity biases.

5.3 Changes in Tobin's Q, CI, and EM

Institutional investors trade stocks for various reasons, such as window dressing, portfolio rebalancing, tax, mutual fund flow, reputation, and information. Therefore, one might concern that our results could be driven by the institutional investors' preference and selection on certain unobserved firm

[27]Importantly, we find that the marginal R^2 varies from 0.18% to 2.21%, and the F test of marginal R^2 is from 70.96 to 1005.73. The correlation of RPI and RPI_IY(-i) is more significant in quantity and in quality, which might be due to the quite prevalent phenomenon that the institutional investors tend to employ similar trading strategies across all firms in their portfolios.

characteristics in the cross section. To mitigate this issue, we provide within-firm evidence in two ways. First, we have included a firm dummy in our regressions on Tobin's Q, CI, and EM in the previous sections. Second, in this subsection, we use the changes in Tobin's Q, CI, and EM as the dependent variables, and re-examine our main tests to investigate to what extent, if any, the persistence in dependent variables shall affect our existing results. The empirical results are presented in Table A-3 . Overall, our main findings still hold when we use changes in Tobin's Q, CI, and EM as dependent variable, suggesting that our main results are more consistent with our disciplinary story rather than the selection story of institutional trading.

5.4 Alternative Measure for RPI

In this section, we employ an alternative measure for RPI in Eq.(3.1). We use the logarithm of the summation of the institutional investors' absolute position changes as the alternative measure for institutional trading, and denote it as Alternative RPI. Table A-4 presents the results. We find consistent results that higher Alternative RPI leads to higher firm value, less empire building, and less earnings management, suggesting that our primary findings are quite robust to an alternative measure of institutional trading.

6 Conclusion

We identify an important mechanism through which the reward-punishment intensity (RPI) from institutional trading improves firm values and disciplines managerial value-destroying behaviors. We find that RPI is positively associated with firm's subsequent Tobin's Q, which is consistent with the notion of governance through trading. More importantly, we provide evidence that the effect of RPI on the subsequent firm values can be attributed to the discipline effect of institutional trading on managerial value-destroying behaviors. We find that firms with higher RPI whose managers are less likely to engage in empire building and earnings management. Following Whited (2006), we employ

hazard estimation to examine the marginal effect of institutional trading on hazard rate of over-investment, and find that firms with higher RPI will have lower hazard rate. By using the abnormal capital investments measure as a proxy for over-investment (Titman et al. (2004)), we find that the RPI is negatively related to managers' propensity to over-invest. In addition, following Kothari et al. (2005) and Hazarika et al. (2012), we use performance-matched discretional accrual to gauge the extent of earnings management, and find that managers at firms with higher RPI are less likely to manage earnings information in the subsequent year.

Moreover, we find a concave relationship between IOC and the governance effect of RPI. We also find that a higher level of wealth-performance sensitivity will enhance the discipline effect of institutional trading. Results are both consistent with the governance through trading argument in Edmans and Manso (2011). The discipline effect of RPI is more prominent in firms with high liquidity, measured by Decimalization and Amihud illiquidity measure, consistent with the evidence from Bharath et al. (2013) and Edmans et al. (2013). Besides, we find that the discipline force of the RPI on empire building is less effective in financially constrained firms and during the takeover wave years.

Our results are robust to using subsample firms with the changes in institutional ownership ratio below the median and to employing two instrumental variables. The first IV constructed as the mean of peer firms' RPI in the same state, industry, and year. The other one is constructed as the mean RPI of all peer firms held by the same institutional investor in the same year. The results are also robust to using changes in Tobin's Q, CI, and EM as the dependent variables and to using an unscaled RPI measure. Overall, our findings suggest that governance through trading improves firm value via deterring managers from engaging in empire building and earnings management.

Appendix A: Hazard Estimation for Empire Building

Whited (2006) proposes a methodology to use hazard model to estimate the probability that a manager undertakes a large investment based on the time since the last large investment.[28] She employs the estimation methodology in Meyer (1990), and starts with a proportional hazards specification with unobservable heterogeneity:

$$\lambda_i(s) = \omega_i \lambda_0(s) exp(x_i(s)' \cdot \beta) \tag{A.1}$$

where $\lambda_0(t)$ is the baseline hazard function, which is common to all firms. ω_i is a random variable and represents the unobservable heterogeneity, following Gamma distribution with unit mean and variance, σ^2. $x_i(s)$ represents a vector of covariates which identifies observable differences across individual firms. β is the vector of coefficients of those covariates accordingly. $exp(x(s)'\beta)$ allows the expected time of the occurrence of the investment "spike" to vary across firms according to their different value of the set covariates. s represents the length of a spell, the duration between two adjacent large investments. Hazard rate, $\lambda(s)$, represents the probability of undertaking a large investments at time s conditional on time elapsed since last large investments. Hazard estimation also allows for right-censored data. For example, if last recorded investment spike occurs in 2000 for firm i, and firm i's data ended in 2002, then the censored duration of firm i's final spell is two-year.

Maximum likelihood method is utilized to estimate the coefficients. Denote T_i as the actual length of time between investment spikes and the censoring time as C_i for firm i. Define $\delta_i = 1$ if $T_i \leq C_i$ and 0 otherwise. Let $h_i = min(T_i, C_i)$. The Log-likelihood function presents as follows:

$$L(\gamma, \beta) = \sum_{i=1}^{N} ln\{[1 + \sigma^2 \sum_{t=0}^{h_i - 1} exp(x_i(t)'\beta + \gamma(t))]^{(-1/\sigma^2)} - \delta_i [1 + \sigma^2 \sum_{t=0}^{h_i} exp(x_i(t)'\beta + \gamma(t))]^{-(1/\sigma^2)} \tag{A.2}$$

where

$$\gamma(t) = ln(\int_t^{t+1} \lambda_0(s) ds) \tag{A.3}$$

and σ denotes the variance of the gamma distribution of the unobservable heterogeneity, ω_i . By choosing he shape of the hazard, we could maximize the likelihood of observing the spells in the whole sample data.

[28] Please refer to Whited (2006) for detailed analysis.

Appendix B: Computation of Performance-Augmented Discretionary Accruals

Kothari et al. (2005) modify the traditional discretionary accrual measure, by controlling for the influence of prior firm performance. By matching the firm performance based on return on assets, Kothari et al.'s method rules out the predictable part of accruals which is performance-relevant, and then improves the accuracy and reliability of the measure of discretionary accruals.

Following Kothari et al. (2005), we first compute the total accrual for firm i in year t as follows:

$$TotalAccural_{i,t} = \frac{\Delta CA_{i,t} - \Delta CL_{i,t} - \Delta Cash_{i,t} + \Delta DEBTCL_{i,t} - DEPAM_{i,t}}{TotAsset_{i,t-1}} \qquad (B.1)$$

where $\Delta CA_{i,t}$ denotes the changes in current asset from year *t-1* to year t for firm i; $\Delta CL_{i,t}$ denotes the changes in current liabilities from year *t-1* to year t for firm i; $\Delta Cash_{i,t}$ denotes the changes in cash from year *t-1* to year t for firm i; $\Delta DEBTCL_{i,t}$ denotes the changes in debt in current liabilities from year *t-1* to year t for firm i; $DEPAM$ denotes the depreciation and amortization expense for firm i in year t ; $TotAsset$ denotes book value of total assets for firm i in year t.

Second, we compute the performance-augmented discretionary accrual by regressing the total accrual on the inverse of total asset, the changes in revenues, then changes in account receivables, the gross value of PP&E, and the return on assets according to the Eq.(B.2). In particular, it is estimated for each of Fama and French's (1997) 48 industry groups in each year t.

$$TotalAccural_{i,t} = \gamma_{0,i} + \gamma_{1,i}\frac{1}{TotAsset_{i,t-1}} + \gamma_{2,i}(\Delta Rev_{i,t} - \Delta AR_{i,t}) + \gamma_{3,i}PPE_{i,t} + \gamma_{4,i}ROA_{i,t-1} + \alpha_{i,t} \qquad (B.2)$$

Following Klein (2002), Cohen, Dey, and Lys (2008), and Hazarika et al. (2012), we use the absolute value of the residual $\alpha_{i,t}$ from the above regression to measure the extent of earnings management, as managers have incentives to both inflate and deflate reported earnings (See Section 2.2 for more details).

Appendix C: Variable Definitions

RPI	The logarithm of the ratio of the absolute value of the summation of changes in quarterly snapshots of institutional holdings (13F quarterly holdings data) and the annual trading volume. (Eq.(1)).
BM	The ratio of the book value of equity and the market value of equity.
MktSize	The logarithm of the market capitalization of equity.
LogAT	Natural log of total assets (AT).
ILLIQ	Following Amihud (2002), we construct the Illiq measure as the daily ratio of absolute stock return to dollar volume.
EM	The absolute value of abnormal accruals derived from performance-augmented discretionary accruals model. This model is introduced by Kothari, Leone, and Wasley (2005).
CI	Following Titman, Wei and Xie (2004), we construct the measure of abnormal capital investment as the ratio of CPAX/TOT_ASSET.
E-index	The Entrenchment index of Bebchuck, Cohen and Ferrell (2009).
Tobin's Q	Tobin's Q is the ratio of market value of assets and the book value of assets. Market value of assets is defined as the difference between the sum of the book value of assets and the market value of common stock and the sum of book value of common stock and balance sheet-deferred taxes. It is also adjusted for the value-weighted average of industry Tobin's Q.
ROA	The ratio of net income to total assets.
Insider Ownership	The fraction of shares held by insiders (CEO, CFO, CO, President).
AGE	The first date of the companys total assets data in Compustat (logarithm).
CashFlow	The sum of income before extraordinary items and depreciation and amortization, scaled by lagged total assets.
SaleGrowth	Changes in sales scaled by lagged sales.
Leverage	The ratio of long term debt (dltt+dls) to total assets (at).
Capx	The ratio of fixed assets (capxv) to total assets (at).
FixedAsset	The logarithm of the ratio of PP&E to total assets (at).
IOC	The sum of the top five institutional investors share ownership
IOR	The institutional ownership ratio.
ScaledWPS	The dollar change in CEO wealth for a one-hundred percentage change in firm value, scaled by annual flow compensation.
Takeover	A dummy variable equals to one if year ends between January 1984 and December 1989.

Table 1. Description Statistics
This table presents the summary statistics of variables. RPI is equal to the logarithm the ratio of the absolute value of the summation of changes in quarterly snapshots of institutional holdings, by using 13F quarterly holdings data, and the annual trading volume. CI is the measure of abnormal capital investment. Following Titman et al. (2004), we construct the measure of CI as the ratio of current year's capital investment and three previous average of firm's capital investment, and then minus 1. EM is the absolute value of abnormal accruals derived from performance-augmented discretionary accruals model. This model is introduced by Kothari, Leone, and Wasley (2005). The detailed definitions of other variables are reported in Appendix C.

Variable	N	Mean	Std. Dev.	25%	50%	75%
RPI	227,856	-1.5024	1.5181	-2.1061	-1.1869	-0.5978
Absolute EM	155,282	0.0591	0.0571	0.0174	0.0408	0.0823
Signed EM	155,282	0.0000	0.0822	-0.0406	0.0016	0.0410
CI	120,208	0.0795	0.8607	-0.4136	-0.0927	0.2929
Tobin's Q	138,203	-0.4014	2.0784	-0.8654	-0.2544	0.0011
LogAT	324,411	4.8213	2.5531	3.0001	4.7013	6.5682
MktSize	172,215	4.9124	2.3153	3.3032	4.8269	6.4600
BM	172,215	0.9022	0.8632	0.3684	0.6800	1.1384
AGE	306,618	2.1100	0.9978	1.3863	2.1972	2.8904
Leverage	170,269	0.2389	0.2009	0.0581	0.2130	0.3708
CashFlow	166,530	0.0239	0.2896	0.0149	0.0720	0.1171
Capx	170,894	0.0635	0.0826	0.0167	0.0416	0.0815
ROA	322,840	-0.0729	18.5298	-0.0191	0.0270	0.0681
InsiderOwnership	92,086	0.0845	1.0929	0.0047	0.0190	0.0725
E index	12,907	2.2878	1.1884	1.0000	2.0000	3.0000
FixedAsset	163,949	-1.7077	1.2367	-2.2932	-1.4366	-0.8213
SaleGrowth	168,783	0.1910	0.5360	-0.0138	0.0979	0.2431
Illiq	205,457	0.5253	4.5293	0.0004	0.0035	0.0532
KZ Index	159,288	1.5437	16.4552	0.4116	0.9680	1.5588
ScaledWPS	33,095	36.8854	125.4722	3.1811	6.8929	16.4806
IOR	204,472	0.2845	0.2783	0.0423	0.1961	0.4724
IOC	176,708	0.1321	0.1068	0.0519	0.1167	0.1891

Table 2. RPI and Subsequent Tobin's Q

This table presents the results of regressions of firm's subsequent Tobin's Q on RPI and other control variables. Tobin's Q is defined as the ratio of book value of assets minus book value of equity plus market value of equity to the book value of total assets, and subtract the value weighted mean of the industry Q. RPI is equal to the logarithm of the ratio of the absolute value of the summation of changes in quarterly snapshots of institutional holdings (13F quarterly holdings data) and the annual trading volume. Size is the logarithm of the total assets. AGE is calculated based on the first date of the company's total assets data in Compustat. IOR is the institutional ownership ratio, based on 13F data. Leverage is the ratio of long term debt and the total assets. Cash is the logarithm of cash. Sale is the logarithm of the sales. Fixed asset is the logarithm of the ratio of PP&E and total assets.Insider ownership is equal to the fraction of shares held by insiders, such as CEO, CFO, CO as well as president. E Index is Entrenchment index of Bebchuk et al. (2009). AdjPIN is the measure of adjusted probability of information based trading (Duarte and Young (2009)). 1-RSQ is the logistic transformation of 1-R^2, measuring the firm-specific stock return variation relative to market-wide variation. Constant is also omitted. Standard errors are clustered at firm level and corrected for heteroscedasticity, and reported in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Variable	(1)	(2)	(3)	(4)	(5)
RPI	0.0672***	0.0664***	0.1371**	0.0971**	0.0601*
	(0.0215)	(0.0215)	(0.0629)	(0.0398)	(0.0326)
SIZE	-0.8097***	-0.8090***	-0.7005***	-0.5731***	-0.8780***
	(0.0674)	(0.0675)	(0.1183)	(0.1094)	(0.0774)
AGE	0.0027	0.0023	0.2416	0.0322	-0.0738
	(0.0467)	(0.0467)	(0.1875)	(0.1079)	(0.0811)
IOR	0.3175**	0.3305**	0.5833**	0.5416**	0.4328**
	(0.1413)	(0.1416)	(0.2478)	(0.2206)	(0.1692)
Leverage	-0.1238	-0.1225	-0.1751	-0.3280	-0.1781
	(0.1431)	(0.1431)	(0.2587)	(0.2356)	(0.1651)
Cash	0.0453***	0.0451***	0.0174	0.0106	0.0585***
	(0.0141)	(0.0141)	(0.0209)	(0.0203)	(0.0159)
Sale	0.1900***	0.1915***	0.2128**	0.0648	0.2097***
	(0.0508)	(0.0509)	(0.0938)	(0.0834)	(0.0578)
FixedAsset	-0.0458	-0.0443	0.0087	-0.0612	-0.0419
	(0.0605)	(0.0605)	(0.0910)	(0.0801)	(0.0783)
Insider Ownership		0.4917	0.1592	-0.6727	0.6797
		(0.3729)	(0.7201)	(0.6225)	(0.4775)
Insider Ownership^2		-0.7479	-0.6079	1.0481	-1.2342
		(0.6881)	(1.3332)	(1.0585)	(0.9094)
E Index			-0.0642		
			(0.0417)		
AdjPIN				-0.6109*	
				(0.3304)	
1-RSQ					-0.0422**
					(0.0166)
Year. Dummies	Yes	Yes	Yes	Yes	Yes
Firm Dummies	Yes	Yes	Yes	Yes	Yes
No. Observations	46669	46664	11855	10924	32698
R^2	0.4295	0.4297	0.5026	0.5197	0.4120

Table 3. Semi-parametric hazard model estimates: effects of Reward-punishment Intensity (RPI)
The sample period is 1980-2012. Following Whited (2006) and Billett et al. (2011), we include firms whose real assets are below the 33rd percentile of the real assets in the first year that the firm appears in sample. CashFlow is the sum of net income and depreciation divided by total assets ((data18+data14)/data6). RPI is equal to the logarithm of the ratio of the absolute value of the summation of changes in quarterly snapshots of institutional holdings, by using 13F quarterly holdings data, and the annual trading volume. SalesGrowth is the growth rate of sales (data 12). Leverage is calculated by ((data9+data34)/data6). TotalAsset is the Compustat data 6. A spike is defined as a investment rate exceeds a threshold, and the thresholds are defined in terms of 2 and 2.5 times the firm median investment rate. A coefficient larger than one indicates that the covariate increases the hazard and increases the expected time to over-invest. Similarly, a coefficient smaller than one means a reduction on the hazard rate of over-investment. Year effects and Fama French 12 industry effects are also included. *Standard errors* are in parentheses under the parameter estimates. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	2 times		2.5 times	
	(1)	(2)	(3)	(4)
RPI	0.9494***	0.7512***	0.9165***	0 .6799***
	(0.0154)	(0.0487)	(0.0119)	(0.0610)
CashFlow	1.6859***	6.3597***	1.4410***	4.2428***
	(0.1338)	(2.6616)	(0.0956)	(2.2444)
SalesGrowth	0.9991	1.0442	1.0005	1.0796
	(10.0000)	(0.0762)	(0.0007)	(0.1065)
Leverage	0.3269***	0.3694*	0.3638***	0.0969***
	(0.0522)	(0.1381)	(0.0443)	(0.0524)
TotalAssets	.9983***	0.9980***	.9992***	0 .9972***
	(0.0002)	(0.0003)	(0.0001)	(0.0004)
E-Index		0.9728		0.8758**
		(0.0446)		(0.0556)
Ind. Dummy	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes
log likelihood	-11864.55	-1685.98	-12898.094	-1068.5

Table 4. RPI and Subsequent Capital Expenditure

This table presents the results of regressions of firm's subsequent capital expenditures on RPI and other control variables. Capital Expenditure is defined following Titman et. al. (2004). RPI is equal to the logarithm of the ratio of the absolute value of the summation of changes in quarterly snapshots of institutional holdings, by using 13F quarterly holdings data, and the annual trading volume. Size is the logarithm of market capitalization. Leverage is equal to the ratio of long term debt to total assets. AGE is calculated based on the first date of the company's total assets data in Compustat. IOR is the institutional ownership ratio, based on 13F data. Sale Growth is the growth rate of sales. Cash flow is equal to the sum of income before extraordinary items and depreciation and amortization. E Index is Entrenchment index of Bebchuk et al. (2009). AdjPIN is the measure of adjusted probability of information based trading (Duarte and Young (2009)). 1-RSQ is the logistic transformation of 1-R^2, measuring the firm-specific stock return variation relative to market-wide variation. Year and firm dummies are also included to control for year and firm effects, while their coefficients are omitted. Constant is also omitted. Standard errors are clustered at firm level and corrected for heteroscedasticity, and reported in parentheses. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Dependent Variable: Subsequent Abnormal Capital Investment					
Variable	(1)	(2)	(3)	(4)	(5)	(6)
RPI	-0.0246***	-0.0239***	-0.0260***	-0.0248*	-0.0358***	-0.0273***
	(0.0057)	(0.0057)	(0.0057)	(0.0147)	(0.0112)	(0.0052)
Size	-0.0026	-0.0133*	-0.0482***	-0.0355**	-0.0645***	-0.0548***
	(0.0068)	(0.0069)	(0.0074)	(0.0151)	(0.0122)	(0.0072)
BM	-0.1206***	-0.1210***	-0.1351***	-0.1585***	-0.1605***	-0.1398***
	(0.0089)	(0.0089)	(0.0092)	(0.0192)	(0.0152)	(0.0084)
Age	0.0082	0.0058	0.0520***	0.0608	0.0884**	0.0678***
	(0.0179)	(0.0178)	(0.0185)	(0.0464)	(0.0364)	(0.0169)
Leverage	-0.7052***	-0.6698***	-0.6920***	-0.5085***	-0.7636***	-0.7071***
	(0.0393)	(0.0396)	(0.0393)	(0.0732)	(0.0633)	(0.0361)
IOR	-0.0510	-0.0512	-0.0629*	0.1299*	0.0409	-0.0618*
	(0.0344)	(0.0345)	(0.0347)	(0.0673)	(0.0513)	(0.0326)
SaleGrowth	0.0000	0.0000	0.0000	0.0210**	0.0017	-0.0000
	(0.0001)	(0.0001)	(0.0001)	(0.0103)	(0.0029)	(0.0001)
CashFlow		0.2419***	0.1800***	0.3918***	0.5550***	0.2025***
		(0.0340)	(0.0325)	(0.0808)	(0.0923)	(0.0321)
FixedAsset			-0.2397***	-0.1929***	-0.2052***	-0.2402***
			(0.0162)	(0.0388)	(0.0280)	(0.0151)
E Index				0.0159*		
				(0.0083)		
AdjPIN					0.0751	
					(0.0973)	
1-RSQ						-0.0088**
						(0.0037)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Firm Dummies	Yes	Yes	Yes	Yes	Yes	Yes
R^2	103327	102569	102154	21671	30060	89825
No. Observations	0.1674	0.1705	0.1819	0.2050	0.1956	0.1757

Table 5. RPI and Subsequent Earnings Management
This table presents the results of regressions of firm's subsequent earnings management on RPI and other control variables. RPI is equal to the logarithm of the ratio of the absolute value of the summation of changes in quarterly snapshots of institutional holdings, by using 13F quarterly holdings data, and the annual trading volume. Following Hazarika et al. (2012), in models (1), (3), (5), and (7) we measure earnings management as the absolute value of abnormal accruals derived from performance-augmented discretionary accruals model. This model is introduced by Kothari et al. (2005). In models (2), (4), (6), and (8) we measure earnings management as the signed abnormal accruals derived from performance-augmented discretionary accruals model. SIZE is defined as logarithm of market capitalization. BM ratio is the ratio of book value of equity and the market value of equity. IOR is the institutional ownership ratio, based on 13F data. ROA is the ratio of net income and total assets. CashFlow is the sum of income before extraordinary items and depreciation and amortization, scaled by lagged total assets. Leverage is equal to the ratio of long term debt to total assets. Fixed asset is the logarithm of the ratio of PP&E and total assets. E Index is Entrenchment index of Bebchuk et al. (2009). AdjPIN is the measure of adjusted probability of information based trading (Duarte and Young (2009)). 1-RSQ is the logistic transformation of 1-R2, measuring the firm-specific stock return variation relative to market-wide variation. Year and firm dummies are also included to control for year and firm effects, while their coefficients are omitted. Constant is also omitted. Standard errors are clustered at firm level and corrected for heteroscedasticity, and reported in parentheses. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Dependent Variable: Subsequent Earnings Management							
Variables	(1) Absolute EM	(2) Signed EM	(3) Absolute EM	(4) Signed EM	(5) Absolute EM	(6) Signed EM	(7) Absolute EM	(8) Signed EM
RPI	-0.0017***	-0.0013***	-0.0041***	-0.0029*	-0.0015**	-0.0018*	-0.0017***	-0.0014***
	(0.0003)	(0.0004)	(0.0010)	(0.0015)	(0.0006)	(0.0010)	(0.0003)	(0.0004)
SIZE	-0.0032***	-0.0017***	-0.0048***	-0.0018	-0.0049***	-0.0014	-0.0035***	-0.0019***
	(0.0004)	(0.0006)	(0.0009)	(0.0014)	(0.0008)	(0.0012)	(0.0004)	(0.0006)
BM	-0.0067***	-0.0142***	-0.0052***	-0.0143***	-0.0063***	-0.0131***	-0.0067***	-0.0142***
	(0.0005)	(0.0008)	(0.0011)	(0.0017)	(0.0009)	(0.0013)	(0.0005)	(0.0008)
ROA	-0.0039**	0.0009	-0.0001	0.0037	-0.0009	0.0021	-0.0038**	0.0007
	(0.0018)	(0.0026)	(0.0007)	(0.0055)	(0.0015)	(0.0041)	(0.0018)	(0.0026)
IOR	-0.0073***	-0.0043	-0.0012	0.0045	-0.0089**	0.0025	-0.0072***	-0.0041
	(0.0018)	(0.0027)	(0.0039)	(0.0057)	(0.0035)	(0.0049)	(0.0018)	(0.0027)
CashFlow	-0.0080***	0.0034	-0.0018	-0.0113	-0.0166**	0.0111	-0.0089***	0.0040
	(0.0030)	(0.0045)	(0.0048)	(0.0092)	(0.0065)	(0.0110)	(0.0030)	(0.0045)
SaleGrowth	-0.0000	0.0000*	-0.0007	-0.0006	0.0003	0.0058***	0.0023***	0.0014*
	(0.0000)	(0.0000)	(0.0010)	(0.0012)	(0.0014)	(0.0021)	(0.0005)	(0.0008)
Leverage	-0.0162***	-0.0652***	-0.0171***	-0.0547***	-0.0179***	-0.0835***	-0.0165***	-0.0658***
	(0.0019)	(0.0030)	(0.0043)	(0.0061)	(0.0037)	(0.0056)	(0.0019)	(0.0030)
FixedAsset	0.0005	-0.0064***	-0.0006	-0.0047**	-0.0049***	-0.0037	0.0009	-0.0062***
	(0.0006)	(0.0010)	(0.0016)	(0.0023)	(0.0014)	(0.0023)	(0.0006)	(0.0010)
E Index			-0.0020***	-0.0008				
			(0.0005)	(0.0008)				
AdjPIN					-0.0029	0.0102		
					(0.0053)	(0.0085)		
1-RSQ							-0.0003*	-0.0003
							(0.0002)	(0.0003)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Obs	95881	95881	20359	20359	29919	29919	95072	95072
R^2	0.3210	0.2073	0.3026	0.2069	0.3295	0.2161	0.3210	0.2079

Table 6. Interaction Effects of the RPI and Institutional Ownership Concentration
This table reports the results of the interaction effects of RPI and Institutional Ownership Concentration (IOC) on subsequent Tobin's Q, CI, and EM. The sample covers form 1980 to 2012. RPI is equal to the logarithm of the ratio of the absolute value of the summation of changes in quarterly snapshots of institutional holdings, by using 13F quarterly holdings data, and the annual trading volume. Tobin's Q is defined as the ratio of book value of assets minus book value of equity plus market value of equity to the book value of total assets, and subtract the value weighted mean of the industry Q. Abnormal capital investment (CI) is defined following Titman et. al. (2004). Following Hazarika et al. (2012), we measure earnings management as the absolute value of abnormal accruals derived from performance-augmented discretionary accruals model. This model is introduced by Kothari et al. (2005). IOC measures the institutional ownership concentration, as the sum of the top five institutional investors share ownership, following Kim and Lu (2011). Detailed definitions for the variables are provided in Appendix C. Year and firm dummies are also included to control for year and firm effects, while their coefficients are omitted. Constant is also omitted. Standard errors are clustered at firm level and corrected for heteroscedasticity, and reported in parentheses. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) Tqind	(2) Tqind	(3) CI	(4) CI	(5) EM	(6) EM
RPI	0.0755***	0.0449***	-0.0211***	-0.0185**	-0.0012***	-0.0007**
	(0.0103)	(0.0143)	(0.0063)	(0.0087)	(0.0003)	(0.0003)
IOC	-3.0697***	-5.4068***	-0.6535***	-0.2946	0.0020	0.0430***
	(0.3881)	(0.8334)	(0.1876)	(0.2020)	(0.0077)	(0.0161)
IOC^2	3.3527***	9.1722***	1.4629***	-1.2976	-0.0007	-0.0789**
	(0.8291)	(2.6019)	(0.4409)	(0.9473)	(0.0133)	(0.0332)
RPI×IOC		0.7103***		-0.1531**		-0.0120***
		(0.2094)		(0.0733)		(0.0040)
RPI×IOC^2		-1.6847***		0.8209***		0.0219***
		(0.6387)		(0.2863)		(0.0077)
SIZE	-0.6373***	-0.6343***	-0.0216***	-0.0217***	-0.0030***	-0.0031***
	(0.0261)	(0.0261)	(0.0078)	(0.0078)	(0.0003)	(0.0003)
AGE	-0.1215***	-0.1195***	0.0425**	0.0430**		
	(0.0215)	(0.0215)	(0.0201)	(0.0201)		
IOR	0.8516***	0.8005***	-0.0386	-0.0198	-0.0111***	-0.0100***
	(0.0871)	(0.0879)	(0.0376)	(0.0387)	(0.0020)	(0.0020)
Leverage	0.1172**	0.1168**	-0.5108***	-0.5102***	-0.0164***	-0.0166***
	(0.0461)	(0.0460)	(0.0427)	(0.0426)	(0.0018)	(0.0018)
Insider ownership	0.0303	0.0284				
	(0.0360)	(0.0359)				
Insider $ownership^2$	-0.0003	-0.0002				
	(0.0006)	(0.0006)				
Cash	0.0440***	0.0448***				
	(0.0067)	(0.0067)				
Capx	0.2328*	0.2411**				
	(0.1217)	(0.1215)				
Sale	0.1312***	0.1332***				
	(0.0225)	(0.0225)				
FixedAsset	-0.0638***	-0.0627***	-0.4023***	-0.4021***	0.0002	0.0002
	(0.0204)	(0.0204)	(0.0212)	(0.0211)	(0.0005)	(0.0005)
BM			-0.0997***	-0.0992***	-0.0051***	-0.0051***
			(0.0072)	(0.0072)	(0.0003)	(0.0003)
SaleGrowth			0.0755***	0.0752***	0.0020***	0.0020***
			(0.0163)	(0.0163)	(0.0004)	(0.0004)
CashFlow			0.1350	0.1361	-0.0075**	-0.0076**
			(0.1449)	(0.1448)	(0.0032)	(0.0032)
ROA			0.0847	0.0838	-0.0052**	-0.0051**
			(0.1187)	(0.1185)	(0.0022)	(0.0022)
Year Dummies	Y	Y	Y	Y	Y	Y
Firm Dummies	Y	Y	Y	Y	Y	Y
No. of Obs	63112	63112	86082	86082	91374	91374
R^2	0.5042	0.5043	0.2332	0.2333	0.3193	0.3194

Table 7. Interaction Effects of the RPI and Wealth-Performance Sensitivity (WPS)
This table presents the results of the interaction effects of RPI and Wealth-Performance Sensitivity (WPS) on subsequent Tobin's Q, CI, and EM. The sample covers form 1980 to 2012. RPI is equal to the logarithm of the ratio of the absolute value of the summation of changes in quarterly snapshots of institutional holdings, by using 13F quarterly holdings data, and the annual trading volume. Tobin's Q is defined as the ratio of book value of assets minus book value of equity plus market value of equity to the book value of total assets, and subtract the value weighted mean of the industry Tobin's Q. Abnormal capital investment (CI) is defined following Titman et. al. (2004). Following Hazarika et al. (2012), we measure earnings management as the absolute value of abnormal accruals derived from performance-augmented discretionary accruals model. This model is introduced by Kothari et al. (2005). Following Edmans, Gabaix, and Landier (2009), we employ scaled wealth-performance sensitivity to capture the sensitivity of the manager's wealth to the stock price (WPS). Detailed definitions for the variables are provided in Appendix C. Year and firm dummies are also included to control for year and firm effects, while their coefficients are omitted. Constant is also omitted. Standard errors are clustered at firm level and corrected for heteroscedasticity, and reported in parentheses. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) Tqind	(2) Tqind	(3) CI	(4) CI	(5) EM	(6) EM
RPI	0.1649***	0.1269***	-0.0473*	-0.0475*	-0.0052***	-0.0048***
	(0.0446)	(0.0468)	(0.0266)	(0.0266)	(0.0007)	(0.0008)
WPS	0.2110	-3.9640*	0.0770	0.0990	10.1774***	47.7714**
	(0.2661)	(2.0235)	(0.0872)	(0.0906)	(3.2040)	(19.7993)
RPI×WPS		1.2192**		-0.0024**		-10.5209**
		(0.5712)		(0.0009)		(5.3009)
SIZE	-0.8191***	-0.8099***	-0.0920***	-0.0920***	-0.0037***	-0.0037***
	(0.0732)	(0.0706)	(0.0119)	(0.0119)	(0.0006)	(0.0006)
AGE	-0.1040	-0.1026	0.0143	0.0149		
	(0.0819)	(0.0818)	(0.0338)	(0.0338)		
IOR	0.5565***	0.5699***	0.2029***	0.2032***	-0.0043*	-0.0043*
	(0.1550)	(0.1550)	(0.0445)	(0.0445)	(0.0023)	(0.0023)
Leverage	-0.0250	-0.0196	-0.5445***	-0.5449***	-0.0165***	-0.0165***
	(0.1659)	(0.1658)	(0.0688)	(0.0688)	(0.0029)	(0.0029)
InsiderOwnership	0.9176*	0.8872*				
	(0.5300)	(0.5304)				
InsiderOwnership^2	-1.3125	-1.2678				
	(0.9601)	(0.9649)				
Cash	0.0375**	0.0367**				
	(0.0146)	(0.0146)				
Capx	0.2119	0.2548				
	(0.4511)	(0.4370)				
Sale	0.2346***	0.2253***				
	(0.0767)	(0.0729)				
FixedAsset	-0.0808	-0.0745	-0.4199***	-0.4198***	-0.0092**	-0.0093**
	(0.0683)	(0.0680)	(0.0289)	(0.0289)	(0.0039)	(0.0039)
BM			-0.0677***	-0.0678***	-0.0042***	-0.0042***
			(0.0230)	(0.0230)	(0.0005)	(0.0005)
SaleGrowth			0.0004	0.0004	-0.0002	-0.0002
			(0.0020)	(0.0020)	(0.0001)	(0.0001)
CashFlow			0.0772	0.0779	0.0122*	0.0123*
			(0.2834)	(0.2834)	(0.0065)	(0.0065)
ROA			0.0342	0.0339	-0.0113***	-0.0113***
			(0.2582)	(0.2582)	(0.0034)	(0.0034)
Year Dummies	Y	Y	Y	Y	Y	Y
Firm Dummies	Y	Y	Y	Y	Y	Y
No. of Obs	17913	17913	24774	24774	28359	28359
R^2	0.4568	0.4575	0.1961	0.1962	0.3455	0.3456

Table 8. Interaction Effects of the RPI and positive liquidity shock (Decimalization)
This table reports the results of the interaction effects of RPI and positive liquidity shock (Decimalization) on subsequent Tobin's Q, CI, and EM. The sample covers form 1980 to 2012. RPI is equal to the logarithm of the ratio of the absolute value of the summation of changes in quarterly snapshots of institutional holdings, by using 13F quarterly holdings data, and the annual trading volume. Tobin's Q is defined as the ratio of book value of assets minus book value of equity plus market value of equity to the book value of total assets, and subtract the value weighted mean of the industry Tobin's Q. Abnormal capital investment (CI) is defined following Titman et. al. (2004). Following Hazarika et al. (2012), we measure earnings management as the absolute value of abnormal accruals derived from performance-augmented discretionary accruals model. This model is introduced by Kothari et al. (2005). Decimalization (Decimal) is a dummy variable that equals to one for the period after January 31, 2001. Detailed definitions for the variables are provided in Appendix C. Year and firm dummies are also included to control for year and firm effects, while their coefficients are omitted. Constant is also omitted. Standard errors are clustered at firm level and corrected for heteroscedasticity, and reported in parentheses. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) Tqind	(2) Tqind	(3) CI	(4) CI	(5) EM	(6) EM
RPI	0.2204***	0.0727*	-0.0223***	-0.0178***	-0.0012***	-0.0011***
	(0.0660)	(0.0375)	(0.0058)	(0.0061)	(0.0003)	(0.0003)
Decimal	-3.2872***	-4.7966***	-0.0460	0.0165	0.0033	0.0056*
	(1.0876)	(0.1598)	(0.0714)	(0.0801)	(0.0028)	(0.0031)
RPI×Decimal		0.4629***		-0.0185*		-0.0008*
		(0.1605)		(0.0103)		(0.0004)
SIZE	-1.2278***	-1.2260***	0.0110	0.0107	-0.0032***	-0.0032***
	(0.2555)	(0.2552)	(0.0078)	(0.0078)	(0.0003)	(0.0003)
AGE	0.2973	0.3701*	0.0167	0.0112		
	(0.2076)	(0.2234)	(0.0212)	(0.0212)		
IOR	0.7149**	0.5399*	-0.1397***	-0.1291***	-0.0097***	-0.0093***
	(0.3217)	(0.3152)	(0.0371)	(0.0369)	(0.0017)	(0.0017)
Leverage	1.3391*	1.2772	-0.1974***	-0.1963***	-0.0168***	-0.0167***
	(0.8053)	(0.7974)	(0.0351)	(0.0350)	(0.0018)	(0.0018)
Insider ownership	0.0123	0.0114				
	(0.0177)	(0.0179)				
Insider ownership^2	-0.7866	-0.7788				
	(0.9589)	(0.9592)				
Cash	0.0849	0.0871				
	(0.0792)	(0.0791)				
Capx	1.5651*	1.6302*				
	(0.8799)	(0.8936)				
Sale	0.1862***	0.1873***				
	(0.0707)	(0.0709)				
FixedAsset	-0.3697**	-0.3657**	-0.4071***	-0.4075***	0.0002	0.0002
	(0.1557)	(0.1549)	(0.0215)	(0.0215)	(0.0005)	(0.0005)
BM			-0.0359***	-0.0360***	-0.0063***	-0.0063***
			(0.0047)	(0.0047)	(0.0004)	(0.0004)
SaleGrowth			0.0724***	0.0722***	0.0019***	0.0019***
			(0.0163)	(0.0163)	(0.0005)	(0.0005)
CashFlow			0.1530	0.1494	-0.0081**	-0.0082**
			(0.1432)	(0.1431)	(0.0032)	(0.0032)
ROA			0.1071	0.1096	-0.0050**	-0.0050**
			(0.1186)	(0.1186)	(0.0022)	(0.0022)
Year Dummies	Y	Y	Y	Y	Y	Y
Firm Dummies	Y	Y	Y	Y	Y	Y
No. of Obs	63405	63405	84991	84991	89660	89660
R^2	0.4062	0.4065	0.2307	0.2308	0.3184	0.3184

Table 9. Interaction Effects of the RPI and Amihud's (2002) Illiquidity measure
This table reports the results of the interaction effects of RPI and Amihud's (2002) Illiquidity measure on subsequent Tobin's Q, CI, and EM. The sample covers form 1980 to 2012. RPI is equal to the logarithm of the ratio of the absolute value of the summation of changes in quarterly snapshots of institutional holdings, by using 13F quarterly holdings data, and the annual trading volume. Tobin's Q is defined as the ratio of book value of assets minus book value of equity plus market value of equity to the book value of total assets, and subtract the value weighted mean of the industry Tobin's Q. Abnormal capital investment (CI) is defined following Titman et al. (2004). Following Hazarika et al. (2012), we measure earnings management as the absolute value of abnormal accruals derived from performance-augmented discretionary accruals model. This model is introduced by Kothari et al. (2005). Following Amihud (2002), we construct the Illiq measure as the daily ratio of absolute stock return to dollar volume. Detailed definitions for the variables are provided in Appendix C. Year and firm dummies are also included to control for year and firm effects, while their coefficients are omitted. Constant is also omitted. Standard errors are clustered at firm level and corrected for heteroscedasticity, and reported in parentheses. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) Tqind	(2) Tqind	(3) CI	(4) CI	(5) EM	(6) EM
RPI	0.0477***	0.0485***	-0.0298***	-0.0301***	-0.0016***	-0.0016***
	(0.0119)	(0.0119)	(0.0049)	(0.0049)	(0.0003)	(0.0003)
ILLIQ	0.0777***	0.0996***	-0.0041**	-0.0254**	0.0003*	-0.0008
	(0.0106)	(0.0152)	(0.0018)	(0.0109)	(0.0001)	(0.0006)
RPI×ILLIQ		-0.0050**		0.0064**		0.0003*
		(0.0024)		(0.0032)		(0.0002)
SIZE	-0.6895***	-0.6883***	0.0053	0.0050	-0.0030***	-0.0030***
	(0.0317)	(0.0317)	(0.0056)	(0.0056)	(0.0004)	(0.0004)
AGE	-0.0922***	-0.0949***	0.0223	0.0228		
	(0.0292)	(0.0292)	(0.0143)	(0.0143)		
IOR	0.4116***	0.4023***	-0.0679**	-0.0686**	-0.0101***	-0.0102***
	(0.0928)	(0.0930)	(0.0274)	(0.0274)	(0.0018)	(0.0018)
Leverage	-0.1720**	-0.1714**	-0.4772***	-0.4777***	-0.0168***	-0.0168***
	(0.0809)	(0.0809)	(0.0319)	(0.0319)	(0.0019)	(0.0019)
Insider ownership	-0.0041	-0.0040				
	(0.0385)	(0.0385)				
Insider ownership^2	0.0003	0.0003				
	(0.0007)	(0.0007)				
Cash	0.0351***	0.0351***				
	(0.0081)	(0.0081)				
Capx	-0.1163	-0.1230				
	(0.1336)	(0.1335)				
Sale	0.1059***	0.1053***				
	(0.0252)	(0.0252)				
FixedAsset	-0.0323	-0.0309	-0.3399***	-0.3398***	-0.0002	-0.0002
	(0.0287)	(0.0287)	(0.0111)	(0.0111)	(0.0006)	(0.0006)
BM			-0.0383***	-0.0383***	-0.0055***	-0.0055***
			(0.0040)	(0.0040)	(0.0004)	(0.0004)
SaleGrowth			0.0733***	0.0734***	0.0000	0.0000
			(0.0107)	(0.0107)	(0.0000)	(0.0000)
CashFlow			0.0397	0.0396	-0.0094***	-0.0094***
			(0.1070)	(0.1070)	(0.0026)	(0.0026)
ROA			0.1542	0.1545	-0.0020	-0.0020
			(0.0996)	(0.0996)	(0.0016)	(0.0016)
Year Dummies	Y	Y	Y	Y	Y	Y
Firm Dummies	Y	Y	Y	Y	Y	Y
No. of Obs	69220	69220	88558	88558	90462	90462
R^2	0.5434	0.5435	0.1884	0.1884	0.3618	0.3618

Table 10. Interaction Effects of the RPI and financial constraints measure (Kaplan-Zingales Index)
This table reports the results of the interaction effects of RPI and Kaplan-Zingales Index (financial constraints) on subsequent Tobin's Q and CI. The sample covers form 1980 to 2012. RPI is equal to the logarithm of the ratio of the absolute value of the summation of changes in quarterly snapshots of institutional holdings (13F quarterly holdings data) and the annual trading volume. Tobin's Q is defined as the ratio of book value of assets minus book value of equity plus market value of equity to the book value of total assets, and subtract the value weighted mean of the industry Tobin's Q. Abnormal capital investment (CI) is defined following Titman et al. (2004). We use Kaplan and Zingales's (1997) Kaplan-Zingales Index (KZ index) for the degree of financial constraint. Detailed definitions for the variables are provided in Appendix C. Year and firm dummies are also included to control for year and firm effects, while their coefficients are omitted. Constant is also omitted. Standard errors are clustered at firm level and corrected for heteroscedasticity, and reported in parentheses. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) Tqind	(2) Tqind	(3) CI	(4) CI
RPI	0.1509**	0.1577**	-0.0320***	-0.0446***
	(0.0680)	(0.0686)	(0.0051)	(0.0084)
KZ index	0.0023	0.0237**	-0.0237	-0.0620**
	(0.0015)	(0.0106)	(0.0201)	(0.0297)
RPI×KZ index		-0.0056**		0.0138**
		(0.0025)		(0.0070)
SIZE	-1.1541***	-1.1569***	-0.0408***	-0.0400***
	(0.3029)	(0.3030)	(0.0067)	(0.0066)
AGE	0.2872	0.2858	0.0211	0.0209
	(0.2051)	(0.2049)	(0.0167)	(0.0167)
IOR	0.8567**	0.8553**	-0.0155	-0.0129
	(0.3354)	(0.3354)	(0.0319)	(0.0319)
Leverage	1.2755	1.2650	-0.5101***	-0.5278***
	(0.8712)	(0.8705)	(0.0708)	(0.0704)
Insider ownership	-0.0504	-0.0516		
	(0.1058)	(0.1059)		
Insider ownership^2	0.0007	0.0008		
	(0.0018)	(0.0018)		
Cash	0.0453	0.0454		
	(0.0810)	(0.0810)		
Capx	1.2134	1.2036		
	(0.9772)	(0.9765)		
Sale	0.1792	0.1829		
	(0.1563)	(0.1565)		
FixedAsset	-0.2505	-0.2473	-0.4329***	-0.4334***
	(0.2052)	(0.2050)	(0.0130)	(0.0130)
BM			-0.1576***	-0.1571***
			(0.0088)	(0.0088)
SaleGrowth			0.0644***	0.0590***
			(0.0111)	(0.0109)
CashFlow			-0.0343	-0.0306
			(0.1110)	(0.1111)
ROA			0.1864*	0.1823*
			(0.1023)	(0.1025)
Year Dummies	Y	Y	Y	Y
Firm Dummies	Y	Y	Y	Y
No. of Obs	56880	56880	83251	83208
R^2	0.2705	0.2705	0.2452	0.2445

Table 11. Interaction Effects of the RPI and Takeover Wave Dummy
This table presents the results of regressions of firm's subsequent capital expenditures on the interaction term of RPI and Takeover Wave Dummy. Capital Expenditure is defined following Titman et. al. (2004). RPI is equal to the logarithm of the ratio of the absolute value of the summation of changes in quarterly snapshots of institutional holdings, by using 13F quarterly holdings data, and the annual trading volume. Size is the logarithm of market capitalization. Leverage is equal to the ratio of long term debt to total assets. Age is calculated based on the first date of the company's total assets data in Compustat. IOR is the institutional ownership ratio, based on 13F data. Sale Growth is the growth rate of sales. Cash Flow is equal to the sum of income before extraordinary items and depreciation and amortization. Takeover dummy equals to one when it is from 1984 to 1989, otherwise zero (Titman et al. (2004)). Year and firm dummies are also included to control for year and firm effects, while their coefficients are omitted. Constant is also omitted. Standard errors are clustered at firm level and corrected for heteroscedasticity, and reported in parentheses. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Variable	(1)	(2)
RPI	-0.0285***	-0.0343***
	(0.0051)	(0.0056)
Size	-0.0512***	-0.0516***
	(0.0071)	(0.0071)
BM	-0.1396***	-0.1399***
	(0.0084)	(0.0084)
Age	0.0665***	0.0586***
	(0.0169)	(0.0169)
Leverage	-0.7070***	-0.7036***
	(0.0361)	(0.0360)
IOR	-0.0519	-0.0443
	(0.0324)	(0.0324)
SaleGrowth	-0.0000	-0.0000
	(0.0001)	(0.0001)
CashFlow	0.2027***	0.2025***
	(0.0322)	(0.0321)
FixedAsset	-0.2403***	-0.2401***
	(0.0151)	(0.0151)
Takeover	-0.0101	-0.1064**
	(0.0315)	(0.0439)
RPI×Takeover		0.0293***
		(0.0086)
Year Dummies	Yes	Yes
Firm Dummies	Yes	Yes
No. Observations	89828	89828
R^2	0.1756	0.1758

Table 12. Interaction effects of RPI and the subsequent CI and EM on the following firm value
This table presents the results of interaction effect between RPI and the subsequent CI and EM on the following firm value. Tobin's Q is defined as the ratio of book value of assets minus book value of equity plus market value of equity to the book value of total assets, and subtract the value weighted mean of the industry Q, in the following year. RPI is equal to the logarithm of the ratio of the absolute value of the summation of changes in quarterly snapshots of institutional holdings, by using 13F quarterly holdings data, and the annual trading volume. Size is the logarithm of the total assets. AGE is calculated based on the first date of the company's total assets data in Compustat. IOR is the institutional ownership ratio, based on 13F data. Leverage is the ratio of long term debt and the total assets. Cash is the logarithm of cash. Sale is the logarithm of the sales. Fixed asset is the logarithm of the ratio of PP&E and total assets.Insider ownership is equal to the fraction of shares held by insiders, such as CEO, CFO, CO as well as president. 1-RSQ is the logistic transformation of 1-R^2, measuring the firm-specific stock return variation relative to market-wide variation. CI_{t+1} is the subsequent abnormal capital investment. EM_{t+1} is the subsequent earnings management. Year and firm dummies are also used to control for year and firm effects, while their coefficients are omitted. Constant is also omitted. Standard errors are clustered at firm level and corrected for heteroscedasticity, and reported in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Variable	(1) Tobin's Q	(2) Tobin's Q	(3) Tobin's Q	(4) Tobin's Q
RPI	0.0612*	0.1087***	0.1095***	0.1152***
	(0.0326)	(0.0388)	(0.0418)	(0.0418)
SIZE	-0.8718***	-0.8728***	-0.8190***	-0.8242***
	(0.0773)	(0.0773)	(0.0864)	(0.0863)
AGE	-0.0724	-0.0765	-0.1243	-0.1260
	(0.0811)	(0.0811)	(0.1228)	(0.1228)
IOR	0.4320**	0.4274**	0.3768**	0.3758**
	(0.1691)	(0.1690)	(0.1850)	(0.1849)
Leverage	-0.1759	-0.1765	-0.2797	-0.2743
	(0.1649)	(0.1648)	(0.1783)	(0.1784)
Cash	0.0587***	0.0596***	0.0506***	0.0510***
	(0.0159)	(0.0159)	(0.0161)	(0.0161)
Sale	0.2078***	0.2079***	0.2223***	0.2262***
	(0.0577)	(0.0576)	(0.0661)	(0.0660)
FixedAsset	-0.0419	-0.0428	0.0015	-0.0001
	(0.0783)	(0.0783)	(0.0875)	(0.0875)
InsiderOwnership	0.6772	0.6742	0.7031	0.6989
	(0.4775)	(0.4774)	(0.5118)	(0.5114)
InsiderOwnership^2	-1.2307	-1.2279	-1.2217	-1.2194
	(0.9094)	(0.9077)	(0.9931)	(0.9921)
1-RSQ	-0.0418**	-0.0417**	-0.0434**	-0.0435**
	(0.0165)	(0.0165)	(0.0174)	(0.0174)
EM_{t+1}	0.4605	3.1947**	3.6403**	3.6839**
	(0.3600)	(1.4164)	(1.4778)	(1.4770)
$EM_{t+1}\times$RPI		-0.8363**	-0.9192**	-0.9313**
		(0.3898)	(0.4101)	(0.4099)
CI_{t+1}			0.0409*	0.1522**
			(0.0210)	(0.0709)
$CI_{t+1}\times$RPI				-0.0343*
				(0.0201)
Year. Dummies	Yes	Yes	Yes	Yes
Firm Dummies	Yes	Yes	Yes	Yes
No. Observations	32698	32698	28348	28348
R^2	0.4120	0.4122	0.4111	0.4112

Table 13. Subsample analysis of the RPI and the subsequent Tobin's Q, CI, EM
This table presents the relationship between the subsequent Tobin's Q, CI, and EM and RPI for subsample firms with changes in total institutional ownership ratio below the median of the year (ΔIOR). A firm is included in this test if its change in institutional ownership ratio below the median of changes in institutional ownership ratio of all firms in the year. Model (1) uses the subsequent Tobin's Q as the dependent variable, and includes firm size (log of total asset), book-to-market ratio, ROA, age, R&D expenditures, and institutional ownership ratio as control variables. Model (2) utilizes the following abnormal capital investment (CI) as dependent variable. We include firm size (log of market capitalization), book-to-market ratio, ROA, fixed asset ratio, cash flow, leverage ratio, and sales growth as control variables. Model (3) uses the following earnings management as dependent variable. We include firm size (log of market capitalization), book-to-market ratio, ROA, age, cash flow, and capx as control variables. Detailed definitions for the variables are provided in Appendix C. Year and firm dummies are also included to control for year and firm effects, while their coefficients are omitted. Constant is also omitted. Standard errors are clustered at firm level and corrected for heteroscedasticity, and reported in parentheses. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Tobin's Q	CI	EM
RPI	0.0300*	-0.0344***	-0.0011***
	(0.0167)	(0.0075)	(0.0004)
SIZE	-0.6463***	-0.0161	-0.0034***
	(0.0462)	(0.0105)	(0.0006)
AGE	-0.2055***	0.0837***	
	(0.0359)	(0.0263)	
IOR	0.4732***	-0.1137**	-0.0078**
	(0.1250)	(0.0523)	(0.0032)
Leverage	0.0999	-0.4981***	-0.0093***
	(0.1206)	(0.0553)	(0.0031)
InsiderOwnership	-0.6393		
	(0.4843)		
InsiderOwnership^2	1.3394		
	(0.9985)		
Cash	0.0473***		
	(0.0129)		
Capx	0.3044		
	(0.2501)		
Sale	0.1712***		
	(0.0383)		
FixedAsset	-0.0463	-0.2238***	-0.0008
	(0.0376)	(0.0185)	(0.0009)
BM		-0.1127***	-0.0054***
		(0.0130)	(0.0007)
SaleGrowth		0.1196***	0.0021***
		(0.0218)	(0.0008)
CashFlow		-0.1592	0.0077
		(0.1718)	(0.0083)
ROA		0.3174**	-0.0232***
		(0.1583)	(0.0076)
Year Dummies	Y	Y	Y
Firm Dummies	Y	Y	Y
No. of Obs	34264	41459	43967
R^2	0.5734	0.2737	0.4084

Table 14. Instrumental variable regressions for RPI and Subsequent Tobin's Q, CI, and EM (second stage)
This table reports the second stage estimation of instrumented variable. We utilize the mean of RPI of all firms in the same state, same industry, and same year, excluding firm i's own RPI as IV for RPI, denoted as Instrumented RPI (Results of the first stage tests are included in Table A-1). The variable of interest is the instrumented RPI. In model (1), we include firm size (log of total asset), book-to-market ratio, ROA, age, institutional ownership ratio, as control variables. In model (2), we include firm size (log of market capitalization), book-to-market ratio, ROA, fixed asset ratio, cash flow, leverage ratio, sales growth, and Tobin's Q as control variables. In model (3), we include firm size (log of market capitalization), book-to-market ratio, ROA, age, cash flow, and capx as control variables. Detailed definitions for the variables are provided in Appendix C. Year and firm dummies are also included to control for year and firm effects, while their coefficients are omitted. Constant is also omitted. Standard errors are clustered at firm level and corrected for heteroscedasticity, and reported in parentheses. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) Tobin's Q	(2) CI	(3) EM
Instrumented RPI	1.4832*	-0.1089**	-0.0118***
	(0.8345)	(0.0492)	(0.0035)
SIZE	-1.1710***	-0.0136**	-0.0026***
	(0.2518)	(0.0066)	(0.0005)
AGE	0.1817	0.0637**	
	(0.2680)	(0.0291)	
IOR	-1.1846	0.1071	0.0098
	(1.0854)	(0.0875)	(0.0064)
Leverage	1.5350***	-0.5978***	-0.0182***
	(0.5642)	(0.0388)	(0.0022)
InsiderOwnership	-1.0511		
	(1.5439)		
InsiderOwnership^2	0.4285		
	(2.7999)		
Cash	0.0826		
	(0.0673)		
Capx	1.5175		
	(1.5646)		
Sale	0.1044		
	(0.1812)		
FixedAsset	-0.1762	-0.2409***	-0.0002
	(0.2272)	(0.0145)	(0.0006)
BM		-0.1094***	-0.0061***
		(0.0086)	(0.0006)
SaleGrowth		0.1046***	0.0029***
		(0.0129)	(0.0006)
CashFlow		0.0275	0.0051
		(0.0795)	(0.0067)
ROA		0.0646	-0.0190***
		(0.0686)	(0.0063)
Year Dummies	Y	Y	Y
Firm Dummies	Y	Y	Y
R^2	0.2928	0.1853	0.3200
No. of Obs	64921	79562	76445

Table 15. Alternative Instrumental variable regressions for RPI and Subsequent Tobin's Q, CI, and EM (second stage) This table reports the second stage estimation of instrumented variable. We utilize the mean of RPI of all peer firms in the same institution and same year, excluding firm i's own RPI as IV for RPI, denoted as Instrumented RPI (Results of the first stage tests are included in Table A-2). The variable of interest is the instrumented RPI. In model (1), we include firm size (log of total asset), book-to-market ratio, ROA, age, institutional ownership ratio, as control variables. In model (2), we include firm size (log of market capitalization), book-to-market ratio, ROA, fixed asset ratio, cash flow, leverage ratio, sales growth, and Tobin's Q as control variables. In model (3), we include firm size (log of market capitalization), book-to-market ratio, ROA, age, cash flow, and capx as control variables. Detailed definitions for the variables are provided in Appendix C. Year and firm dummies are also included to control for year and firm effects, while their coefficients are omitted. Constant is also omitted. Standard errors are clustered at firm level and corrected for heteroscedasticity, and reported in parentheses. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) Tobin's Q	(2) CI	(3) EM
Instrumented RPI	0.7032**	-0.1048***	-0.0037***
	(0.3043)	(0.0230)	(0.0011)
SIZE	-1.1712***	-0.0174***	-0.0031***
	(0.3732)	(0.0061)	(0.0004)
AGE	0.2159	0.0607***	
	(0.2492)	(0.0199)	
IOR	-0.1351	0.1044**	-0.0035
	(0.4012)	(0.0483)	(0.0025)
Leverage	1.3132	-0.6218***	-0.0175***
	(1.0039)	(0.0355)	(0.0019)
InsiderOwnership	-0.9962		
	(1.2756)		
InsiderOwnership^2	0.8076		
	(2.3923)		
Cash	0.0884		
	(0.0962)		
Capx	1.5972		
	(1.4013)		
Sale	0.1795		
	(0.1881)		
FixedAsset	-0.1872	-0.2462***	0.0004
	(0.2379)	(0.0141)	(0.0005)
BM		-0.1173***	-0.0063***
		(0.0078)	(0.0005)
SaleGrowth		0.1183***	0.0022***
		(0.0129)	(0.0005)
CashFlow		0.0215	0.0072
		(0.0683)	(0.0059)
ROA		0.0468	-0.0207***
		(0.0569)	(0.0055)
Year Dummies	Y	Y	Y
Firm Dummies	Y	Y	Y
R^2	0.2609	0.1863	0.3218
No. of Obs	68850	86184	89866

Table A-1 . Instrumental variable regressions for RPI (first stage)
This table presents estimation results of a regression model of RPI on RPI_SYI(-i) as well as a set of control variables. We utilize the mean of RPI of all firms in the same state, same industry, and same year, excluding firm i's own RPI as IV for RPI, denoted as RPI_SYI(-i). Model (1) is for the tests of the subsequent Tobin's Q in Table 14. Model (2) is for the test of the subsequent abnormal capital investment in Table 14. Model (3) is for the test of the subsequent earnings management in Table 14. All regressions control for firm- and year- fixed effects. Robust errors are clustered at the firm level and adjusted for heteroscedasticity. Standard errors are reported in parentheses, by adjusted for adjusted for heteroscedasticity and clustered at the firm level. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) Tobin's Q	(2) CI	(3) EM
RPI_SYI(-i)	0.1470***	0.1280***	0.1338***
	(0.0112)	(0.0098)	(0.0106)
SIZE	0.1243***	0.0310***	0.0543***
	(0.0163)	(0.0091)	(0.0095)
AGE	0.0120	0.4572***	
	(0.0172)	(0.0276)	
IOR	1.2446***	1.6705***	1.7370***
	(0.0467)	(0.0474)	(0.0462)
Leverage	-0.3901***	-0.2336***	-0.2258***
	(0.0513)	(0.0444)	(0.0452)
InsiderOwnership	0.9856***		
	(0.1518)		
InsiderOwnership^2	-1.5349***		
	(0.3131)		
Cash	-0.0107**		
	(0.0051)		
Capx	0.0667		
	(0.1115)		
Sale	0.0189		
	(0.0124)		
FixedAsset	-0.0186	0.0065	0.0038
	(0.0138)	(0.0117)	(0.0130)
BM		0.0516***	0.1004***
		(0.0100)	(0.0117)
SaleGrowth		-0.0032	-0.0393***
		(0.0086)	(0.0089)
CashFlow		-0.0446	-0.0221
		(0.0491)	(0.1066)
ROA		0.0783**	0.1341
		(0.0337)	(0.0984)
Year Dummies	Y	Y	Y
Firm Dummies	Y	Y	Y
R^2	0.6992	0.6964	0.7023
Incremental R^2	0.0026	0.0018	0.0018
Incremental F-test	94.08	71.53	70.96
No. of Obs	64921	79562	76445

Table A-2 . Alternative Instrumental variable regressions for RPI (first stage)
This table presents estimation results of a regression model of RPI on RPI_IY(-i) as well as a set of control variables. We utilize the mean of RPI of all peer firms (excluding firm i's own RPI value) in the same institution and same year as IV for RPI, denoted as RPI_IY(-i). Model (1) is for the tests of the subsequent Tobin's Q in Table 15. Model (2) is for the test of the subsequent abnormal capital investment in Table 15. Model (3) is for the test of the subsequent earnings management in Table 15. All regressions control for firm- and year- fixed effects. Robust errors are clustered at the firm level and adjusted for heteroscedasticity. Standard errors are reported in parentheses, by adjusted for adjusted for heteroscedasticity and clustered at the firm level. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) Tobin's Q	(2) CI	(3) EM
RPI_IY(-i)	2.0112***	1.5875***	1.7848***
	(0.0604)	(0.0448)	(0.0474)
SIZE	0.0597***	-0.0093	-0.0081
	(0.0134)	(0.0073)	(0.0070)
AGE	-0.0111	0.3153***	
	(0.0136)	(0.0217)	
IOR	1.0605***	1.4750***	1.4577***
	(0.0402)	(0.0402)	(0.0374)
Leverage	-0.2546***	-0.1900***	-0.1854***
	(0.0413)	(0.0360)	(0.0340)
InsiderOwnership	0.5500***		
	(0.1273)		
InsiderOwnership^2	-0.8481***		
	(0.2627)		
Cash	-0.0088**		
	(0.0042)		
Capx	-0.0103		
	(0.0925)		
Sale	0.0185*		
	(0.0109)		
FixedAsset	-0.0156	-0.0015	-0.0038
	(0.0122)	(0.0101)	(0.0103)
BM		0.0289***	0.0472***
		(0.0083)	(0.0086)
SaleGrowth		-0.0143*	-0.0264***
		(0.0082)	(0.0071)
CashFlow		-0.0691	-0.0028
		(0.0463)	(0.0864)
ROA		0.0737**	0.1268
		(0.0348)	(0.0795)
Year Dummies	Y	Y	Y
Firm Dummies	Y	Y	Y
R^2	0.7133	0.7113	0.7223
Incremental R^2	0.0221	0.0201	0.0205
Incremental F-test	859.4872689	870.07	1005.73
No. of Obs	68850	86184	89866

Table A-3 . RPI and Changes in Tobin's Q, CI, and EM

This table presents the results of regressions of firms' changes in Tobin's Q, CI, and EM on RPI and other control variables. RPI is equal to the natural log of the absolute value of the summation of changes in quarterly snapshots of institutional holdings, by using 13F quarterly holdings data, and scaled for the annual trading volume. SIZE is defined as logarithm of total asset in mode(1), and logarithm of market capitalization in model(2) and model(3). BM ratio is the ratio of book value of equity and the market value of equity. IOR is the institutional ownership ratio, based on 13F data. Detailed definitions for the variables are provided in Appendix C. Year and firm dummies are also included to control for year and firm effects, while their coefficients are omitted. Constant is also omitted. Standard errors are clustered at firm level and corrected for heteroscedasticity, included in parentheses. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) ΔTobin's Q	(2) ΔCI	(3) ΔEM
RPI	0.0344**	-0.0252***	-0.0014***
	(0.0157)	(0.0065)	(0.0004)
SIZE	-0.0888**	-0.0216***	-0.0028***
	(0.0350)	(0.0071)	(0.0004)
AGE	-0.0815**	-0.0004	
	(0.0332)	(0.0194)	
IOR	-0.7569***	-0.0464	0.0022
	(0.0822)	(0.0348)	(0.0019)
Leverage	0.4452***	-0.1241***	-0.0176***
	(0.0966)	(0.0399)	(0.0023)
FixedAsset	0.0655**	-0.5785***	0.0146***
	(0.0271)	(0.0171)	(0.0027)
Cash	-0.0098		
	(0.0095)		
Sale	-0.0944***		
	(0.0327)		
Capx	-1.5089***		
	(0.2688)		
InsiderOwnership	-0.2701		
	(0.2757)		
InsiderOwnership^2	0.3331		
	(0.4764)		
BM		-0.0008	-0.0013**
		(0.0095)	(0.0006)
SaleGrowth		-0.0463***	-0.0038***
		(0.0166)	(0.0009)
CashFlow		0.7822***	0.0105
		(0.1370)	(0.0091)
ROA		-0.4360***	-0.0097
		(0.1297)	(0.0085)
Year Dummies	Y	Y	Y
Firm Dummies	Y	Y	Y
No. of Obs	45988	80435	74724
R^2	0.1675	0.1221	0.0566

Table A-4 . Robust regressions for alternative RPI and Subsequent Tobin's Q, CI, and EM
This table reports the robust regressions for alternative RPI and subsequent firm value, abnormal capital investments, and earnings management. Alternative RPI is equal to the natural log of the absolute value of the summation of changes in quarterly snapshots of institutional holdings, by using 13F quarterly holdings data in the previous year. In models (1), (4), and (7), we control for both year and firm fixed effect, and cluster the robust errors at the firm level and adjusted for heteroscedasticity. In models (2), (5), and (8), we control for both year and firm fixed effect, and cluster the robust errors at the industry level and adjusted for heteroscedasticity. In models (3), (6), and (9), we control for both year and industry fixed effect, and cluster the robust errors at the firm level and adjusted for heteroscedasticity. We include other main control variables, namely firm size, book-to-market ratio, return on assets, firm's age, R&D expenditure scaled by sales, institutional ownership ratio, fixed asset ratio, cash flow, leverage ratio, the growth of sales, and firm value. *t-values* are in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) Tobin'Q	(2) Tobin'Q	(3) Tobin'Q	(4) CI	(5) CI	(6) CI	(7) EM	(8) EM	(9) EM
Alternative RPI	0.0869***	0.0875***	0.2535***	-0.0589***	-0.0589***	-0.0434***	-0.0020	-0.0020	-0.0013
	(0.0121)	(0.0130)	(0.0127)	(0.0165)	(0.0173)	(0.0081)	(5.96)***	(4.51)***	(3.82)***
SIZE	-0.6792***	-0.6816***	-0.1739***	-0.0186	-0.0186	-0.0063	-0.0037	-0.0037	-0.0060
	(0.0479)	(0.1009)	(0.0211)	(0.0140)	(0.0182)	(0.0076)	(5.65)***	(4.40)***	(11.08)***
AGE	0.0034	0.0055	-0.0027***	0.0823***	0.0823**	0.0269***			
	(0.0083)	(0.0062)	(0.0009)	(0.0308)	(0.0385)	(0.0093)			
Leverage	0.3021***	0.2995**	-0.2328***	-0.8532***	-0.8532***	-0.3522***	-0.0011	-0.0011	-0.0009
	(0.1035)	(0.1212)	(0.0701)	(0.0822)	(0.0872)	(0.0537)	(2.23)**	(2.42)**	(2.76)***
IOR	-0.2272***	-0.2309***	-0.7536***						
	(0.0848)	(0.0740)	(0.0584)						
InsiderOwnership	0.0514***	0.0525***	0.0717***						
	(0.0174)	(0.0174)	(0.0210)						
InsiderOwnership^2	-0.0010***	-0.0010***	-0.0014***						
	(0.0003)	(0.0003)	(0.0003)						
Cash	0.1509***	0.1508***	0.3279***						
	(0.0130)	(0.0199)	(0.0149)						
Capx	0.1945	0.1939	0.0324						
	(0.1440)	(0.1631)	(0.1394)						
Sale	0.1785***	0.1808***	-0.0700***						
	(0.0430)	(0.0457)	(0.0194)						
FixedAsset	-0.0009	-0.0000	-0.0299	-0.0839***	-0.0839***	-0.0585**	0.0002	0.0002	0.0005
	(0.0059)	(0.0046)	(0.0286)	(0.0290)	(0.0270)	(0.0251)	(0.25)	(0.23)	(0.65)
BM				-0.1372***	-0.1372***	-0.0853***	-0.0042	-0.0042	-0.0065
				(0.0142)	(0.0184)	(0.0117)	(3.46)***	(3.02)***	(4.28)***
CashFlow				0.2685*	0.2685*	-0.1154	0.0035	0.0035	0.0077
				(0.1506)	(0.1425)	(0.1813)	(1.31)	(1.39)	(2.38)**
ROA				0.1056	0.1056	0.2012	-0.0040	-0.0040	-0.0093
				(0.1237)	(0.1248)	(0.1716)	(1.45)	(1.52)	(3.40)***
SaleGrowth				0.1336***	0.1336**	0.1702***			
				(0.0503)	(0.0519)	(0.0450)			
Year Dummies	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry Dummies	X	X	Y	X	X	Y	X	X	Y
Firm Dummies	Y	Y	X	Y	Y	X	Y	Y	X
Firm Cluster	Y	X	Y	Y	X	Y	Y	X	Y
Industry Cluster	X	Y	X	X	Y	X	X	Y	X
Obs	49452	49452	49452	66756	66756	66756	99634	99634	99634
R^2	0.5514	0.5492	0.2088	0.2381	0.2381	0.0153	0.3290	0.3290	0.0950

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